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Correlation Analysis Between R&D Expenditure and Company Income of High-tech Enterprises in Zhaoqing High-tech Zone,in China

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Abstract: The main products of high-tech enterprises are high-tech products,so high-tech products are of great importance to any high-tech enterprise.For this reason,many high-tech enterprises invest a large amount of funds in the research and development of high-tech products every year,which is the research and development expenses referred to in the industry,in order to ensure their advantages in the technology,type and quantity of high-tech products.This paper collects and studies the financial data of R&D expense input of 15 high-tech enterprises engaged in the production of stainless steel products for 5 years,and selects the advantages and disadvantages of three representative R&D methods of three different high-tech products.Under the double measurement of R&D expense investment risk and high output,the comparative financial research on the advantages and disadvantages of R&D expense investment mode has certain reference significance for the decision makers of high-tech enterprises in deciding how to invest R&D expense in Zhaoqing High-tech Zone,in China.

Keywords: Comparison of R&D modes of high-tech products;Comparison of R&D expenses; Risks and outputs

The main products of high-tech enterprises are high-tech products,and the main income and profits of enterprises come from high-tech products,so high-tech products are very important to any high-tech enterprise.For this reason,many high-tech enterprises invest a lot of money in the research and development of high-tech products every year in order to ensure their advantages in technology,variety and quantity,which is referred to as the research and development expenses in the industry.

1. Investment in R&D expenses of high-tech enterprises

1.1 Composition of R&D expenses

Materials and energy costs directly consumed by R&D activities;Salaries,allowances and bonuses of R&D personnel;Depreciation expenses and maintenance expenses of instruments,equipment,workshops,etc.in the R&D process;Patent application and evaluation fees for research and development achievements;Technical consulting fees,information fees,travel expenses,etc.in the R&D process;Development of samples,models and molds for similar products.

1.2 R&D expenditure investment ratio policy

There are corresponding documents for the investment of R&D expenses of high-tech enterprises in the country.The proportion of R&D expenses to sales revenue of enterprises in the Administrative Measures for the Accreditation of High-tech Enterprises promulgated by the state is as follows:For enterprises with sales income of less than 50 million yuan,the proportion is set at 6%;The proportion of enterprises with sales income of 50 million to 200 million yuan is set at 4%;The proportion of enterprises with sales income of more than 200 million yuan is set at 3%.In the actual business activities of enterprises,this expense will generally account for 5%to 8%of the total turnover of enterprises,and some will reach more than 10%,and even more will reach about 20%.The R&D expenses of any high-tech enterprise are a lot of expenses for the enterprise.How to make good use of this R&D expenses,reduce the risk of its investment and make it have greater output has become a major event that more high-tech enterprises need to pay attention to and plan well.

2. Comparison of R&D expenditure of high-tech enterprises-Taking A,B and C companies as examples in Zhaoqing High-tech Zone,in China

In this paper,the R&D expenses of three high-tech enterprises,A,B and C,which are both engaged in the production of stainless steel hardware products,are tracked for a long time,and the data of their research expenses for 5years are continuously collected and tracked,and the systematic conditions and comparative financial research are carried out on these data.

2.1 A high-tech enterprises R&D expenditure.

Company A adopts the method of reverse development of products(that is,imitation development),and the R&D expenses of the company with this development method mainly focus on:

(1)Materials and energy costs directly consumed by R&D activities.

(2)R&D personnel's salaries,allowances and bonuses.

(3)Development expenses for samples,models and molds of similar products of the research and development target products.

The company's research and development expenses for samples,models and molds of similar products are particularly prominent,accounting for more than 70%of the total research expenses,and have remained at this ratio for 10 consecutive years.

2.2 B R&D expenditure of high-tech enterprises

Company B adopts the forward R&D mode(that is,the whole process of R&D and the complete set of production processes and core technologies of products are completely mastered),and the investment in R&D expenses of forward research is mainly concentrated on:

(1)Materials and energy costs directly consumed by R&D activities.

(2)R&D personnel's salaries,allowances and bonuses.

(3)depreciation expenses and maintenance expenses of instruments,equipment,workshops,etc.in the process of research and development.

(4)Technical consulting fees,data fees,travel expenses,etc.in the R&D process.

The investment period of R&D expenses required by the company's R&D objects is relatively long,and the period of obtaining results is also long,and the output of research expenses is relatively slow.These four expenditures account for more than 80%of the total R&D expenses,and the expenditure of developers and materials and energy accounts for the largest proportion.

2.3 C R&D expenditure of high-tech enterprises

Company C adopts a two-team two-way R&D mode(that is,forward R&D and reverse R&D).The simultaneous development of the two R&D directions determines that it will invest more in R&D personnel and R&D funds than a single R&D enterprise,and the R&D expenses of this development company account for more than 10%of the company's operating income.The cost of materials and energy directly consumed by the investment in R&D activities;Salaries,allowances and bonuses of R&D personnel;Depreciation expenses and maintenance expenses of instruments,equipment,workshops,etc.in the R&D process;Technical consulting fees,information fees,travel expenses,etc.in the R&D process.

This kind of R&D target product is similar to the sample,model and mold development projects,which are relatively average,because there are many R&D projects in which the proportion of R&D personnel will be relatively high.

3. High-tech enterprises R&D expenditure into the company's income correlation analysis in Zhaoqing High-tech Zone,in China

The following table 1-3 is a data table of R&D expenditures and patents and high-tech products obtained by companies A,B and C.

