Journal of Social and Economic Statistics

Vol.5, Special Number, 2016

DOES THE OXYGEN COSUMPTION INFLUENCE THE COMPANY TURNOVER? AN EMPIRICAL ANALYSIS ON MEDICAL BUSINESS

***Cristina STANCIU-MANDRULEANU*[a]**

Abstract

The article aims to examine the influence that the requests of oxygen is exerted on the turnover of Microcomputer Service SA Romanian company, using linear regression analysis, taking into account the company network hospital units in the period 2008-2015, respectively, 45 hospital units.

The purpose of the study is to forecast the next year turnover of the company, given the increasing levels of requests for oxygen, following the development of hospitals and compulsory hospital unit's alignment to European standards.

In the study it was taken into account the typology of hospital, the hospital capacity, expressed in number of hospital beds and geographical region to which the unit belongs.

The empirical results of the study emphasized that the consumption of oxygen affects in significant manner the turnover of the company.

This study is of interest to health care providers, hospitals managers, patients, third party payer as economic reality proves that, at present, quality of medical care is equally a priority for everyone involved.

Keywords: turnover, medical oxygen market, linear regression model, medical oxygen consumption

JEL Classification: I15, L65

Author's/Authors' Affiliation

[a] Bucharest University of Economic Studies, Economic Cybernetics and Statistics Doctoral School, cristina.mandruleanu@rdsmail.ro

1. Introduction

In a market economy, a company is operating in conditions of strong competition, both domestic as well as foreign markets.

In order to achieve the objectives it has to conduct its business based on its own economic well-founded strategy, technically and economically. The management and organization of business activity of the company is playing an increasingly important role as a result of the fact that the world has made new mutations on the internal and external market and great progress in the management theory on the application of modern concepts.

The analysis of turnover must always relate to the strategic position of the company. To obtain a healthy profit, it is important to know what level of turnover the business requires. The manager must take into consideration the pricing, the company spending and use of the profit, and decide how each of these will help him to meet his target. These decisions are also influenced by the economically context, the business targets and the current situation in the industry.

The turnover is considered to be a fundamental indicator of the volume of activity of a company and obviously it is always considered when evaluating a company.

The analysis of turnover is essential for the assessment of the place of the company in its field, its position on the market, skills to develop its various activities in a profitable manner. The level of turnover provides information about how important is the company, if its results compared to those in the field are significant and also if its market share is negligible.

The purpose of the analysis of turnover affects the knowledge of the dynamics of a company sales, of the factors which condition their evolution in order to develop market strategy and forecasts grounding of the main economic and financial indicators.

The personal contribution consists in turnover analysis of a Romanian company, active in the medical oxygen field, because its turnover dynamics has a particular importance in defining the company's strategy. Given that market factors prevail in the system of variables that explain the results of a company, it is important to follow the dynamics of turnover to identify the actual status of the company.

2. Literature review

The global medical gases and equipment market is segmented on the basis of product, application, end user, and region. The global medical gases market is sub segmented into medical pure gases and medical gas mixtures. The increasing base of geriatric population resulting in a decrease in immunity levels and increased susceptibility towards respiratory diseases are some key growth factors.

North America medical gases and equipment market was the largest accounting for over 40.0% of the total revenue in 2013 and will continue to dominate until 2018. The presence of sophisticated healthcare infrastructure, high volume of minimally invasive

medical procedures, and the industry-friendly initiatives such as the implementation of the U.S. Food and Drug Administration Safety and Innovation Act are some of the factors attributing to its large share.

Europe medical gases and equipment industry is the second largest revenue generating region owing to, the presence of lucrative growth opportunities in Eastern European markets such as Russia and Poland. European associations are actively involved in providing help to local manufacturers regarding regulations for production and distribution of these products.

Europe was followed by Asia Pacific, which accounted for over 19.0% revenue in 2013. Rapidly improving healthcare infrastructure, patient awareness levels, and unmet clinical needs in developing countries such as India and China are expected to attract more manufacturers to fulfill untapped opportunities in these regions.

Increasing awareness regarding chronic and respiratory diseases and rise in disposable income have led to the adoption of better use, which is expected to play a major role in driving the demand over the next six years.

