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# Implementing employee skill flexibility to mitigate the effects of changes in technology, and employment on performance: An empirical study of a causal model in Chinese firms.

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***Abstract***
*When employeespossess abilities that can permit them to adapt to rapidly changing work situations and overcome unanticipated obstacles, then they are flexible.*
*In order to investigate the role played by employee skill flexibility in shaping the relationship between the factors of unstable business environment and firm's performance, this article analyses its mediating effect with the theoretical perspective. This analysis constructs a correlation model between factors of environmental dynamism, firm'sperformance, and employee skill flexibility. In this construct, we introduce the concepts of the environment, the changes that occur within it, and its effect on productivity. Moreover, the construct also explains the concept of flexibility of human resource and the role it plays on helping managers deal with the changes from the business environment so as to enhance performance. In particular, it develops a knowledge system of foreignemployees' skill flegibility research (in Chinese firms),discusses the research limitations, and proposes research directions. The main conclusions and enlightenment of this research are:*
*Employee skill flexibility (as a dimension of human resource flexibility) has a significant positive impact on employee level performance which supports the initial hypothesis.*
*Secondly, it was found that there is a significantly strong positive impact of employee level performance on operating level performance.*
*Thirdly, from a linear judgement, employee skill flexibility (ESF) has a positive effect on the firm's operational level performance. This papershall focus on foreign employees in China and shall lay a foundation for using employee skill flexibility to mitigate the influence of unstable environment on theperformance. Moreover, an indepthresearch toquantifythe extent of the mediating effect of employee skill flexibility in different industries can be a guideline for recruiters, thus a major step towards sustainable growth.*
***Keywords:*** *Unstableenvironment, employee skill flexibility(ESF), productivity, Human Resource flexibility, environmental uncertainty, technology, employment, performance.*

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## I. Introduction

Prior to the era of globalization, human resource management was a necessary tool in the Chinese economy. The adoption of the open-door policy over three decades ago has projected the country to becoming an active member of the international community thanks to its huge population and vibrant economy. Puttingmore emphasis on the technological innovation of Chinese firms has madeChina's economyto leapfrog from a developing economy to an important competitor in the global battle for technological leadership, thereby attracting many foreign skilled employees (Piperopoulos et al., 2018, p. 233). This success has greatly been attributed to the government's ability to anticipate, change, or adapt to potential challenges. With this bright economic forecast, researchers have developed great interest in the root cause, and argue that value human resource flexibility among an organization is a growing powerful trend in the current business environment in China.

The speed with which employees can adapt to technological changes is important for the firm's

performance. The changes in the economic and industrial environments greatly affectthe way managers deploy their strategies in order to eventually influence firm performance.Our main focus shall be on the skill flexibility of foreign employees in China.Firstly, we have to demonstrate that human resource flexibility can moderate the impact of the factors of unstable business environment on firm's performance. Secondly, we showwhether employee skill flexibility has got a strongly positive impact on the influence of unstable business environment on firm's productivity or not.

How top managers in China perceive the contribution of foreign employees to firm's productivity is very vital for our investigation.With more than 500000 foreigners working in China, the labor markets can be considered as thatfundamentalbranch of the national environmentsaffectingthe persistence of firm's performance (Chacar, Newburry, &Vissa, 2010).

In China, the foreign labor force is concentrated around certain regions from where we paid more emphasis when conducting our research. According to the recent population census, the region of Guangdong has got a great number of foreigners (about 418000). There is a total of about 164000overseas residentsin Shanghai with more than 18% of them deemed as high-end talents.Other cities like Hangzhou, Ningbo, Yiwu, Chongqing, and Beijing were also considered during the study.

We shall focus on those companies that recruit both foreigners and Chinese with more than six (06) years of work experience. Moreover, control variables like the firm's age (age), size (scale), type of ownership (type), and industry type (industry)are also very crucial for the selection of thesamplepopulation. The survey is carried-out through questionnaires and the data collected is analyzed in different stages with the use of the statistical tools.

We shall explain in the conclusion whether employee skill flexibility is vital for Chinese firms seeking expansion (via product and market development) into foreign markets.

## II. Literature review and research hypotheses

Human resource flexibility is 'the extent to which the firm's human resource possess skills and behavioral repertoires that can give the firm options for pursuing strategic alternatives in the firm's competitive environment, and also the extent to which the necessary human resource management practices can be identified, developed and implemented quickly to maximize the flexibility inherent in those human resourcesWright and Snell (1998, p.761).

**The concept of unstable business environment**

The concept of environmental uncertaintyor unstable business environmentcan be subdivided into two notions; the environment and the changes that occur within it. The environment in which a firm finds itself is generally considered as "the collection of physical and social factors that are directly considered in the decision-making behavior of individuals in an organization" (Duncan, 1972). Some scholars have identified three (03) major characteristics of the environment. They include"stability/dynamism", "simplicity/complexity", and "munificence/hostility"(Tan &Litschert, 1994; Dess& Beard, 1984; Mintzberg, 1983). Amongst these characteristics is dynamism (unpredictable change) that refers to "the rate of change and innovation in an industry as well as the uncertainty of actions by customers, suppliers, technology and the job market".

**The effects of changes in industrial environment on firm's performance**

The causal linkage between unstable business environment and firm's performance has been elaborated in most management and human resource studies (Thompson 1967; Hafer and Schendel 1978). Moreover, theories from "organization and natural environment literatures", "contingent resource-based view" analyses have all proven that the way managers view the threat from various external environments(such as technology innovation, professional training and academic curriculum) can impact the strategy of the company which will subsequently have an effect on organizational performance (Nadkami, and Narayanan 2007; Verdu-Jover, Llorens-Montes and Garcia Morales 2006;Fiol and O'Connor 2003;).They should be sufficiently adaptive to respond to the expectations of their immediate environment which they could encounter subsequently (Teece 2007; Van Den Bosch, and Volberda 2005; Raisch and Birkinshaw 2008).

