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Is There a Contradiction between the Factors of the Application of A.I., and Social Ethics and Productivity? A Case Study on Applying Smart PLS

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ABSTRACT:*Lately, there is a wave of large enterprises that are replacing traditional labor with a wide application of robots to reduce production costs and increase productivity. As a result, the development and implementation of these low level AI applications is contributing to serious unemployment problems, and may generate social issues. Thus, in the pursuit of sustainable development and the wide application of robots for production, should these enterprises also consider the adoption of ethical supporting measures to fulfill their corporate social responsibilities?*

As such, this study targeted the employees of a Taiwanese owned business locat-ed in Longhua Science Park, Shenzhen, China as the research subjects, using the Pur-posive Sampling method to select the research population. The Partial Least Squares Structural Equation Modeling (PLS-SEM) method is adopted to verify the fitting ef-fect of its Inner Model and Outer Model. The Bayesian Estimation method is adopted to analyze the path coefficients between "implicit (unobservable) variables" of the Inner Model to determine the model's path effect. The Bootstrapping test is applied to determine if the inner model's direct effect, mediating effect or total effect is signifi-cant. The findings of this study show that for a certain Taiwanese business located in Longhua Science Park, Shenzhen, China: (1) The wide use of robots in production has a negative and significant impact on its production costs; (2) Production costs have a negative and significant impact on production efficiency; (3) The heavy use of robots in production has a negative impact on corporate social responsibility, but it is not significant; (4) Corporate social responsibility has a positive and significant impact on employee satisfaction; (5) Employee satisfaction has a positive and significant impact on its employees' organizational commitment; and (6) Employees' organization com-mitments have a positive but insignificant impact on their Production Efficiency.

Additionally, based on the purpose discussed above, a further exploration in this study is implemented to clarify if by weighing in on both the application of AI and corporate ethics, can these companies improve productivity and operate sustainably, or will these companies face the quandary of dilemma? Therefore, amidst the promotion of such AI applications, the government and relevant enterprises need to devise comprehensive supporting measures.

KEY WORD*:Artificial intelligence, Social ethics, Productivity*

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I. INTRODUCTION

Recently, driven by the rapid development and integration of applications of the Internet of Things, cloud computing, big data analysis, algorithms, and software and hardware of information technology, the industries related to artificial intelligence have been resurrected. Klaus Schwab, founder and chairman of the World Economic Forum, called the development of artificial intelligence the "Fourth Industrial Revolution" (Schwab, 2017), and some researchers have called it "The Second Machine Age" (Brynjolfsson& McAfee, 2014). Unlike the three previous industrial revolutions, where the major factors of transformation were driven by mechanization, electrification and digitalization, this industrial revolution is driven by artificial intelligence, thus creating an "intellectualized transformation" (Lai, 2019).

As the economy booms, the public is beginning to pay attention to corporate social responsibility. To keep pace with the international market and increase market competitiveness, companies are beginning to invest funds to help implement corporate social responsibility. For entrepreneurs, this means that they need to assume the corresponding social responsibilities, and cannot merely pursue business profits above all else, that is, just develop robotic products that please consumers meet the market requirements and gain high profits. In this modern society, companies that actively take on social responsibilities are like individuals with honor and integrity, and are more likely to be respected by consumers and thus become champions in market competition. How to organically integrate ethical responsibility and economic benefits to achieve a win-win situation is the

goal of the contents for researching corporate ethics and decision-making. In the long run, robotic driven production enterprises should follow the development path of first "weighing in on both ethics and profits", and then pay attention to the ethical design of robots during product development, produce robots that meet certain ethical norms, and clearly define the scope and methodology of their applications (Du, 2016).

Thus, today's company of excellence must be trusted by, and allow the whole-hearted engagement by, all levels of employees, which in turn will improve work efficiency and reduce production costs; herein, the actual organizational commitment is an important indicator of employee trust in the organization. Therefore, how to effectively control costs, adequately allocate resources and improve efficiency, so-as-to improve competitiveness, has become the most important issue in the survival of businesses.

