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An Identification of Various Risks to evaluate the performance in Knowledge-Based Companies

Mohammad Reza Hasanzadeh, Behrooz Arbab Shirani, Gholam Ali Raissi Ardali

Department of Industrial & system Engineering, Isfahan University of Technology, Isfahan, Iran

K E Y W O R D S: Structural Equations, Knowledge Management, Performance; Risk Assessment; Management Risk, Rules and Regulations Risk, LISREL.

ABSTRACT: The purpose of the present study was to identify various risks in knowledge-based companies. As an applied and correlation study, the project employed library and field methods to gather required data. The statistical population included all managers and experts of knowledge-based companies in Tehran (N = 380). Using Morgan's Table, the sample size was computed 181. In this study, we firstly provided the research design and then, collected the literature related to the topic. Having studied the literature, we proposed a conceptual model and designed a questionnaire for the statistical population. The provided questionnaire contained 7 items indicating corporate performance benchmark and 6 items identifying and measuring risks such as political risk, rules and regulations, operational human resources, industry, and management. The validity and reliability of the questionnaire was also confirmed. Finally, the obtained data was analyzed using Structural Equations Model through LISREL and SPSS Softwares. As the research findings revealed, there is a significant negative relation between the company performance and political risks, rules and regulations, operational human resources, industry, and management.

Introduction

While in the past knowledge was not considered to be a main source and a driving force of economic growth and the raising of the standard of living, in the 20th century society started to realize its importance, and it has since become an integral part of economic theories and models. The economies of all developed countries are currently based on knowledge and information, and therefore they are referred to as knowledge economies. Their functioning is conditional upon creation, distribution and use of knowledge and related information.

In its right time, traditional and capital-oriented industry will be replaced with knowledge-based industries (Whittington et al., 2009; Chung, 2011).

According to Gibson (2000), knowledge-based economy refers to an economy in which knowledge production, distribution and use is the main source of growth and wealth creation. According to Soorenketo et al. (2004), knowledge-based enterprise refers to enterprises that employ university graduated individuals and specialists from their main texture and are the main source of income for them. In other words, in these enterprises, wealth is produced through applying internal capabilities of individuals.

The characteristics of a knowledge based organization, however, go beyond product to include process, purpose and perspective. Process refers to an organization's knowledge based activities and processes. Purpose refers to its mission and strategy. Perspective refers to the worldview and culture that influences and constrains an organization's decisions and actions. KBOs exhibit knowledge-intensive processes, purpose, and perspective, regardless of their product.(Zack, 2003)

In knowledge-based companies, economic growth and job creation is actualized appropriate with innovation capacity (Pettigrew et al., 2000).

Following Davenport and Prusak (2000): "Knowledge is a fluid mix of framed experiences, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information." Knowledge originates and is applied in the mind of individuals, whereas in organizations it can be embedded in routines, processes, practices, and norms (Davenport and Prusak 2000). It actively enables performance, problem-solving, decision-making, learning and teaching by integrating ideas, experience, intuition, an skills, to create value for employees, the organization, its customers, and shareholders (Liebowitz 2000; Probst et al. 2000). Commonly agreed, knowledge can be split into two types: explicit and tacit (Polanyi 1997 and Nonaka and Takeuchi 1995). Tacit knowledge is held by experts, having topic specific as well as cognitive skills that contain patterns of thought or notions, beliefs, institution and mental models. Explicit knowledge can be articulated in an artifact of some type outside a human being and be transferred e.g. to non-experts.

Explicit knowledge is rational and includes theoretical approaches, problem solving, manuals, and databases. The transfer of knowledge from tacit to explicit or explicit to tacit can be viewed as a continuous learning process becoming the so-called knowledge spiral (Nonaka and Takeuchi 1995; Senge 1990). It enables building and conveying knowledge in need of good "Knowledge Management" to enhance the process, finally leveraging corporate performance.

In today's economy – knowledge-based economy – the value of goods, services and companies is created not only by tangible assets but mostly by assets based on all kinds of knowledge – Intangible Assets. Results obtained from traditional factors such as labour, land and capital are more and more dependent on effective usage of knowledge and therefore knowledge management.

