

Standard economic benefit evaluation of innovation-oriented enterprises——A case study of S enterprise

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Abstract. More and more innovation-oriented enterprises pay attention to standardization, but how much benefit standards can bring to the production and operation of enterprises is a matter of concern to managers. Therefore, it is of great significance to evaluate the impact of standards on the economic benefits of these enterprises. This paper takes S enterprise as an example to evaluate the impact of standards on its economic benefits.

1 METHODS

Standards economic benefit refers to the contribution of standards to economic value creation. The earnings before interest and tax (EBIT) indicator is used as a measure of value created. EBIT accounts for the gross profit of an enterprise (revenue minus costs) at a given point in time. The impact of a standard on EBIT is a key indicator to measure the economic benefits of a standard[1]. EBIT reflects the profitability of the enterprise's main business[2], and profitability is a comprehensive reflection of value drivers. Through the evaluation of the impact of value drivers, the impact of standards on EBIT is evaluated to reflect the economic benefits of standards. This paper uses value chain and analytic hierarchy process to reason the impact of standards on the profitability of enterprises, and uses fuzzy comprehensive evaluation method to solve the ambiguity and uncertainty of evaluation, and transforms qualitative evaluation into quantitative evaluation.

2 VALUE CHAIN ANALYSIS

The main products of S enterprise are functional thin film materials, which belong to new materials. Compared with traditional materials, new materials have the characteristics of high technology intensity, long research and development investment cycle, and huge amount of equipment investment[3]. The primary activities of S enterprise to realize its value include marketing and sales, research and development, production, quality inspection and logistics; supporting activities include raw material procurement and equipment maintenance. See Figure 1.

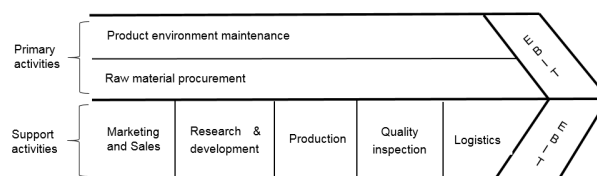


Fig. 1. Value chain of S enterprise profitability

2.1 Primary activities

2.1.1 Marketing and Sales

S enterprise's products are divided into two categories: customized and non-customized. Therefore, S enterprise's marketing activities mainly take place before technology research and development and production. Through financial settlement, the capital can be recovered and used for the purchase of raw materials, research and development, production and other links of the value chain, as well as the payment of loans and interest to banks, so as to ensure the progress of all links of the value chain. Marketing is a key link to communicate with known customers and identify the needs of potential customers. If the analysis of customer needs is not sufficient or deviated, the product may not meet the needs of customers, resulting in the increase of costs and affecting customer satisfaction. Therefore, marketing is the basic link to realize enterprise value increment.

2.1.2 Research and development

Research and development is the innovative activities that provide new products (new or local innovations) to the market through research and development[4], that is an important link to transform customer needs into products, and is also the core activity of S enterprise value chain. The intellectual property of an enterprise is

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mainly generated through research and development, which is a key link to reflect the competitiveness of an enterprise. Product concept research and development, technical research and development needs the full cooperation of marketing personnel and technical research and development personnel, to complete the docking of customer demand and product realization, product process research and development is the technical path of the final realization of the concept and technical research and development results, is the foundation of quality.

In the research and development stage, the production process parameters of the product should be determined through theoretical research, laboratory small scale test, pilot scale test and performance test. Therefore, research and development is a link where products may not meet customer needs.

2.1.3 Production

Production is the manufacturing process of physical products, and it is also the main activity of S enterprise value chain. Equipment failure and accidents in the production will have a significant impact on the enterprise value chain, and it is also a link that may lead to products that do not meet the needs of customers.

2.1.4 Quality inspection

Product quality is the foundation of enterprise survival and development. Quality inspection is an important link to control the inflow of unqualified raw materials and outflow of unqualified products. If the products that do not meet the needs of customers, at a small level, it will affect customer satisfaction and cause the loss of the enterprise's reputation; at a large level, it may lead to product defects of customers or even accidents, which will lead to the loss of customers and even the society and affect the long-term development of the enterprise. The products that do not conform to the established standards are found through quality inspection, and the reasons are analyzed together with marketing, research and development and production personnel to achieve traceability and improve the stability of product quality and avoid greater losses.

