

EMPIRICAL ANALYSIS OVER THE EVOLUTION OF THE INNOVATIONAL FIXED COSTS AND ITS RECOGNITION IN THE HUMAN RESOURCES ORIENTATED ENVIRONMENT

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ABSTRACT: Through this research, we wish to demonstrate the bond between the flow of know-how and the growth of the economical potential, translated through the lowering of the fixed costs for the innovation process, this being one of the few solutions which offer continuous profits to the share holders as the pressure to attract new customers and to face the competition forced them to lower their prices. To achieve the innovative process, a company should counteract the effects of the growing fixed costs and only if the revenues overcome the costs, the next step will be setting up production and selling. We will show in our research how this simple theoretical model will drive us towards a specific regression model, which shall be called the model of stochastic limit. The regression model will correspond to the econometrical model, proving that the resulted restrictions are sufficient to determine the limit, supposed to be specific for each company. We will be able to state that the variable which affects the fixed costs does not have a direct influence over the sales; sufficiently to identify the parameters of the limit model. Though we cannot evaluate directly the fixed costs, we can still identify the determinants of the limit and the sales point associated to the innovative products.

Keywords: the fixed costs, human resources

JEL Codes: M41

1. Introduction

The four big companies in audit and consulting, also known as “Big Four”, have high rates of personnel fluctuation. Recently, the consulting team from Deloitte, left for KPMG. E&Y and PwC are losing people too, including management departments, because they want to work in high qualified jobs from financial or accounting departments. Besides double salary, they obtain a flexible program and you can see this on the websites of the companies which are full of vacant jobs.

At the outset of this there are many causes. In this field there is a qualified staff crisis, the only ones that offers qualified training are the big four companies. Even harder is now to find part-time qualified staff to work on top periods.

These companies are not interested in increasing the size of the teams, because the cost with the staff will rise. Cutting down fixed costs is one of the few solutions that offer shareholders high profits. There is a pressure to grow the business by wining new clients but the competition forced them to price less. The big four, had totalized a turnover of 93 million euro in Romania, in 2006, and now they are accepting small contract of audit for just 5000 euro. That’s insufficient for a satisfying margin, which means you have to maintain lower fixed costs. For manager auditor, the firm will tax the client with approximately 170 euro/hour and the cost are 17euro/hour. That means six time less if we consider the period when the employee doesn’t work for the client. In most cases,

the profit rate in these firms is higher than 50 % and the indicators shows a employee usage of over 80 %.The pressure for results is on the partners, from chain of command, which come from another country and their future job depends on immediate result.

Table no. 1

Situation of incomes and costs with the personnel as presented in any of the Big Four

<i>Position</i>	<i>Monthly income (euro)</i>	<i>Fee/hour charged to client (euro)</i>	<i>Expense of the company with employee per hour (euro)</i>
<i>Junior (entry)</i>	<i>450-550</i>	<i>25-40</i>	<i>4-5</i>
<i>Assistant/semi senior</i>	<i>650-900</i>	<i>40-60</i>	<i>6-7</i>
<i>Senior</i>	<i>900-1250</i>	<i>70-95</i>	<i>9-10</i>
<i>Supervisor</i>	<i>1500-1700</i>	<i>100-150</i>	<i>12-14</i>
<i>Manager</i>	<i>2000-2700</i>	<i>170-200</i>	<i>17-22</i>
<i>Senior manager</i>	<i>3500-5000</i>	<i>250-390</i>	<i>28-40</i>
<i>Director/Principal</i>	<i>>7000</i>	<i>320-370</i>	<i>>60</i>
<i>Partner</i>	<i>10.000-15.000</i>	<i>370-410</i>	<i>>120</i>

(Source: Capital, nr. 18/3.05.2007)

The indicator of employment is described as ratio of time worked by employee (charged to client), to total hours in a year. As a individual indicator it shows “how busy was the employee” with projects. The average of this indicator in Big Four is 80% and while the employee is promoted, it decreases, from almost 100% in junior position (target is 80%), at almost 80% in the second year, 70% in the third year and 60 % in the fourth year. The indicator has a low value, for partners who come for two hours to adjust a project.