The main characteristics of knowledge-based economy or intangible economy according to Andriessen (2004) are the following:

Knowledge replaces labour and capital as fundamental resources in production and intangible assets create a substantial part of the value added of companies;

The knowledge content of the products and services is growing rapidly;

The concept of ownership of resources has changed: knowledge resides in the head of employees;

The organizations have changed and the management of intangible resources is different from tangible or financial resources.

In 1959 Penrose E. wrote that a company is both an administrative organization and a set of resources: productive and human. According to Penrose just the resources themselves do not take place in production processes, all resources should be transformed into services. Services are the function of experience and knowledge obtained by a company. This thought was widely developed only in 1980s. And now almost everyone stays to the position of Nonaka and Takeuchi who wrote in their book "The knowledge – creating company" that only those companies that can create knowledge can be successful in today's world.

The knowledge in today's economy becomes a locomotive that defines the development of the contemporary companies. The successful companies are, undoubtedly, those constantly introducing the innovations based on new technologies as well as on knowledge, experience and attainments of their employees. It is arguable that the value of companies is now mostly generated by Intangible Assets, and not by "traditional" assets having the tangible form.

The surveys reveal that 2/3 American companies have recently turned to pro-active thinking and place a higher emphasis on collection and analysis of non-financial data. The same surveys confirm the fact, that one third of all the effected investment solutions is based on the existing Intangible Assets, and that the decisions made on the basis of Intangible Assets allow to make a more accurate prediction of income and profitability of a company in the future, and, hence, the company's value for the shareholders. The inclusion of the effects connected with the Intangible Assets of a company into the measuring system of the activity results admits making them more efficient, and, therefore, opens the possibility of making executive compensation system more efficient as well.

Even though there does not exist the only one right method for knowledge valuation, nowadays a wide variety of methods are developed. According to the latest surveys only from 6 to 30% of company's value are obtained from tangible assets. Everything else comes from Intangible Assets. That is why about 50% of all investments of companies are made in the sphere of Intangible Assets: R&D, personnel development, infrastructure, etc. [see Fuler, 2002]. That is why it is more and more important for managers to pay attention to Intangible Assets and be able to evaluate them in order to use them more effectively and obtain core competences for their companies. (Volkav, Granina, 2007)

According to the opinion of B. Lev, the terms Intangible Assets, Knowledge Assets and Intellectual Capital are interchangeable owing to the fact that all three terms are "widely used: Intangible Assets in accounting literature, Knowledge Assets – by economists, Intellectual Capital – in management and law literature; and on the whole they come to the same: to the future benefits that are not embodied materially" (Lev, 2003).

Hence, Intangible Assets, or Intellectual Capital, are defined by B.Lev as "non-physical sources of value (claims to future benefits) generated by innovation (discovery), unique organizational designs, or human resource practices". Intangible Assets, as defined in (Lönnqvist, Mettänen, 2002), are non-material sources of creating a company's value, based on the employees capabilities, organizations' resources, the way of operating and relations with the shareholders. In (Lönnqvist, Mettänen, 2002), as in (Lev, 2003), the terms Intellectual Capital and Intangible Assets are suggested for interchangeable usage.

Intangible Assets are a company's "weightless wealth" that helps it to obtain real profit. Every company should understand that nowadays paying much attention to Knowledge Management in general and to Intangible Assets especially may help to create and develop its core competences and thus yield competitive advantage on the market. (Volkov, Garanina, 2007)

In the time of knowledge economy, knowledge management has become a critical factor for a business' survival and development of industrial clusters. The enterprise knowledge management in Industrial clusters aimed at achieving spread and proliferation of explicit knowledge and tacit knowledge in industrial clusters. (Fang,. Et al. 2011)

Within the last years, nearly all major corporations started Knowledge Management (KM) initiatives, particularly to strengthen the knowledge base within the organization, especially to help employees share, activate and increase their knowledge to finally generate a more innovative, faster acting, competitive organization. Recognizing knowledge as the primary intangible resource to make companies more efficient and effective was the basis for the "knowledge-based economy" and for KM. Increasingly sophisticated customers, new technologies, eager new competitors, and the need for more innovative products forces companies to be able to manage their knowledge assets well. The introduction of a KM initiative is a large investment for many corporations. Therefore performance measurement systems are required to make the benefits and the performance of KM initiatives transparent. Especially in times of scarce budgets the usefulness of KM is in doubt, as the business impact of such initiatives often can be hardly quantified or is only indirectly measurable.

