

The Relationship between Use of Robots, Technical Production and Corporate Social Responsibility of a Multinational Enterprise in Taiwan: A Case Study

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Abstract: The use of robots can save labor costs and increase the efficiency of enterprises to increase competitiveness, but for enterprises to use robots in the technical production has a positive impact on corporate social responsibility? This is one of the important issues to be explored at present, so this study uses a multi-national enterprise in Taiwan as the research object, and Purposive Sampling is adopted. This study also uses Multivariate regression analysis and other statistical methods. These research results show that in a multi-national enterprise in Taiwan: (1) Large-volume Use of Robots on Technical Production has a positively significant impact; and (2) Large-volume Use of Robots on Corporate Social Responsibility has a positive impact, but not significant. Finally both of these findings will be available to the MNE or the relevant government departments for references.

Keywords: Robots, Technical Production, Corporate Social Responsibility, MNE

I. INTRODUCTION

Research background and motivation

21st century is a new era of technology, the hot topic of global attention-robotics. All the World's major technology companies have invested in research and development to own this huge business opportunity, and the World's governments have produced a home service robot for people to solve work-force problems [1]. With the continuous progress of technology, the machine is no longer set up a single program to perform a single job. There are many companies began to invest a lot of manpower and money for artificial intelligence research and development that the main purpose is to enable the robot to complete some of the more complex work or analyze big Data. Artificial intelligence has a wide range of applications, often found in the life of their figure, but also makes our lives more convenient. There are many industries rely on the ability to effectively improve the efficiency of the intelligent robot, when artificial intelligence gradually progress. People cannot help but begin to fear that automation will replace human beings. And the advancements in robotics will have a huge impact on our generation. What impact will it have on human life? This is also one of the main topics that should be deeply explored at present [2].

In addition, the working mode of the new type in the Industry 4.0 Intelligent Factory needs the autonomy, flexibility and adaptability of the system. The introduction of robots into the working environment is one of the trends to move into the Smart factory due to the need for newer production methods. The robot is equipped with new plant requirements and has the re-programmability capability to adapt to changes in the flexible manufacturing system (FMS) and reconfigurable manufacturing Systems (RMS). The upgrading of the industry, not to allow the robot to replace human resources is to build a cooperative relationship between the two, together towards a new manufacturing mode of intelligent production. One of the core of the Smart Factory is to use the production efficiency of the robots and the precision of the process to promote the industry, and effectively increase the interaction between the collaborative robots and human efficiency is one of the key to industry 4.0 [3]. In recent years, we have also been in the newspapers and magazines to see the large number of robots used in technical production, such as BMW in Germany in which the production sector using robotic automatic assembly. It not only can shorten the time, but also can greatly reduce labor costs and increase production efficiency.

While enterprises in the thinking to reduce costs and increase efficiency, business operators also have to take into account the good corporate social responsibility of corporate ethics.

Based on the above, this study is to explore the relationship between Use of Robots, Technical Production and Social Responsibility of Enterprises. And this study uses a Multi-national enterprise production staff as the main sampling population. So the main purposes of this study are as follows.

Main purposes of this study

(1) To realize whether Large-volume Use of Robots in a multi-national enterprise in Taiwan has a positively significant impact on Technical Production?

(2) To realize whether Large-volume Use of Robots in a multi-national enterprise in Taiwan has also a positive and significant impact on Corporate Social Responsibility?

II. LITERATURE REVIEW

Conceptual definition of Robot

The concept of the robot is defined, "Its concept is a high degree of precision. The ability to repeat completely produces the high-quality products, more competent for hazardous operations. Nor is it easy to be bored with a single less-than-poor job, and not to cause mistakes due to lack of concentration; In addition, the robot not only can be better than people do to complete a series of physical activities more quickly, but it is also more and more to complete including the cognitive abilities that were once thought to be difficult to succeed, such as making judgments, feeling emotions, and even driving etc., which will change the daily activities of human beings and affect the ecology of various Industries." The conceptual definition described above is primarily a synthesis of the following literature.