The indicator of recovery represents a ratio of incomes (charged to clients), to Costs (fee /hour * worked hours).There is a fee standard charged to clients for every employee position. For employee position there is a fee standard charged to clients. The performance indicator, these won't lower fewer than 505, only for very small project in “Big four“case.

In the next analysis, we presume that, to carry out the innovation process of a product or service, the company must counteract the effects of fixed costs increasing. The company will compare fixed costs with net incomes during life-cycle of a product or service. The product will be make and sell, only if the incomes will surpass fixed costs. We will show that this theoretical model will lead to a specific regression model, named in the following, the stochastic threshold model.

Even more, if we look at the theoretical hypothesis, we can say that variables that affect fixed costs don't have a direct influence over sales level. This fact is sufficient to identify the parameters of threshold model. Although, without other hypothesis, we can not estimate fixed costs in a direct way, because of lack of proper data, but we can identify the determinants of the threshold and the sales level of innovation products.

Some investments have a distinctive feature of absorbing in an irreversible way the costs, which explains the fact that reselling or their residual value is much smaller than their purchase value. Launching a new product on the market or inside the firm, is imperfect concerning irreversible expenditure so it implies additional fixed costs. These fixed costs can be related to know-how investment, patent acquisition, personnel training, market research or acquisition of specialized equipments. We will try next; develop a theoretical model, concerning fixed costs for

launching a new product on the market. The model starts from the premise, that innovation is considered only if incomes from the new product sales overrun a certain threshold. The statistic model is specified which is related to economic model. It will be proving that restriction from economic model is sufficient to determine this threshold, which is specific to every firm.

2. Theoretical model

Beside fixed costs of launching an innovation on the market, there are other causes because of whom, a firm of research and development doesn't have a imposing sales figure for new products.

The product can be in research stage or the company has realized only innovation process without a sales/trading sector included in the project. We will presume the case of a company who's usually involved in research and development of activities and who have developed such projects in the recent past.

We will accumulate detailed material for this study but without implying specific circumstances, because the results will not lead to a different score. We consider as a hypothesis the fact that the virtual company we considered, has the right to decide yearly if will launch other new product or services.

The variables used in the model are:

s = allocated budget for research and development department

y = annual sales of the new product

μ = forecasted annual sales for the new product

c = fixed costs for launching a new product on the market

T = product life cycle

r = deduction of expenses rate

\square = price rise over the limit of variable cost/unit

We must not forget that, this is a general model. We presume that all research and development expenditure (C&D) are carried out from moment 0, before the decision of launching the product on the market. In that moment, the deduction of expenses rate from investment s , is represented by formula:

$$(1) \int_0^T \gamma \mu(s) e^{-rt} dt - s - c$$

We presume that research and development expenditure (C&D) have a positive effect on the prospected sales of the new product. The first condition for maximum profit is:

$$(2) \frac{Y}{r} (1 - e^{-rT}) \mu'(s) = 1$$

If we presume that $\mu'(s) < 0$ and $\mu(s) > 0$, then the first equation has a finite solution which it could be zero. We will note this optimum investment in C&D as been s_{opt} . The optimum level of C&D expenditure is independent from product launching costs, noted with c . The C&D expenditure rises with \square value, which represents a competitiveness index.

The optimum level rise with T and decrease with rather longer is the life cycle of a product, the higher are the expenditure. $\mu(s)$ Represents sales level if C&D expenditures are determinable. From the moment the decision of developing a new product is taken, the sales are distinct from initial planned value, with an error, represented by this formula:

$$(3) y = \mu(s^{opt}) + v$$

Innovation is brought to market only if the deduction of expenses rate overruns fixed costs for launching the product.

$$(4)^1 \frac{\gamma(\mu(s^{opt}) + v)(1 - e^{-rT})}{r} > c$$

Equation (3) and equation (4) delimitate a threshold regression model; if awaited income surpasses the threshold of cost (4), then sales arise from equation 3.