Some of the prominent players in the global medical gases market include Air Products and Chemicals, Inc. (U.S.), The Linde Group (Germany), Air Liquide (France), Praxair, Inc. (U.S.), Taiyo Nippon Sanso Corp. (Japan), SOL-SpA (Italy), Airgas, Inc. (U.S.), Atlas Copco (Sweden), Messer Group (Germany), and GCE Holding AB (Sweden). Together, the top 10 players accounted for approximately 70% to 75% of global medical gases and equipment market in 2012.

Growing amount of collaborations such as mergers and acquisitions, license agreements, and new product developments are business strategies used by companies to establish ancillary and target untapped market with high penetration rate.

In Europe, Linde Group (Germany) and Air Liquide (France) were the major players, together representing approximately 50% to 55% market share in 2013.

In the medical pure gas segment, being the most widely used medical gas, oxygen held the highest share (65% to 70%) of the total pure medical gases market in 2013. The global oxygen market has maintained a steady 5-6 percent growth over the last ten years. The focus of this growth has, however, shifted, with marginal growth in some developed countries balanced by massive growth in developing economies. The oxygen supply in Western Europe, for example, has grown by 46 percent over the last ten years, but grew by less than 1 percent from 2005 to 2006.

On the Romanian market of medical oxygen activates:

* Multinationals oxygen manufacturing by industrial method (99.5% purity): Linde Gaz Romania, Messer Romania, Siad Romania, Air Liquide Romania
* Romanian company that uses oxygen generators (93% purity): Microcomputer Service SA

In the past 6 years, there were two interested companies to enter on the market of medical oxygen, GB Indco SRL and Oxistar SRL. GB Indco SRL from Bucharest only sells medical oxygen production plants (without rent or sell oxygen per m^3), and the company Oxistar SRL Cluj serves only its own county, having about 10 hospitals customers.

The article examines the influence exerted by the requests (consumption) of oxygen on the turnover of the Romanian company Microcomputer Service SA at the level of the year 2015 (compared with 2011), using linear regression models, taking into account the network of hospital units of the company in the period 2008-2015, respectively 45 hospital units.

In Romania there are no known information regarding market size and market value of medical oxygen. This market consists mainly of liquefied oxygen (obtained by industrial methods), oxygen obtained by the method PSA (provided by generators) and oxygen delivered by concentrators (fixed or portable, in the condition of care home or in the hospital).

The market growth was found in increasing the turnover of the active companies on this market. Also, the market share have a larger impact on the performance of companies especially where there is low growth, as in the medical oxygen market. On this market, competition for market share is brutal. Economic factors play a larger role in the variance of sales, earnings and margins, more than other factors. Margins tend to be low and operations run at maximum efficiency due to competition. Since sales come at the expense of other companies, they invest heavily in marketing efforts or even loss leaders to attract sales.

On this market, companies may be willing to decrease prices and go under competitors prices and even to lose money on products, temporarily, in order to win contracts agains competitors or to force competitors to give up. Once they gain greater market share and competitors are ousted, they attempt to raise prices. This strategy can work, or it can backfire, compounding their losses. However, this is the reason why this industrie is dominated by a few big players.

The main purpose of the study is to predict which will be the turnover of the romanian company in the following year, taking account of the increase in level of requests for oxygen, as a result of the development of hospitals (equipping with extra beds and increase the number of bubbled oxygen) and of compulsory hospital units alignment to European Communities standards.

The Romanian medical oxygen market is characterized by a small number of producers, each having an important share in terms of oxygen supply. Each producer aims to maximize the profitability for their own, without collaborating with other manufacturers, so that on this market there is a balance of Cournot type.

3. Some insights on the medical oxygen market

In the year 2000, following a market study by referring to the medical oxygen market, Microcomputer Service SA found that in Romania there is only the industrial method for producing medical oxygen, of concentration of 99.5%, which is then distributed to the hospitals in tubes of various capacities (6m3, 10m3) or in large tanks.

As a result, the company identified very precisely the market niche that presented real potential, so that since 2000 Microcomputer Service has introduced a new American technology, which prepare onsite medical oxygen, of concentration 93% +- 3%. The company identified in the US a way to get a product similar to the national product, with a

great price advantage for end users (the hospitals units), which allowed to the Romanian company to be differentiated from the multinational companies.

