

COMPANY TURNOVER RESEARCH IN THE ELECTROTECHNICAL MARKET

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Key words: regression analysis, loyalty index, premium goods, industrial production index, construction volume, correlation, predictors, residual self-correlation, Durbin-Watson statistic.

The article represents the results of electrotechnical company turnover research using regression analysis. The Factors influencing a turnover and relating to a macro and micro sphere of marketing are defined. The multi-regression model is computed. The analysis of model adequacy (significance) is done. The results are interpreted.

At the present moment one of the priority directions of development of Russia is the electrical-and-energy industry and without it the growth of the industrial production is impossible. Over the last few years a lot of attention has been paid to this branch of industry because the growth of energy consumption outstrips the economic growth of the country and regions. Refreshing and increasing of generating capacity demands a modern approach to the electrotechnical industry development. The main problem is that it is impossible to develop the industry when the structure, production volumes and the other parameters of demand on this production are not clear. Investment program of RAO UES of Russia was a initiator of the mixed industries development and in particular the electrotechnical industry.

The volumes of purchases of electrotechnical production should be increasing by 3,4 times at 2010 in comparison with 2006. The growth of volume of electrotechnical production consumption will be accompanied by the form of new technological requests.

It is a necessary to define all factors that influence on the electrotechnical production turnover (income) for the development of its effective

marketing strategy. All these factors can belong to marketing microenvironment and be influenced by the firm and also belong to macroenvironment that the company can not influence¹.

The target of the research is a definition of factors and theirs power and character of influence on turnover (y).

The multiple regression equation was built on the basis of data of internal reports of electrotechnical company and Federal State Statistics Service of Russian Federation for the period from January 2005 to June 2007 for the solution of this problem. It offered to consider as predictors the following indicators (table 1).

The first five indicators belong to the microenvironment, and the last two - to macroenvironment. Average sum of income per one client is a very important indicator because it characterizes company marketing activity.

A company can increase an interest in its production with additional special programs. The level of exclusiveness of turnover and its volume increase as a result. The alternative strategy of growth presumes the increase of intensiveness level when the focus is on getting new customs and not on increasing of the orders volume.

Table 1

Explaining variables in a model of company turnover

Variables	Variable name, units of measurement	What environment it belongs to
x_1	Average sum of income per one client (thousand rubles)	Microenvironment
x_2	Loyalty index	Microenvironment
x_3	Premium-good income, (thousand rubles)	Microenvironment
x_4	Share of paid sums from invoiced sums	Microenvironment
x_5	Delay in shipment, (days)	Microenvironment
x_6	Industrial production index of Russian Federation, (% to December 2004)	Macroenvironment
x_7	Construction volume, (billion rubles)	Macroenvironment

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Loyalty index performs the correlation between numbers of circulation months when the customer has been buying the electrotechnical goods and disparity between first and last circulations (months).

Premium-good income characterizes the basic of company offering of goods. Here we have outstanding switch-room equipment that a company makes according to special individual orders. Over the last years this directions becomes a priority in the trade policy of company. The income of premium goods strongly influences on the growth of turnover of a company and it means that the strategy was right and it is implemented successfully.

Share of paid sums from invoiced sums, from one hand, characterizes how the company

a weighting system the structure of gross value added in economic types activity is used because the consumers of the company goods represent different industries. The correction on informal activity was made too.

The construction volume is a volume of work made in the activity of "Construction" in Russian Federation in a monetary terms. This macro-indicator is very important for a company because the targeted consumers of this production are construction and erection companies that perform in the Russian Federation.

Previously a correlation analyses was made for the definition of linear statistic correlation between predictors and depended variable. The results of correlation analyses are presented in table 2.

Table 2

Paired indices of correlation matrix

Variables	Correlation							
	Correlation coefficients with the level of validity were defined $p < 0,05$							
	N = 30							
	Y	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇
Y	1,00	0,80	0,40	0,67	0,28	0,21	0,47	0,60
X ₁	0,80	1,00	0,44	0,46	-0,04	0,34	0,27	0,29
X ₂	0,40	0,44	1,00	0,51	-0,13	0,09	0,53	0,38
X ₃	0,67	0,46	0,51	1,00	-0,02	-0,11	0,42	0,56
X ₄	0,28	-0,04	-0,13	-0,02	1,00	0,02	-0,04	0,20
X ₅	0,21	0,34	0,09	-0,11	0,02	1,00	0,03	-0,04
X ₆	0,47	0,27	0,53	0,42	-0,04	0,03	1,00	0,81
X ₇	0,60	0,29	0,38	0,56	0,20	-0,04	0,81	1,00

qualified in relations with clients: if the company has a lot of unrealized deals it means that it is inefficient in orders. On the other hand this indicator shows a market situation. A negative economic situation leads to the growth in numbers of unrealized deals.

Delay in shipment is the difference between date of dispatched of goods and the contract date.

Reduction the of cycle of "order-dispatch" is an important direction of growth of competitiveness of the company and is one of the tasks of marketing logistics.

Two indicators belong to marketing macroenvironment. Industrial production index in % to December 2004 includes the following activities: Mining operation, Manufacturing activities, Production and distribution of electro energy, gas and water.

It is accounted on the basis of dynamics of production of 730 of the main important goods-representatives (in a natural or value terms). As

As a result of correlation analyses (where $\alpha < 0,05$) was defined a correlation between average income of the company (y) and average sun of income per one client (x_1), loyalty index (x_2), premium-good income (x_3), industrial production index(x_6), construction volume (x_7).

