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ITJ

ISSN 1812-5638

INFORMATION TECHNOLOGY JOURNAL

ANSInet
Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Information Technology Journal 12 (21): 5975-5980, 2013
ISSN 1812-5638 / DOI: 10.3923/itj.2013.5975.5980

Internal Control Evaluation Research Based on Biotech Companies in Xinjiang

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Abstract: It is important for biotechnology enterprises to improve internal control efficiency and effectiveness under the background of industrial transformation and upgrading and structural optimization. Based on the research of internal control defect, information disclosure and evaluation methods, internal control evaluation index and model are given to conduct the quantitative and qualitative research. The fuzzy synthetic evaluation model results show that the special committees role have not been well played in the professional field, the professional level and the professional quality of company management team need to be further improved and inspection supervision mechanism does not operate smoothly and effectively in Xinjiang Tianshan Company. Furthermore, numerous risks and problems can be seen via research. Such internal control countermeasures as perfect strategy, standard system and business strategy are put forward to deal with internal control in biotechnology enterprises.

Key words: Biotechnology enterprises, internal control, fuzzy synthetic evaluation model, countermeasures

INTRODUCTION

In order to cooperate with the implementation of Sarbanes-Oxley Act (SOX rule), the auditing standards No. 2 (AS No. 2) and auditing standards No. 5 (AS No. 5) are given to establish a risk-oriented evaluation method in financial report in America. According to Canada's control standards committee, if the control provides reasonable assurance for organizations to achieve their targets, the control is effective. In China internal control is regarded as a mandatory requirement of listed companies. Biological industry is one of the strategic emerging industries in Xinjiang. There are many biotechnology companies in Xinjiang, such as Xinjiang Tianshan Animal Husbandry Bio-engineering Co., Ltd (Tianshan Company), Xinjiang Western Animal Husbandry Co., Ltd and so on. The paper aims to study the efficiency and effectiveness of internal control via quantitative method in Xinjiang biotech companies.

The first is the perspective of science of auditing, economics and organization theory (Maijoor, 2000).

The second is the perspective of enterprise management (Chen and Zhang, 2008). The third is the target-directed perspectives (Zhang *et al*., 2011). The fourth is the external perspective of listed companies (Li and Zeng, 2013). The fifth is the perspective of VBR (Bao, 2012).

According to COSO report, internal control targets include: Management efficiency, the reliability of financial reporting and the compliance of laws and regulations. In 2008 China's ministry of finance issued

According to "enterprise internal control basic norms" in China, the overall objectives of internal control aim to improve management efficiency and effectiveness to achieve the development strategy through enterprise management, asset security, the reality of financial reports and related information. The overall target is divided into the strategic target, management target, report target, compliance target and asset security target (Zhang *et al*., 2011; Jones, 1991). The major defects are divided into nine categories: internal control account flaws, training defects, the final report and the accounting policy defects, revenue recognition accounting policy flaws, duty separation defects, account checking flaws, subsidiary defects, executive's defects and technical defects (Ge and McVy, 2005). Internal control defects include control environment defects, risk assessment defects, control activities defects, information and communication defects and the internal supervision defects (Institute of Nanjing University Accounting and Finance Team, 2010). The material internal control defects are divided into specific account defects, the final report and the accounting policy defects, revenue recognition and subsidiary control defects (Tian *et al*., 2010). The internal control defects include revision behavior existed in annual report of listed companies and auditor changes (Lu, 2009). The internal control defects are negatively related to the quality of the audit committee (Krishnan, 2005). The

financial reporting errors are negatively related with the company's performance (DeFond and Raghunandan 2002). A substantial loopholes is positively related to the operation complexity and negatively related to the company size and profitability (Ge and McVy, 2005).The higher the company's accounting risk is, the greater the likelihood of its internal control defects appeared (Doyle *et al*., 2007). In order to identify defects, management-related internal control evaluation and accountant-related internal control audit should be integrated (Wu and Yang, 2011). The important and significant control deficiencies should be distinguished on the basis of the qualitative or quantitative standards (Wang, 2011).