In a rapidly changing business environment, obtaining resources can be very challenging. Therefore, making the proper and timely adjustments,then implementing them dynamically with environmental changeswill help firms obtain a wide variety ofadvantages in the short term (D'Aveniet al.2010). To achieve this series of short-term advantages, managers will require additional resources in order to make timely and less costly adjustments. How managers strategically match their resources and capabilities to changing business environment is a very important issue in the domain of management and strategic studies (Andrews, 1971). Moreover, firms can also develop long term sustainable values through transformational activities that can help themput together and reconfigure their specialized assets in order to meet up with changing market expectations(Teece 2007). Note that rapidity in which changes occur with respect to environmental instability

can seriously affect the position of an organization in terms of its competiveness in the market (Sharfman and Dean, 1991). The process through which changes occur in an organization can be seen as a series ofpossibilities in which each investment opportunityconfers preferential access to potential investment opportunities (McGrath, Ferrier and Mendelow 2004; Bowman and Hurry 1993; Trigeorgis 2001;), that will help the firm take advantage of the opportunities, or restrain from thedangers in an unstable business environment. Previous studies have established from a resource-based view that there exist a significant correlation in the relationship between environmental instability and firm'sperformance.

A very important requirement for managers to efficiently implement their strategiesis to evaluate the perceived threats from the environment, and then compare them with the internal strengths and weaknesses of the firm. The managers will then proceed in a decision making process that includes an increase in the resources they invest. As a heuristic for performance, it is necessary for firms to co-align with the expectations of the business environment in which they find themselves (Sirmon et al. 2007;McGrath et al. 2004; Teece 2007).

**Human Resource Flexibility**

Previous studies have established important and vital role of flexibility in the way an unstable business environment is being managed (Sanchez 1993). It can be defined as; the actual resources and capabilities that the company possess in order to react to wide variety ofchallengescoming from its dynamic business environment(Sanchez, 1995). At the level of the company,skill flexibility hasgenerallybeen viewed and regarded as a human resource process that permits the employees to merge onsite and offsite activities (Allen, Johnson, Kiburz, 2013; Leslie, Manchester, Park, and Mehing, 2012).

Human resource flexibility can therefore be defined in a contemporary perspective asthe extentwith which workerscandecide, and organize certaindimensions of their work responsibilities(Hill et al, 2008)**.** Human resource flexibility has three main components;

The first component is flexibility of the structure of the human resource system:the extent by which a firm can adjust and implement itshuman resource practices within different situations. It is also the rate with which this adjustment and application can be made(Bhattacharya et al; 2005, p. 624). It has gotthe attributes of being the number of different ways to which employee skills can be implemented, and how workers with varying capabilities can be redeployed or coordinated.

The second aspect is employee behavioral flexibility:'the degree to which employees own and exhibit a wide range of behavioral scripts that they can apply in situations with specific demands' (Wright, and Snell, 1998).

The third component of this concept is called employee skill flexibility: Being the main focus of our study, it can be defined as 'the variety of waysin which certain abilities owned by an employee can be efficiently implemented' and 'how these employees with varied abilities and capabilities can be rapidly administered in a workplace' (Wright and Snell 1998, pp. 764-765). Therefore, if workers of a firm own a wide range of abilities that can carry outvariety of tasks when needed, this organization can be considered as havinga higher degree of employee skill flexibility. This type of flexibility to some extent could help the organization generate a lot of competitive advantage (Bhattacharya et al. 2005). Genuine employee abilities are nonreplicable, valuable, rare, and cannot be substituted.

We can therefore confirm that the ability for employees to own varied skills contributes to the changing capability of an organization (Teece, Pisano, &Shuen, 1997; Eisenhardt& Martin, 2000;). In other words, human resource flexibility predominantly focuses on adjusting the attributes of the employees namely; the ability to learn, to adapt, to acquire knowledge, and to respond to behaviors within the context of an unstable business environment (Wright, Dunford, and Snell,2001; Wright and Snell, 1998).

This research shall pay more emphasis on (a.) employee skill flexibility in firms located in mainland China. (b.) The degree to which this skill flexibility is linked to the employee level and firm level operational performance. The rapid transformation of China's economy from an agricultural and mining, through manufacturing and designing, to an innovative, hi-tech and service economy has been met with a lot of changes in the industrial environment. In response to these environmental changes, firms have taken specific actions like changes in strategy, structures, pricing methods, supplier relationships, and marketing (Nayyar and Bantel 1994; Volberda 1998), not forgetting adaptive employee abilities.

**Role of Human Resource Flexibility**

In the past, researchers have already established how importanthuman resource management is to a firm's employee level and operational level performance. Previous research works have shown that human resource managementis an important tool for enhancing a firm's competitive advantage within the context of a fluctuating business sector. For instance, researchers haveinvestigated the different possibilities through which firms can enhance their competitive advantage via theuse of human resource and management practices (Schuler and Jackson, 1987).

They investigated employee adaptability at the individual level (Pulakos, Arad, Donovan, & Plamondon, 2000 Lepine, Colquitt, & Erez, 2000) eventhough this adaptability has not yet been scientifically linked to the firmlevel outcomes. Moreover, at the organization level, scholars succeeded to establish the role of human resource practice on firm's operational and financial outcomes(e.g., Huselid, 1995; Delery& Doty, 1996). These studies did not implicitly explain whether these practices are adjustable, or examine how employee ability contributes to firm'sproductivity.

In recent years, some scholars have succeeded to merge individual-level and organization-level views, confirming that human resource flexibility is an intangible asset that a firm can obtain from individual abilities and behaviors, and implemented through human resource procedures. They have also separately examined the different aspects of the flexibility of human resource to see how they are related to the firm's output at the operational and financial levels (Bhattacharya M., Gibson D., and Doty, D.H., 2005). This relationship has been the object of many proposals even though it has not yet beenexamined into details. When examining some of the challenges faced byhuman resource flexibility, our knowledge of the different aspects involved in the construction of this theory can be improved tremendously.This can lead to a major breakthrough in the field of the management of human resource. Some researchers have also proposed that the role of human resource flexibility should be viewed from a long-term perspective that can bring sustainable advantage, thus leading to consistent firm performance, (Wang and Ahmed, 2007). In order for human resource flexibility to be considered an indispensable toolfor a long term competitive advantage of an organization, it has to be;

**Valuable:** Human resources can be considered valuable when they enable the firm to put in place techniques that canenhance the effectiveness of the various procedures (Barney, 1991). The notion of value in this case requiresthe need for both job demand and offer to be constantly changing with time. i.e., organizations shouldadvertise jobs that require a wide variety of human abilities, and that workers should exhibit some differences in the type of abilities that they possess at every level. Hence, there is an existence of a variation in the value that employees have for the company.So, human resource flexibility can developthe value ofan organization (Wright et al., 1995).