Currently, the hospital system in Romania is using the current two types of medical oxygen: medical oxygen of 99.95% concentration, produced according to the technology of liquefaction, which occurs industrial and which is delivered by tubes and tanks and medical oxygen of 93% concentration, produced according to technology of molecular sieves with medical devices using oxygen concentrators, which allows the preparation of medical oxygen inside hospitals.

The two products are used for the same medical purpose, being substitutable, the first being a medicinal product in the European Pharmacopoeia, the second being a medicinal product in the American Pharmacopoeia since 1990, produced and marketed in Romanian hospitals since 2000, according to the Law 176/2000, European Directive of Medical Devices 93/42 / EEC and international medical standards adopted as national medical standard SR ISO 10083.

The market served by Microcomputer Service is represented at national level, of 103 hospital units, public and private. In this article, the research was based on the information obtained from 45 hospitals for us to report to the same customer base, both in 2011 and 2015. According to the Statistical Yearbook of the Ministry of Health, in the year 2014 in Romania there are a total of 425 hospitals.

4. Data and methodology

The data used in this research report covers the period 2011 - 2015, being obtained internal, from accounting records and technical reports of the company Microcomputer Service SA.

The dependent variable used is the company's turnover in 2011 and 2015, while the independent variables included in the analysis are the medical oxygen consumption for 45 public hospital units in Romania.

There were also taken into consideration the reports published by the Ministry of Health with regards to the hospital classification (type framing, size, number of beds).

I started from the research of the literature, using academic publications, professional and commercial publications, as well as reports from the National Institute of Statistics and Ministry of Health. In parallel, I implemented an internal and external secondary research using data generated from the inside of the business, namely: the minutes concluded with public hospitals, technical reports, invoices, accounting records.

In the study were taken into account the typology of hospital (hospital county / municipal and remaining units), the hospital capacity expressed in number of hospital beds and geographical region to which it belongs the units.

The article seeks the variation of turnover in 2015 compared to 2011 due to oxygen consumption, considered as reference year. In 2010, the medicinal use oxygen was introduced in the European Pharmacopoeia (monograph no. 2455), the only work of reference for quality control of medicinal products in the signatory states of the Convention.

The European Pharmacopoeia purpose is to promote the protection of public health by developing common standards recognized, intended for use by healthcare professionals and generally to all those who have connection with the quality of drugs.

As a result of the legal regulation on the definition, production and use of medical oxygen, I decided to analyze the impact of introducing of the oxygen in the European Pharmacopoeia on public hospitals in Romania.

If by the year 2011, the hospitals manifested reluctance in purchasing a product that was not yet included in pharmacopoeia, it is important to determine if this factor had a decisive influence on the decision of the hospitals for the purchase of oxygen.

After analyzing the evolution of the company's financial indicators in the period 2011 - 2015, it finds increase in turnover and profit, as follows:

Table 1. The variation of the turnover and profit for Microcomputer: **Service** SA

Indicators	**2012/2011**	**2013/2012**	**2014/2013**	**2015/2014**
Turnover	4%	8%	5%	6%
Profit	10%	26%	20%	30%

For the analysis of the impact of the oxygen consumption on the variation of the turnover of the company Microcomputers Service I have used the linear regression analysis for the year 2011 and 2015 using a total of 45 hospitals in the country.

After estimating models it verify their validity with Fisher test, the significance of the parameters is tested with Student test and the model's creditworthiness is analyzed with specific indicators.

To build a linear regression model, we defined the oxygen consumption hospitals as independent variable, while the turnover of the company was considered the dependent variable. To determine the linear regression model parameters, we considered the evolution of a set of data indicators (oxygen consumption and turnover) in 2011 and 2015. Also after validation of models it is tested the quality of the residuals using the Jarque-Bera test for normality, the non-autocorrelation with Durbin Watson and Breusch Godfrey statistic and the heteroskedasticity test with White and Glejser test. It is aimed to quantify the positive impact of the consumption on the turnover by increasing the turnover in 2015 compared to 2011. For this comparison, we take into account the economic and econometric results of the two models.

