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The Dilemma of Corporate Sustainable Development and Corporate Social Responsibility-Using the Application of Artificial Intelligence as an Example

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Abstract: Using robots in the workplace may help companies reduce labor costs and enhance work efficiency, and thereby improve corporate competitiveness, but, does it provide a positive significant influence on corporate social responsibility? This is one of the important topics worth exploring at the moment. Hence, this study conducted a research on employees of the production department of a certain large corporation in Taiwan, using the Purposive Sampling method on the population, and Regression Analysis method on the statistical data. The results of this study show: Using robots in the workplace presents a negative impact on corporate social responsibility, but the influence is not significant. The research findings of this study may serve as a reference for businesses, or relevant agencies in the government.

Keywords: Robot, Corporate Social Responsibility

I. INTRODUCTION

Background and Motivation

Artificial intelligence has such a wide range of applications that we often find its presence in daily living. It helps provide more convenience to our everyday lives, while many industries are depending on smart robots to improve efficiency effectively. As artificial intelligence improves gradually, people are beginning to worry that automation will replace human workers, and that the advancement of robotic technology will impose a huge and widespread influence on our generation. What impacts will it have on humanity?

As the artificial-intelligence technology develops, many large enterprises have started adopting robots in place of manual production, in order to reduce the expenses for human resources and improve work efficiency, thereby enhancing corporate competitiveness. According to news reports, the BMW automobile factory has adopted robots to assemble cars. These robots, equipped with a high degree of artificial intelligence, are capable of taking away job opportunities from workers employed in traditional assembly methods, by saving time and being more efficient. However, when a corporation is calculating labor cost and operational efficiency, should it also take into account its corporate social responsibility, such as: employees' right to work and right to earn a living? A large population of unemployed workers is a tremendous social problem accordingly. This is a business-ethics issue worthy of exploration by the government and business, and it is one of the major topics to be discussed and analyzed in depth by this study. Hence, this study chooses a multi-national enterprise in Taiwan as the research subject, and explores the dilemma between applying AI (artificial intelligence) robots in production to help create sustainable management, and its corporate social responsibility. The main purpose of this study is as described below:

Main Purpose of this Study

It is to understand whether the large-scale use of robots by business has a significant and negative impact on corporate social responsibility, with the expectation that the research findings of this study may serve as a reference for these businesses, or relevant agencies of the government.

II. LITERATURE REVIEW

The Conceptual Definition of a Robot

The conceptual definition of a robot in this study is "a high-precision machine that can repeatedly produce high quality products. It is very competent in performing dangerous work, and is not bored by performing monotonous operations or will not make careless mistakes; in other words, robots take over highly repetitive jobs, so that human labor can be transferred to more value-added jobs. Additionally, collaborative work with robots can improve job efficiency. Furthermore, not only can robots accomplish a series of various physical activities better and faster than humans, they are becoming more and more capable of completing cognitive tasks that previously were considered too difficult for a machine, such as: making a judgment, feeling an emotion, or even driving a car. This paradigm will change human beings' daily work activities and affect the ecology of various industries." The aforementioned definition is derived from the following literature.

Haag【1】proposed that high precision robots can repeatedly produce high quality products, are very competent in performing dangerous work, and will not be bored by monotonous operations or make mistakes by being careless.

Ross【2】observed that the original term, robot, meant laborers or coolies, but now is used to represent all machinery that can imitate human behavior and thinking. It is basically a merger of two long-term trends; in which using advanced technology to replace labor is meeting the requirement for cheap labor by the upper stratum. When next generation robots are mass-produced at low cost, even the cheapest labor will not be able to compete, and this phenomenon will change the employment structure.

Manyika & Bughin【3】believed that the rapid development of robots, AI, and machine learning is driving us to the cusp of an automation era. Not only can robots accomplish a series of physical activities better and faster than humans, they are becoming more and more capable of completing cognitive tasks that previously were considered too difficult for them to succeed in, such as: making a judgment, feeling an emotion, or even driving a car. This paradigm will change human beings' daily work activities and affect the ecology of various industries【4】.