**Rare:** This characteristic depends on the distribution of talents and skills in the job market (Wright et al., 1995). Thiscondition is therefore connected specifically to the way labor is available and is being mobilized (Becker, 1964; Williamson, 1985).

**Difficult to imitate:** Employers can acquire human skills from the job market, or by internally training its employees to develop them. Within the context of a complex environment with intensecompetition, having some special qualities can tremendously change the tides to your favor. In human resource management, if a company owns certain resources that can be duplicated or imitated by a competitor, it cannot be considered as an important source of competitive advantage in a longterm for that company. Whenwe cannot easily identify the fitbetween the resources actually possessed by the organization andtheir long term competitive advantage, we can rightly acknowledge the existence of a causal ambiguity (Alchain and Demsetz, 1972; Reed and DeFillippi, 1990). These characteristics ensure that rival firms rarely duplicate well-developed human resources.

**Without substitutes:** Human resources are those organizational resources that are durableand not easilyreplacedby a wide range of innovative technologies, new products indifferent markets over a long time period. Therefore, it can be stated that "human resources could have substitutes in the short term, however, this substitution cannot generate any sustained competitive advantage in the long term" (Wright et al., 1995, p.312). So even if a firm hasgot employees with great potentials and commitment, another firm can generate innovative equipment that will be capable of producing abetter quality product at a more rapid rate than the highly skilled and committed employees from the previous firm. Given that technology can be imitated over time, this technology can be available for sale in the market after a relatively short time period.

**Mediating effect of human resource flexibility (employee skill flexibility)**

The importance of theeffect of worker flexibility climate that exist between strategic human resource management and firm performance with respect to banks in China (Muhammad Ali, Shen Lei, Xiao-Yong Wei 2017)clearly illustrate how employees feel more confident and contribute to firm's productivity when they're flexible and more involved.

The way managers perceive environmental instabilities is an important indicator to how they decide on a wide variety oftangible and intangible resources to deploy their espouse strategy in order to eventually boost the productivity of the firm. This point of view can be seen as a dynamic process in which administratorsregularly renew, reconfigure, and implement the firm resources, in order to obtainlong term firm performance in the face of challenging environmental uncertainties (Chan et al. 2004; Teece 2007; Helfat et al. 2007). Its main objective is to create flexibility routine that permit the firm to have alternatives on its future direction depending on environmental contingencies. This willtherefore maximizethe economic return for the company (Bowman and Hurry 1993; Leiblein 2003; McGrath et al. 2004). This process usually takes time and is socially complex especially when it has to do with intangible assets possessed by the organization. By utilizing

the ambidexterity of flexibility inducing human resource practices, managers can adopt an incremental trainingschedule fortheirworkersin order to meet the expectations of present and future strategies. The standardization of such routines by firms require them to possess coordination flexibility which, for example, may be achieved by having flexible human resource practices such asBalanced Scorecard(BSC), MBO-based performance appraisal and group-based incentive schemes that can value and reward discretionary employee skill and behavior using newly acquired competences.

**Overall role of Human Resource flexibility**

In general, it can be said that a firm's competitive advantage in the long term can be promoted with the essential role played byhuman resource flexibility in some aspects that are impacted by human resource strategic management, and enhance firm's performance. Table 1 below shall illustrate this assertion.

**Table 1. Human Resource Flexibility and coordination flexibility indication**

| Strategic HRM component | HR flexibility | Coordination flexibility |
|---|---|---|
| Practices | Applicability of practice across jobs | Malleability of practices |
| | | Speed of feedback on practice impact |
| Employee skills | Individual skill breadth | Variety of skills in the Workforce |
| | Ability to acquire new skills | Ability to acquire diverse skills From contingent workers |
| Employee behavior | Rigidity of script application | Complementarity/conflict between scripts of different groups |

Source: Wright and Snell (1998, p.214)

**Causal Linkage and Hypotheses Formulation**

Most scholars have analyzed the dimensions of firm'sperformance using different methods in order to establish the linkage between various aspects of human resource flexibility, and effective performance(Guest, 1997). A broader view of these linkages can be reflected in the Balanced Scorecard (BSC) (Kaplan and Norton 1996) theories, and concepts. This Balance Scorecard developsa causal framework of value creation by the firm (Kaplan and Norton,2001).This strategic map begins with workers that are skilled, motivated, empowered, and capable of running processes required for thelong term creationof value in a business. In this map, the firm financial performance is located at the extreme of the framework (Guest, Michie, Conway and Sheehan-Quinn 2003). Hence, thehuman resource flexibility of a firm should have a direct impact on the different production outcomes (Dyer and Reeves 1995; Wright et al. 2003; Becker and Huselid 1998; Sett 2004).Our research shall show how the components that constitute parts of thehuman resourceflexibility(employee skill flexibility) can mediate the effectof unstable businessenvironment(employment-Emp, technology-Tech) on firm'snon-financial productivity (employee level productivity-ELP, operational level productivity-OLP).