5. Empirical results

5.1 ESTIMATING A LINEAR REGRESSION MODEL FOR 2011

After the establishment of the data, we have applied the linear correlation Pearson coefficient between the two sets of values. The coefficient r will tell us the intensity of the relationship between the two variables.

In the first stage I will determine the regression equation and the second stage consists in the use of this equations in the prediction.

Table 2. The estimated regression model for 2011

Variable	Coefficient	STd. Error	t-Statistic	Prob.
C	18450.62	7801.031	2.365152	0.0226
XI	21.27394	1.139240	18.67380	0.0000
R-squared	0.890225	Mean dependent var		78324.94
Adjusted R-squared	0.887672	S.D. dependent var		142342.0
S.E. of regression	47706.39	Akaike info criterion		24.42694
Sum squared resid	9.79E+10	Schwarz criterion		24.50724
Log likeihood	-547.6063	Hannan-Quinn criter.		24.45688
F-statistic	348.7107	Durbin-Watson stat		1.382477
Prob(F-statistic)	0.000000			

Estimation Equation: Company's turnover = C(1) + C(2)*oxygen consumption

YI = 18450.6244909 + 21.2739366315*XI

Note: Dependent Variable: YI; Method: Least Squares; Sample: 1 45; Included observations: 45

The empirical results revealed that if the oxygen consumption increases by 100 m3 / month then the turnover increases in average with 2127 lei.

The empirical results of the T test for testing the significance of the parameters of the regression model revealed that intercept of the model is statistically significant at the significance level of 5% (Prob <0.05).

Instead, the coefficient of oxygen consumption showed a positive impact on the variation of turnover and is considered to be significant at the 1% significance threshold (Prob <0.01).

The model is considered to be statistically valid, because the results of Fisher test confirms this (Prob (F-state) <0.01).

The goodness of fit of the model highlighted a high degree of determination shown by both coefficients R-squared and Adjusted R-squared, so it can say that 89% of the variation can be explained by the consumption of oxygen and the difference up to 100% being placed on account of other factors which not included in the model (we refer of building distribution networks and hiring other medical devices).

In order to be able to use the regression model in providing forecasts of turnover of the company taking into account a larger number of hospital and thus a higher medical oxygen consumption it is important to verify the set of hypotheses of linear regression model based almost on the residuals.

From the graph of the residuals can be found that the turnover values estimated by the model based on the hospitals oxygen consumption adjusts quite accurately the original empirical data, so that the errors are relatively small.

In order to verify the normality of the residuals, it was applied Jarques-Bera test.

As the calculated value of the test is far superior to chi-square critical value (5.99), and in addition, the probability concerned Jarque-Bera is very close to 0, we can say that the hypothesis is invalidated, so the errors do not follow a normal distribution. Also, kurtosis coefficient exceeds 3, which means that the distribution is called leptokurtosis.

The homoscedasticity hypothesis was tested using Glesjer and White tests. Considering a level of significance of 5%, as the probabilities of both tests White and Glesjer are much lower than the 5% level, the hypothesis is rejected and admit that such errors are heteroskedastic. This requires the correction of regression model.

The hypothesis of non-autocorrelation residuals was tested using the Durbin-Watson statistic for detecting autocorrelation of order 1, respectively using Breuch-Godfrey test for autocorrelation of higher order.

As the value of the statistics Durbin-Watson is DW=1.38 and the critical values are dL=1.47 and dU=1.56, so 0<DW<dL, result that the residuals series showed positive autocorrelation of order 1.

The empirical results of Breuch-Godfrey test reveals no evidence of autocorrelation for a maximum 2 lags. As the coefficients residuals of 1 lag and 2 lags are not statistically significant (prob.> 10%), and in addition the values of the Breuch-Godfrey test have probabilities even higher than 10% risk, we can admit that the hypothesis is confirmed and there is no serial correlation.

So we can mentioned that the model of turnover for 2011 have the residuals not normally distributed, heteroskedastics and non-autocorrelated.

Therefore the correction of the model is necessary in order to correct heteroscedasticity of the residuals expressing the original variables in natural logs.