Despite the overwhelming feedback KM has gained in the past years, implementations of KM initiatives often still lack appropriate performance measurement systems (Amelingmeyer 2000; Davenport et al. 2000; Gentsch 2000; Nonaka et al. 1995).

Current measurement approaches for Knowledge and KM, such as Tobin's Q (North et al. 1998) or Calculated Intangible Value (Stewart 1997), solve this problem only partially.

KM is about interventions in the organizations' knowledge base, which by definition includes individual and collective intellectual assets that help an organization to perform its tasks (Amelingmeyer 2000; Probst et al. 2000; Romhardt 1998). It undergoes regular changes that constitute organizational learning (Senge 1990). A review of the early KM literature shows that raw technical approaches drew the initial interest, but are not sufficient to produce the desired outcome of KM (Davenport and Prusak 2000; Probst et al. 2000). While intranets and information repositories may provide means for people, they are not good in helping people apply the new knowledge in the context of process work (Massey et al. 2002). Therefore every KM initiative has not only technical aspects, but also involves people and processes.

There is uncertainty in everyday life, in organizations and projects (Olsson, 2007), representing a clear threat to the business, but also in itself is a significant opportunity that must be taken (Hillson, 2011). There is a connection between uncertainty and risk as Hillson (2004) indicates: "The risk is the uncertainty measured, and uncertainty is a risk that cannot be measured"

Risk is a multifaceted concept (Wang et al, 2004), which is defined as the probability of a damaging event occurring in the project, affecting its objectives (Yu, 2002; Baloi and Price, 2003) however not always associated with negative results. Risk may also represent opportunities, but the fact that most of the risk usually has negative results has led individuals to only consider the negative side of risk (Baloi and Price, 2003; Hillson 2011).

In economic theory, risk refers to situations where the decision maker can assign probabilities to different possible outcomes (Knight, 1921). Similarly, in decision theory, risk is the fact that the decision is made under the condition of known probability over the states of nature (Luce and Raiffa, 1957). In project management, there is no consistent definition for risk (Ward and Chapman, 2003; Perminovaetal., 2008). In the project management body of knowledge (Project Management Institute, 2004), risk is considered as ''an uncertain event or condition that, if it occurs, has a positive (opportunity) or negative (threat) impact on project objectives. ''However ,many practitioners and researchers in project management still consider risk to be more related to adverse effects on project performance (Williams, 1995;BoehmandDeMarco,1997;SmithandMerritt, 2002; WardandChapman,2003).

Today, risk management is an integral part of project management (Olsson, 2007; del Caño and de la Cruz, 2002), where one of the most difficult activities is determining what are the project's risks and how should they be prioritized (Anderson, 2009). This is a key process and most of project managers know that risk management is essential for good project management (Baloi and Price, 2003; Perera and Holsomback, 2005; Alali and Pinto, 2009).

Risk management is defined as the process of identifying and assessing risk, and to apply methods to reduce it to an acceptable extent (Tohidi, 2011). Then, the main purpose of project's risk management is to identify, evaluate, and control the risk for project success (Lee et al, 2009). Overall, risk management process includes the following main steps: (1) Risk planning; (2) Risk identification; (3) Risk assessment (qualitative and quantitative);

(4) Risk analysis; (5) Risk response; (6) Risk monitoring, and (7) Recording the risk management process (ISO 31000:2009; Baloi and Price, 2003).

Risk management is a structured approach for the identification, assessment, and prioritization of risks followed by planning of resources to minimize, monitor, and control the probability and impact of undesirable events (Smith and Merritt,2002). It has been widely applied in many disciplines, such as management, engineering, insurance, finance, environment, politics, etc. In R&D management, the major purpose of risk management is to increase success rate of an R&D project, which will lead to corporate success. (Wang,. Et al, 2010)

Several researchers have developed risk management methodologies to improve success rates of R&D projects. Browning et al.(2002) proposed a risk value methodology that quantifies technical performance risks to identify ,assess ,monitor ,and control the identified risks throughout the project.