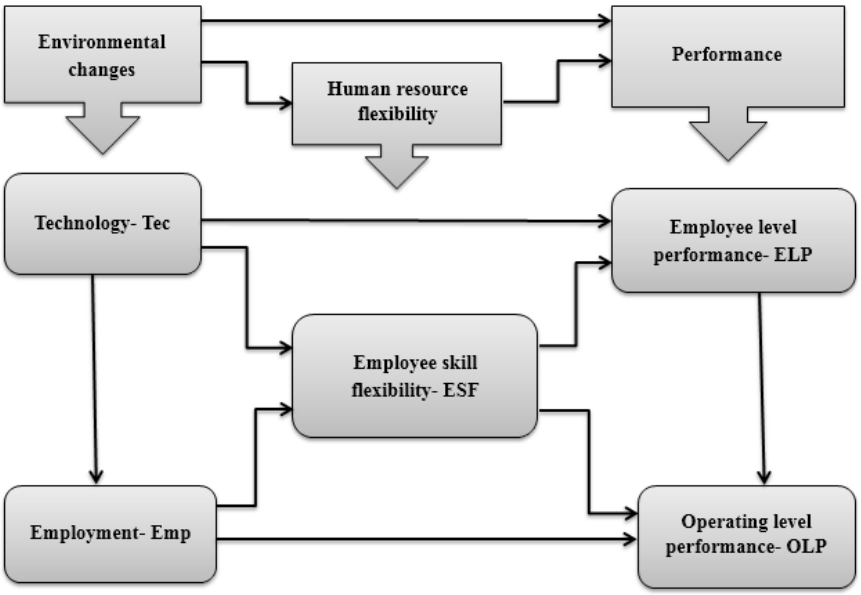


**Fig 1:** The causal link between unstable business environment, human resource flexibility, and firm's performance is clearly illustrated above.

Based on the above-discussed ideology, we have developed the following hypotheses;

**General hypothesis:**
**H:** Human resource flexibility developed by a company can mitigate the impact of unstable environment on firm's performance
**H1:** Employee skill flexibility actually possessed by the firm will mediate the influence of technology change on the employee level performance.
**H2:** Employee skill flexibility will mitigate the impact of employment on employee level performance.
**H3:** Employee skill flexibility level in a company will moderate the effect of change in technology on operating level performance.
**H4:** Employee skill flexibility within the company shall influence the impact of employment on firm's operating performance.
**H5:**Employee level performance has significant and positive effect on operating level performance.

## III. Research Methodology

After formulating the hypotheses, the techniques of investigation and analysis to be used for the verification of the hypotheses formulated will be reviewed in this part. The purpose of this part is to further explain the scientific progress of our work.
**Research type:** A survey of the different companies that recruit foreign nationals in China was carried out. This research is exploratory, deductive and quantitative in nature. All the empirical inquiries that are used for the investigation of theabove theories within its reallife context will be examined (Eisen Hardt, 1989, Yin, 2013).
**Sample selection and Procedure:** To carry out this investigation, we initially targeted a pre-sample of about 280 firms. The selection was based on the industry classification on the stock exchange and other centers for the monitoring of Chinese economy. Only companies that recruitedmore than15 full-time foreign employees were considered eligible for the sample. The reason for this choice can be explained by the unavailability of an adequate human resource system (suitable for this study)in smaller firms (see Huselid 1995). Given that China is rapidly trending towards a hi-tech economy, about 30% of firms selected were manufacturing firms, and 70% from service and hi-tech industries. Other criteria used in the selection of the sample included;
**Age (Log** (Age)**):** The longevity of the firm (at least 8 years old) was important for us to examine the trend in the human resource practice.
**Size (Log(**employees**)):** The number of employees (with at least 15 foreigners) was used to select firms that have suitable human resource systems that were adaptable to our research.
**Type of ownership:** Firms with private ownership, state ownership, foreign ownership and joint ventures were also thoroughly considered as part of the sample.
After removing the outliers, a total of 200 firms were retained as the main sample population for the research. Fig1 below summarizes the various variables whose data will be essential for this investigation.

| Variables | Sub dimension |
|---|---|
| **1. Control variables(CV)** | **Firm size(scale)**<br>**Firm age(age)**<br>**Type of ownership(type)**<br>**Industry type(industry)** |
| **2. Human Resourceflexibility(mediating variable, MV)** | **Employeeskill flexibility(ESF)** |
| **3. Environmental uncertainty(independent variable, IV)** | **Technology(Tec)**<br>**Employment(Emp)** |
| **4. Firm performance(dependent variable, DV)** | **The employee level performance(ELP)**<br>**The operating level performance(OLP)** |

**Fig2:**Summary of questionnaire variables

**Data collection:**In order to take into account as many different industries as possible while maintaining the scope of the study, a questionnaire-based survey was conducted in which only one respondent was chosen from each firm. Given that this study involved investigation from a wide range of industries in mainland China, a single respondent design was used (Huselid 1995; Worren, Moore and Cardona 2002; Batt 2002;). Due to the sensitivity of this process, it was important to get a more reliable and objective perception of the human resource system. To obtain this objectivity, we selected respondents from top level management with at least six (06) years of work experience, and a good mastery of the basic operations and business environment of the firm.The decision to choose non-human resource managers as respondent was to guarantee the fairness of the data collection process. They included the chief executive officer(CEO), chief financial officer(CFO), chief operations officer(COO).By selecting respondents who are not from the human resource department,weenhance the reliability of measurements (Batt, 2002) because their objectivity about the human resource system is not biased. Middle level managers were selected in firms where we couldn't get top managers as respondents. Among the respondents, we recorded a 92%(CEO = 40%, CFO = 20%, COO = 32%) response rate for the questionnaire which was very acceptable(see fig2 below). We only had 7% foreigners and 93% Chinese.