Hung【4】believed that robots that are equipped with currently available state-of-the-art Artificial Intelligence, such as: facial recognition and other such innovative technologies, are in possession of many characteristics that humans lack, such as: deep learning, tirelessness, precision and free of emotions. Thus, the adoption of robots has become a trend. Robots take over highly repetitive jobs, so that human labor can be transferred to more value-added work. Additionally, collaborative work with robots can improve work efficiency.

Peng【5】pointed out that robots may be categorized in three groups, according to their usage: (1) Industrial Robots: refer to multi-joint mechanical arms or robots with a multi degree of freedom; (2) Service Robots: refer to devices that provide services to humans, or that are equipped to work interactively with humans; and (3) Special Robots: are those used in military, space and polar applications, or for disaster prevention.

According to the definition set by the International Federation of Robotics (IFR), robots can be classified in two major categories: industrial robot and service robot. According to Gao【6】, service robots can be divided into two realms: professional service robots and home service robots. Professional service robots are: (1) Special Purpose Robots: sewer working robots, deep-sea working robots, miniature robots, educational robots, indoor-security robots, outdoor-patrol robots, automobile/aircraft cleaning robots, fire rescue robots, disaster relief robots, automatic moving robots, Nano robots, pipeline inspection robots, tour guide robots, and public-area cleaning service robots; (2) National Defense robots: mine detection robots, unmanned robots, space exploration robots, anti-terrorism bomb-disposal robots, small reconnaissance robots; (3) Agricultural Use Robots: logging robots, fruit picking robots, and fruit and vegetable grafting robots; and (4) Medical use robots: robotic electric scooters, rehabilitation support robots, laser treatment robots, and surgical assistant robots. The home service robots are: (1) Housekeeping Robots: vacuuming robots, weeding robots, and window cleaning robots; (2) Entertainment Robots: toy robots, leisure-use robots, educational training robots; (3) Disability Robots: wheelchair Robots, and rehabilitation robots; (4) Home Security and Surveillance Robots; and (5) Other types of robots.

Corporate Social Responsibility

The conceptual definition of corporate social responsibility (CSR, in short) in this study refers to a moral or ideological theory that discusses whether, or not, governments, limited companies, institutions, and individuals have a responsibility to contribute to society." The above definition is derived from the following literature.

There is no recognized standardized definition of CSR, but it generally refers to a standard that corporations adopt beyond their ethical, legal and public requirements; when conducting business activities, they also take into consideration the impact that these activities have on various stakeholders. The concept of CSR is based on the ideal that business operations must be consistent with a sustainable development scheme, where in addition to companies' financial and operational conditions, companies must also consider their impact on society and the natural environment. The concept of CSR is different from that of social enterprises, where CSR is initiated by for-profit organizations with sustainable development as its basis. Its concept originated earlier than social enterprise, which was initiated by non-profit organizations with public welfare as its core ideal. Stakeholders are individuals or groups that can influence, or be influenced by, the decisions and actions of the business, including but not limited to: employees, customers, suppliers, communities and groups, parent companies or affiliates, cooperative partners, investors and shareholders. As such, when a business comes in contact with relevant stakeholders, the business will try to integrate social and environmental considerations. The Corporate Sustainability Report, which is prepared for the various stakeholders of the business and can also

be called the Corporate Social Responsibility Report, discloses the company's goals, achievements, commitments and plans for sustainable management and social responsibility in a report format【7】.

The Impact of Robots on Corporate Social Responsibility

Regarding the impact of robots on corporate social responsibility: although there is no literature found so far to support this study, to explore facts of the matter, this study designed questionnaire for statistical explorations. The hypotheses are as follows:

Hypothesis 1: (H_1): The use of robots in businesses has a significant negative impact on CSR.

$H_{1\text{-}1}$: The use of robots has a significant negative impact on employees' right to work.

