

The role of internal resources within industrial and manufacturing enterprises in the Czech Republic

JARMILA STRAKOVÁ

JAN VÁCHAL

Department of Management
Institute of Technology and Business
Okružní 10, České Budějovice
CZECH REPUBLIC

strakova@mail.vstecb.cz; vachal@mail.vstecb.cz <http://www.vstecb.cz>

Abstract: This contribution presents the results of the analysis of internal resources from the perspective of their influence on the profitability of industrial and manufacturing enterprises of the Czech Republic. The testing set included 186 industrial and manufacturing enterprises. For the mathematical and statistical processing the dimensional reduction and regression analysis (logit model and its transformation) was used, which enabled the indication and determination of the importance of the chosen internal resources. The greatest importance was proved in financial resources, lower in enterprise strategy and employees' level. Negative influence was noticed in internal regulations and standards and wage level. A transformed optimal model of internal resources was used to correct the results emerging from possible non-objectivity in managers' evaluation. The results suggest that top managers in tested manufacturing and industrial enterprises overestimate especially internal regulations and standards, wage level, management level, manufacturing technology and security, while, on the contrary, they underestimate financial resources.

Key-Words: internal resources, internal business environment, competition advantage, industrial and manufacturing enterprises, top managers, knowledge.

1 Introduction

Internal business environment having a straight impact on the existence, development and prosperity of enterprises includes a set of controllable elements, i.e. physical, personal, financial resources, and intangible resources [13], [20]. Clegg classify internal resources into two groups, resources based on ownership and resources based on knowledge. One group of internal resources is made up of physical resources (such as machinery, buildings), financial, personal resources and intangible resources (intellectual property), the other group represents expert knowledge [5].

A lot of authors have dealt with internal resource analysis, Barney, Grant, Teece and Seddon can be presented as the best known authors. According to the above-mentioned authors, internal resources should prove certain characteristics, should the enterprise reach competition advantage, i.e. be valuable, rare, lacking substitute, and imperfectly imitable [1], [8], [18], [16]. Prahalad and Hamel and Zuzák add that to reach competition advantage it is necessary for the enterprise to be endowed with

extra abilities (capabilities) except internal resources [14], [22]. Abilities and resources are central for source-oriented approach. Abilities enable the enterprise to make determinative benefit for the customers as opposed to sources that are understood to be mainly the inputs into product or service production, they are not negotiable. Connecting sources and abilities creates the term of so-called 'core competence' that should be fulfilling three criteria: they should offer a potential entry into a wide variety of markets, they should significantly contribute to the business subject reaching its goals, and being only imperfectly imitable [5].

Enterprises orienting on internal sources is marked by the scientific community as resource-based view, which became, in the 1980s and 1990s, one of the most influential and most cited manager theories. Barney [1], Barney et al. [2] and his colleague Grant [8] are considered to be the fathers of this approach. According to Grant, external business orientation does not offer a safe base at the times of quick change, a base that would allow a development of a successful strategy. From the

perspective of strategic management, resource-based view believes that it is of a greater advantage to focus on those internal resources that are at least partially manageable rather than on factors of external business environment that do not fit within the enterprise's control [8]. On the other hand, resource-based view has been criticized by many authors, especially its problematic view of knowledge and causal ambiguity have been reproached [17]. According to Priem and Butler and Toms it misses the enterprise theory and practical utility [15], [19].

Within the strategic management area, a quite extensive research was implemented, emphasizing the role of internal resources as the main power of enterprises' competition advantage. Researchers argue that the unique position, which business subjects in relation to their competitors develop, is based on complex business resources. Among these resources knowledge possesses the greatest potential of serving as a source of sustainable competition advantage and it strengthens the enterprises' positions against their competitors [4]. Liebeskind also identifies with this opinion, considering managers' and employees' knowledge strategically the most important internal resources [11]; further, Beazley et al. or Kogut and Zander [3], [10]. According to Caiazza et al., a higher performance of enterprises towards their competitors results from the ability to create, transfer, and combine knowledge in a way that cannot be imitated by other enterprises [4]. Wessels et al. claim that internal environment is strongly dependent on managers' competence that is a key part in reaching given enterprise goals. Basic competence includes mainly the existing experience and managers' communication abilities, consideration of the opinions of employees, as well as focusing on the needs of their career development [21].

2 Material and Methods

Using targeted selection and in co-operation with the Czech Statistical Office, a testing set of 186 industrial and manufacturing enterprises in the Czech Republic was assembled. Utilizing trained interviewers with individual approach, a collection of input data was implemented in the period of 2016 – 2017. The analysis itself used the dimensional reduction method [6], [7], [9] and a generalized linear model [12].