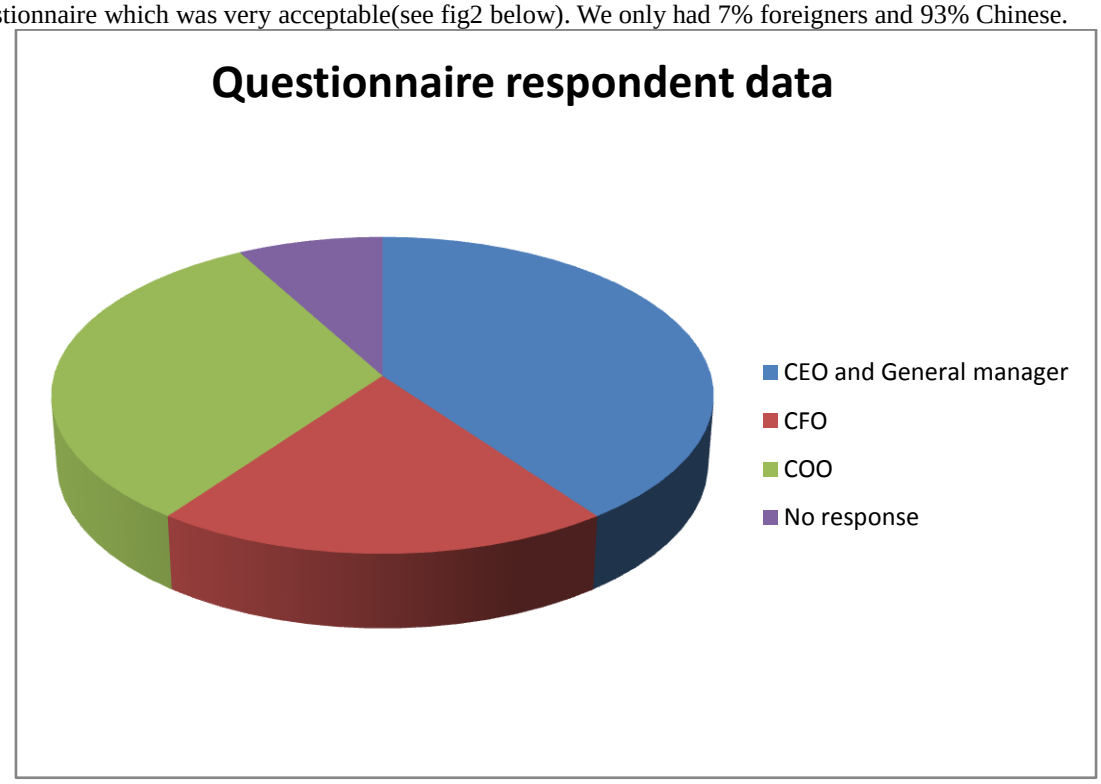


**Fig3:** Questionnaire respondent data

**Conduct of the investigation**

The data from the questionnaire was analyzed with the help of statistical tools. Initially, the test of the validity was carried out via the measurement of the Reliabilities. Table3 shows that the questionnaire componentswere properly loaded on their correspondingvariables. The sampling appropriateness and degrees of freedom were .875, and 861 respectively.

The descriptive analysis of the different means, standard deviations, together with the correlation

between variables is shown in Table2. The data reveal that the standard deviation of .8656 for **Tec(see fig3)**, .8142 for **Emp** are the most normally distributed meanwhile.712 for **ESF,**and .7087 for OLP are skewed to the right.

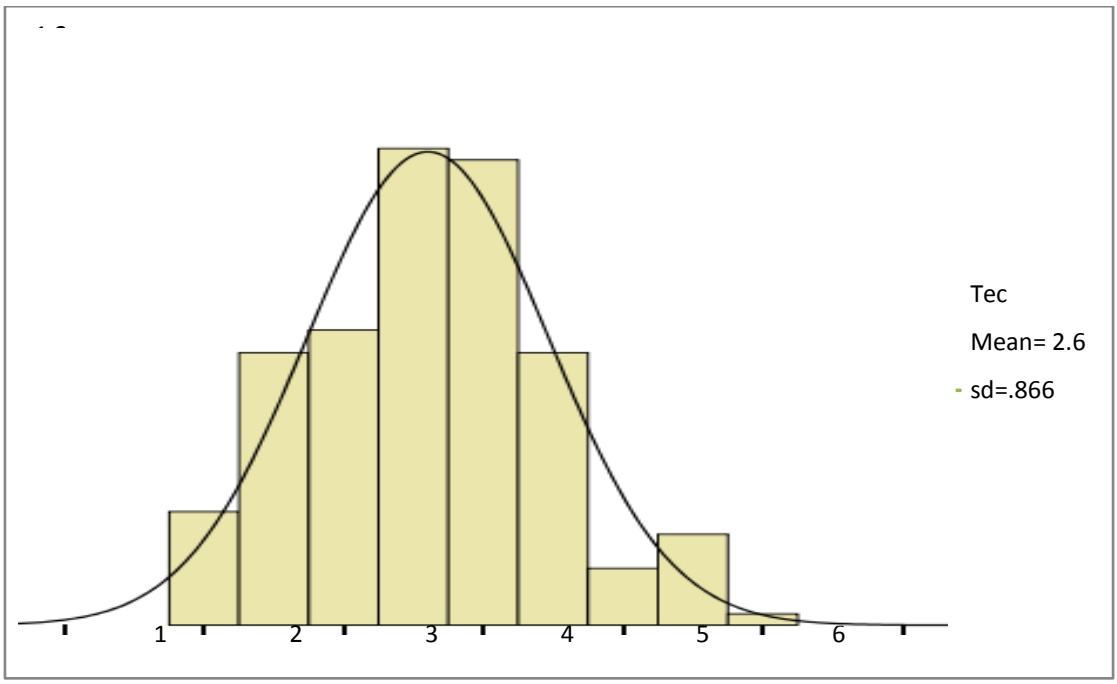


**Figure 4:**The distribution of the sub-dimension variable (Tec).

**Table2: Descriptive Statistics**

| | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ELP** | 2.059 | .5977 | 1 | | | | | | | | |
| **OLP** | 2.135 | .7087 | .822* | 1 | | | | | | | |
| **EMP** | 2.302 | .8142 | .262* | .236** | 1 | | | | | | |
| **TEC** | 2.602 | .8656 | .484* | .439** | .537** | 1 | | | | | |
| **ESF** | 2.29 | .712 | .462* | .443** | .442** | .744** | 1 | | | | |
| **Scale** | 2.30 | 1.054 | -013 | -.037 | .180** | .004 | -.053 | 1 | | | |
| **Age** | 2.48 | .834 | -145 | -.149* | .016** | -.142 | -.307** | .310** | 1 | | |
| **Type** | 2.53 | .928 | .075 | .020 | -.036 | .003 | -.006 | .138 | .221** | 1 | |
| **Industry** | 3.72 | 1.457 | -.173 | -.119 | -.237* | -.180** | -.226** | -.264 | .064 | -.064 | 1 |

**. P< 0.01
*. P<0.05

Table2 also shows the correlationcoefficients of the variables. The outcome shows that the two dimensions of firm'sproductivityare strongly correlated: .822 between ELP and OLP. The ESF index is moderately correlated with all two dimensions of firm's productivity: .462 between ESF and ELP, .443 between ESF and OLP. Emp and Tec are moderately correlated with .535 between them. We can also see a positive correlation .262 between Emp and ELP. But the correlation between Tec and Emp is .484 which is moderate.