As such, this study targeted the employees of a Taiwanese business located in Longhua Science Park, Shenzhen, China as the research population, and used the Purposive Sampling method to sample the population. The main research purpose is briefly explained as follows:

(1) Whether the heavy use of robots in production has a significant impact on production cost;
(2) Whether the production cost has a significant impact on production efficiency;
(3) Whether the heavy use of robots in production has a significant impact on corporate social responsibility;
(4) Whether corporate social responsibility has a significant impact on employee satisfaction;
(5) Whether employee satisfaction has a significant impact on the employees' organizational commitment;
(6) Whether employees' organization commitments have a significant impact on Production Efficiency

Based on the purpose discussed above, a further exploration of this study is to clarify, whether or not, by weighing in on both the application of AI and corporate ethics, can these companies improve **productivity** and operate sustainably?

II. LITERATURE REVIEW

2.1 The Application of Artificial Intelligence

Artificial Intelligence (AI) is also called "machine intelligence". "Artificial Intelligence" was born in 1956 at the Dartmouth Summer Research Project on Artificial Intelligence. Currently, the development of AI-related industries is fast-moving, particularly in the areas of image recognition, semantic analysis, natural language processing, and machine learning and reasoning. AI is a method of applying artificial technology to a non-human machine so that it may possess a level of human intelligence. In other words, AI refers to instilling human-like "intelligence" in to a machine through the use of computer programming, so that a machine may generate "behavior" that is similar to humans, including reasoning and thinking, planning and learning, interacting and communicating, perceiving and recognizing, moving and manipulating of objects, etc. At present, the most common machine behaviors utilizing AI applications include: (1) image and object recognition; (2) speech and sound recognition; (3) natural language processing and semantic analysis; (4) data analysis and trend prediction; (5) learning and logical reasoning; and (6) object manipulation (Lai, 2019).

The Economist (2016) pointed out that AI is a computer science technology that enables a system to perform tasks that require the use of human-like intelligence, including visual perception, speech recognition, decision-making, and language translation.

Kaplan &Haenlein (2019) believed that AI is a system that can correctly interpret and learn from external data, and apply the learned results to achieve specific goals through flexible adaptability.

Robot Use and Production Costs

To date, literature on the use and production costs of robots, relating to this study, have not been found. In order to make the hypotheses of this research more rigorous, a questionnaire survey method is used to propose the following hypotheses:

H_{1a}: The heavy use of robots in production has a negative and significant impact on production costs.

Production Costs and Production Efficiency

Kuo (1999) discovered that there are many factors, ranging from product characteristics to production processes, affecting production costs and production efficiency. And, the factors that affect manufacturing costs also affect production efficiency. Therefore, by controlling manufacturing costs, improvement of production efficiency can be realized.

Literature on production costs and production efficiency that is related to this study is very limited. In order to make the hypotheses of this study more rigorous, a questionnaire survey method is used to propose the following hypotheses:

H_{1b}: Production costs have a negative and significant impact on production efficiency.

2.2 Social Ethics

In the realm of normative ethics, it can be divided into two parts: one concerns individuals, which refers to moral agent; the other concerns society, which is social ethics. Social ethics is the study of the internal structure, communication order and operating rules of society; its ultimate goal is to explore the fairness and justice in society. In other words, social ethics is centered on rights and obligations with human freedom and equality as the goal, and is a moral theory that pursues social fairness and justice.

The academic definition of corporate social responsibility changes gradually as the times change. In the past, it was believed that in addition to pursuing profits, businesses also needed to meet social values and social expectations (Bowen, 1953). It is now evolved to that CSR activities, as performed by businesses, should exceed legal norms (McWilliams, Siegel & Wright, 2006).

Robot Use and Corporate Social Responsibility

To date, significant literature on robot use and CSR that is related to this study has not been found. In order to make the hypotheses of this research more rigorous, a questionnaire survey method is used to propose the following hypotheses:

H_{2a}: The heavy use of robots in production has a significant negative impact on corporate social responsibility.

CSR and Employee Satisfaction

Chen's (2015) research showed that corporate social responsibility has a positive impact on employee job satisfaction; corporate social responsibility has a positive impact on organizational identity; employee job satisfaction has a positive impact on organizational identity; employees with differing background variables have different views of CSR, job satisfaction and organizational identity.

Huang (2017) pointed out that a company's perception of social responsibility has a partial significant and positive impact on job satisfaction.

Zheng(2017) research discovered that CSR perception has a positive and significant impact on job satisfaction.

Lai (2018) research pointed out that the extent of value and support an organization exhibits towards CSR and the management's support of CSR policy have significant impact on employees' awareness of CSR; additionally, employees' awareness of CSR affects job satisfaction. As long as an organization implements CSR internally and externally, it will have a positive and significant impact on employee job satisfaction.