Table 3.1 A Company's turnover,R&D expenditure and patent data sheet

year	Turnover(ten thousand)	Growth rate(%)	R&D expenses(ten thousand)	R&D ratio(%)	Number of ordinary patents	Number of invention patents	Number of high-tech products
2017	12000.00	9.1	800.00	6.70	14	1	4
2018	12500.00	4.2	800.00	6.40	13	0	3
2019	12000.00	-4.0	800.00	6.70	15	0	5
2020	12300.00	2.5	800.00	6.50	12	0	2
2021	13000.00	5.7	800.00	6.20	16	1	3
5-year accumulation			4000.00		70	2	17

Data source A company

Table3.2 B Company's turnover,R&D expenditure and patent data sheet

year	Turnover(ten thousand)	Growth rate(%)	R&D expenses(ten thousand)	R&D ratio(%)	Number of ordinary patents	Number of invention patents	Number of high-tech products
2017	15000.00	50.0	1300.00	8.7	12	1	2
2018	20000.00	33.30	1600.00	8.0	11	1	2
2019	32000.00	60.0	3000.00	9.2	10	2	1
2020	40000.00	25.0	4000.00	10.0	15	7	5
2021	80000.00	100.0	8000.00	10.0	13	10	8
5-year accumulation			17900.00		61	21	18

Data source B company

Table 3.3 C Company's turnover,R&D expenditure and patent data sheet

year	Turnover(ten thousand)	Growth rate(%)	R&D expenses(ten thousand)	R&D ratio(%)	Number of ordinary patents	Number of invention patents	Number of high-tech products
2017	15000.00	25.0	1200.00	8.0	12	1	2
2018	22000.00	46.7	1600.00	7.3	11	1	2
2019	25000.00	13.6	2000.00	8.0	10	2	1
2020	30000.00	20.0	2300.00	7.7	15	2	5
2021	40000.00	33.3	3200.00	8.0	13	4	8
5-year accumulation			10300.00		61	10	18

Data source C company

Through the data analysis in the above table,the R&D expenditure input and company income points of companies A,B and C are as follows:

（1）Company A closely follows the market and adopts reverse research,focusing on the R&D expenses to upgrade the existing products in the market.The advantages of this kind of research are:the output is very fast after the research cost is invested;The research and development cycle is short,and the research and development expenses used are low;R&D expenses are highly targeted and well controlled;Fast R&D output can ensure the market share of products,increase turnover,feed back research and development,and ensure the reliable and stable source of R&D expenses.Enterprises have always been in a low-profit market,and it is difficult for enterprises to obtain high profits to drive the rapid growth of enterprises.Once the products put into the market have unexpected events,the production risks of enterprises will be very great.

（2）Company B adopts advanced forward research and development,pursuing the full set of core technologies of product technology and the front-end leadership of products.The investment point of research and development costs is the comprehensive development of products with 100%core technology.Such research and development benefits include:ensuring the comprehensive technology leadership of products and mastering the core technology;The proportion of R&D spending will not explode;Stable R&D development,long R&D cycle,conducive to training more technical innovation points and related technical personnel.In the first few years of its five years of development,B company did not have its own core technology to operate the market,and there was no new product to put on the market.The company was in a period of product vacancy,and its turnover growth was difficult.This period was also the most difficult period for the company,and it faced the greatest risk of survival.

（3）Company A mainly adopts both forward and reverse research and development methods.The investment point of R&D expenses is large,and the demand for R&D expenses is large.However,the benefits of such investment include:R&D investment and close to the market,ensuring that there are constantly new products put into the market,and obtaining good turnover to feed the source of R&D expenses;Engage in core technology research and development,so that enterprises have the opportunity to get high returns

on research and development expenses;Two-way R&D allows R&D teams to get more communication,so that the R&D cycle is shortened,so that the industry cycle of R&D costs is shorter,and R&D costs can be repaid faster.

4. Comparative analysis of R&D expenditure and turnover data of high-tech enterprises

(1)In the development stage where the company takes short-term hot-selling products in the market,namely"following the market",as the dominant direction of the company's development,it is more appropriate to adopt the way of reverse product development of Company A,which invests limited research and development expenses into the research and development of hot-selling products and obtains the production process of products at the fastest speed so that the products can be quantitatively produced in its own company to obtain the market.The rapid increase of turnover,so that the enterprise's research and development expenses to the company's income to reach the highest degree.

(2)In the development stage when the company decides to build its own blockbuster products,namely"build the market"as the dominant direction of the company's development,the dual-team two-way R&D mode(namely forward R&D and reverse R&D)of Company C should be adopted,and the two R&D directions should be carried out simultaneously.Invest part of the R&D expenses into reverse product development to ensure that the company has popular products to maintain the stability of the company's turnover;In addition,part of the research and development expenses will be invested in the forward research and development of products,so that the technical strength of the enterprise will be continuously enhanced,the core technology of the enterprise's products will be constantly supplemented,and the core products of the enterprise will be gradually developed to maximize the benefits of the core products of the enterprise.

(3)When the enterprise reaches the development stage of"leading the market"with technology,B company should adopt relatively advanced forward research and development,and pursue the full set of core technologies of product technology and the front-end leadership of products.The enterprise invests all the research and development expenses into the technology research and development that can lead the future market,so that the technical force of the enterprise can reach the absolute leadership position,so that the market will be the first to recognize its own technology,and use the technology brand to launch the trend-leading products,so that the enterprise can get the absolute leading position in the market and rich interests.

References:

[1]Liang Yanyuhigh-tech enterprises in the design and development of new products cost controlanalysis[J].China's accounting fortownship enterprises 2016(11).

[2]Kang Yanling,Huang Guoliang,Chen Kejing,the impactof executive characteristics on R&D investment-based on the empirical analysis of high-tech industries[J].Scientific andtechnological progress and countermeasures.2011(08).

[3]Fang Xiukun.Researchon the correlation between R&D investment and enterprise value of high-tech enterprises[J].modern business trade industry.2014(24).

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