**Table3:** Measurement of reliability

| Sampling and Bartlett test | | |
|---|---|---|
| Sampling appropriateness | | .0875 |
| Bartlett test | Appropriateness | 3430.986 |

| | | |
|---|---|---|
| | degrees of freedom(N) | 861 |
| | Significance | .000 |

In order to establish the intermediaterole of employee skill flexibility on firm performance, we had to carry out regression analysis.
Given that the employees are from 181 different firms, we only used the intercept of the variables as the predictor of our outcomes. An ordinary regression analysis to confirm the reason for conducting the test was carried out. This process will be used to establish the variable coefficients and significance within a 95% confidence interval.
Initially, the regression of ELP on both Tec and Emp with ESF as the mediating variable generated some coefficients and values(see appendix 1). This relationship is highlighted in Fig5 below.

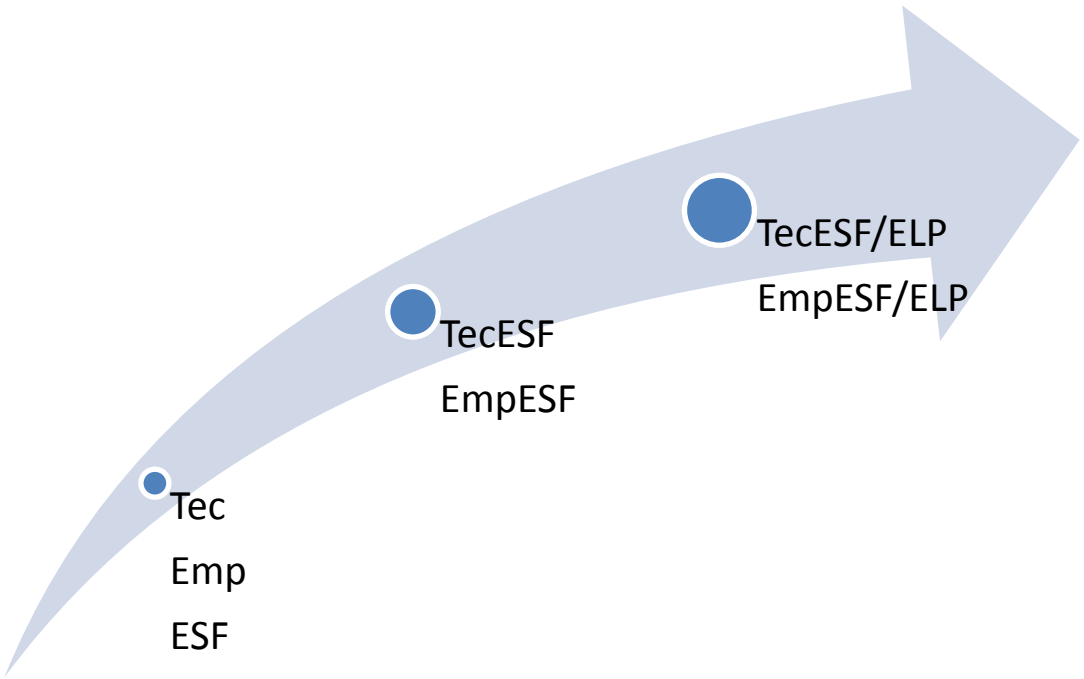


**Fig5:** Regressing ELP on TecESF, and EmpESF

R-square=.429
BetaESF=1.275, BetaTecESF=-1.852, BetaEmpESF=.024
F-value= 23.733

The next sub-modelis comprised of regressing OLP on Tec and Emp with ESF as the mediating variable. The coefficients and values obtained from this regression are shown in appendix2. Fig6 below summarizes this relationship.

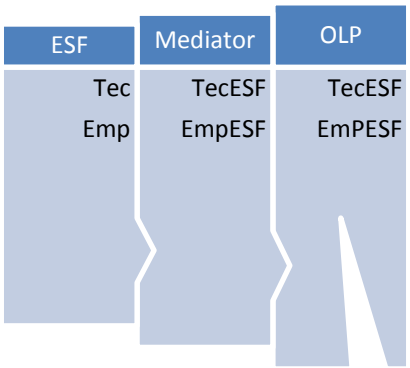


**Fig6:**Regressing OLP on TecESF, and EmpESF

The F-value, Beta coefficients, and R-square were derived from appendix2.
R-square = .371
BetaESF = 1.271, BetaTecESF = -1.767, BetaEmpESF = -.025

F-value = 19.671
The third sub-model to be investigated consists of regressing OLP on ELP.

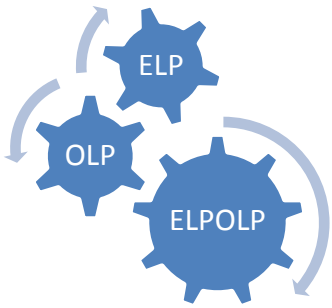


**Fig7:**Regressing OLP on ELP.

From the table in appendix3, we can obtain the values and coefficients of the required variables.
BetaELP = .825
R-square = .679
F-value = 349.196

As shown in Table4 below, to carry out the hypothesis testingwe applied hierarchical regression analysis. During this process weentered the control variables first, followed by the ESF index,TedESF, EmpESF, then ELP index (independent variables). The table summarizes this regression model with ELP and OLP (dependent variables). In addition, the variance factors for the test of linearity of ESF and ELP dimensions were verified (Myers, 1990; Neter, Wasserman, & Kutner, 1990). The variance factors (R-square) were found to be within acceptable limit (see Table5 for the result).