Chen (2018) research showed that strengthening CSR may boost employees' work commitment and job satisfaction; in particular, employees with higher seniority may show a higher work commitment.

Wu(2019) believed that employees' CSR awareness has a positive and significant impact on job satisfaction.

This study reaches the following hypothesis by summarizing the above description concerning the impact of CSR and employee satisfaction：

H_{2b}: Corporate social responsibility has a positive and significant impact on employee satisfaction.

Employee Satisfaction and Employees' Organizational Commitment

Huang (2017) proposed that job satisfaction has a partial significant and positive impact on organizational commitment.

Chen (2019) Research showed that corporate employees' job satisfaction has a positive and significant impact on organizational commitment, job satisfaction has a positive and significant impact on job performance, and organizational commitment has a positive and significant impact on job performance. Job satisfaction affects job performance through organizational commitment, which means it has a full intermediary effect; however, job autonomy has no moderating effect on job satisfaction or job performance.

Guo (2019) pointed out that job satisfaction has a positive effect on organizational commitment.

Ciou (2019) discovered that job satisfaction and organizational commitment are positively correlated.

Miao(2019) believed that there is a significant and positive relationship between employee job satisfaction and organizational commitment.

Wu (2019) pointed out that corporate employee job satisfaction has a significant and positive effect on organizational commitment; therefore, a corporation should strive to satisfy the requirements of corporate employee job satisfaction, by ameliorating conditions of their dis-satisfaction, thereby improving employee job satisfaction.

This study reaches the following hypothesis by summarizing the above description concerning the impact of employee job satisfaction and their organizational commitment:

H_{2c}: Employee satisfaction has a positive and significant impact on the employees' organizational commitment

Employees' Organizational Commitment and Productivity

Hsu (2003) pointed out that organizational commitment has a significant impact on productivity.

The research of Zhang, Chen, Lee&Su(2006) found that a company's organizational structure is significantly correlated with job characteristics, and has a significant impact on organizational commitment, in addition, its moderating effects on employee career development is influential but insignificant.

Literature on employee organizational commitment and production efficiency, that is related to this study, is limited. In order to make the hypotheses of this study more rigorous, a questionnaire survey method is used to propose the following hypotheses:

H_{2d}: Employee organizational commitment has a positive and significant impact on Production Efficiency.

2.3 Productivity

Father of Management, Peter Drucker believes that the purpose of a business is economic performance, and the reason for its existence. The definition of performance usually includes two aspects: efficiency and effectiveness. Efficiency is measured by the quantity difference between output and input, which refers to the manpower, expenses, costs and output required to achieve the goal, which are then compared in a quantitative manner. Efficiency can be regarded as the indicator for measuring the direct relationship between output and input. The efficiency evaluation, according to the specific industry, can be subdivided into absolute efficiency and relative efficiency: Absolute efficiency is to obtain the maximum output with a given fixed input; Relative efficiency refers to the relative comparison of the input-output ratio in homogeneous measurement units. Farrell believes that efficiency can be divided into: (1) Allocative Efficiency: Based on the premise when the input price and production technology are fixed, the ability of the manufacturer to use the optimal ratio of an input combination, that is, Price Efficiency and (2) Technical Efficiency: The maximum output that a manufacturer can obtain under the premise of a fixed input factor, also known as Productive Efficiency. Both technical efficiency and allocative efficiency must be achieved to have the Overall Efficiency (Huang, 2013).

Farrell (1957) proposed the method of using production-possibility frontier (PPF) to estimate production efficiency. The research hypothesizes that when manufacturers are in the same production frontier, then the difference between the production frontier and actual output is attributed to technical inefficiency. Deterministic non-parametric frontier: Farrell defines productive efficiency as the product of technical efficiency and allocative efficiency. In the subsequent research, Forsund, Finn, Knox Lovell & Schmidt (1980) defined the production frontier by dividing the empirical method into Deterministic Nonparametric Frontier, Deterministic Parametric Frontier, Deterministic Statistical Frontier and Stochastic Frontier. Of these, the Stochastic Frontier method is widely used by scholars.

III. Research Method

3.1 Research Framework Diagram

The research framework of this study is based on the above research motivation, purpose, literature review and hypothesis, as shown in Figure 1.