The following risks have been considered in the present study:

Political risk

Political risk does not have one single definition, although it may generally be understood as the risk of unanticipated transformations in the national and international business environment as a result of political changes, caused by governments' decisions and causes various problems for investment. When these changes are applied from the behalf of legal references or governmental offices, regardless of the potential presence or absence of political or economic benefits, risk is called political risk. The changes of rules such as tax rules and export and import related regulations will lead to political risk. Domestic investors mainly face domestic political risk. Political risks mainly drive from rules changes, binding cases for certain regions, prices, and required documents. In addition to social and political events such as elections, war, revolution, revolts, and various objections proportionally influence investment risk (Lehkonen.2015);

Rules and regulations risk

Several definitions of regulatory risks are known from the literature. According to Wright et al. (2003, p. 118) the most obvious definition states that "regulatory risk arises whenever regulation affects the cost of capital of the regulated firm". This type of risk is one of the important types of investors' risk. This risk derives from three general categories of regulations change which are as following:

Changes in regulations of a beneficiary company: most of financial institutes start to act by taking license. This license will include risk; that is, this license may not be extended. Accordingly, investor has to lose heavy money in his/her investment. As a significant instance, it can be referred to the nationalization of banks during the last three decades in most of countries.

Changing in operational policy of authorities formulating regulations such as decreasing benefit level in the 1980

Changing capital adequacy, regulations related to determining the minimum required capital specify which organizations can survive and which should be omitted in financial scenes. In industrial environment in which such rules and regulations are more pale, market determine the survival and omission of organization. However, in an environment with non-market regulations, authorities specify this issue (Knieps, 2007)

Human resources risk

This type of risk is related to personnel policies of a company such as employment, education, motivation, and maintaining employees. Human resources risk appears in various forms such as losing valuable employees, inadequate or inaccurate motivation risk of mangers and etc. For example, if a specialized employee with high technical knowledge leaves organization, the system can be paused and disturbed. Obviously, companies pay heavy salaries to individuals to be immune from such a risk (Stevens, 2005).

Operational risk

This kind of risk can occur due to inefficacy of personnel (people risk), technology (technology risk), and work (process risk. The most important factors influencing operational risk are as follow:

Internal fraud: refers to fraud by employees

External fraud: refers to those

Unintentional factors or carelessness due to employees or unsecure work place which cause to physically remove assets.

Factors due to the performance of facility receivers

External factors such as legal limitations, political evolutions, and natural factors, designing appropriate internal control system, training employees, applying necessary expertise appropriate with the complexity of company or organization's affairs are the best method of covering this risk. Some factors influencing this function include applying appropriate and efficient technology, particularly regarding IT, applying cautious principles of contracts and predicting some probable dangers and providing some management methods (Shafer, 2013)

Industry risk

Refers to a group of companies competing with each other in a market and in fact, has an identical territory or market. Industry risk includes investment return fluctuations which are probable due to certain events and changes in a certain industry. These changes are caused due to the change of prices at national or international level, industry life cycle, tax of an industry's products, issues related to workers unions in an industry, access to primary resources, and other similar factors. (Alessandri, 2006)

Management risk

The risks associated with ineffective, destructive or underperforming management, which hurts shareholders and the company or fund being managed. (Li, 2014)

Improper decisions of administrative mangers of companies and institutes can be followed by negative consequences for their organization. Based on various management levels, risk level due to improper decisions is different and influences the performance of organizations at different levels (Ismaeilzade, 2012).

Methodology

The purpose of the present study was to identify various risks in knowledge-based companies. As an applied and correlation study, the project employed library and field methods to gather required data. The statistical population included all managers and experts of knowledge-based companies in Tehran (N = 380). Using Morgan's Table, the sample size was computed 181. In this study, we firstly provided the research design and then, collected the literature related to the topic. Having studied the literature, we proposed a conceptual model and designed a five-point Likert Scale-based questionnaire for the statistical population. The provided questionnaire contained 7 items indicating corporate performance benchmark and 6 items identifying and measuring risks such as political risk, rules and regulations, operational human resources, industry, and management. The validity and reliability of the questionnaire was also confirmed. Using Cronbach's alpha, the reliability of the questionnaire computed 0.949. To analyze the obtained data, descriptive and inferential statistics were employed through SPSSS and LISREL Softwares.