Table 3. The log-log regression model for 2011

Variable	Coefficient	STd. Error	t-Statistic	Prob.
C	5.641469	0.448683	11.90477	0.0000
LOG(XI)	0.756561	0.062010	12.20071	0.0000
R-squared	0.775875	Mean dependent var		10.77016
Adjusted R-squared	0.770663	S.D. dependent var		0.829171
S.E. of regression	0.387505	Akaike info criterion		0.985253
Sum squared resid	6.456900	Schwarz criterion		1.065549
Log likeihood	-20.16819	Hannan-Quinn criter.		1.015186
F-statistic	148.8572	Durbin-Watson stat		2.143991
Prob(F-statistic)	0.000000			

Note: Dependent Variable: lOG(YI); Method: Least Squares; Sample: 1 45; Included observations: 45

The corrected model is a log-log model who has the particularity to have the coefficients expressed in relative units, as elasticities.

So, according to the estimation results, we can say that if the oxygen consumption growed by 1% then the turnover will increase on average by 0.76%. Both coefficients are statistically significant (prob<0.01).

The F-test of overall significance determines that the model is statistically significant. The model is valid because the Fisher test verify this (prob (F-state) <0.01)). R-squared indicates a strong relationship between the model and the response variable (indicates a high degree for goodness-of-fit) so that the oxygen consumption explains 78% of turnover variation of the company.

In respect of the assumptions on the residuals, it is found that the hypothesis of normality of the residuals is now validated, as a result of the model correction, because the probability of Jarque-Bera test is close to 1.

The hypothesis of errors homoscedasticity, as a result of the model correction, is validated and the probability of White and Glejser tests is superior to the risk of 10%.

The hypothesis of non-autocorrelation residuals is also verified on the corrected model.

The model fits very well the data. We can also use the regression model for forecasting.

The log-log model is considered to be appropriate for turnover's company forecast taking into account the oxygen consumption of a representative hospital, average size, with a rate of 4000 m3, considered to be a target for the company.

So takin into account the equation of the model, for an oxygen consumption in a hospital of 4000 m3, the turnover's company will amount to a value of 103 546 lei.

5.2 ESTIMATING A LINEAR REGRESSION MODEL FOR 2015

The empirical results revealed that if the oxygen consumption increases by 100 m3 / month then the turnover increases in average with 2214 lei.

The empirical results of the T-test for testing the significance of the parameters of the regression model reveals that the intercept of the model is statistically significant at a significance level of 10% (Prob <0.10). Instead, the coefficient of oxygen consumption shows a positive impact on the variation of turnover and is considered to be significant at the 1% significance threshold (Prob <0.01).

The model is considered to be statistically valid, because the results of Fisher test confirms this (Prob (F-state) <0.01).

The goodness of fit of the model highlighted a high degree of determination shown by both coefficients R-squared and Adjusted R-squared, so we can say that 87% of the variation can be explained by the consumption of oxygen and the difference up to 100% being placed on account of other factors which are not included in the model (we refer of bulding distribution networks and hiring other medical devices).

Table 4. The estimated regression model for 2015

Variable	Coefficient	STd. Error	t-Statistic	Prob.
C	17981.32	10592.05	1.697625	0.0968
XI	22.14951	1.258718	17.59689	0.0000
R-squared	0.878066	Mean dependent var		96612.09
Adjusted R-squared	0.875231	S.D. dependent var		182379.1
S.E. of regression	64421.26	Akaike info criterion		25.02770
Sum squared resid	1.78E+11	Schwarz criterion		25.10800
Log likeihood	-561.1233	Hannan-Quinn criter.		25.05764
F-statistic	309.6505	Durbin-Watson stat		1.539714
Prob(F-statistic)	0.000000			

Estimation Equation: Company's turnover = C(1) + C(2)*oxygen consumption

YI = 17981.3173353 + 22.1495131137*XI

Note: Dependent Variable: YI; Method: Least Squares; Sample: 1 45; Included observations: 45

In order to be able to use the regression model in providing forecasts of turnover of the company taking into account a larger number of hospitals and thus a higher medical oxygen consumption it is important to verify the set of hypotheses of linear regression model based almost on the residuals.