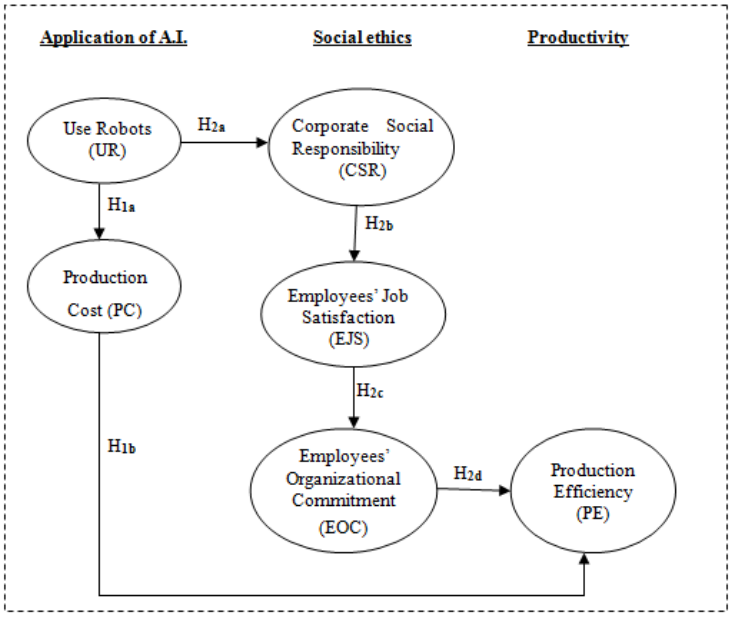

Figure 1 Research Framework

3.2 Research Subject and Questionnaire Design

The research subjects of this study are employees of a Taiwanese business located in Longhua Science Park, Shenzhen, China, and the Purposive Sampling method is adopted for testing. 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, a valid return rate of 77.3%. The structure of the questionnaire is based on the variables in the main dimension of this study, as shown in Table 1.

Table 1 Questionnaire Structure

Main Dimension	Number of Questions	Questionnaire Reference
AI Applications	6	Lai (2019)
Corporate Ethics	6	Wu (2019)
Productivity	3	Huang (2013)

3.3 PLS-SEM

There are two families of SEMs: one is called Covariance-based SEM (CBSEM) and the other is called Variance-based SEM or Partial Least Square SEM (PLS-SEM). The latter's functional characteristics are summarized in Table 2. The advantages of Partial Least Squares Structural Equation Modeling, (PLS-SEM): (1) Model Complexity; (2)Exploratory Research; (3)Non-Normal Data; (4)Focus on Prediction; (5)Theory Development; (6)Convergence Ensured; (7)Use of Categorical Variables; and (8)Theory Testing etc. (Hair, Hult, Ringle&Sarstedt, 2014) and its benefit in determining the fitting effect of Inner and Outer Models are the reasons why this study adopt PLS-SEM to research the fitting effect of the said research models of this study.

Table 2 Features of PLS-SEM

	PLS-SEM
Goal	maximum explanatory power of dependent variables
Data source	raw data (format: .csv or .txt)
Software	Smart PLS, PLS-Graph, Visual PLS etc.

Source: Hair et al (2014)& this study

3.4 Questionnaire Data Processing and Measurement System

The questionnaire of this study is divided into three Inner/Latent variables: AI Applications, Corporate Ethics and Productivity. Each Latent Variable is divided into the following Outer / Observable variables, and several questions are devised for each observable variable. Then surveyed data is processed, and an original questionnaire data file is created. The Partial Least Squares Structural Equation Modeling (PLS-SEM) method is adopted to verify the fitting effect of the Inner Model and Outer Model of this study. The Bayesian Estimation method is adopted to analyze the path coefficients between "implicit (unobservable) variables" of the Inner Model to determine the model's path effect. The Bootstrapping test is applied to determine if either the inner model's direct effect, mediating effect or total effect are significant (Qiu, 2014).

3.5 Common Method Variance (CMV) Test

Using Latent Marker Variable with PLS and One Marker Variable for control to test common-method bias, it is determined that common-method variance does not exist in the questionnaire designed by this study. Figure 2 shows the "model after using the marker variable".