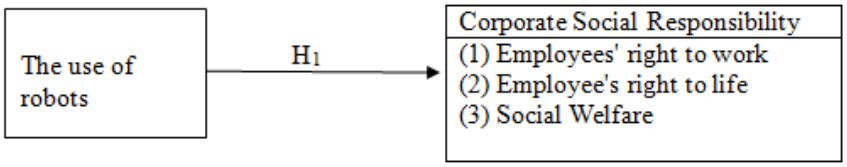
$H_{1\text{-}2}$: The use of robots has a significant negative impact on employees' right to life.

$H_{1\text{-}3}$: The use of robots has a significant negative impact on social welfare.

III. RESEARCH METHOD

Research Framework

This study aims to explore whether the large-scale use of robots in businesses has a positive and significant impact on CSR, and constructs an appropriate research framework as follows:



Questionnaire Sampling Method and Test

The research subjects of this study are employees of the production department of a certain large corporation in Taiwan, and this study adopts the Purposive Sampling method for sampling. To increase the content validity and reliability of the questionnaire, experts were invited to correct or eliminate inappropriate questionnaire items before conducting the Pilot Test, and a Post Test was conducted after. A total of 300 copies of questionnaire were issued, and 232 returned copies are valid, with a valid return rate of 77.3%.

The Reliability and Validity of the Questionnaire

(1) This questionnaire referenced the Cronbach α value, proposed by Cuieford 【8】, as a measure of the consistency of internal variables. The greater the coefficient value α, the greater the degrees of correlation between the internal variables; that is, the higher the consistency of the responses of the questionnaire variables in each dimension. If Cronbach α coefficient is between 0.35 and 0.7, the reliability is in the acceptable level; if α is greater than 0.7, the reliability is high; if α is less than 0.35, the reliability is low【9】. The questionnaire items of the main dimension of this study are high in reliability, where every Cronbach α value is greater than 0.7.

(2) Validity refers to a test that can measure the accuracy of attributes or behavior being tested【10】. Validity can be divided into content validity (including expert validity) and construct validity. Wherein, content validity refers to the depth of the theoretic framework basis that supports the questions or hypotheses for measurement; construct validity refers to the degree of abstract concepts or attributes that can be measured by the question items, which is often measured by the factor analysis method.

Upon completion of the question design phase, experts were invited to review the questionnaire, and then pretest questionnaire were released selectively as a Pilot Test, so that inappropriate questions could be revised, improved, or removed. Lastly, a formal questionnaire was issued for Post Test. The purpose of this process was to ensure that the questionnaire content had a considerable degree of surface validity and content validity, in addition to the theoretical basis that the questionnaire content was based on for this study, hence the questionnaire has been proven to have considerable extent concerning its content validity.

The Statistical Method

The primary method used in this study for statistics is the regression analysis method, and SPSS statistical software package is used for data analysis.

IV. RESULTS AND ANALYSIS

As mentioned before, the main purpose of this study is to explore whether the large-scale use of robots in businesses has a positive and significant impact on CSR. Questionnaire survey was used as a research tool,

and data processing and statistical analysis were conducted based on the data collected from the questionnaire survey.

The Pearson Product-Moment Correlation Analysis of Each Main (Sub-) Dimension of This Study

To explore the correlation between variables of the use of robots and CSR, this study adopted Pearson Product-Moment Correlation Analysis to analyze and discuss the degree of correlation between variables, as shown in Table 1.

Table 1: The Pearson Product-Moment Correlation Analysis of Each Main (Sub-) Dimension of This Study (n=232)

Variables	The use of robots (1)	Employees' right to work (2)	Employees' right to life (3)	Social Welfare (4)
(1)	1			
(2)	-.433***	1		
(3)	-.487***	.824***	1	
(4)	.137	.297	.432***	1

Notes: * denotes p<0.05；** denotes p<0.01；*** denotes p<0.001

4.2 Regression Analysis of Each Dimension

In this section, the linear regression analysis is used to inspect if the large-scale use of robots in businesses has a positive and significant impact on CSR.