Findings

Descriptive Statistics

Given to the obtained results, 69.4% of the sample was male and 30.6% was female. Also, 4.4% of the sample was 20-30 years old; 30.6% was 30-40 years old; 30% of the sample was 40-50 years old; and 35% was above 50 years old. Finally, 28.1% of the sample had BA degree; 46.3% had MA degree, and 25.6% had PhD and above.

Inferential Statistics

The Proposed Conceptual Model Using Structural Equations of LISREL

Using LISREL Software, the following conceptual model was proposed for the study:

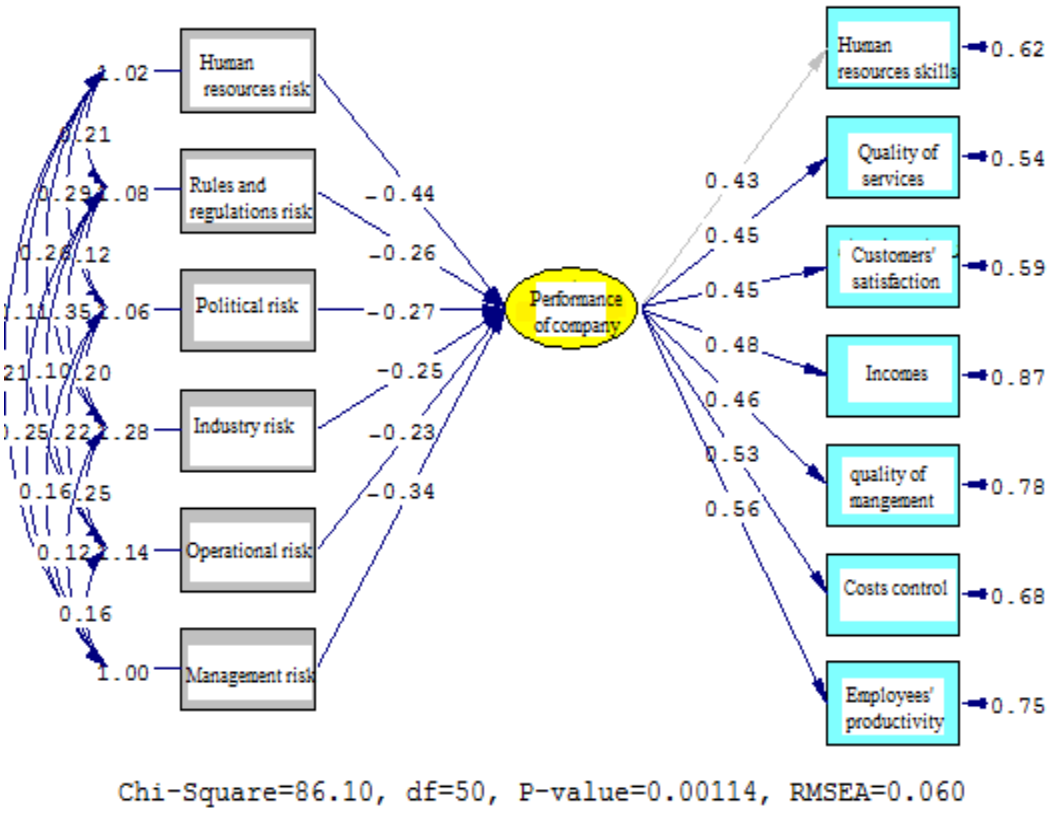

Figure 1. The conceptual model estimating the standard coefficients

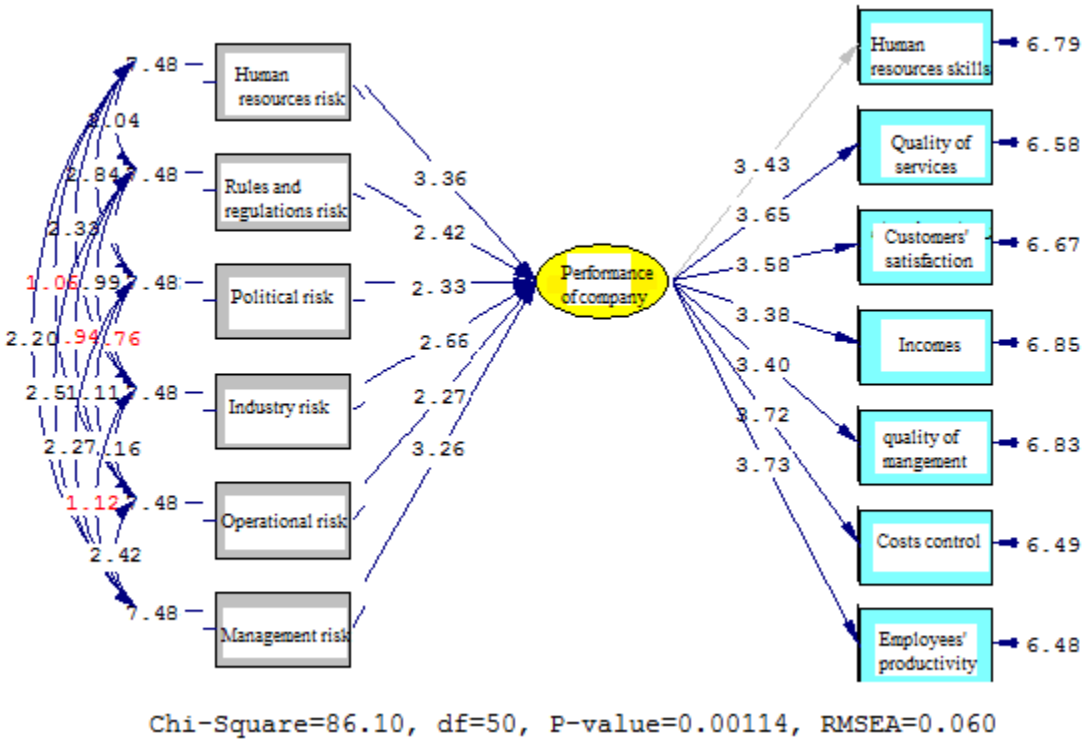

Figure 2. Structural equations model at significance state (t-value)

Figure 2 shows structural equations model of the research at significance state (t-value). This model, in fact, tests all measuring equations (factor loading) and structural equations using t statistic. According to this model, path and factor loading coefficients are significance at the confidence level of 95%. If the value of t statistic is out of the interval of – 1.96 to + 1.96, the model at significance state, shows that all factor loading are significant at the confidence level of 95%. Therefore, the convergence of the questionnaire items is found to be valid to measure the concepts in this stage. That is, the questionnaire has measured what the researcher tended to measure.

Model Interpretation

Table 1. The interpretation of structural equations model