From the graph of the residuals can be found that the turnover values estimated by the model based on the hospitals oxygen consumption adjusts quite accurately the original empirical data, so that the errors are relatively small.

The calculation of p-values for hypothesis testing typically is based on the assumption that the population distribution is normal. Therefore, a test of the normality assumption may be useful to inspect. So, the hypothesis of normality of errors is tested using the Jarque-Bera test.

As the calculated value of the test is far superior to chi-square critical value (5.99), and in addition, the probability concerned Jarque-Bera is very close to 0, we can say that the hypothesis is invalidated, so the errors do not follow a normal distribution. Also, kurtosis coefficient exceeds 3, which means that the distribution is called leptokurtosis.

The homoscedasticity hypothesis was tested using Glesjer and White tests. Considering a level of significance of 5%, as the probabilities of both tests White and Glesjer are much lower than the 5% level, the hypothesis is rejected and admit that such errors are heteroskedastic. This requires the correction of regression model.

The hypothesis of non-autocorrelation residuals is tested using the Durbin-Watson statistic for detecting autocorrelation of order 1, respectively using Breuch-Godfrey test for autocorrelation of higher order.

As the value of the statistics Durbin-Watson is DW=1.54 and the critical values are dL=1.47 and dU=1.56, so dL<DW<dL, we can say that we are in the zone of indecision and it is recommending the positive autocorrelation of order 1.

The empirical results of Breuch-Godfrey test reveals no evidence of autocorrelation for a maximum 2 lags. As the coefficients residuals of 1 lag and 2 lags are not statistically significant (prob.> 10%), and in addition the values of the Breuch-Godfrey test have probabilities even higher then 10% risk, we can admit that the hypothesis is confirmed and there is no serial correlation.

So overall, we can mentioned that the model of turnover for 2015 have the residuales not normally distributed, heteroskedastics, and non-autocorrelated.

Therefore the correction of the model is necessary in order to correct heteroscedasticity of the residuals expressing the original variables in natural logs. The corrected model is a log-log model who has the particularity to have the coefficients expressed in relative units, as elasticities.

Table 5. The log-log regression model for 2015

Variable	Coefficient	STd. Error	t-Statistic	Prob.
C	6.053971	0.568891	10.64171	0.0000
LOG(XI)	0.661417	0.075743	8.732355	0.0000
R-squared	0.639425	Mean dependent var		10.98305
Adjusted R-squared	0.631040	S.D. dependent var		0.782393
S.E. of regression	0.475242	Akaike info criterion		1.393441
Sum squared resid	9.711757	Schwarz criterion		1.473737
Log likeihood	-29.35241	Hannan-Quinn criter.		1.423374
F-statistic	76.25402	Durbin-Watson stat		2.094446
Prob(F-statistic)	0.000000			

Note: Dependent Variable: LOG(YI); Method: Least Squares; Sample: 1 45; Included observations: 45

So, according to the estimation results, we can say that if the oxygen consumption grows by 1% then the turnover will increase on average by 0.66%. Both coefficients are statistically significant (prob<0.01).

The F-test of overall significance determines that the model is statistically significant.

The model is valid because the Fisher test verify this (prob (F-state) <0.01)). R-squared indicates a strong relationship between the model and the response variable (indicates a high degree for goodness-of-fit) so that the oxygen consumption explains 64% of turnover variation of the company.

In respect of the assumptions of the residuals, it is found that the hypothesis of normality of the residuals is now validated, as a result of the model correction, because the probability of Jarque-Bera test is close to 1. The hypothesis of errors homoscedasticity, as a

result of the model correction, is validated and the probability of White and Glejser tests is superior to the risk of 10%.

The hypothesis of non-autocorrelation residuals is also verified on the corrected model.

The model fits very well the data. We can also use the regression model for forecasting.

The log-log model is considered to be appropriate for turnover's company forecast taking into account the oxygen consumption of a representative hospital, average size, with a rate of 4000 m3, considered to be a target for the company.

So taking into account the equation of the model, for on oxygen consumption of a hospital of 4000 m3, the turnover's company will amount to a value of 102 724 lei.