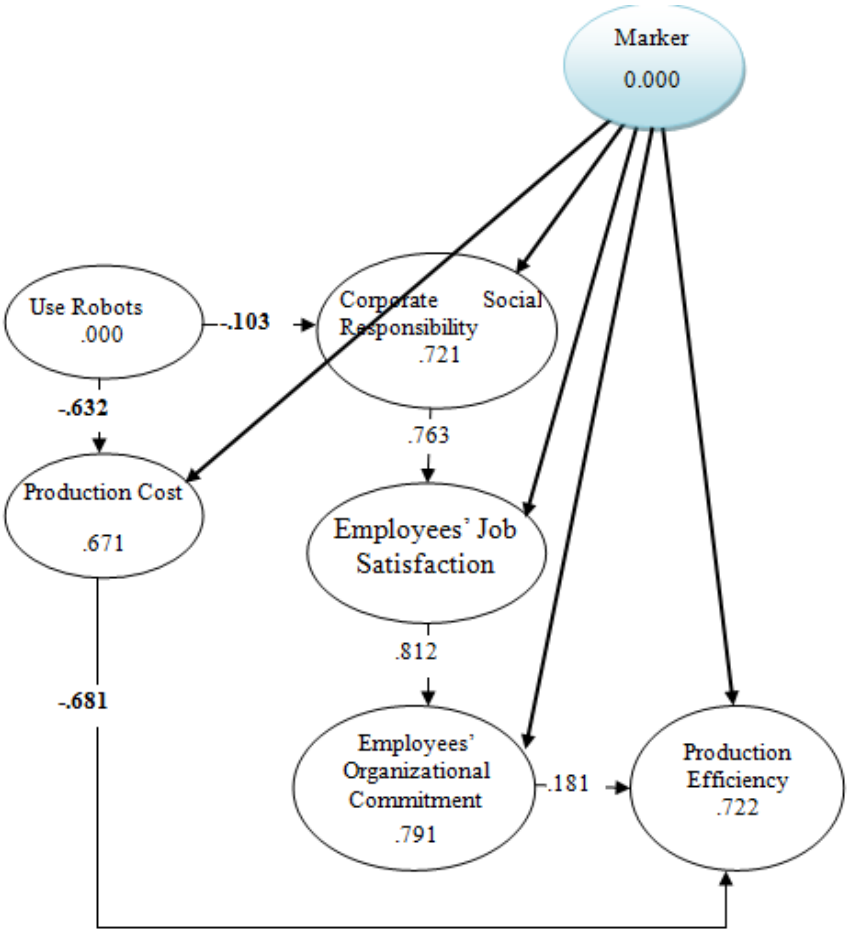

Figure 2 CMV test

IV. RESULTS AND ANALYSIS

4.1 Outer Model

The Outer Model of this study is a formative indicator model.

To evaluate the results of the formative indicator model, Table 3 shows that the Cronbach's α in this study is greater than 0.8, the Composite Reliability (CR) is greater than 0.5, and the Average Variance Extracted (AVE) is greater than 0.5, thus, the Outer Model of this study has Convergence Validity. In addition, the AVE in this study is also larger than the Square of Constructs Correlation, so the Outer Model of this study also has discriminate validity. Table 4 shows that the Factor Loadings in this study are greater than Low Cross-Loading, which also help to determine that the Outer Model in this study has discriminate validity (Esposito, Chin, Henseler&Wang, 2010).

Table 3 Indicators for Convergence Validity and AVE Discriminate Validity of Outer Model

	AVE	Composite Reliability	Cronbach's α	(1)	(2)	(3)	(4)	(5)	(6)
(1) UR→PC	.882	.874	.871	**.882**					
(2) PC→PE	.842	.833	.824	-.803	**.842**				
(3) UR→CSR	.531	.523	.519	-.414	-.402	**.531**			
(4) CSR→EJS	.772	.764	.752	.742	.713	.724	**.772**		
(5) EJS→EOC	.814	.811	.803	.801	.742	.727	.772	**.814**	
(6) EOC→PE	.681	.673	.661	.604	.613	.621	.614	.643	**.681**

Table 4 Discriminate Validity

	UR	PC	CSR	EJS	EOC	PE
UR	.411	**-.882**	**-.531**	.442	.331	.331
PC	.421	.422	.462	.472	.342	**-.842**
CSR	.242	.411	.411	**.772**	.332	.314
EJS	.311	.334	.331	.314	**.814**	.323
EOC	.413	.441	.443	.414	.341	**.681**

Remarks:
(1) Bold font indicates Factor Loadings
(2) Serif font indicates Cross Loadings