2.1 Dimensional Reduction

Dimensional reduction is a method that estimates the dimension and central subspace of the general linear model. This means that we want to find $p \times d$ dimensional matrix B of the minimum rank d such that $F(y/x) = F(y/B'x)$, [6], [7], [9]. The dimensional reduction calculation is based on the inverse distribution $F(x/y)$. In the analysis, the calculation methods of the dimensional reduction, referred to as incisive inverse regression (SIR), will be used. The statistical software "R" will be used for the calculation.

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Dr(formula = ER ~ ML + EL + OSC + EST + TE +
MTP + PPS + FRC + WL + MRL + BBN + LRD +
SEE + TW + ICS + IRS + CC + SE, data = method
= "sir")
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2.2 Generalized Linear Model

GLM allows to express the relation between the explained variable and the set of explanatory variables (regressors) by a regression function that is a linear function of unknown estimated parameters [12].

The link function used within the logit model is:

$$X\beta = \ln\left(\frac{\mu}{1-\mu}\right).$$

The statistical software "Statistics" will be used for the calculation.

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Legend:

List of internal resource variables:

- ML – Management Level;
- EL – Employees' Level;
- OSC – Organization Structure of the Company;
- EST – Enterprise Strategy;
- TE – Technical Equipment;
- MTP – Manufacturing Technology, Procedures;
- PPS – Portfolio of Products / Services;
- FRC – Financial Resources of the Company;
- WL – Wage Level;
- MRL – Marketing Level;
- BBN – Brand and Business Name;
- LRD – Level of Research and Development;
- SEE – Social Environment of the Enterprise;
- TW – Training of Workers;
- ICS – Information and Communication Systems;
- IRS – Internal Regulations, Standards;

- CC – Corporate Culture;
 SE – Security;
 PIS – Production and Industry Sector;
 ER – Economic Result.

Due to the comparison of data provided by managers and the results of a logit model, which is optimal against profit maximization, the estimates of regression parameters of the model were transformed into a scale according to which managers evaluated the standard of internal enterprise resources in input questionnaire rasters (1 – low standard of internal resources; 2 – average standard of internal resources; 3 – high standard of internal resources). Regressors having the lowest estimate within the model have been assigned the lowest weight with regard to profit maximization, and vice versa. For transformation, parameter estimates were used straightaway; all regressors possess an equal value scale, i.e. estimate size is mutually comparable. Comparing value average given by managers, and transformed estimate of internal resources (IR) produced a difference between reality and the optimal model expressed in percentage.

Transformed optimal model of internal enterprise resources (VZOpt):

$$VZOpt = 2 * ((IR - \min(IR)) / (\max(IR) - \min(IR))) + 1$$

In conclusion, the results of the top managers' opinion of manufacturing and industrial enterprises will be presented in terms of the prediction of the significance of the analyzed internal resources.

3 Results and Discussion

Table 1: Dimensional Reduction of Internal Resources

Internal Resources	Dir1
	Production and Industry Sector
Management Level	-0.0878606
Employees' Level	0.2935342
Organization Structure of the Company	0.0254322
Enterprise Strategy	0.2997468
Technical Equipment	0.0569380
Manufacturing Technology, Procedures	-0.1627348
Portfolio of Products / Services	0.1597841
Financial Resources of the Company	0.6955649
Wage Level	-0.2250152
Marketing Level	0.0003156

Brand and Business Name	-0.0320998
Level of Research and Development	-0.0012451
Social Environment of the Enterprise	0.2373516
Training of Workers	0.0094677
Information and Communication Systems	0.1211276
Internal Regulations, Standards	-0.3865621
Corporate Culture	0.0629441
Security	0.0200956

Results given in Table 1 reflect the opinions of managers in production and industry enterprises. A relatively high influence of financial resources on the profitability of tested enterprises has been proven. The result draws attention to the necessity of the top management paying greater attention to financial resources. Nevertheless, it is necessary to claim that this result is being noted during economic growth, and thus its further enhancement during a decrease in economic growth may be expected. A lower influence was indicated in enterprise strategy and employees' level, on the contrary, a negative influence was proven in internal regulations and standards, and wage level. In other tested internal resources, statistically significant values were not proven, implying that they may be perceived by managers as an inherent part of the functioning of the given enterprise itself.