5.3 COMPARISONS BETWEEN THE TWO MODELS (2011 VS 2015)

This part of the article aims to analyze the influence of oxygen consumption on the turnover of the Romanian company Microcomputer Service SA, at the level of 2015 compared with the reference year 2011, for the network of 45 hospital units of the company.

If in the year 2011 the consumption of oxygen explained 77% of variation of turnover, in the year 2015 it was found that this percentage dropped to 64%. However, it might be asserted that the share of oxygen consumption influence in the total variation of the overall turnover was high, meaning there is a strong correlation.

Both models had significant coefficients for the purpose of the test Student, so there can be mention that both, intercept and coefficient of oxygen consumption showed a positive impact on the variation of turnover and is considered to be significant at the 1% significance level.

Both models had significant coefficients for the purposes of Fisher test, so that the model is statistically valid, Prob (F-statistic) is very low. Subsequently, for both models were checked the main assumptions of the residuals, normality, non-autocorrelation and homoscedasticity hypotheses and in case of information, the models were corrected.

The empirical results revealed that the errors do not followed a normal distribution, were heteroskedastic and non-autocorrelated.

Therefore the correction of the model was necessary in order to reject heteroscedasticity by applying natural logs.

The criteria taken into account for the selection of the best model were t the highest value of R-squared and lowest values of the Akaike and Schwarz information criterion. Given a collection of models for the data, AIC estimates the quality of each model, relative to each of the other models.

It is important to mention that analyzing all the information, the most appropriate is 2011 model of turnover, reflecting the best modeling of the evolution in time of the turnover based on oxygen consumption.

Table 6. Comparison of linear regression models 2011 versus 2015

2011

Variable	Coefficient	STd. Error	t-Statistic	Prob.
C	5.641469	0.448683	11.90477	0.0000
LOG(XI)	0.756561	0.062010	12.20071	0.0000
R-squared	0.775875	Mean dependent var		10.77016
Adjusted R-squared	0.770663	S.D. dependent var		0.829171
S.E. of regression	0.387505	Akaike info criterion		0.985253
Sum squared resid	6.456900	Schwarz criterion		1.065549
Log likeihood	-20.16819	Hannan-Quinn criter.		1.015186
F-statistic	148.8572	Durbin-Watson stat		2.143991
Prob(F-statistic)	0.000000			

2015

Variable	Coefficient	STd. Error	t-Statistic	Prob.
C	6.053971	0.568891	10.64171	0.0000
LOG(XI)	0.661417	0.075743	8.732355	0.0000
R-squared	0.639425	Mean dependent var		10.98305
Adjusted R-squared	0.631040	S.D. dependent var		0.782393
S.E. of regression	0.475242	Akaike info criterion		1.393441
Sum squared resid	9.711757	Schwarz criterion		1.473737
Log likeihood	-29.35241	Hannan-Quinn criter.		1.423374
F-statistic	76.25402	Durbin-Watson stat		2.094446
Prob(F-statistic)	0.000000			

Note: Dependent Variable: LOG(YI); Method: Least Squares; Sample: 1 45; Included observations: 45

6. Conclusions

The present study was addressing to health care providers, managers, patients, third party payer as economic reality proves that, at present, the quality of medical services becomes at the same time as a priority for everyone involved.

To develop a profitable activity, the manager of the company is obliged to take decisions, to act quickly to tackle social and economic constraints impacting future evolution

Given that there is an intense connection between the hospitals consumption of oxygen and turnover of the company, in the sense that a percentage share of nearly 90% of the variation in turnover is explained by the consumption of oxygen, it can be concluded that the turnover reflects appropriately the level of activity.

Following this analysis, as well as forecasting the results, the company manager may set the trend of company's activity: strong or weak growth, stability, slow or fast regression and future strategy of approach of new customers.

So, in the short term, the manager can decide which are the hospitals that are part of the target group as well as the profitability brought by the potential customer. So, we can make predictions on the dynamics of the turnover and subsequently, the level of the profit for each potential customer (hospital unit), on the basis of the estimated needs for hospitals medical oxygen and the amount collected / invoiced, using the regression model previously developed.