4. 2 Inner Model

The validity evaluation indicators of the Inner Model are (1) Coefficient of determination (R^2): According to Hair et al (2014), when R^2>0.67, the Dependent Inner Variables are considered to have practical values; when R^2 = 0.33 or so, it indicates moderate explanatory power; R^2 = 0.19 or so, it indicates weak explanatory power; (2) Path Coefficient; and (3) Effect size (f^2): it indicates the influence of independent variables over the dependent variables. According to Cohen (1988), when f^2>0.35, it indicates a strong influence of independent variables over the dependent variables; when f^2=0.15, it indicates that independent variables have moderate influence over dependent variables; and when f^2=0.02, it indicates that a weak influence of independent variables over the dependent variables. Additionally, Predictive relevance (Q^2)>0 means independent variables are influential to dependent variables, and the greater the Q^2 value, the stronger the predictive correlation, which can be obtained using blindfolding function. Table 5 shows that in the Path Coefficients of the inner model of this study, the P-Values of all the path coefficients are less than .001, indicating that they reach the level of significance. Additionally, Table 6 shows that R^2 of dependent variables ((PC, CSR, EJS, EOC, PE) are .671, .721, .683, .791 and .722 respectively. They are all greater than 0.670, and their Redundancy value is as high as .754, indicating that the Inner Model has a Goodness-of-fit. (Qiu, 2014)

Table 5 Path Coefficients (Mean, STDEV, t-Values)

	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (O/STERR)	p-value
(1)UR→PC	-.632	.121	5.223	.000***
(2) PC→PE	-.681	.103	6.612	.000***
(3) UR→CSR	-.103	.121	.851	
(4) CSR→EJS	.763	.122	6.254	.000***
(5) EJS→EOC	.812	.132	6.152	.000***
(6) EOC→PE	.181	.131	1.382	

Remarks:
(1) The bootstrap procedure is just used to compute standard error and t-values of outer loadings, outer weights, and path coefficients. For these reasons: t =original/ std. error
(2) Report→Html Report
(3) t>1.96 at p < 0.05; t >2.58, at p < 0.01; t> 3.29 at p<0.001 for two-tailed tests

Table 6 R Square & Redundancy Value of Dependent variables (PC, CSR, EJS, EOC& PE)

	R^2	Communality	AVE	Redundancy
UR		.882	.882	.754
PC	.671	.842	.842	

CSR	.721	.531	.531	
EJS	.683	.772	.772	
EOC	.791	.814	.814	
PE	.722	.681	.681	

Remarks：
(1) Factor loadings >0.7
(2) AVE=Communality >0.5(reflective index)
(3) Composite Reliability≒Cronbach's α>0.7
(4) Redundancy=√Average Communality* Average AVE, and the greater the Redundancy value, the better the model.
(5) The five main dimensions of the research model of this study, PC, CSR, EJS, EOC & PE, are Dependent Variables.

4. 3 Overall Model Estimation

The standardized regression path coefficients of the overall model estimation of this study and the R Square of Dependent Variables, are shown in Figure 3.

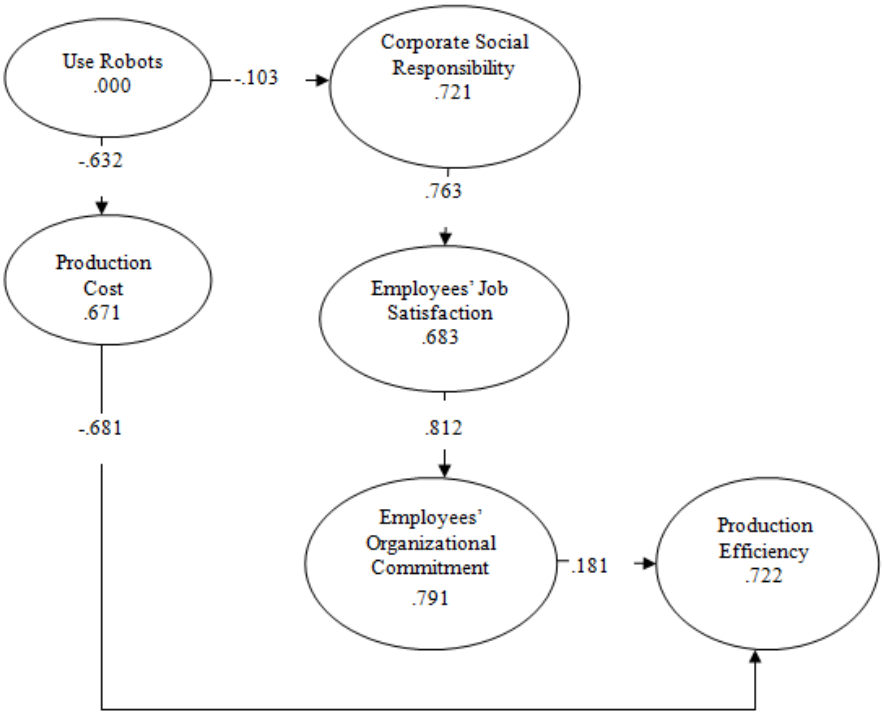

Figure 3 Overall Model Estimation Results (Standardized)