The Theoretical model implies the fact that the optimum level of expenditure with C&D and at once forecasted sales of the new product is independent from launching costs. This doesn't mean that C&D efforts are independent from initial costs. If these are forecasted of being high, the project might be unprofitable, the expenditure deduction rate (equation 1) might be negative and so the project will not be implemented. But if we take into account that a project is nevertheless profitable, the optimum expenditure is independent from fixed costs of launching a product on the market. This fact is important for threshold model specification, because it justifies the exclusion of variables which affects fixed cost of launching a product, from sales equation. We must emphasize the fact that in this empirical model, the C&D effort is independent from variables.

3. Econometric Model

To specify the econometric model which develops equations (3) and (4), we introduce the next notations:

y = constant annual sales of innovative products

y^* = latent annual sales of innovative products

c^* = latent threshold of fixed expenditure

x = exogenous variable which affects sales of innovative products

z = exogenous variable which affects the threshold sales of innovative products

β = vector of regression coefficients of variables x

α = vector of regression coefficients of variables z

ε = calculated error from sales equation

η = calculated error from threshold equation

σ_ε = standard deviation of ε

σ_η = standard deviation of η

ρ = correlation coefficient between η and ε

We will try not to estimate in a direct way the structural model from equation (3) and equation (4). From equation (4), we notice that the threshold is represented by:

$$(5) c^* = \frac{c^*}{\gamma(1 - e^{-rT})}$$

Without other considered hypothesis, we cannot recover c cost. But we can express c^* from equation (5) and $\mu(s^{opt})$ from equation (3) as a function of exogenous variables, z and x . We will use exclusion restrictions of the economic model. In other words, the variables that affect the threshold by fixed costs, c , will not enter in the sales equation, (3). In this way we will obtain the latent regression equations:

$$(6) c^* = z\alpha + \eta$$

$$(7) y^* = x\beta + \varepsilon$$

$$(8) \begin{pmatrix} \varepsilon \\ \eta \end{pmatrix} \sim N \left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_\varepsilon^2 & \dots \\ \rho\sigma_\varepsilon & \sigma_\eta^2 \end{pmatrix} \right)$$

The companies will have meaningful sales for new products only if (forecasted) sales will have surplus over threshold c^* . So, latent and observable variables are related through:

$$(9) I = I(y^* > c^*)$$

$$(10) y = \begin{cases} 0 & \text{if } I = 0 \\ y^* & \text{if } I = 1 \end{cases}$$

The probability of profitable sales of the new product is represented by this equation:

$$(11) \Pr(I=1) = \Pr(y^* > c^*) = \theta \left(\frac{x\beta - z\alpha}{\sqrt{\sigma_{\eta^*}^2}} \right)$$

Where

$$\sigma_{\eta^*}^2 = \sigma_\eta^2 + \sigma_\varepsilon^2 - 2\rho\sigma_\varepsilon\sigma_\eta$$

and θ represents cumulative distribution function of standard normal distribution. The forecasted sales of the innovative product (conditioned by the hypothesis that they must be positive), are:

$$(12) E(y|I=1) = x\beta + \frac{\sigma_\varepsilon^2}{\sigma_{\eta^*}^2} \times \frac{\varphi \left(\frac{x\beta - z\alpha}{\sqrt{\sigma_{\eta^*}^2}} \right)}{\theta \left(\frac{x\beta - z\alpha}{\sqrt{\sigma_{\eta^*}^2}} \right)}$$

Where φ is the density distribution function of standard normal distribution.