2.1.5 Logistics

Logistics is the final link of product delivery to the final customer or dealer, the timely and safe delivery of products can finally complete the value added of the enterprise value chain. Efficient and reasonable logistics not only reduce the operating cost of enterprises, but also provide quality services for customers and enhance the competitive advantage of enterprises.

2.2 Support activities

2.2.1 Raw material procurement

Raw material procurement is the pre-link for S enterprise to carry out research and development and production, and the cost control of raw materials is the key point of enterprise cost control. High quality raw material supplier is an important basis for product quality stability, but also to realize the fundamental guarantee of enterprise value increment.

2.2.2 Product environment maintenance

Accurate operation of production line equipment is the basis to support the smooth production of products, is the guarantee of the implementation of production technology. Good product environment is the guarantee to achieve product quality in line with customer needs.

3 PROFITABILITY ANALYSIS

3.1 Composition of profitability

As a supplier of new materials, the profitability of S enterprise is a comprehensive reflection of its marketing ability, technological innovation ability, production ability, logistics ability, raw material guarantee ability, product environment maintenance ability, and compliance guarantee ability.

1)Marketing ability reflects the ability of the enterprise in marketing activities, which is reflected through the enterprise's response to the market and customer demand, customer relationship maintenance and other activities.

2)Technological innovation ability reflects the ability of the enterprise in research and development activities, which is reflected through technology research and development and product design activities.

3)Production ability reflects the comprehensive ability of the enterprise in product production, quality inspection and equipment maintenance activities, which is reflected through the flexibility and stability of production lines and product quality assurance activities.

4)Logistics ability reflects the ability of the enterprise in logistics activities, which is reflected by the timeliness and security of product delivery.

5)Raw material guarantee ability reflects the ability of the enterprise in purchasing activities, which is reflected through supplier evaluation and purchasing control activities.

6)Production environment maintenance ability reflects the ability of the enterprise in production environment maintenance activities, which is reflected through equipment maintenance activities.

7)Compliance management ability reflects the ability of the enterprise in administrative management activities, which is reflected in environmental, energy and occupational health management activities.

3.2 Standards impact on profitability

The influence factors of profitability cover management standards, technical standards and working standards that the enterprise production and management used, as well as the personnel system, distribution system, financial system, incentive system, enterprise culture, personnel's ability, enterprise fund support and material support for the conduct of business and other factors will also have potential impact on the production and operation of the enterprise. The above factors will influence and interact with each other. For example, enterprise culture and marketing ability will influence technological innovation.

3.2.1 Marketing ability

Through the use of key standards, it is easy to quickly and accurately grasp customer needs, help potential customers and real customers to build confidence in the enterprise, make customers believe that the enterprise can continue to provide high quality products and services, as well as effective customer support and complaint handling, and maintain good customer relations.

3.2.2 Technological innovation ability

Through the use of design, development and innovation management standards, as well as product experiment, trial production standards, facilitate the communication and collaboration of the technical team, so as to improve the efficiency of technology research and development, product process design, and reduce the use cost of engineers.

3.2.3 Production ability

Improve the efficiency of production allocation according to customer needs, reduce the number of nonconformities (defects), and reduce rework and claim costs by using key standards, such as configuration and management of production facilities, product environment management, quality management, production process validation procedures, production management operational procedures, and nonconformities control procedures.

3.2.4 Logistics ability

Improve the speed and reliability of packaging to ensure timely and safe delivery of products by using handling, storage, packaging, protection and delivery procedures, warehouse procedures, and key standards such as invoices and returns.

3.2.5 Raw material guarantee ability

Stabilize supplier relationships and ensure raw material procurement efficiency and quality stability through the use of supplier selection and evaluation procedures, procurement control procedures, etc.

3.2.6 Production environment maintenance ability

Through the use of product environmental management technology standard procedures, product environmental management information transmission procedures, equipment inspection and maintenance standards, to provide a good environmental protection for product production.

3.2.7 Compliance management ability

Through the use of compliance evaluation and control procedures, environmental protection agreements, energy management, occupational health management and other standards, law-abiding awareness is embedded in daily management to ensure that the production of enterprises conforms to laws, regulations and mandatory standards.