On the basis of this study, the objective is to develop a regression model in order to estimate the total medical oxygen market value in Romania, for which there are currently no relevant data, articles or estimates of evolution. Obtaining and analyzing this information are essential for other companies interested to enter this market, in order to increase their chances of fast integration.

Thus, the analyzed company, Microcomputer Service, can calculate the dimension of the global market share, relative and specific, and time evolution, which is on the one hand, the result of the dynamism of the company, and on the other hand, it is given by the degree of customer satisfaction. In terms of a complex process of globalization of markets and the internationalization of production and technology, the company must know in advance the real needs of hospital units, the place of the overall market of medical oxygen, the market relations and competition.

Prior to deciding on a strategy, the company must understand and analyze the market on which can be found in terms of structure, dynamics and developments possible. The purpose of the research is to achieve a very important analysis tool for the
study of the strategies to be promoted. The study highlighted the practical behavior on the Romanian medical oxygen market, however, it can also be extrapolated to other areas, taking account of the particularities of the respective market.

References

Albu, C. (2005). Analiza microeconomica a agentilor economici in conditii de piata, Editura A.S.E, Bucureşti

Albu, C. (2003). Comportamentul microeconomic al agentilor economici in conditii de piata. Aplicatii, Editura A.S.E, Bucureşti

Anghelache, C. (2013). Model de analiza macroeconomica bazat pe functia de regresie, Revista Romana de Statistica nr 1/2013

Anghelache, C. (2013). Elemente de econometrie teoretica, Ed. Artifex, Bucuresti

Bitterman, H. (2009). Bench-to-bedside review: Oxygen as a drug, Critical Care 2009

Buse, L. (2005). Analiza economico-financiara, Ed. Economica, Bucuresti

Consiliul Concurentei Romania (2013). Revista Romana de Concurenta, nr 1-2, Bucuresti

Dinu, E. (2004). Rentabilitatea firmei in practica, All Beck, Bucuesti

Dumitru M. (2006). Mediul international de afaceri, Ed. Pro Universitaria, Bucuresti

Grilo, I., Mertens, J.F. (2009). Cournot equilibrium without apology: Existence and the Cournot inverse demand function, Games and Economic Behavior

Ministerul Sanatatii (2014). Strategia nationala de rationalizare a spitalelor

Niculescu, M. (2005). Diagnostic global-strategic, Ed. Economica, Bucureşti

Popescu, D.D. (2007). Creating value through company analysis, H'art Publishing Science, Bucharest

Buzzell, R., Gale, B., Sultan R.G.M. (1975). Market share – a key to profitability, Harvard Business Review

Voineagu, V., Titan, E. (2007). Teorie si practica econometrica, Editura Meteor Press

http://www.medicalgasresearch.com – Oxygen as a medical gas mixture.

http://www.strategyr.com/MarketResearch/Medical_Oxygen_Systems_Market_Trends.asp - The global medical oxygen systems market

http://www.strategyr.com/Medical_Oxygen_Systems_Market_Report.asp - Medixal Oxygen systems – a global strategic business report.

http://documents.tips/documents/studiu-privind-analiza-dinamica-si-factorial-a-a-cifrei-de

http://www.marketresearch.com/product/sample-7717018.pdf - Global Oxygen Cylinder Market 2013-2018: Trend, Forecast and Opportunity Analysis"

http://www.marketsandmarkets.com/Market-Reports/medical-gases-equipment-market-217979261.html - Medical Gases MArket by gases

http://www.scritub.com/management/marketing/Analiza-diagnostic-strategica-20319122124.php - Analiza diagnostic strategica a firmei

http://www.marketsandmarkets.com/ResearchInsight/medical-gases-equipment.asp - Oxygen to Lead the Medical Gases Market

http://www.investopedia.com/ask/answers/061515/how-does-market-share-affect-companys-stock-performance.asp - How does market share affect a company's stock performance? By Investopedia

http://www.transparencymarketresearch.com/medical-gases-and-equipment.html - Medical gases and equipment market

http://www.grandviewresearch.com/industry-analysis/medical-gases-market - Medical Gases Market Analysis By Product

http://oxygenworldwide.com/news/articles-and-information/641-the-future-of-the-oxygen-market.html - The future of the oxygen market