Peng [4] indicated that according to the robot uses can be divided into three categories: (1) industrial robot: refers to the industrial field of multi-joint robotic arm or multi-doff robot, (2) service-oriented robot: to provide human services or with human interaction function device; and (3) Special type robot: used in military, space, polar, disaster prevention, etc.

Haag [5] deemed that Robot has a high degree of precision; it can repeat the completion of high-quality products; it is more competent for dangerous jobs and It does also not to be bored with the complicated jobs or to make a mistake due to lack of concentration for a single, less-than-poor job.

Ross [6] explained that Robots refer to the meanings of labor, Coolies, and now includes all can simulate human behavior and ideas of the machine. It is basically two long-term trends into one, using advanced technology to do it, and to provide cheap labor for the upper layer, when the next generation of robots by the low cost of mass production, even the cheapest workers are unable to contend, thus changing the employment pattern.

Manyika & Bughin [7] indicated that in the rapid development of robots, A.I. (Artificial Intelligence) and Machine learning, we are at the cusp of an era of automation where robots can do a series of physical activities better and faster than People do.

Besides, it is becoming more and more capable of including cognitive abilities that were once thought to be unsuccessful, such as making judgments, feeling emotions, and even driving, which would change the daily activities of human beings and affect the ecology of various industries [8].

Hong [8] believed that robots are paired with the burgeoning artificial intelligence and innovative technologies. i.e. Face recognition which are features that many humans cannot reach. i.e. deep learning, never being tired, not making mistakes and not having emotions; therefore, The introduction of robots has become a trend, and robots can replace the repetitive work, to transfer manpower to higher value-added work, and through the collaboration with the robot, can also improve efficiency.

Conceptual definition of Technical Production

Although in this study there is no literature on the definition of Technical Production until now. But In order to study the questionnaires designed well, it is necessary to summarize the conceptual definition of Technical Production which means, "A product and raw materials in the production process must have a precision technology production capacity, or a service industry can provide cutting-edge technology services to the public which are regarded as the category of Technical Production".

Conceptual definition of Corporate Social Responsibility

The concept of CSR in this study is defined as" it is a moral or ideological theory, and mainly discusses whether the government, limited companies, institutions and individuals have the responsibility to contribute to Society. There are positive and negative aspects: the former is the responsibility to participate in social activities; the latter refers to the responsibility not to participate." The above definitions are based on the following literature.

In recent years, with corporate social responsibility issues gradually received attention, governments also began to develop a variety of relevant regulations and norms such as Klynveld Peat Marwick Goerdeler (Ann KPMG), the Global Reporting Initiative (GRI), United Nations Environment Program me (UNEP), and Centre for Corporate Governance in Africa (CCGA) published about "Carrots & Sticks-Global Trends in Sustainability Reporting Regulation and Policy " in 2016., and the report states that 383 samples of the 71 countries surveyed in 2016 have a sustainability disclosure norm, compared with the 180 specifications found in the 2013 survey, it grew by 113%. In an environment where CSR norms and awareness grow every year,

companies have to make overseas direct investments, and branches established in host countries must first follow local norms ([9] ; [10] ; [11]). The academic definition of Corporate Social Responsibility changes with the times, and in the early days it was thought that enterprises should conform to social values and meet social expectations [12] in pursuit of profit, and evolve to the view that corporate CSR activities go beyond the legal norm [13] . At present, various international organizations have begun to attach importance to the concept of CSR and put forward relevant Norms.