4 EVALUATION MODEL CONSTRUCTION

To evaluate the impact of standards on S enterprise profitability, it is necessary to build a hierarchical model of the impact of standards on corporate profitability(see Figure 2). Tier 1 indicators include marketing ability, technological innovation ability, production ability, logistics ability, raw material guarantee ability, production environment maintenance ability, compliance management ability. Tier 2 Indicators include promoting efficiency, delivering information effectively, reducing cost, Ensuring work quality, reducing risk

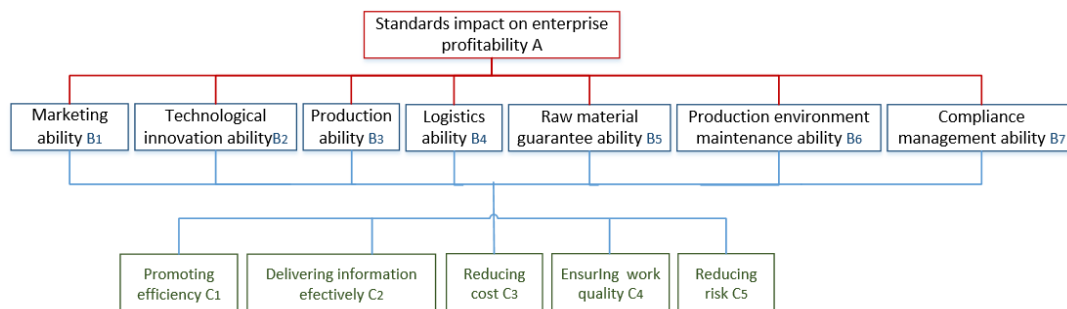


Fig. 2. Standards impact on S enterprise profitability

5 CONCLUSION

The hierarchical model was used to form a questionnaire, and S enterprise management experts from different departments were invited to participate in the survey to determine the influence weight of each evaluation indicator.

Four experts filled out the questionnaire. According to the weight value given by the four experts, the final weight value are formed through consistency verification (see Table 1).

Table 1. Weight value of indicators on S enterprise profitability

Tier 1 Indicators	Tier 1 Weight Value	Tier 2 Indicators	Tier 2 Weight Value
Marketing ability	0.0924	Promoting efficiency	0.0203
		Delivering information effectively	0.0322
		Reducing cost	0.0132
		Ensuring work quality	0.0148
		Reducing risk	0.0119
Technological innovation ability	0.2042	Promoting efficiency	0.0241
		Delivering information	0.0251
		Reducing cost	0.0337
		Ensuring work quality	0.0885
		Reducing risk	0.0330
Production ability	0.1861	Promoting efficiency	0.0381
		Delivering information	0.0204
		Reducing cost	0.0412
		Ensuring work quality	0.0589

		Reducing risk	0.0275
Logistics ability	0.1752	Promoting efficiency	0.0361
		Delivering information	0.0434
		Reducing cost	0.0239
		Ensuring work quality	0.0452
		Reducing risk	0.0265
Raw material guarantee ability	0.1183	Promoting efficiency	0.0162
		Delivering information	0.0170
		Reducing cost	0.0243
		Ensuring work quality	0.0477
		Reducing risk	0.0130
Production environment maintenance ability	0.1249	Promoting efficiency	0.0249
		Delivering information	0.0127
		Reducing cost	0.0299
		Ensuring work quality	0.0335
		Reducing risk	0.0240
Compliance management ability	0.0988	Promoting efficiency	0.0211
		Delivering information	0.0171
		Reducing cost	0.0195
		Ensuring work quality	0.0286
		Reducing risk	0.0125

Four experts give the ratio of standards to all the factors that affect S enterprise profitability, the conclusions were statistically and normalized, and the fuzzy comprehensive evaluation method was used to calculate the results. The evaluation results are shown as Table 2.

Table 2 Evaluation results of experts

Standards influences ratio	5%	10%	15%	20%	25%	30%	35%	40%	80%
Conclusion distribution	0.0247	0.0312	0.0438	0.0761	0.0000	0.1970	0.5000	0.0296	0.0976

From the above results, it can be concluded that the impact of standards on EBIT of S enterprise is 35%.

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