Return On Equity (ROE) is in direct proportion to the voluntary disclosure (Bowman and Haire, 1975). Therefore, there is the rapider growth and there is the better information disclosure (Smith and Watts, 1992; Gaver and Gaver, 1993). When the company has the significant disclosure deficiencies in internal control, the company's share price falls obviously and higher capital cost appears (Ashbaugh-Skaife *et al*., 2009). As for the company's stock price, the average decline rate is 25% when it announces restatement of financial statements (Richardson *et al*., 2003). The most disclosure is related to training class's defects, board of director's defects, internal audit defects and subsidiary defects (Shan, 2010). Internal control information disclosure of listed companies is divided into internal audit report, self-assessment report, details, general statements and simple disclosure (Yang, 2009). The enterprise internal control information disclosure level (ICDI) is significantly positive to its internal control evaluation score (Zhang *et al*., 2011). The extent of voluntary information disclosure in China's listed companies is positively related to the proportion of the number of independent directors to the board of directors and profitability (Qiao, 2003). The listed company voluntary disclosure internal control information is significantly positive to the total assets scale, net interest rate of assets and the proportion of independent directors (Fang *et al*., 2009). The enterprise internal control construction and information disclosure become a mere formality (Wang, 2011).

INTERNAL CONTROL EVALUATION METHOD

The detailed evaluation method focuses on the process from the control to the risk. Starting from the enterprise internal control, the method aims to evaluate operating effectiveness of internal control design based on the existing internal control framework, so as to determine whether there are internal control defects and substantial loopholes. Defects of this method in the internal control framework are universal. The basic risk evaluation method focuses on the process from risk to control. If the internal control defects do not constitute a substantial loophole, the operation of internal control is effective. Internal Control Self-assessment (CSA) is made to irregularly or regularly evaluate enterprises and the subsidiary's internal control system and evaluate the effectiveness of internal control and its implementation efficiency (Zhang and Wu, 2005). CSA implement methods mainly include ICQ self-audit, custom questionnaire, control guidelines, interview technique, control model coordination group meetings and interactive coordination group meetings (Liu, 2008). CSA methods include guide meetings method, questionnaire survey method and management result analysis method (Yang, 2010). CSA implements mainly depend on management attitude, enterprise culture, the matching CSA implement method, status of the internal audit department and personnel quality (Deng and Liu, 2013).

INTERNAL CONTROL EVALUATION INDEX

Internal environment is divided into hard environment factors and soft ones. The former is decomposed into corporate governance structure and organizational design. The latter is decomposed into corporate culture, human resource policies and other indicators (Bao, 2012). Company-level internal control is divided into internal environment, risk assessment, control activities and so on. Operation-level internal control is divided into procurement and payment cycle, inventory and production cycle, etc (Xiong, 2012). The first class index includes control environment, risk identification and assessment, etc (Xie *et al*., 2013). The first class index includes legal compliance management, asset security, financial reports and related information, etc. (Li and Zeng, 2013).

Based on research achievements, internal control evaluation index system includes five level indicators: internal environment, risk assessment, control activities, information and communication, internal supervision system and other 23 secondary indexes. First of all, internal environment is decomposed into management philosophy and management style, governance structure, organization structure, internal audit and human resources policies. Tianshan Company sets up internal audit department, general manager office, etc. Tianshan Company audit departments conduct internal audit in operation and management, financial situation, etc. Secondly, risk assessment is decomposed into industry system evaluation, technical risk assessment, operation

risk assessment, financial risk assessment such secondary indexes. Third, control activities are decomposed into sound system, control measures and key control. Fourth, information and communication are decomposed into information collection channels, information transmission process, safe operation of information system and transparent mechanism of anti-fraud. Fifth, internal supervision is decomposed of daily supervision, special supervision, post-supervision, internal audit institutions, internal supervision defects determination and self-assessment.

INTERNAL CONTROL EVLUATION MODEL

First step aims to establish judgment matrix of the layers, using the Delphi method and corporate sample. Suppose that judgment matrix is:

$$R_i = \begin{bmatrix} u_{11} & u_{12} \cdots & u_{1j} \\ u_{21} & u_{22} \cdots & u_{2j} \\ \vdots & \vdots & \vdots \\ u_{i1} & u_{12} \cdots & u_{ij} \end{bmatrix} \quad (1)$$

And so on, the next layer judgment matrix can be given. The element values are denoted by d_{ij}.