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

Overall Model	Unstandardized Coefficients		Standardized Coefficients	*t*	Significance	Collinearity Diagnostics		Label
	Estimation of B	Standard Error	Beta Distribution			Tolerance	VIF	
(Constant)	.897	.124	.312	1.785	.054			
The Use of Robots(M_1)→CSR (ESR)	-.956	.144	-.153	-1.133	.124	.750	1.411	H_1

a. Dependent Variable : CSR (ESR)

Table 2-1: The Coefficient Table of Regression Analysis

Model (2-1)	Unstandardized Coefficients		Standardized Coefficients	*t*	Significance	Collinearity Diagnostics		Label
	Estimation of B	Standard Error	Beta Distribution			Tolerance	VIF	
(Constant)	.697	.524	.413	2.785	.000			
The Use of Robots(M_1)→ Employees' Right to Work (JR)	-.856	.344	-.563	-2.743	.000	.852	1.631	$H_{1\text{-}1}$

a. Dependent Variable : Employees' Right to Work (JR)

Table 2-2: The Coefficient Table of Regression Analysis

Model (2-2)	Unstandardized Coefficients		Standardized Coefficients	*t*	Significance	Collinearity Diagnostics		Label
	Estimation of B	Standard Error	Beta Distribution			Tolerance	VIF	
(Constant)	.693	.124	.312	2.711	.000			
The Use of Robots(M_1)→ Employees' Right to Life (EER)	-.851	.144	-.551	-2.443	.000	.852	1.632	$H_{1\text{-}2}$

a. Dependent Variable: Employees' Right to Life (EER)

Table 2-3: The Coefficient Table of Regression Analysis

Model (2-3)	Unstandardized Coefficients		Standardized Coefficients	*t*	Significance	Collinearity Diagnostics		Label
	Estimation of B	Standard Error	Beta Distribution			Tolerance	VIF	
(Constant)	.897	.132	.312	1.664	.074			
The Use of Robots(M_1)→Social Welfare(SW)	-.253	.134	-.033	-1.231	.061	.851	1.423	H_{1-3}

a. Dependent Variable: Social Welfare(SW)

By studying the data in Tables 1, 2, 2-1, 2-2 and 2-3, this study derives the test results of the hypothesis of this study, as shown in Table 3.

Table 3: Research Hypotheses and Test Results

Research Hypotheses		Test Results
H_1	The use of robots has a negative impact on CSR, However, it is not significant (Beta coefficient is -.153).	Not Fully Substantiated
H_{1-1}	The use of robots has a significant negative impact on employees' right to work (Beta coefficient is -.563)	Substantiated
H_1-$_2$	The use of robots has a significant negative impact on employees' right to life (Beta coefficient is -.551).	Substantiated
H_1-$_3$	The use of robots has a negative impact on social welfare, but it is not significant (Beta coefficient is -.033).	Not Fully Substantiated

V. CONCLUSIONS AND RECOMMENDATIONS

From an analysis of above data, the following conclusions are reached:

Conclusions

From an analysis of above data, the following conclusions are reached:

H_1: The use of robots by business has a negative impact on CSR, but it is not significant (overall). These results may serve as a reference for businesses or relevant agencies in the government.

Implication for Management

In order to reduce costs and increase work efficiency, companies often consider using a large number of robots to replace human labor; as such, the business entity may gain positive financial performance, but many employees may be laid off as a result. When employees are laid off suddenly, they may lose their financial resources due to the loss of their right to work, which in turn affects their right to life. Hence, the entire social welfare system is negatively impacted. Overall, the results of this study suggest that the use of robots by business has a negative impact on social welfare.

Recommendations

Research Limitation

(1) The research subject of this study is limited to the employees of the production department of a certain multi-national corporation in Taiwan; the results do not represent all companies.

(2) The Purposive sampling method adopted by this study may present some bias on the population.

Direction for Future Research Development

(1) It is recommended that subsequent studies increase the scope of the research population.

(2)It is recommended that subsequent studies adopt a different sampling method, such as: Stratified Random Sampling.

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