

# The variation of the turnover and its effect on the exploitation risk

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**Abstract.** Through this study, an analysis was made of the relationship between the result, the volume of activity and the cost structure for a multiproduct enterprise. It was considered that enterprises are constantly facing the need to explore and exploit new production possibilities and for this they need to permanently reconfigure their product portfolio. In order to achieve this, the company must have a control of fixed and variable costs that will allow it to choose the volume of activity correlated with the internal characteristics and information on the market. The statistical calculation was used to calculate the risk associated with turnover through the covariance coefficient. As the size of the risk depends on the company's ability to control the cost structure and to act to reduce possible volume variations, turnover was considered to be the most important indicator that should be given high importance and should be constantly monitored. Thus, from the study it can be seen that the change in turnover determines the change in the risk coefficient.

## 1. Introduction

The rapid development of new technologies has led companies to find solutions to continuously improve their efficiency in order to cope with potential market threats [1,2]. Thus, ambidexterity emerged among firms, ie a combination of innovations and innovative practices designed to use exploration and exploitation for short-term success and long-term survival [3,4,5]. The problem of ambidexterity has advantages and disadvantages highlighted in the literature [6,7,8], which sometimes affect performance.

Strategic agility is another concept that complements the first through the perspective of organizational renewal without focusing only on strategic orientation [9,10].

Pursuing resource efficiency and cost reduction [11], while exploration seeks greater flexibility and the discovery of new knowledge [12]. Thus, for sustainable growth, exploration is the one that contributes by creating conditions for companies to be receptive to change [13,14], and through exploitation increases the innovative potential of firms and implicitly the degree of risk [15]. Although the risk of exploitation is higher [11,16] the concern for the permanent increase of efficiency, the improvement of products and skills, makes the exploitation activity a performance factor [17]. The risk, encountered in almost all branches of activity, appears as a result of the existence of market factors that cannot be eliminated, such as: demand variability, fluctuations in the acquisition price level of production factors or managers' competence regarding the opportunity of decisions.

The purpose of this study is to perform an analysis of a multi-product enterprise in which products have different weights and which may change due to changes caused by the continuing need to explore

new opportunities and exploit them. The analysis between the result, the volume of activity and the structure of the costs highlighted their dependence on any possible variation. Subsequently, the mean square deviation for each product and in total the possible variant was calculated and the increase of the risk coefficient was observed, as a result of the increase of the turnover, through the covariance.

## 2. Material and method

This study started from an enterprise that makes three products for which the quantity, the selling price, the variable unit cost and the fixed costs are known, according to Table 1.

**Table 1.** The forecasted situation of the enterprise

No	Elements of study	Unit	Product A	Product B	Product C	Total
1	Quantity	Pcs.	7,520	4,200	2,300	-
2	Unit selling price	RON	700	450	560	-
3	Variable unit cost	RON	620	410	520	-
4	Fix costs	thousand RON				125.00

According to the financial theory at the level of exploitation, the risk can be measured and perceived according to the result indicators. The variability of the result can be manifested by its increase or decrease, the risk can be perceived both as an opportunity to obtain something additional and as a decrease of the initial value until a possible future loss.

The relationship between result, activity volume and cost structure was studied. It is known that fixed expenses affect the flexibility of the enterprise due to the impossibility of adapting them to the volume of activity. Thus, the size of the operating risk depends on the company's ability to control the cost structure and to know the sensitivity to possible fluctuations of the activity level. For this, for the multi-product enterprise, studied, the weighted average price ( $p_{wa}$ ) of the products was calculated according to their unit price and the value share in the total turnover, the weighted unit margin on variable costs ( $M_{wv}$ ) according to the individual margin and the value share of each product in the total turnover. Then the equilibrium turnover ( $T_e$ ) was determined according to equation (1) and the safety margin ( $M_s$ ), according to equation (2).

$$T_e = \frac{CF}{\frac{m_p}{p_p}} \quad (1)$$

$$M_s = \frac{T - T_e}{CA} 100 \quad (2)$$

It was followed that the working hypothesis, to what extent, the variation of variable costs and turnover affects the result. Fixed costs were considered in this case to remain unchanged.

From a statistical point of view, the risk analysis can be obtained by calculating the variance ( $\sigma^2$ ) and the mean square deviation ( $\sigma$ ) [18]. The analysis used the forecast, as a way for the manager to predict the uncertain revenues, future states and phenomena of the system and possible uncertainties in different degrees and it was admitted from the beginning that factors that could not be identified and on which the manager has no control. For this, a forecast model was made to establish the level of turnover starting from the information from a company related to the previous year and knowing that there may be fluctuations in the economy due to external variables such as inflation, changes in commodity prices and consumables etc. within the limits of  $0 \div \pm 10\%$ .

