

# DEVELOPMENT OF PERFORMANCE INDICATORS IN A COMPANY FROM THE AUTOMOBILE INDUSTRY

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*Summary: In this document is presented the development of the performance indicators based on the EFQM evaluation of Renault Technologie Roumanie company, an organization operating in the field of the automotive industry. This company is actually a regional center that deals with engineering activities and technical consulting (CAEN 7112) for the Renault Group. Following this self-assessment, one of the most important fields, which have to be improved is the performance indicators which will also help to develop the concept of people.*

## 1. Introduction

This work aims to improve the performance indicators for the company Renault Technologie Roumanie, following an action plan. Renault Technologie Roumanie (RTR) is a regional engineering center of the Renault Group. The main responsibility of this company, is the global development of the Dacia range but also a small part of the Renault range, especially an adaptation of projects targeting vehicles and mechanical manufacturing in the Eastern Europe and the Mediterranean region [1].

This company have design offices in Bucharest, where engineers try to fulfill market requirements in terms of automobiles. The vehicles designed in those offices are tested and approved on the Titu Technical Center. After an authority give the approval, the vehicles are mass-produced in the Mioveni factory [1].

## 2. Current stage

The EFQM's principles of excellence are chosen to cover all the concepts of this evaluation, to have a whole picture of this company [12].

- Achieving Balanced Results [2]
- Taking Responsibility for a Sustainable Future [2]

By covering all the concepts of this model, a much clearer overview of this organization can be achieved at the end of this evaluation. Both the concepts that have a positive impact on the organization and those that can be improved can be determined. These improvements can be implemented through an action plan [12].

**Table 1. EFQM principles and concepts [3]**

|                                                | 1          |   |   |   |   | 2        |   |   |   | 3      |   |   |   |   | 4                        |   |   |   |   | 5                               |   |   |   |   | 6                |   | 7              |   | 9           |   |
|------------------------------------------------|------------|---|---|---|---|----------|---|---|---|--------|---|---|---|---|--------------------------|---|---|---|---|---------------------------------|---|---|---|---|------------------|---|----------------|---|-------------|---|
|                                                | Leadership |   |   |   |   | Strategy |   |   |   | People |   |   |   |   | Partnerships & Resources |   |   |   |   | Processes Products and services |   |   |   |   | Customer Results |   | People Results |   | Key Results |   |
|                                                | A          | B | C | D | E | A        | B | C | D | A      | B | C | D | E | A                        | B | C | D | E | A                               | B | C | D | E | A                | B | A              | B | A           | B |
| Achieving Balanced Results                     |            |   |   |   |   |          |   |   |   |        |   |   |   |   |                          |   |   |   |   |                                 |   |   |   |   |                  |   |                |   |             |   |
| Taking Responsibility for a Sustainable Future |            |   |   |   |   |          |   |   |   |        |   |   |   |   |                          |   |   |   |   |                                 |   |   |   |   |                  |   |                |   |             |   |

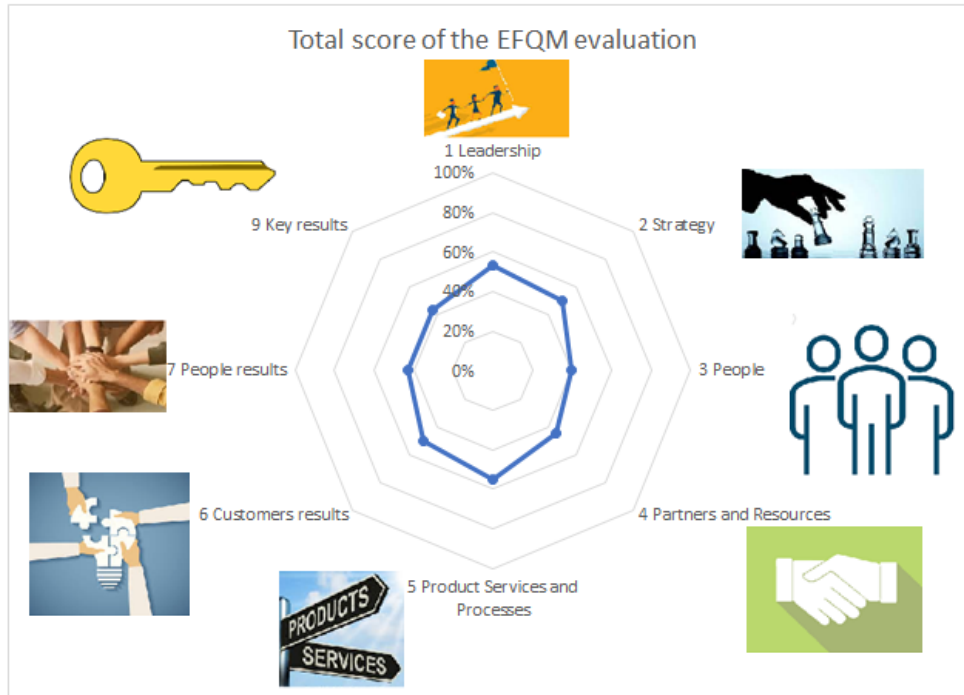


Fig. 1. Total score of the EFQM evaluation [4],[5],[6],[7],[8],[9],[10],[11]

The strengths of this company which are identified after going through all the concepts and principles of the EFQM, are on the side of products and services, exactly on point 5C of this assessment scorebook (Products and services are designed and developed based on customer needs and expectations), where this company scored a total of 55 points out of the total of 100 points and on the leadership side, exactly on point 1C (Leaders interact with customers, partners and representatives of society), where this company scored a total of 60 points out of the total of 100 points. On this last point (1C), even if it has the highest score from all the concepts, on the systematic deployment part there where the approach must be deployed in a structured way with the method used for deployment being planned and executed soundly, this company scored 35 points out of the total of 100 points. This systematic deployment is directly linked to the people and their results [12].