Index	The main model estimations	Allowed limit
Chi-square	1.72	Below 3
GFI	0.92	Above 0.9
RMSEA	0.06	Below 0.9
CFI	0.92	Above 0.9
NFI	0.95	Above 0.9
NNFI	0.91	Above 0.9
IFI	0.92	Above 0.9

Generally, working with LISREL, each of indices obtained for the model are not the cause of the model fitness on its own right. In some works, for X^2/df, the value below 3 is acceptable and in the present study, this value is 1.72. GFI indicates relative value of variance and covariance explained by the model. This criterion varies from 0 to 1. The value which is closer to 1 shows higher good fitness of the model. The value of GFI for the research model has been computed 0.92. To investigate the performance of a model, particularly in comparison to other possible models in terms of explaining a set of observed data, normed fit index (NFI), non-normed fit index (NNFI), incremental fit index (IFI), and comparative fit index (CFI) have been employed. The values above 0.9 of these indices indicate highly appropriate fitness of the proposed model in comparison to other possible models. Finally, the root mean square error of approximation (RMSEA) has been used to investigate the fact

that how the considered model combines fitness and saving. In the present research, the value of RMSEA has been estimated 0.01. According to the fitness indices shown in the above table and figures, the research data has an appropriate fitness with factor structure and theoretical infrastructure of the research, indicating the convergence of the items with theoretical structures.