The most plausible function of the threshold models is derived from the union of observable variables distributions (y, I)

$$(13) F_{y,I}(I=0) = \Pr(y^* < c^*) = 1 - \theta \left(\frac{x\beta - z\alpha}{\sqrt{\sigma_{\eta^*}^2}} \right)$$

$$(14) F_{y,I}(y, I=1) = \Pr(c^* < y^*, y^* = y) = \Pr(c^* < y^* | y^* = y) \Pr(y^* = y) \\ = \theta \left(\frac{(y - z\alpha) - \rho\sigma_\eta \left(\frac{y - x\beta}{\sigma_\varepsilon} \right)}{\sigma_\eta \sqrt{1 - \rho^2}} \right) \times \frac{\varphi \left(\frac{y - x\beta}{\sigma_\varepsilon} \right)}{\sigma_\varepsilon}$$

So the correlation can be written like this:

$$\text{Log}L_i = \sum_{i=1}^N \left\{ \begin{aligned} &(1 - I_i) \text{Log} \left[1 - \theta \left(\frac{x_i \beta - z_i \alpha}{\sigma_\eta} \right) \right] + I_i \text{Log} \left[\frac{\varphi \left(\frac{y_i - x_i \beta}{\sigma_\varepsilon} \right)}{\sigma_\varepsilon} \right] \\ &+ I_i \text{Log} \left[\theta \left(\frac{(y_i - z_i \alpha) - \rho \sigma_\eta \left(\frac{y_i - x_i \beta}{\sigma_\varepsilon} \right)}{\sigma_\eta \sqrt{1 - \rho^2}} \right) \right] \end{aligned} \right\} \quad (15)$$

It's also possible to estimate the model by a method with 2 phase's². A sufficient condition to identify the parameters of a threshold model is that sales equation to include at least one exogenous variable which it must not be in threshold equation.

4. Information and data about the sample

4.1. The source

We will use data from Statistical Annual Report, the edition published in 2006, reported to data from Statistical Annual Report - 2004.³ The population of the study covers all companies with 10 or more employee, from al service and production branches from Romania. The sample is represented by 5.171 (table at page 11), companies with a answer rate of 79,1%. From the available information we can see that answer absence didn't influence the study results in a meaningful way.

The sample contains two parts. In the first one, the companies were asked to report basic information about the company, like activity sector, sales figure, exports, number of employees, etc. The second part consists in questions which belong to C&D domain, innovation and the curricular issue. Only the companies that answered affirmatively to at least one of the next questions were invited to complete the second part of the sample.

Did your company developed changes over technological product in the last four years?

Did your company developed changes over on technological processes in the last four years?

Does your company want to develop technological changes on product or processes in the next two years?

In this study, we make a difference between three types of product (1) products that are not changed in their (2) incremental improved products and (3) radical improved product or brand new products. In the study it is a difference between "new in company" products and "new for activity sector" products.

The products from the second category will be interpreted as been the "real" innovations. The first category includes imitations of innovative products, launched earlier by the competition. With other words, the sales of "new for company" innovative products represent an indicator of imitation and diffusion of technology, rather than "actual innovation".

4.2. Descriptive statistic

The sample is formed from 4094 companies. After the exclusion of the companies with missing data or of those with less plausible answers, there were left 2887 companies (Data set no 1). For our empirical analysis, we will distinguish another two data sets. We will omit the companies from the sample that hadn't report innovative activities and so we obtained the data set 2 (1593

companies). Furthermore excluding the companies that have realized C&D efforts only occasional, we will obtain the data set no 3 (622 companies). Initially we have restricted data from set no 3, because, these companies were likely to develop new products or services within specialized labs and with professionals and now they are in the stage where they plan to launch new products on the market. Descriptive data of set no 3 are shown in table no1. Also in the table are found statistics of companies that has a positive sales figure, referring to new products on the market or new products in the company.

The annual average sales of new products like “for the company” and “for the activity sector” are amounted to 10, 4 million RON and 1, 1 million RON. The standard deviations are significantly because there are in the sample, a few multinational companies with high labor productivity and with high sales figures, as regards to innovative products. ⁴

The growth of sales between 2004 and 2006 is high of about 12%. Such a growth, results from the fact that the analysis includes only companies that are based on C&D activity, which presumes a rapid development. There are theoretical arguments that supports a correlation between exports and innovation which explains the fact that average exports from our sample is 43%, comparing to average national exports which is 25 %.