The main problem in this organization, according to the scoring mentioned before, is not that the people don't get good results in general, but they do not get good results compared to the goals that are set by the organization. These things can explain areas for improvement that are identified after going through all the concepts of the EFQM. Those points are on the people side, exactly on the point 3D (People and the organization have a dialogue) where this company scored 35 points out of the total of 100 points, on the people results (7B Performance Indicators) and key results (9A Key Performance Outcomes) where this company scored 40 points out of the total of 100 [12].

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**Table. 2. EFQM results [3]**

|                                                       | 1          |     |     |   |     | 2        |   |   |   |     | 3      |   |   |     |     | 4                        |   |     |   |   | 5                               |   |   |     |   | 6                |     | 7              |     | 9           |     |     |
|-------------------------------------------------------|------------|-----|-----|---|-----|----------|---|---|---|-----|--------|---|---|-----|-----|--------------------------|---|-----|---|---|---------------------------------|---|---|-----|---|------------------|-----|----------------|-----|-------------|-----|-----|
|                                                       | Leadership |     |     |   |     | Strategy |   |   |   |     | People |   |   |     |     | Partnerships & Resources |   |     |   |   | Processes Products and services |   |   |     |   | Customer Results |     | People Results |     | Key Results |     |     |
|                                                       | A          | B   | C   | D | E   | A        | B | C | D | E   | A      | B | C | D   | E   | A                        | B | C   | D | E | A                               | B | C | D   | E | A                | B   | A              | B   | A           | B   |     |
| <b>Achieving Balanced Results</b>                     |            | 50% | 60% |   |     | 50%      |   |   |   | 45% |        |   |   |     |     |                          |   | 35% |   |   | 55%                             |   |   |     |   |                  | 55% | 45%            | 45% | 40%         | 40% | 45% |
| <b>Taking Responsibility for a Sustainable Future</b> | 55%        |     |     |   | 45% |          |   |   |   |     |        |   |   | 35% | 45% |                          |   | 45% |   |   |                                 |   |   | 55% |   |                  |     |                |     |             |     |     |
| <b>Total</b>                                          | 53%        |     |     |   |     | 50%      |   |   |   |     | 40%    |   |   |     |     | 45%                      |   |     |   |   | 55%                             |   |   |     |   | 50%              |     | 43%            |     | 43%         |     |     |

### Action Plan

The objectives and the indicators that are followed for the development of the performance indicators of this organization are described below:

For the performance indicators to be configured in a such way that people's results will be closer to the target, the fixed objective is to balance the tasks at the level of the departments and to introduce a bonus system for key solutions that can bring time/cost reduction within the projects through innovation.

To pursue this objective, the following indicators will be established:

- Measuring the variation over time of the number of tasks at the level of each employee compared to the average time
- The duration of a project from the prototype phase to the final product phase
- The cost savings that each department can bring through innovation

These indicators will be tracked following the actions:

- Reanalyzing the volume of the work at each level, to balance the number of tasks at the level of employees.
- Optimizing the time in which a project goes from the prototype phase to the final product phase to highlight and unblock the stages that receive more work requests than they can process at their maximum flow capacity (bottleneck)
- Introducing a bonus system for finding new and innovative solutions for each element of the vehicle. Through this action, the organization aims to reward any employee who will find an economical and innovative solution for vehicle parts.

The following targets will be set for these indicators:

- The target set for the first indicator is to balance the workload equally for each employee (by managing the ETI involvement time estimation factor).
- The target set for the second indicator is to shorten the development time of a new vehicle by 10%,
- Cost reduction for the final product by 1% without affecting their quality

### 1<sup>st</sup> objective: Measuring the variation over time of the number of tasks at the level of each employee compared to the average

The estimation of the involvement time of each employee for each activity refers to his activity rate considered proportionally to the average activity rate. [15]

For a certain period, the activity rate (RA) is the ratio between the average working time on a certain perimeter of the employee and the average working time of the reference on each perimeter.