Table 2: Optimal Model of Internal Resources

	Estimate	Std. Error	Z value	Pr(> z)
(Intercept)	-3.625033	1.231258	-2.944	0.00324 **
Management Level	-0.120963	0.417355	-0.290	0.77194
Employees' Level	0.783300	0.503887	1.555	0.12006
Organization Structure of the Company	0.381078	0.539210	0.868	0.38559
Enterprise Strategy	0.686463	0.404936	1.695	0.09003 •
Technical Equipment	-0.055071	0.409948	-0.134	0.89314
Manufactur. Technology, Procedures	-0.144634	0.460911	-0.314	0.75367
Portfolio of Products / Services	0.375442	0.408288	0.920	0.35781
Financial Resources of	1.128013	0.399264	2.825	0.00472 **

the Company				
Wage Level	-0.527105	0.415910	-1.267	0.20503
Marketing Level	0.018737	0.392108	0.048	0.96189
Brand and Business Name	-0.005951	0.375357	-0.016	0.98735
Level of Research and Development	0.025504	0.345725	0.074	0.94119
Social Environment of the Enterprise	0.349833	0.458446	0.763	0.44541
Training of Workers	-0.220737	0.397288	-0.556	0.57848
Information and Communication System	0.218466	0.376254	0.581	0.56149
Internal Regulations, Standards	-0.680074	0.417402	-1.629	0.10325
Corporate Culture	0.035758	0.482613	0.074	0.94094
Security	-0.060013	0.390869	-0.154	0.87798

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 2 introduces results of the importance of tested internal resources from the perspective of their optimal combination and influence on enterprise profitability. Statistical significance was proven in financial resources and enterprise strategy. The result in financial resources and enterprise strategy corresponds with the outputs from dimensional reduction (see Table 1), which is, from the perspective of manager perception standard of this issue, a very valuable piece of knowledge. From the perspective of the current situation of enterprises operating within the production and industry sector in the Czech Republic, the obtained outputs may be understood to be relevant. The surprising finding is that significance was not proven in the marketing, research, development, corporate culture, brand and business name, and technical equipment standard, for these resources participate directly on the economic results of business subjects. These obtained results will be the object of a further analysis and solution.

Table 3: Transformed Optimal Model of Internal Resources – determining managers' 'error rate'

Internal Enterprise Resources	Values in transformed model of Internal Resources	Managers' 'Error Rate'
Management	1.618456	-0.3305571

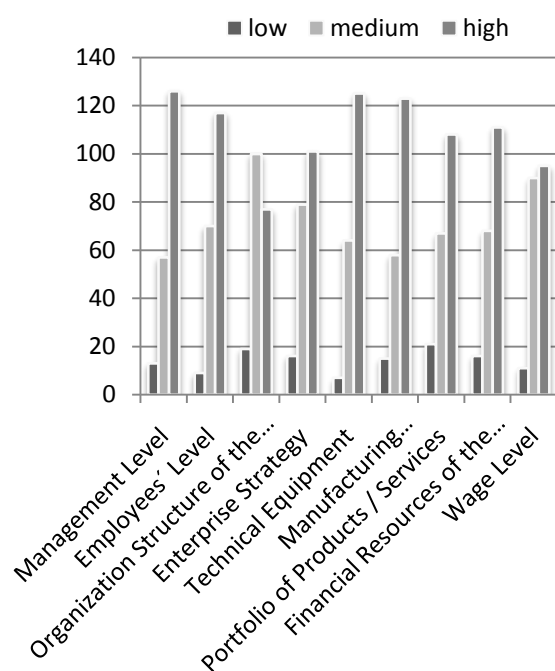
Level		
Employees' Level	2.618698	0.2206395
Organization Structure of the Company	2.173784	0.008934786
Enterprise Strategy	2.511583	0.1912754
Technical Equipment	1.691341	-0.2994907
Manufacturing Technology, Procedures	1.592272	-0.3678426
Portfolio of Products / Services	2.167549	-0.07482762
Financial Resources of the Company	3.000000	0.3924731
Wage Level	1.169205	-0.4127095
Marketing Level	1.772984	-0.1027554
Brand and Business Name	1.745675	-0.2965172
Level of Research and Development	1.780469	0.03001925
Social Environment of the Enterprise	2.139222	0.07498733
Training of Workers	1.508091	-0.1975675
Information and Communication Systems	1.993912	-0.008420356
Internal Regulations, Standards	1.000000	-0.4946237
Corporate Culture	1.791811	-0.114847
Security	1.685875	-0.385557

Table 3 includes results of managers' 'error rate'. The results given hereby draw attention to which internal resources are overestimated or, on the contrary, underestimated, by managers in relation to enterprise profitability; values around 0 point to the correct estimate. The results clearly prove that managers within the observed production and industry sector overestimate especially internal regulations and standards, wage level, management level, manufacturing technologies and procedures, and security. Overestimating the above-mentioned internal resources may be explained for instance by their anchorage in the state legislation and relevant ministries with a subsequent implementation into their own enterprise rules and regulations. Another

explanation may be linked to a high standard of technological development and innovation process on both national and international levels, where these internal resources are perceived as a competition tool. Wage overestimation may be explained by the fact that the research survey is carried out at a significant pace of economy growth, and also wage growth, which is, in many business subjects perceived as a future stability threat not only to business environment, but to enterprises themselves. Management's overestimation may mean a low level of self-reflection in many of top managers overestimating their own expertise and practical skills, while the explanation may be also found in their unwillingness to educate themselves further, and underestimate theoretical knowledge in general, and enhance practical experience.