Sales threshold, from equation (5) depends on fixed costs of penetration strategy. A possible standardization of these costs is the minimum efficiency scale which is often used as an index for costs structure of a company. There are at least four problems concerning fixed costs standardization. First of all, standardization is a gross method to approximate fixed costs. Secondly, the method doesn't vary from one company to another and last, some companies belong to several industrial branches.

Table no. 2

The descriptive statistics of the variables used in threshold model. (We agree on following abbreviation: new innovations for the company (If) and new innovations for activity branch (Is))

Variable	-million RON-		
	Total sample	Firms with sales for If	Firms with sales for Is
Total sales 2006	243,42	255,59	273,04
% of If sales	36,09	39,32	34,74
% of Is sales	4,00	3,92	10,10
Endogenous variables			
Logarithm of average sales If/employee	10,40	11,33	10,75
Logarithm of average sales Is/employee	3,83	3,95	9,64
Exogenous variables			
Products provided by C&D activity -% from total products	3,55	3,62	4,22
Sales growth in % 2004-2006	12,09	11,79	13,02
Percentage of exports	43,10	44,24	42,56
Number of employees in C&D activity	790,65	832,54	916,85
Fixed costs standardization : worked years average in C&D activity	4,57	4,55	4,91
Life cycle average in industry (years)	10,58	10,58	10,72
Small firm presence (<50 employees in the core activity of the firm)	72,05	72,60	70,91

Firms from high-edge sector	1,57	0,58	0,59
Firms from service sector	12,22	9,54	12,23
Firms with their headquarters in Bucharest	67,71	32,12	73,72
Firms that are strongly dependent on parent company	0,15	0,11	0,54
Firms with C&D special consulting	3,28	3,04	23,31
Firms with foreign acquisition of know-how	22,43	18,5	15,72

(Source: the indexes are calculated on the basis of numbers provided by the Statistical Annual Report on 2007)

5. Hypothesis and results

5.1. Hypothesis

We will define the hypothesis, which must be tested with the help of threshold model, before we formulate the results of the study. This fact helps us to identify the variables which need to be included or excluded from threshold equation or from sales equation.

Hypothesis.1. Production correlated with C&D activity raises the sales quantum

While C&D activity is a major input in the innovation process, we expect that its intensity and the developed products connection will have a direct influence over added value of products obtained due to innovation activity.

Hypothesis.2. The cooperation concerning C&D declines the sales threshold of new products

Sharing knowledge and risks by mutual C&D agreement, lowers fixed costs for entry on the market and develops future profits due to innovation by “bringing in” the external positive effects.

Hypothesis.3. Demand growth stimulate the perspective of future successful sales of new products

Schmookler (1966) suggested that demand is crucial for innovation efforts. Recent empirical research had proved this theory.

Hypothesis.4. The firms that are localized in urban environment benefit from know-how outsourcing and from corporative excess. That’s why they have a lower threshold for market entry of innovative goods.

The environment in which a firm unfolds activity can be more or less an influential element over innovation activity. It’s often said that firms situated in a urban center, where’s a high density of population, can benefit from regional excess of know-how. That’s because direct contact with business partners improves information exchange and determines a steady relation. We can test this hypothesis, using a density index, worked out by Manshaden (1966) for Norway.

Hypothesis.5. The longer is the life cycle of the innovative good, the lower the sales threshold will be.

This hypothesis arise from the result of equation (5).A long life cycle, implies a market entry cost/unit and that’s relatively low. We use standardization over the life cycle average of goods, innovation in industry. This information was collected at the firm or company level.

Nevertheless we had to convert this variable into a sector average and that's because of lack of accurate answers and information.

Hypothesis.6. The more powerful the presence of small innovators in branch is, the smaller is the costs of market entry for new product threshold is.

We have introduced “the presence of small entrepreneur“variable in the threshold equation to test the hypothesis. That means that we have selected the firms with less than 50 employees in a main activity department.