Also there is an important statistical correlation between many regressors. The attribute of multicollinearity is an intimate relations of x_6 and x_7 ($r_{6,7}=0,81$). In this case the algorithm step-by-step of making a regression model was used. In every step one predictor was included beginning from the parameter that was correlated with the depended variable the most. This process ends when the adding of new variable has no sense and no influence on increasing the adequate model.

As a result of regression analyses a model was made that consists of 4 predictors: average sum of income per one client (x_1), premium-good income (x_3), construction volume

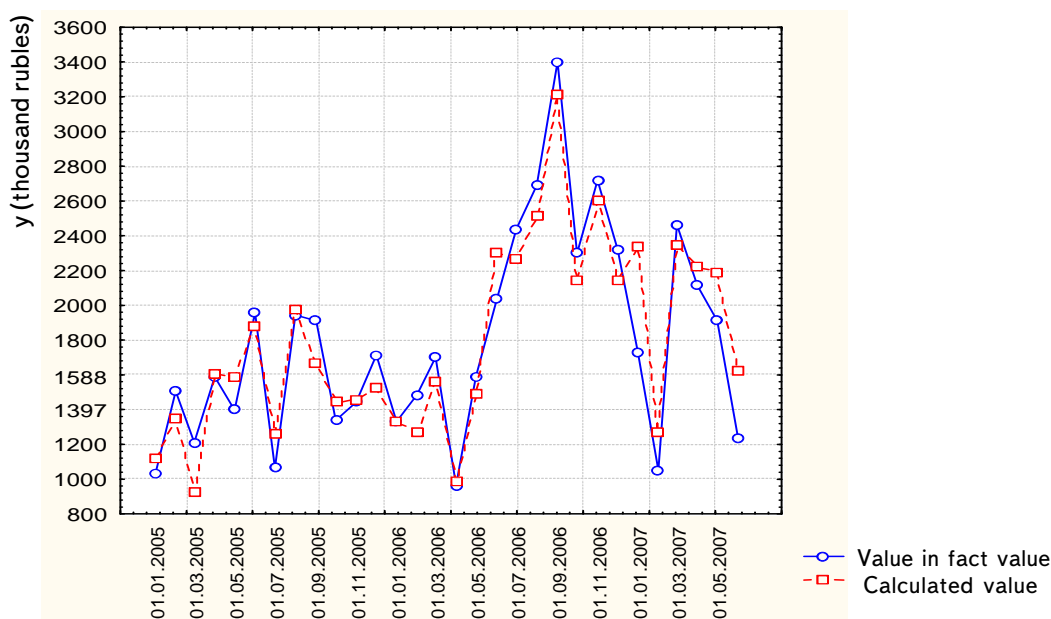


Fig. Company incomes accounted by regression model and in fact

(x_7), Share of paid sums from invoiced sums (x_4). According to the F-criterion the hypothesis about equality of all coefficients of the model rejected with $\alpha < 0,05$ (observing meaning $F(4,25) = 41,58$), so the regression equity is very important. Regression model has the following type:

$$\hat{y} = -383,74 + 38,08x_1 + 2,12x_7 + 1440,16x_4 + 0,419x_3,$$

(7,56) (2,33)
(3,47) (2,81)

$$; F(4,25) = 41,58 ; DW = 1,59 ;$$

$$\hat{S} = 227,04 .$$

Determination coefficient performs that predictors included in a model define 87% of dispersion data of company turnover.

Under regression equity presented the observed meaning of t-criterion according to them all coefficients with regressors are important with $\alpha < 0,05$.

Analyzing the nominal regression coefficient (β) can make a consequence that the average sum per one client () of orders influences the dynamics of company income and the other indicators influence on income 2,3 and 3 times less ($\beta_i = 0,21 \div 0,27$ from construction volume from the shares of the paid sums)

In order to estimate the model's adequacy more work was carried out on the analysis of residual component. Due to the fact that the

given data is temporal rows, in order to estimate residual self-correlation of the remaining there was applied the Durbin-Watson statistic. The value of which $DW = 1,59$ is close to 2. It is possible to assume the absence of residual self-correlation which is one of the most important features of the model's adequacy (figure).

Figure demonstrates actual and modeled figures of the turnover which give a visual confirmation of the model's adequacy conclusion.

Out of the received model one can draw a conclusion that the proliferation of the average sum for a single client for 1000 rubles will lead to the company's revenue increase by 38000 rubles, the rise of building works in Russia by 1 mlrd. rubles can lead to an income increase by 2000 rubles, the increase of the paid bills portion by 1.0 % will lead to the turnover by 14440 rubles, the revenue on the premium goods (non-standard electric shield equipment) holds, on average, 40 % from the entire turnover.

Consequently the focus the marketing policy of a company should be made on increasing order volumes, realizing more qualified work with clients for reducing of share of broken deals, and enforce work with premium goods. Construction volume are defied by conditions in state and world economy.

¹ Aivazyan S.A., Ivanov S.S. Econometrics. M., 2008; Econometrics / Editor I.I. Eliseeva. M., 2007; Econometrics / Editor V.S. Mkhitarian. M., 2008; Federal State Statistics Service of Russian Federation, Official website, <http://www.gks.ru>.