The global compact, as proposed by the United Nations, requires companies to comply with the 10 principles of human rights, labor, the environment, anti-corruption, and the Global Reporting Initiative (GRI), which publishes Sustainability-reporting guidelines as a reference structure for corporate social responsibility reports [11] . Bénabou & Tirole [14] defined CSR as a sacrifice of profits for the benefit of the community, that is, the company voluntarily transcends the legal and contractual obligations, and therefore the CSR includes: such as employee friendliness, environmental friendliness, adherence to corporate ethics, respect for the Company's community and investor friendliness. Sometimes beyond these limits, such as sponsorship of art, sports, and other public goods, most economists now view CSR as purely corporate spending, so that profits are sacrificed for the benefit of Society. In the past half-century, the United States has a large number of relevant research and sustainable development concepts related to CSR. Although the concept of corporate social responsibility is now widely recognized by most countries, enterprises and society in the world, corporate social responsibility is still not clearly defined. Corporate social responsibility presents different business measures for countries, cultures, decrees and enterprises.

Corporate Social Responsibility covers a wide range of topics, including shareholder, employee relations, Human rights, customer relations, suppliers, community, environment and other related issues etc. [15] .

Kao & Lin [16] pointed out that corporate social responsibility attaches importance to ethical and moral character, shareholder rights, Labor human rights, supplier management, Consumer rights, environment, Community participation, and performance information to expose the responsibility of Stakeholders. Chu [15] considered that social responsibility should not be solely responsible for shareholders, but is equally liable to other relevant internal and external Stakeholders.

When the enterprises do not aim at pursuing profit, but use the limited resources to put forward the Corporate Social Responsibility, which is helpful to the interested Persons.

Carroll [17] divided CSR definition into four categories: (1) Economic aspects; (2)Legal aspects; (3) Moral dimensions; and (4) Social expectations. The most important Corporate Social Responsibility is "Economic aspect ". Besides, Carroll [17] also indicated that the enterprises are the basic economic unit of the society. It has the responsibility to the Society's demand and provides the product, the service of the production, and the other Enterprises' roles should establish on these basic hypotheses. Moreover, the society expects the enterprises to obey the law, satisfies the economic demand under the law rule. The Society also hoped the enterprises be able to perform beyond the legal level and abide by Ethical norms and Behaviors.

In addition, the social expectation is like the public good behavior of the enterprises, it is the public welfare behavior that the enterprise set the tone as the voluntary role.

The classification of Corporate Social Responsibility in this study is based on Carroll's categories [17] .

The Relationship Between the Main Constructs

The Use of Robots on Technical Production

In recent years, the impact of artificial intelligence on the financial sector is so great, mainly because compared to other areas, the core of finance lies in data and money, more intuitive, and easy to quantify by artificial intelligence, measuring, processing data alone by using the machines more handy. It can be said that machines replace Labor is the financial, financial industry trend. In addition, in the Internet age, Artificial intelligence is regarded as the driving force of industry 4.0, the emergence of advanced productive forces will depend on the development of artificial intelligence, so all countries have invested a great deal of research enthusiasm for artificial intelligence, want to make breakthroughs in artificial intelligence field.

In the future, AI will inevitably become a major force in the development of all occupations.

From the above, this study proposes the following hypothesis.

Hypothesis 1 (H₁): Large-volume Use of Robots in a multi-national enterprise has a positively significant impact on Technical Production.

The Use of Robots on Corporate Social Responsibility

According to the network reported that Foxconn production line began to deploy 40,000 robots, steadily advancing the "Million Robot" Program.

Even if you are skilled, the number of pieces per unit of time, the emergence of robots will also make artificial unemployment. In addition, unmanned convenience stores, unmanned factories, unmanned vehicles... These intelligent systems, already in the gradual landing, can completely replace the basis of repetitive jobs. Such as cashier, salesperson, Bank teller, conductor, charge, lorry driver, car driver, water online staff. In 2017 the Foxconn production line began planning to deploy 40,000 robots, steadily advancing the Million Robot Program. Even if you are skilled, the number of pieces per unit of time, the emergence of robots will also make artificial unemployment.