Testing Research Hypothesis

Table 2. Path coefficient, t statistic and hypothesis testing result

Main hypotheses	β	T statistic	Determination coefficient (R^2)	Sig.	Result
The relation between human resources risk and the performance of the company	-0.44	3.36	0.87	<0.05	Confirmed
The relation between rules and regulations and the performance of the company	-0.26	2.42		<0.05	Confirmed
The relation between political risk and the performance of the company	-0.27	2.33		<0.05	Confirmed
The relation between industry risk and the performance of the company	-0.25	2.66		<0.05	Confirmed
The relation between operational risk and the performance of the company	-0.23	2.27		<0.05	Confirmed
The relation between management risk and the performance of the company	-0.34	3.26		<0.05	Confirmed

The obtained value of determination coefficient (R^2) indicates that to what extent the existing risks explain the performance of the company variance. This coefficient has been reported 0.87 for the model. Therefore, it can be stated that the existing risks explain 87% of the performance of the company variances.

There is a relation between human resources risk and the performance of the company.

As shown in Table 2, the relation between human resources risk and the performance of the company has a path coefficient of – 0.44 (t = 3.36). The obtained t-value for this parameter is greater than 1.96. Therefore, this hypothesis is confirmed at the confidence level of 95%.

There is a relation between rules and regulations risk and the performance of the company.

According to Table 2, the relation between rules and regulations risk and the performance of the company has a path coefficient of - 0.26 (t = 2.42). The obtained t-value for this parameter is greater than 1.96. Therefore, this hypothesis is confirmed at the confidence level of 95%.

There is a relation between political risk and the performance of the company.

Shown in Table 2, the relation between political risk and the performance of the company has a path coefficient of - 0.27 (t = 2.33). The obtained t-value for this parameter is greater than 1.96. Therefore, this hypothesis is confirmed at the confidence level of 95%.

There is a relation between industry risk and the performance of the company.

Shown in Table 2, the relation between political risk and the performance of the company has a path coefficient of - 0.25 (t = 2.66). The obtained t-value for this parameter is greater than 1.96. Therefore, this hypothesis is confirmed at the confidence level of 95%.

There is a relation between operational risk and the performance of the company.

According to Table 2, the relation between political risk and the performance of the company has a path coefficient of - 0.23 (t = 2.27). The obtained t-value for this parameter is greater than 1.96. Therefore, this hypothesis is confirmed at the confidence level of 95%.

There is a relation between management risk and the performance of the company.

As shown in Table 2, the relation between political risk and the performance of the company has a path coefficient of - 0.34 (t = 3.26). The obtained t-value for this parameter is greater than 1.96. Therefore, this hypothesis is confirmed at the confidence level of 95%.

Conclusion

Rapid technology changes, the impact of political components to convey technical knowledge in knowledge-based businesses domain, the need of heavy investment in research and development, trying to maintain the dynamicity to produce new products, heavy and continuous investment in research and development section, in stability in rules and regulations especially in tariff barriers and technology transfer domain, and so forth are the items which demand the necessity of taking risk management into consideration to develop knowledge-based businesses. The purpose of propounding risk management in this domain is to identify various risks to prepare knowledge-based businesses domains in order to decrease the probable undesirable effects due to near and far environmental factors on the growing trend of such businesses. It is due to the fact that risks are a part of these businesses' reality and individuals working in this domain are inevitable to face the probable dangers of producing and exporting knowledge-based goods. It is also necessary to consider risk management as one of the motivational factors to develop knowledge-based businesses. Given that a bulk of people searching job is university graduates, developing such businesses is followed by many benefits in terms of creating job, earning exchange incomes and promoting the standard life level of citizens. Using reasonable mechanisms and identifying and evaluating uncertainties as threats and opportunities management, in addition to making use of opportunities, the probable damages due to developing knowledge-based businesses development can be minimized.

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Florian Resatscha Ulrich Faisstb, aInstitute of Electronic Business, Berlin University of the Arts, Germany, resatsch@ieb.net bCompetence Center IT & Financial Services, University of Augsburg, Germany, ulrich.faisst@wiwi.uni-augsburg.de

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