4. 4 Significance Test

Smart PLS is adopted in this study to test the significance level of the overall model. As shown in Figure 4, the numbers on the lines in the Inner Model, are t values. When t > 1.96, it means "significant". The numbers in the Outer Model are Un-standardized measurement coefficients.

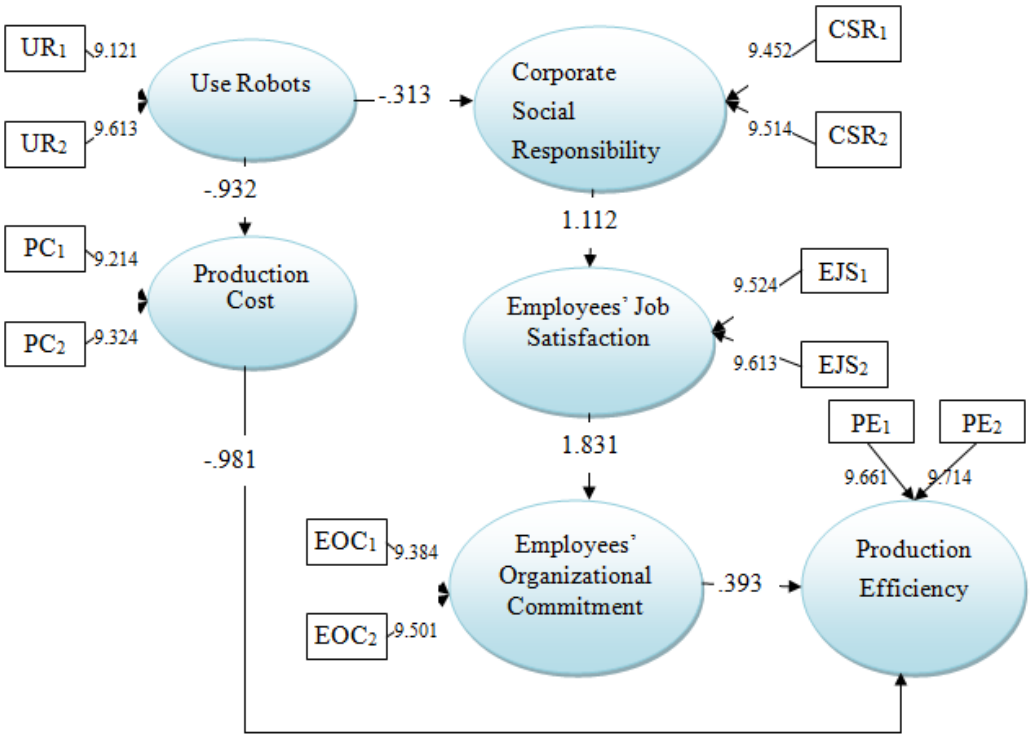

Figure 4 Significant Test Results Using Smart PLS (Un-standardized)

4.5 Bayesian Estimation and Bootstrapping test

Table 7 Bayesian Estimation and Bootstrapping test

Variables	Point-of-Estimate	Product of Coefficients		Bootstrapping			
				Bias-Corrected 95% CI		Percentile 95% CI	
		SE	Z	Lower	Upper	Lower	Upper
				Total Effect (Un-standard Value)			
UR→PC	-.632	.121	-5.223	-5.102	-5.223	-5.101	-5.225
PC→PE	-.681	.103	-6.612	-6.509	-6.715	-6.502	-6.723
UR→CSR	-.103	.121	-.851	-.730	-.972	-.724	-.974
CSR→EJS	.763	.122	6.254	6.132	6.376	6.131	6.381
EJS→EOC	.812	.132	6.152	6.020	6.284	6.012	6.292
EOC→PE	.181	.131	1.382	1.251	1.513	1.243	1.522

Table 7 above shows that the estimates of the 95% Confidence intervals, which uses Bias-Corrected & Percentile-Two Dimensions, contain no zeros, indicating that the intermediary effects of the variables of the study (PC, CSR, EJS& EOC) exist.