Pure physical strength or simple repetitive work will inevitably be replaced by AI. Simple duplication of work is a good thing for the industry as a whole, especially in the 21st century, where talent is Paramount. Low-end jobs that occupy too much of the workforce are actually a waste, not to mention the fact that the World's labor force is already declining, and for developed countries, the prevalence of low fertility and demographic ageing has been a problem for them, especially in Taiwan in recent years.

How to improve the whole quality of the labor force becomes a problem to be solved urgently when the quantity of labor is decreasing gradually.

Based on the above, this study proposes the following hypothesis:

Hypothesis 2 (H₂): Large-volume Use of Robots in a multi-national enterprise in Taiwan has a positive and significant impact on Corporate Social Responsibility

III. RESEARCH METHOD

Research Framework

According to the research motives and the purposes as well as the related literature to establish the suitable research structure as shown in Figure 1.

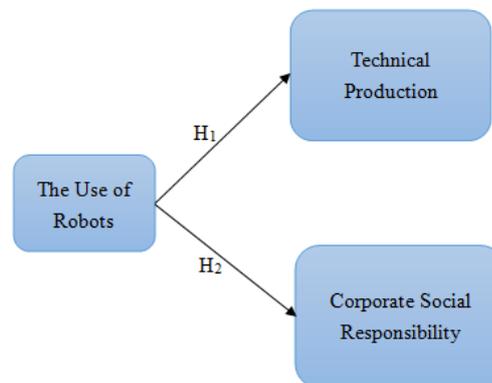


Figure 1: Research Framework

Sampling Method and Application of Questionnaires

This study takes the production department staff of a multinational enterprise in Taiwan as the research object-Population, and uses the Purposive sampling to carry on the sampling, but in order to increase the Content Validity and the Reliability of this Questionnaire, then carries on the questionnaire design; first conducts the Expert Questionnaire before the Pilot-test. The unsuitable questionnaire items were amended or excluded, and the final Post-Test, 300 questionnaires, the effective recovery of 243 questionnaires, so the effective recovery rate is 81%.

Reliability and Validity of the Questionnaires

(1) This questionnaire is based on the Cronbach value proposed by Cuieford [18] as a measure of the consistency of internal variables. When the coefficient value- α is larger; the greater the degree to which the internal variables are measured, the higher the degree of consistency of the response of the questionnaire variables in the construct. If the Cronbach alpha coefficient is between 0.35 and 0.7, it is acceptable. The alpha coefficient is greater than 0.7 means Questionnaire Questions have a highly "consistence", and the alpha coefficient is lower than 0.35 means Questionnaire Questions have a "very low consistence" [19].

However, the main constructs of the subject of this study have a highly reliability which Cronbach's greater than 0.7; (2) Validity means that a test can measure the correctness of the trait or behavior.

It is intended to measure **【20】**. It can be divided into Content Validity that includes Expert Validity, and Constructive Validity. The former is only the content of the theoretical framework, sufficient to measure the value of the research of the hypothesis or proposition content, and the latter refers to the questions can be measured by the degree of abstract concepts or characteristics, often measured by factor analysis. After the Questionnaire' design is completed, in order to enable the users to fully understand the content of the questionnaire, then the questionnaire revised and measured. The first to carry out Expert questionnaire, and then focus on the issue of pre-Test questionnaire implementation (Pilot test) which will not fit the questionnaire items to be modified or rejected, and finally the formal questionnaire is established after the post-test **【19】**. This aim is to hope that the content of the questionnaire has a considerable degree of Surface and Content validities, and the Questionnaire content of this study has a literature theory basis; therefore, it has a considerable Content Validity.

Statistical methods

This research mainly uses the Regression analysis etc. as the statistical methods, and uses the SPSS, statistical package software, carries on the data analysis.

IV. RESEARCH FINDINGS AND ANALYSES

As mentioned above, the main purpose of this study is to explore whether the Large-scale Use of Robots on Technical production and Corporate Social Responsibility has a positively significant impact respectively? So, questionnaire survey is as a research tool, according to the data collected by the questionnaire to carry out processing and statistical analysis in this study. Finally this research findings and analyses are described as below.