5.2. Results

The estimation of threshold model for data set from table 1, are shown in Table 2.1, for new product within the firm and in table 2.2 for new products within the activity sector. In threshold equation, a positive coefficient means that the correspondent variable is related by a positive ratio, with the sales threshold. That means that the threshold of the variable cost rises. If the coefficient of a variable from threshold equation and from sales equation is positive and is higher in sales equation than threshold equation then the variable represents a possibility for the firm to develop innovations.(11). This fact is valid only if the coefficient of sales equation is negative and lower than in threshold equation.

Even though the threshold is not observable, the parameters of threshold equation and those from sales equation are identified by exclusion restrictions. The theoretical model from point 1 implies the fact that variables just like co-operation in C&D domain don't enter in sales equation. In threshold equation, the variable is significant for service sector for new product inside the firm and for new products inside the activity sector. Though exclusion of service sector from sales equation is unknown, the results are not much higher with the introduction of this variable in equation. This indicates a fair apportion of variables in equation and not the lack of importance concerning service sector. A permissible correlation between the error coefficients from threshold equation and from sales equation will be permitted. This correlation will capture variables specific to firms that have been left beside in both equations.

Table no. 3

Estimation for “If” products. Threshold equation

Exogenous variables	Coefficients	Standard Error
Factor of possible interruption of C&D activity	11,181 (*)	2,809
Average life cycle in industry	0.034	0,147
Standardization of fixed costs	-0,046	0,070
Presence of small industry in %	-0,064(**)	0,022
Firms that benefits from consulting in C&D	-1,046	0,651
Firms with co-operation in C&D	-0,904	0,535
Firms with foreign acquisition of know-how	0,349	0,549
Firms localized in populous areas	-0,111	0,568
Firms from high-edge sector	-0,173	0,670
Service firms	2,029	0,748
Firms that are strongly dependent on parent company	1,147	0,790

(Source: authors)

Table no 4

Results for Sales/Employee equation (Log. (15)), correlated with If products. Dependent variable is the logarithm from annual average of sales/employee of If products in thousand RON (on logarithm scale)

Exogenous variables	Coefficients	Standard Error
Factor of possible interruption of C&D activity	10,897(**)	0,158
Logarithm associated with number of employees	0,041(*)	0,025
C&D intensity product (years of employee associated to C&D product as a percentage from total value associated to employee)	0,036(**)	0,006
Sales growth 2004-2006	0,004(**)	0,001
Exports quota from sales	0,503(**)	0,100
Firms from high-edge sector	-0,271(**)	0,082
Firms from service sector	-0,111	0,112

(Source: authors)

Notes:

(*) the coefficient is meaningful for a 90% level

(**) the coefficient is meaningful for a 95% level

- C&D intensity. Both values for If and Is indicates a higher intensity of C&D in higher sales of «new products sold/number of employees» indicator. Corresponds with (2) and I.1. from upper part.

Co-operation between C&D reduce the sales threshold considerably, for both If and for both Is. The effect is statistically significant, in both cases.

Table no. 5

Estimation for Is: Threshold equation

Exogenous variables	Coefficients	Standard Errors
Factor of possible interruption of C&D activity	12,037	2,855
Average life cycle in industry	-0,124	0,142
Standardization of fixed costs	-0,013	0,055
Presence of small industry in %	0,025	0,025
Firms that benefits from consulting in C&D	-0,711	0,554
Firms with co-operation in C&D	-1,361	0,532
Firms with foreign acquisition of know-how	-0,763	0,553
Firms localized in populous areas	-0,164	0,548
Firms from high-edge sector	-0,563	0,653
Service firms	-1,333	0,764
Firms that are strongly dependent on parent company	1,733	0,751

(Source: authors)

Sales/employee equation (Log (15)), correlated with Is products. Dependent variable is the logarithm from annual average of sales/employee of “Is” products in thousand RON (on logarithm scale)