4.6 Path Effect Analysis Test for Inner Model

This study uses Bayesian estimations to examine the path coefficients of latent (unobservable) variables in the inner model. This is followed with the Bootstrapping tests to gauge the significance of the intervening effect. Table 5 shows:

(1) UR has a negative and significant impact on PC: T Statistics (O / STERR) is $|-5.223| > 1.96$ Hypothesis H_{1a}

is substantiated.
(2) PC has a negative and significant impact on PE: T Statistics (O/STERR) is $|-6.612| > 1.96$
(3) UR has a negative and insignificant impact on CSR: T Statistics (O/STERR) is $|-.851| < 1.96$
(4) CSR has a significant positive impact on EJS: T Statistics (O/STERR) is 6.254 > 1.96. Therefore, Hypothesis H_{2b} is substantiated.
(5) EJS has a significant positive impact on EOC: T Statistics (O/STERR) is 6.152 > 1.96. Therefore, Hypothesis H_{2c} is substantiated.
(6) EOC has a positive impact on PE: T Statistics (O / STERR) is 1.382 > 1.96, but it is not significant. Therefore, hypothesis H_{2d} is only partially substantiated.

V. CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the author will draw conclusions based on the above analysis and results, and propose the contribution of this research, and finally put forward the limitations in the research process and make suggestions for subsequent research.

5.1 Conclusions

Summarizing the above, this study targeted the employees of a Taiwanese business located in Longhua Science Park, Shenzhen, China as the research subjects, adopted PLS-SEM to explore the fitting effect of the Inner and Outer Models of this study. The research findings show:
(1) Using Robots has a negative and significant impact on Production Cost, that is, a company that uses a large number of robots to produce its products has a negative and significant impact on its production cost.
(2) Production Cost has a negative and significant impact on Production Efficiency; thus, hypothesis H_{1b} is substantiated; that is, a company's production cost has a negative and significant impact on its production efficiency.
(3) Using Robots has a negative impact on Corporate Social Responsibility, but it is not significant; thus, the hypothesis H_{2a} is only partially substantiated; that is, the large-scale use of robots in production by companies has a negative impact on corporate social responsibility, but it is insignificant. This shows that businesses must have comprehensive supporting measures to address employees' unemployment issues.
(4) Corporate Social Responsibility has a significant and positive impact on Employee Job Satisfaction. This shows that when facing the pressure of a competitive environment, business operators must take various approaches to reduce production costs in order to increase productivity and maintain the sustainable competitiveness in the industry, while at the same time, it is necessary to also address employee career planning and development.
(5) Employee Job Satisfaction has a significant and positive impact on Employee Organizational Commitment. This shows: Satisfied employees can create organizational synergy, thereby making commitments to the business organization.
(6) Employee Organizational Commitment has a positive impact on Production Efficiency, but not significant. This shows: the employees of a business have committed to their organization and are willing to work for the organization. Though, the productivity of their organization may be increased as a result, the rate of productivity increase is far less efficient than production using dedicated robots.

The research findings of this study may serve as a reference for decision-makers of businesses. The Inner Model and the Outer Model of this study have a good fitting effect.

5.2 Research Contributions

(1) In terms of theoretical applications, this study focuses on the exploration of relevance of the "multi-dimensions" research topic; therefore, Smart PLS is adopted as a research tool in this study, which is a great contribution to theoretical application.

(2) The results of this study can help provide a further understanding on whether a company's weighing in on both the application of AI and corporate ethics can improve its **productivity** and allow the company to operate sustainably. This can serve as a reference for decision makers of businesses or relevant government departments, which is a great practical contribution.

5.3 Research Limitation

Despite the limited resources, this study was conducted in a rigorous manner at every phase of the research. However, the following research limitations still exist: Because Purposive Sampling is used to sample the population in this study, although the recovery rate of effective samples is high, the effective samples may be insufficient to represent the population, which may generate biased results.

5.4 Recommendations

(1) Subsequent studies may expand the research scope and compare the results to better understand whether the correlation effects of each major dimension of the research topic are the same and adopt the stratified random sampling method to sample the population.

(2) SEM group analysis can be used to verify whether the correlations between variables are the same.

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