The second step is to calculate eigenvalue of maximum and eigenvector of the judgment matrix. The approximate calculation method is used to have access to geometric mean value of all elements of in matrix rows. That is:

$$\overline{w} = \sqrt[n]{\prod_{i=1}^{n} a_{ij}} i = 1, \Lambda, n \quad (2)$$

Among them, n = 1, Λ, 6. And get:

$$\overline{w} = (\overline{w}_1 \Lambda \overline{w}_n)^T \quad (3)$$

Then have the normalization process, that is:

$$w_i = \frac{\overline{w}_i}{\sum_{j=1}^{n} \overline{w}_j} i = 1, n \quad (4)$$

$\overline{w} = (\overline{w}_1 \Lambda \overline{w}_n)$ is eigenvector approximation and a factor of relative weight.

The maximum eigenvalue of judgment matrix is:

$$\lambda_{max}, \lambda_{max,} = \sum_{j=1}^{n} \frac{(A\overline{W})_i}{n\overline{w}_i} \quad (5)$$

Among them, $(A\overline{w})_i$ is i element of the vector. A is judgment matrix.

If CI≤0.1, its consistency is acceptable. If its consistency is acceptable, the weight can be got.

Suppose that a target weight of the main guidelines is C = (C1, C2, C3). Among them, c_i represents U_i proportion, i = 1, 2, 3 and:

$$\sum_{i=1}^{3} c_i = 1, c_i \geq 0 \quad (6)$$

Set target weights of sub-criteria layer is:

$$C_1 = (c_{11}, \Lambda, c_{1j}), c_2 = (c_{21}, \Lambda, c_{2j}), c_3 = (c_{31}, \Lambda, c_{3j})$$

Among them, Cik represents Uik proportion, K = 1, Λ, 3 and:

$$\sum c_{ik} = 1, c_{ik} \geq 0 \quad (7)$$

The portal evaluation matrix is set for main criteria layer evaluation indicators U_i (i = 1, 2, 3) and fuzzy comprehensive evaluation collection B_i (i = 1, 2, 3) is given.

If separately considered indicators U_{ij} and reviews extent is rijt, the fuzzy evaluation matrix R i (i = 1, 2, 3) is followed:

$$R_i = \begin{bmatrix} r_{i11} & \Lambda & r_{i15} \\ M & M & M \\ r_{inl} & \Lambda & r_{in5} \end{bmatrix} \quad (8)$$

Among them, i (i = 1, 2, 3) is the number of indicators for the classification factors and n is the number of evaluation in the relevant sub-criteria layer.

Fuzzy comprehensive evaluation set of indicators of the main criteria layer is based on Bi = Ci×Ri. Among them:

$$b_{it} = \bigvee_{j=1}^{n} (c_{ij} \wedge r_{ijt})$$

I = 1, 2, 3 and t = 1, Λ, 5.

The fuzzy evaluation matrix of evaluation objects is:

$$B = (b_1, \Lambda, b_5) = C * \begin{bmatrix} B_1 \\ B_2 \\ B_3 \end{bmatrix} \quad (9)$$

Among them:

Table 1: Evaluation standards of internal control

Score	Level	Meanings
ICI≥95	A	Excellent (best)
90≤ICI<95	B	Good (high)
80≤ICI<90	C	General (low)
ICI<80	D	Bad (worst)

$$b_j = \bigvee_{j=1}^{3} (C_i \wedge b_{it})$$

j = 1, Λ, 5, t = 1, Λ, 5.

Evaluation standards of internal control can be given based on research reference and expert score shown in Table 1.

According to:

$$(\overline{b_1}, \overline{b_2}, \overline{b_3}, \overline{b_4}) \begin{bmatrix} 100 \\ 80 \\ 60 \\ 0 \end{bmatrix}$$

the total score of internal control is 86.27 in Xinjiang Tianshan Company.

In accordance with the maximum membership degree principle, the internal control performance is higher.