The working hypothesis was to determine if the risk increases when turnover increases and if when the share of the product is high it will cause a change in risk.

According to each variant or possible state of evolution of the company's activity, the annual turnover to be forecast was calculated, starting from the individual turnover related to each product, which adjusts with the probability of occurrence, according to equation (3):

$$T_p = X_i \cdot p_i \quad (3)$$

Where:  $X_i$  - Projected turnover.

Subsequently, the average related to these possible states was calculated, according to equation (4):

$$X = \sum X_i \cdot p_i \quad (4)$$

The mean deviation was established according to equation (5):

$$\Delta = X_i - X \quad (5)$$

Then we calculated the mean square deviation which multiplied by the probability of occurrence of the state of turnover (0, -5, -10, 5, 10).

The variance was calculated as the mean of the quadratic deviations of a random variable and is the covariance of the random variable (turnover) with itself and measures the dispersion of the result against the mean. When the variant associated with the expected result is higher and the associated risk is high. The risk variation coefficient was determined, which measures the registered risk, the variant being less risky when the covariation coefficient is lower. The covariance coefficient was established according to equation (6):

$$\sigma = \text{cov} = \sqrt{\Delta} \quad (6)$$

### 3. Results and discussion

Taking into account the calculation elements taken into account after the analysis, the following indicators presented in Table 2 resulted.

**Table 2.** The situation of cost-volume-result indicators

No	Economic indicators	Unit	Product A	Product B	Product C	Total
1	The company's turnover	thousand RON	5,264.00	1,890.00	1,288.00	8,442.00
2	The share of each product in turnover	%	62.35	22.39	15.26	100.00
3	Operating result	thousand RON	523.66	140.01	72.93	736.60
4	Margin on variable costs ( $M_{wv}$ )	thousand RON	601.60	168.00	92.00	861.60
5	The share of margin in turnover	%	11.43	8.89	7.14	10.21
6	Unit margin	RON	80.00	40.00	40.00	-
7	Weighted average production price ( $p_{wa}$ )	RON	436.48	100.75	85.44	622.67
8	Unit weighted margin ( $M_{wu}$ )	RON	49.88	8.96	6.10	64.94
9	Equilibrium turnover ( $T_e$ )	thousand RON	682.01	314.83	267.00	1,198.51
10	Relative safety margin ( $M_s$ )	%			85.80	

The analysis of Table 2 shows that product A has the largest share, followed by products B and C. The analysis of the table shows that the company makes a profit when the turnover is over 1,198.51 RON, a value that allows it to bear variable costs determined by the volume of activity and coverage of fixed costs. The contribution of each product to reaching the equilibrium point is given by the equilibrium turnover calculated individually at the level of each product. The relative safety margin shows us that the existing turnover can be diminished by a maximum of 85.8% without the company registering negative results, which tells us that the company has a favorable position on the market, this being less vulnerable to exploitation risk.

Following the calculation of the turnover variation in relation to the percentages of variation taken in the study, the variation was obtained at product level and by total enterprise, according to Table 3.

**Table 3.** The situation of the turnover variation and the effect on the result

Percentage of variation	The company's turnover			Total	Percentage of variation	Operating result			Total
	Product A	Product B	Product C			Product A	Product B	Product C	
0.00%	5,264.00	1,890.00	1,288.00	8,442.00	0.00%	523.66	140.01	72.93	736.60
-5.00%	5,000.80	1,795.50	1,223.60	8,019.90	-5.85%	493.58	131.61	68.33	693.52

-10.00%	4,737.60	1,701.00	1,159.20	7,597.80	-11.70%	463.50	123.21	63.73	650.44
5.00%	5,527.20	1,984.50	1,352.40	8,864.10	5.85%	553.74	148.41	77.53	779.68
10.00%	5,790.40	2,079.00	1,416.80	9,286.20	11.70%	583.82	156.81	82.13	822.76

The variation of the turnover and of the variable cost with the mentioned percentages determined the variation of the operating result in a much greater proportion.

Table 4 presents a model for calculating the risk coefficient when turnover varies by 0%, according to the result obtained in Table 3.

**Table 4.** Statistical calculation of the mean square deviation

Product type	$p_i$	$X_i$	$X_i p_i$	$X_i - X_{\text{mediu}}$	$(X_i - X_{\text{mediu}})^2$	$(X_i - X_{\text{mediu}})^2 * p_i$
Product A	0.30	5,264.00	1,579.20	2,760.38	7,619,697.74	2,285,909.32
Product B	0.50	1,890.00	945.00	-613.62	376,529.50	188,264.75
Product C	0.20	1,288.00	257.60	-1,215.62	1,477,731.98	295,546.40
Total	1.00	8,442.00	2,781.80			2,769,720.47

According to the results obtained in Table 4, a value associated with the risk was obtained determined by the risk variation coefficient of 1,664.25 ( $\sigma = \text{cov} = \sqrt{\Delta}$ ).