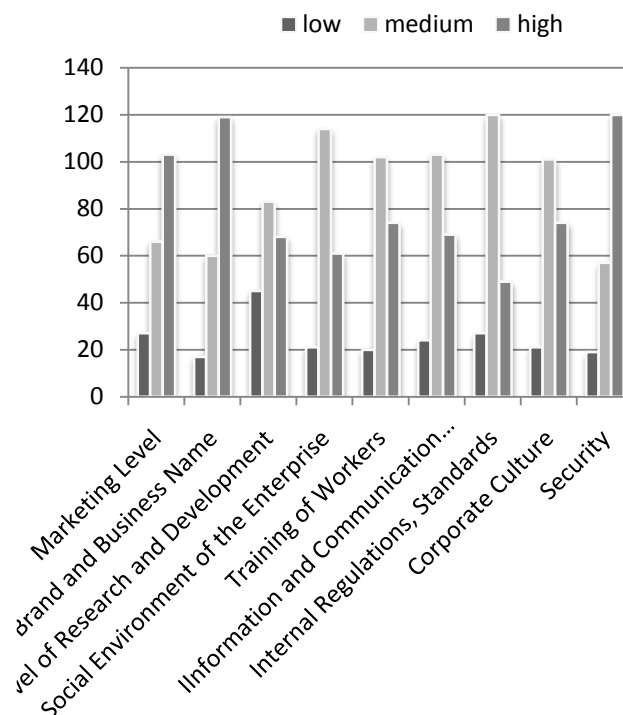
Underestimating financial resources stands in a certain opposition to the results of dimensional reduction (Table 1), where managers describe financial resources as decisive. This contradiction between the model and the current (real) state is possible to be commented as follows, nowadays highly profitable enterprises prevail significantly, thus this internal resource is not perceived as limiting with regard to a positive approach to foreign financial resources; it may also represent a certain level of absence of financial literacy within financial managing.

Fig.1a: Predicted future importance of internal resources – part 1.



Source: Authors

Fig.1b: Predicted future importance of internal resources – part 2.



Source: Authors

Managers of industrial and manufacturing enterprises attach great importance to the future mainly to the quality of management, technical equipment, technology, brand and business name, security and the quality of employees. These results correspond to the results in Table 3 where managers also overestimate these sources, which suggests a certain degree of distortion of both the prediction and the real perception of the current importance of internal resources.

4 Conclusion

This paper analysed the influence and significance of internal resources on enterprise profitability operating in industry and production sector in the Czech Republic. Within objective learning, it is necessary to claim that the research was implemented during a high economic growth of the national economy, which may have significantly limited the perception of certain internal factors by enterprise managers. It is necessary to consider the obtained results the first close-up to the solving of this issue, while the authors of this paper continue in their research, improving the input information with the use of a greater set of enterprises.

The research leads to a conclusion that competitiveness, economic prosperity and enterprise sustainability operating in production and industry sector depend on their financial powers within enterprise strategy. Statistically, their significance was not proven in internal resources in which their significant influence could be expected, such as in research and development, marketing, technology and technical equipment, respectively in resources that are theoretically considered to be significant.

The given outputs may be marked as a branch analysis of internal resources. Internal resources that may have a significant influence on enterprise profitability are being analysed. Mainly the results of the transformed optimal model, expressing the difference between reality and the optimal model, i.e. managers' 'error rate' in perceiving the individual internal resources, as well as the utility of mathematically-statistical methods for the enterprise environment analysis, specifically the internal enterprise resources, strategy management and decision-making may be marked as very valuable findings. While making evaluation of gained research results, it is necessary to take into account also the aspect of overestimating and underestimating in some tested internal resources from the point of view of the perception of their both current and future state.

Internal resources may be marked as a very significant component of the enterprise environment from the perspective of managing business sphere. According to the authors of this paper, internal resources are justifiably worth a great attention because they may be considered a base for development, prosperity, and enterprise competitiveness. The real situation in current business sphere within the Czech Republic still owes much to this challenge and need.

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