**Table 4:** Mediating effect of employee skill flexibility on firm's productivity

| | **Dependent Variables** | | | | | |
|---|---|---|---|---|---|---|
| Variables | ELP | | | OLP | | |
| | Beta | N | residual | Beta | N | residual |
| **Control variables** | | | | | | |
| Scale | .029 | | | .021 | | |
| | | | 171 | | | |
| Age | .018 | 9 | | .024 | | |
| | | | | | 9 | 171 |
| Type | .000 | | | -.049 | | |
| Industry | -.023 | | | .021 | | |
| **Independent variables** | | | | | | |
| ESF | | | | | | |
| TecESF | 1.275 | 9 | 171 | 1.271 | 9 | 171 |
| EmpESF | -1.852 | | | -1.767 | | |
| | .024 | | | -.025 | | |
| ELP | | | | | | |
| | | | | .825 | 5 | 175 |

N=Degree of freedom
ELP=Employee level productivity
OLP=Operating level productivity
ESF=Employee skill flexibility

## IV. Results

The coefficient of the various variables obtained from the regression analysis helped us confirmed whether the hypotheses were supported or not. Table5 summarizes these results

**Table5:** Summary of the result of the hypothesis testing.

| Hypothesis | Hypothesis width | Beta | R square | F | P value | Status |
|---|---|---|---|---|---|---|
| H1 | TecESFELP | -1.852 | .429 | 11.193 | .000 | Unsupported |

| | | | | | | |
|---|---|---|---|---|---|---|
| H2 | EmpESFELP → | .024 | .429 | 23.733 | .000 | Supported |
| H3 | TecESFOLP → | -1.767 | .371 | 11.13 | .000 | Unsupported |
| H4 | EmpESF → OLP | -.025 | .371 | 19.671 | .000 | Supported |
| H5 | ELP → OLP | .825 | .679 | 349.196 | .000 | Supported |

Thegeneral objective is to investigate whether the mediating effect of ESF on the influenceofenvironmental uncertainty onfirm's performance is strong and positive or not. The results from the above table are elaborated below.

**H**1: There is a significant positive impact of TecESFon ELP..

It was observed that ELP was regressed on TecESF to test the hypothesis H1. The result shows that TecESF significantly predicted ELP, $F(9,429) = 11.193$, $p<0.001$ which indicates that ESF can play a significant role in shaping ELP($b = -1.852$, $p < 0.001$). These results clearly direct the strongly negative effect of TecESF. In addition, the R-square = .429 indicates that this model explains 42.9% of the variance in ELP.

**H2:** There is a strong and positive effect of EmpESP on ELP.

To test for H2, ELP was regressed on EmpESP. The regression data shows that EmpESP predicted ELP, $f(9,429)= 11.193$, $p<0.001$. This indicates that EmpESP can play a role in shaping ELP(b=.024, P,0.001) indicating the weak positive effect of EmpESP. Moreover, the R-square = .429 indicates that this model explains 42.9% of the variance in ELP.

**H3:**TecESF has got a significantly positive effect on OLP.

In this test, the operational level performance(OLP) was regressed on the TecESF variable to test forhypothesis H3. Our outcome reveals that TecESF significantly predicted OLP, $F (9,371) = 11.13$, $p<0.001$ indicating that TecESF plays a significant negative role in shaping the value of OLP ($b =-1.767$, $p< 0.001$). Furthermore, the R-square = 0.371 explains a 37.1% of the model variation in OLP.

**H4:** There is a strong and positive influence of EmpESF on OLP.

By regressing OLP on EmpESF to test for H4, it was revealed that EmpESF significantly predicted OLP, $F(9,371) = 11-13$, $P<0.001$. This shows thatEmpESF plays a weak positive role in shaping OLP ($b = .025$, $p<0.001$). The value of R-square =0.371 explains a 37.1% of the model variation in OLP.

**H5:** There is a significant positive impact of employee level performance (ELP) on operating level performance (OLP).

The regression of the OLP on ELP to test for H5 shows that ELP significantly predicted OLP, $F (5,679) = 13.829$, $p <0.001$ indicating that ELP can play a significant role in shaping OLP ($b = 0.825$, $p < 0.001$). This clearly directs the strongly positive effect of ELP. Moreover, the R-square = 0.679 depicts that this model explains 67.9% of the variance in OLP.

**Discussion and conclusion**

This research examined the mediating effects of human resourceflexibility on the influence of unstable environment on firm's performance with main focus on employee skill flexibility (ESF). The study was conducted among a sample of Chinese companies recruiting both Chinese and foreign employees in mainlandChina. We also investigated the effects of employee level performance on operating level performance.

The end result of this investigation was obtained through a scientific process comprising different stages. We started by first establishing a valid measurementfor environmental uncertainty that was suitableour study. Secondly, the roles of employee skill flexibility in mediating the effects of unstable environmentonemployee leveland operational levelperformance were studied through multiple regression analyses. This was followed by testing of a multi-level full causal model through structural equation modeling. The generality of our results obtainedfrom both manufacturing companies (30%), and hi-tech companies (70%)can be identified as important milestone in strategic human resource management research. This result was guaranteed by a credible sample selection of respondents who were non-human resource managers with many years of professional experience.The analysis of the exploratory factors of the questionnaire dataas shown in Table3clearly signifies that the different dimensions are distinct but interrelated.

The hypothesis testing of the different components of the business environment, firm'sperformancereveals that foreign employee skill flexibilityis weak and positively associated with employee level, and operational level performance in Chinese firms.

The relationship between employee level performance (ELP) and firm operating performance (OLP) was examined in this study. The results showed that ELP is strong and positively related toOLP. From this

finding, it was derived that employee skill flexibility exhibits an important role in improving firm operating performance becausethe rapid response time can be reduced by a variation in skills.

The results from our study also confirm that intangible assets in human coordination and skills are a source of competitive advantage for the firm (Bhattacharya et al. / Human Resource Flexibility 635)(Lei et al., 1996; Hitt et al., 2001; Miller & Lee, 2001; Wright et al., 2001).Although we did not directly assess the "fit" of foreign employee skill flexibility with that of the Chinese employee, our study shows that skill variety provides the potential for greater fit by improving thepossibilities for the firm to compete.