In order to be able to establish the risk coefficient related to all possible situations for the studied enterprise, the risk coefficient was calculated for each possible variant and for each possibility of variation according to the percentages studied (Table 5).

**Table 5.** The situation of the risk variation coefficient

Percentage of variation	Option 1	Option 2	Option 3
	A(0.3), B(0.5), C(0.2)	B(0.3), C(0.5), A(0.2),	C(0.3), A(0.5), B(0.2)
0.00%	1,664.25	1,541.35	2,080.50
-5.00%	1,564.99	1,488.91	1,926.08
-10.00%	1,476.75	1,447.45	1,779.44
5.00%	1,722.88	1,688.70	2,076.02
10.00%	1,810.27	1,729.33	2,222.05

Following the analysis of Table 5, it is found that option 2 offers for the enterprise the lowest risk in all situations of variation of the turnover studied, compared to options 1 and 3. This tells us that when we assign the lowest probability value the product with the highest share in turnover the risk decreases.

#### 4. Conclusions

Through the turnover forecast, it is possible to schedule the future activity and implicitly of the necessary efforts for its realization. Knowing the possible variants that may exist at the level of the future activity, the management of the enterprise can plan its actions in such a way as to face the uncertainty.

In the study it is observed that any future variation between  $0 \div \pm 10$  at the level of turnover and implicitly at the level of variable costs determines a positive operating result, which varies in a greater proportion than the variable that determined the variation. Because the analyzed enterprise is a multiproduct enterprise, the equilibrium point could not be established quantitatively but only in value through the equilibrium turnover which is observed to be different due to the different weight that each product has in the structure of the enterprise. The analysis of the exploitation result at the level of each product shows us the value level as a result of the variation suffered and implicitly the influence transmitted on the global result.

By analyzing the coefficient of variation of the risk to which the company is subject if a certain event would occur according to the associated probability, it can be seen that it fluctuates, obtaining higher values and an increased risk when turnover is high, the share of the product in the assortment range is high or the probability associated with the main product takes the highest value. This association is justified in terms of the company's dependence on the main product (A) which has the highest share of high risk, the company's dependence on certain customers requesting this product and dependence on

suppliers who deliver raw materials. Any change in product A, determined by technology, customer preferences, market conditions or the price of manufacturers can affect the company to a much greater extent than the changes associated with products B and C.

## References

- [1] Bican P M and Brem A 2020 *J. Sustainab.* **12** 5239
- [2] Li F 2020 *J. Techn.* **92**
- [3] O’Cass A, Heirati N and Ngo L 2014 *J. Ind. Mark. Man.* **43** 862
- [4] Jurksiene L and Pundziene L 2016 *Europ. Bus. Rev.* **28** 431
- [5] Montealegre R, Iyengar K and Sweeney J 2019 *J. of the Assoc. for Inf. Syst.* **20** 1
- [6] Lavie D, Stettner U, and Tushman M L 2010 *The Acad. of Man. Annals* **4** 109
- [7] Vorhies D, Orr L, and Bush V 2011 *J. of the Acad. of Mark. Sc.* **39** 736
- [8] Brem A 2017 *Int. J. of Entrepr. and Innov. Manag.* **21** 261
- [9] Hock M, Clauss T and Schulz E 2016 *J. Manag.* **46** 433
- [10] Klammer A, Gueldenberg S, Kraus S and O’Dwyer M 2017 *Int. Entrepr. and Manag. J.* **13** 739
- [11] O’Cass A, Heirati N and Ngo L 2014 *Ind. Mark. Man.* **43** 862
- [12] Raisch S, Birkinshaw J, Probst G and Tushman M L 2009 *J. Org. Science* **20** 685
- [13] Stubner S, Blarr H, Brands C and Wulf T 2012 *J. of Small Bus. & Entrepr.* **25** 217
- [14] Shin H, Lee J, Kim D and Rhim H 2015 *Int. J. of Prod. Econ.* **168** 181
- [15] Ireland R D and Webb J W 2009 *J. Bus. Horiz.* **52** 469
- [16] Choi D and Lee K 2015 *J. Comp. in Hum. Behav.* **42** 120
- [17] Hughes M, Filser M, Harms R, Kraus S, Chang M and Cheng C 2018 *Brit. J. of Man.* **29** 595
- [18] Dallochio M and Salvi A 2004 *Finanza d’azienda* (Milano: EGEA) p 217