Exogenous variables	Coefficients	Standard error
Factor of possible interruption of C&D activity	9,428	0,578
Logarithm associated with number of employees	-0,047	0,060
C&D intensity product (years of employee associated to C&D product as a percentage from total value associated to employee)	0,029	0,013
Sales growth 2004-2006	0,007	0,003
Exports quota from sales	0,366	0,235
Firms from high-edge sector	-0,198	0,213
Firms from service sector	-0,533	0,235

(Source: authors)

6. Conclusions

Sales growth. Sales growth for 2004 2006 period has a small positive effect over If and Is sales. We will consider that this fact confirms Schmookler theory. According to this theory, the demand needs innovation, although this fact might cause objections because innovation brings added value faster.

Location. The firms location has a negative sign, but it's not significant over the sales threshold.

Product life cycle. The average life cycle doesn't influence sales of innovative products. So we will repel hypothesis I.5. We must know that a variable life cycle must be compounded because of huge lack of answers from the survey.

Competition between small entrepreneurs. Using the presence of small firms as a calculation method in competitive rate for core sector of the firms, we accept hypothesis I.6. for If and repel it for Is. Of course, standardization is an indirect method to note the price level over cost/unit variable which plays an important role in a econometric model.

Firms that benefit from C&D consultant. These firms have a lower threshold and so they benefit of a higher rate of probability that the product will reach the market. We must notice that coefficients of innovative products are relatively high but insignificant.

Other factors. We have included variables for firms that belong to high-edge sectors. Including C&D co-operation and C&D intensity in the model, high-edge sector will probably lose amplitude. We must notice the fact that 2004-2006 period was “stamped” by a strategic and developed activity in It and electronic domain. Also we included a variable for service firms. It seems that service firms have a lower probability of selling innovative products. Even more, the Is/employee produced by service firms, is the lowest from production firms.

This study has of course, some gaps. The innovation indicator is a new concept which it has been used for the first time in the states of EU. The firms are not used yet to answer the questions concerning these indicators and the accounting procedures are not ready to produce such information. As a consequence, many firms has reported gross estimation rather than accurate numbers. So this case study must be taken rather as a theoretical one, though it has data from economic reality.

Further more, we had a single study, so it couldn't be used at its real value, time variable between exogenous and endogenous variables. A possible justification is that many exogenous variables will not be modified over time and so there is some typical dependence.

The biggest problem of the study is the lack of data. Many questions have no answers or superficial answers concerning design, creation tools, marketing research and investments in fixed assets related to innovations. In future activity, this type of data should be used for a direct forecast of fixed costs of innovative products and their market launching.

The study demonstrates a theoretical methodology. We propose a economical model to analyze new indicators for added value of innovation. This model presumes restrictions related to the econometric model and there are multiple results. Some can't be accepted or denied, like the effect of C&D intensity over forecasted sales.

We have highlighted some important results. Some added value is brought by co-operation in C&D activities, shown by the fall of fixed costs for launching an innovation on the market. We have doubts concerning the evaluation method of relational capital and if the rest of indicators and of exogenous variables have influences over financial and accounting indicators. We have found out that geographical position of a unit doesn't influence in a significant way the C&D activity. This fact is counteracting by the impact of the level of threshold equation under the influence of external consulting.

This makes us wonder in what way, financial standings can reveal an intrinsic number of a contract, the real value that the firms profit will support. We found out that in financial reports domain, accounting indicators, supports only in an unimportant extent the influences studied in the upper section. So we could suggest a correction in the future with the results of a similar analysis, developed with more exact models.

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¹ M. Schulz, The Innovation Decision and Fixed Costs, *Industrial and Corporate Change*, Vol12, No5, pg. 83.

² Zur Shapira, "The flow of ideas and timing of evaluation as determinants of knowledge creation", *op.cit*, vol11, n.2, pg. 34.

³ The two years period seemed more appropriate for such analyses, than having a single year difference.

⁴ We have evaluated the indexes, excluding the multinational companies and the results were not significantly changed, and as such, we have decided to include the multinational as well in the statements of research.