Analysis of Pearson Product-Movement Correlation between the Constructs of This Study

In order to discuss the relationship among the Use of Robots, Technical Production and Corporate Social Responsibility, this study analyzes relations hip between the main Constructs by using Pearson Product-Movement Correlation in which the analysis of results is as shown in Table 1.

Table 1: Pearson Product-Movement Correlation of the Major (Sub-) Constructs of This Study (n=243)

Variables	The Use of Robots (1)	Technical Production (2)	Corporate Social Responsibility (3)
(1)	1		
(2)	.533**	1	
(3)	.382*	.021	1

Note: *denotes p<0.05; ** denotes p<0.001; *** denotes p<0.001

Regression Analysis of Each Construct

In this section, linear multi-Regression Analysis is used to examine whether the Large-volume Use of Robots in the Multinational enterprise has a positively significantly impact on Technical Production and Corporate Social Responsibility respectively? Table 2 is the “Coefficient Table of Regression Analysis (Overall)” as shown below.

Table 2: The Coefficient Table of Regression Analysis (Overall)

Overall Model	Unstandardized Coefficients		Standardized Coefficients	t	Significance	Collinearity Diagnostics		Label
	Estimation of β	Standard Error	Beta Distribution			Tolerance	VIF	
(Constant)	.897	.124		1.785	.054			
The Use of Robots(M ₁)→ Technical Production (TP)	.853	.224	.653	2.731	.651	.761	1.512	H ₁

The Use of Robots (M ₁) →Corporate Social Responsibility (CSR)	.956	.144	.323	1.633	.422	.750	1.411	H ₂
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a. Dependable Variables : Technical Production (TP) &Corporate Social Responsibility (CSR)

From Tables 1 - 2, it can be found that the hypothesis of the results of this study as shown in Table 3.

Table 3 Research Hypotheses and Test Results

Research Hypotheses		Test Results
H ₁	Large-volume Use of Robots in a multi-national enterprise in Taiwan has a positively significant impact on Technical Production. (<i>t</i> -value is 2.731).	Fully Substantiated
H ₂	Large-volume Use of Robots in a multi-national enterprise in Taiwan has a positive impact on Corporate Social Responsibility, but it is not significant (<i>t</i> - value is1.633).	Not Fully Substantiated

V. CONCLUSIONS AND RECOMMENDATIONS

Through the above data analysis and results, the following conclusions can be obtained as follows:

Concrete Conclusions

In the multinational enterprise in Taiwan,

- (1) Large-volume Use of Robots on Technical Production has a positively significant impact; and
- (2) Large-volume Use of Robots on Corporate Social Responsibility has a positive impact, but not significant.

Both of these findings will be available to the MNE or the relevant government departments for references.

Recommendations

Management Implications

The large-volume Use of Robots will have a positively significantly impact on the process of Technical Production, which can not only reduce the cost of work force and production, but also increase work efficiency. However, the large number of robots will make the large number of layoffs, leading to another social problem that is related to the ethical issues of Corporate Social Responsibility.

Finally hope those enterprises use a large number of robots for mass production, but can also take into account the Staff's re-employment problems.

At the same time, it is suggested that the relevant government departments should also consider this dilemma and lay a reasonable policy orientation for enterprises and employees.

Research Limitations

- (1) The Purposive sampling method adopted by this study may present some bias on the population;
- (2) The object of this study is limited to the production department' employees of a multinational company in Taiwan and the results cannot represent all enterprises.

Future Research and Development Direction

- (1) It is suggested that a follow-up study may be based on different sampling methods, such as Stratified Random Sampling or Simple Random Sampling etc.

- (2) The proposed follow-up study can increase the scope of research objects. Regarding Ethical issues-Corporate Social Responsibility, this study hopes that enterprises in a large number of imported robots in use, but also to take into account the staff's re-employment problems.

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