INTERNAL CONTROL EVALUATION RESULTS ANALYSIS

Tianshan Company is the national cattle frozen semen production unit and the national thoroughbred cow base and the only national frozen sperm production enterprise in Xinjiang, which is one of the leading enterprises of domestic well-bred breeding industry. Company adopts technical means such as frozen technology, embryo transfer and so on, promote quality frozen embryos, strive to improve the cattle breed structure, increase the production of high quality animal products, improve breeding efficiency and the animal husbandry industrialization and promote the pace of the rich peasants in Xinjiang.

However, the company is facing numerous difficulties. The first is fund's investment risks. Whether investment projects are timely finished and whether project implementation process and implementation effects are well or not, there are some uncertainties. In the process of project implementation, the company is also suffering many uncertain factors including industrial policy changes, market changes and management changes. Meanwhile, such factors and changes as competitors' progress, changes in product prices, changes in market capacity, changes in the macroeconomic situation, sales channels as well as marketing personnel can also affect the project-related return on investment and the company's expected revenue. The second is ROE risk reduction. It will take some time for the company to raise capital investment projects to generate benefits. So an increasing net asset can cause the decreased ROE risk in the near term. The third is management risks. After the company stock issue succeeds, the company's asset size will increase substantially. Whether the company can establish management system to form the restraint mechanism to ensure the safe and effective company operation, it is the certain risk problems. The fourth is product quality risks. Although the company has always been the establishment of strict quality management, establish and improve the quality management system and continuously improve staffs' quality consciousness, have access to ISO9001: 2008 quality management system certification and China Good Agricultural Practices certification, some product quality problems will affect production and operation situation. The fifth is brain drain risks. The breeding enterprise's core competitiveness depends upon the strain, purity and number of seeds, the advanced production technology, production of embryo, transplants, the determination of production performance as well as seed system. Company's frozen sperm production control technique, superovulation and embryo transfer technology, embryo cryopreservation and thawing technology do not apply for patent technology and these techniques are mainly owned by the core technical personnel. If there is the poor or bad equity incentive, salary, bonuses, etc. in the future, they will leave the company in the future. So the company is facing the turnover risk of core technical personnel.

TIANSHAN COMPANY INTERNAL CONTROL COUNTERMEASURES

Perfect strategy: First of all, index system should be evaluated from the perspective of regulation or supervision to maintain market order and the effectiveness in Tianshan Company. Second, the evaluation index system should also give from the perspective of enterprise management to continuously strengthen the internal control management and improve the efficiency and effectiveness of business activities. Thirdly, there are effective human resource policies. According to enterprise and employee conditions, regular training plan, the scientific and rational compensation system, performance appraisal system and the personnel system should be formulated to ensure the best interests of enterprise employees to improve enterprise management efficiency. Fourthly, corporate culture is created to guide staffs to finish management and control tasks.

Standard system: First of all, Tianshan Company should formulate the unified and reasonable recognition criteria of major internal control defects to provide the reference for enterprise accountants. Second, Tianshan Company should strengthen the supervision criteria of internal control information disclosure in order to promote the effective implementation of the internal control auditing. Thirdly, supervision departments should strengthen the supervision of information disclosure of internal control, increase the punishment intensity and regulate the disclosure of internal control audit report.

Business strategy: First of all, biotech enterprises should set up professional collection and storage company in bulk raw material producing areas in order to purchase and store raw materials in relatively low price to reduce the price fluctuation risk of raw materials. They should open up new raw material supply channels at the same time and make efforts to reduce raw material costs. Second, biotech enterprises should pay close attention to vegetable protein market at home and abroad, timely grasp the market information and have good control of the rhythm of raw materials procurement and product sales, aim at stable operation and reducing management risks. Third, under the background of industrial transformation and upgrading and structural optimization, Tianshan Company's main business should form into the pattern of paying equal attention to fodder and veterinary medicine. The complementary of fodder business and pharmaceutical business is beneficial to resolving management risks from the livestock and poultry disease and food safety, so as to enhance market competition ability and risk resistance ability.

ACKNOWLEDGMENTS

This research is supported by the Fund of the Key Research Center of Humanities and Social Sciences in the general Colleges and Universities of Xin Jiang Uygur Autonomous Region (050212C05), the National Natural Science Foundation of China (11101216), Qing Lan Project and the Nanjing Xiaozhuang University (2010KYYB13).

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