Further study should explore the degree to which the "fit" between foreign and Chinese employee skill flexibility can enhance firm operational performance in some specializedsectors over a long time period.

Even though our study could notfocus on the long-term effect, our performance measures are at least partially collected after the flexibility measures. In the future, researchers can explore the extent to which dimensions of human resource flexibility are related with firmperformance over a long time period.

**Theoretical significance:**The results from this study have got far reaching implicationson the improvement of workplacecapability literatures (Allen et al., 2013). The second significance is that it ascertains the acquisition of superior firm performance. This achievement occurs when the environmental expectations perceived by managers are been matched with adequate human resource flexibility possessed by the firm. Data obtained from the different Chinese companies involved in this study agreed with the above implication theory.Ananalysis on the efficiency of skill flexibility of employee has fundamentally been developed in response to a risein employment challenges and fluctuations. Another implication is that of employee skill flexibility beingapplied to tackle issues regarding the rapidly evolving technology. This study, however, shows that employee skill flexibility is highly valued among foreign and Chinese workers, and is also important for the firm operationalperformance. Hence, human resource flexibility should not only be theorized with respect to balancing the demands in employment needs, but also, and perhaps primarily, with respect to the rapid technological innovation, as well as the fluctuations in the markets. Therefore, the reasons for employees to adopt human resource flexibility are as important as studying the need for people to use these practices. Hence, availability of employee skill flexibility can be an important signal through which employees become engaged and efficient while applying the use of flexibility. This may further enhance the firm'sproductivity and improve their competitiveness.

Future studies can focus on investigating how dual career couples with young kids in Africa can adopt different types of skillflexibility to create competitive advantage within varying business situations (Sirmon et al. 2007).

**Limitations:** Although this study has revealed a lot of new and positive ideas in this research area, it has beenproven to have some setbacks which deserve further investigation.

The study was carried out within a very short time period. A research design based on long term data collected in different time intervals would have been ideal. Further research may endeavor to include these improvements.

Due to the adoption of physical confinement measures during the investigation period(covid 19), getting access to some top managers was very difficult, hence leading to a delay and lack of credible data collected from certain firms.

The study focused generally on foreign employees working in companies in mainland China. It did not include Chinese employees working with foreigners in Chinese companies outside China.

The fit between Chinese and foreign skilled employees, and the extent to which they enhance firm productivity was not done. An empirical study to examine how to quantify the effect of foreign skill flexibility in different industries should be carried out in the future.

**Practical significance of the study:** There aretwo main implications for managerial procedures in firms.

The putting in place of some standards for the evaluation of environmental uncertainty would help managers make accurate assessment on how to implementhuman resourceflexibility procedures in situations where there arecontinuous changes in the business environments. This assessment will help speed-uptheputting-in-place of relevant guidelines that would stimulate theappropriate skills requiredto match the adequate environmental threats and opportunities.

Managers may be aware that it is necessaryforworkersto beflexible, because it enhances competitiveness and improves productivity. Organizations having a wide variety of options from which workers can rely in order to improve productivity will perform better in the long term.

The customization of work schedulesin such a way that it permits employees to decide on which way they would want to carry out their work, will definitely increase theirwillingness to work, and improve the organization's productivity (Rousseau, 2005). Furthermore, firms should note that flexibility is not only an issuefor individual employees, but also for employees working as a team.

## V. Conclusion

Our research was based on investigating the role of human resourceflexibility (ESF) on the influence ofunstableenvironment (Tec, Emp)onfirm'sperformance (ELP, OLP). The study focused on showing whether employee skill flexibility of foreign employees will mediate this relationship. The hypotheses and results predicted, and found that the availability of employee skillflexibility would be WEAK and positively related to employee level and firm's operational levelperformance. Hence, this study provided some further evidence for the business case for the need of human resourceflexibility (De Menezes & Kelliher, 2011). In general, this study goes to ascertain the fact that the effects of human resourceflexibility in Chinese firms is vital to take employee skill flexibility into consideration.

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## Appendices

### Appendix1

| Model | R | R square | adjusted R-square | Standard error | Change statistics: Change in R-square | Change in F-value | N1 | N2 | Significant change in F | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .240[a] | .058 | .036 | .5868 | .058 | 2.691 | 4 | 176 | .033 | |
| 2 | .520[b] | .270 | .240 | .5209 | .212 | 16.778 | 3 | 173 | .000 | |
| 3 | .655[c] | .429 | .399 | .4635 | .159 | 23.733 | 2 | 171 | .000 | 1.953 |

a. Predictor variable: (constant), industry, type, age, scale

b. Predictor variable: (constant), industry, type, age, scale, Tec, Emp, HRflex

c. Predictor variable: (constant), industry, type, age, scale, Tec, Emp, HRflex, EmpHR, TecHR

d. Dependent variable: ELP

### Appendix2

| Model | R | R-square | adjusted R-square | Standard error | Change statistics: Change in R-square | Change in F-value | N1 | N2 | Significant change in F | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .193[a] | .037 | .015 | .70324 | .037 | 1.700 | 4 | 176 | .152 | |
| 2 | .475[b] | .226 | .195 | .63599 | .189 | 14.062 | 3 | 173 | .000 | |
| 3 | .609[c] | .371 | .338 | .57678 | .145 | 19.671 | 2 | 171 | .000 | 1.993 |

a. Predictor variable: (constant), industry, type, age, scale

b. Predictor variable: (constant), industry, type, age, scale, Tec, Emp, HRflex

c. Predictor variable: (constant), industry, type, age, scale, Tec, Emp, HRflex, EmpHR, TecHR

d. Dependent variable: OLP

**Appendix3**

| Model | R | R square | adjusted R-square | Standard error | Change statistics: Change in R-square | Change in F-value | N1 | N2 | Significant change in F | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .193[a] | .037 | .015 | .70324 | .037 | 1.700 | 4 | 176 | .152 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | .824[b] | .679 | .669 | .40748 | .641 | 349.196 | 1 | 175 | .000 | 1.784 |

a. Predictor variable：(constant), industry, type, age, scale

b. Predictor variable：(constant), industry, type, age, scale, ELP

c. Dependent variable：OLP