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Calculation method:

1) The equivalent of the involvement time of each employee will be calculated for each activity that is carried out

2) Summing of all of the factors described in point 1)

Example:

Estimated involvement time of each employee (ETI) is the summation of the activity rate for all of the perimeters (RA) [15]

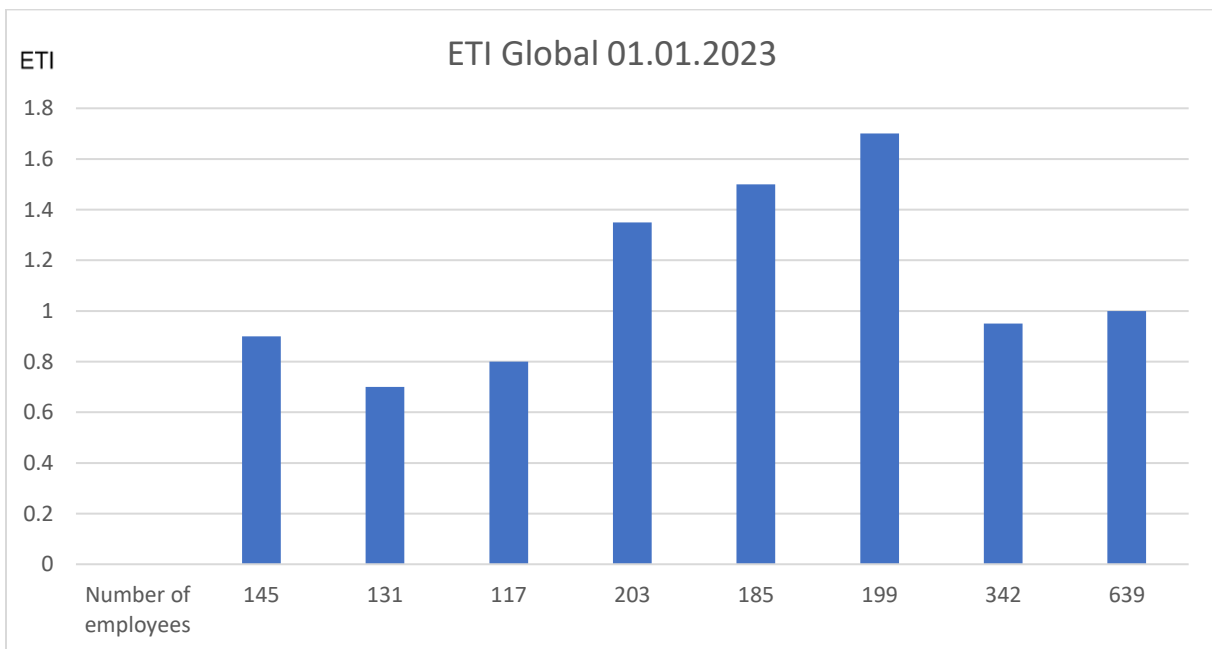
$$ETI = RAx + RAy + RAz \quad (1)$$

The target set for this ETI factor, will be 1 (100%), or in other words, the estimate of an employee's involvement time related to the activity rate for all perimeters should not exceed or be less than the average activity rate.

The time set for reaching this target will be 6 months.

The data will be collected both by management and by the self-assessment of each employee.

Table. 3. ETI global [14],[15]



To be easier to process, an average will be made of the data collected of the employees who exceed ETI 1, of those who are below the threshold of 1 and they will be related to the employees with the average activity rate as in the graph below.

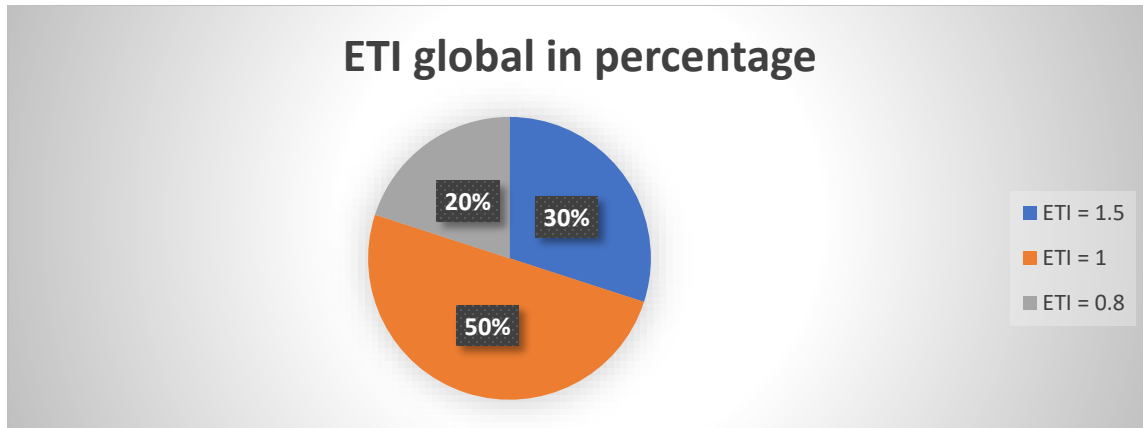


Fig. 2. ETI global in percentage [14],[15]

To optimize the workload and to reach the proposed target, the following formula will be used:

$$\text{Optimized ETI} = \frac{ETI1 + ETI2 + ETI3}{3} \quad (2)$$

$$\text{Optimized ETI} = \frac{1,5 + 1 + 0,8}{3} \quad (3)$$

$$\text{Optimized ETI} = 1,1 \quad (4)$$

## 2<sup>nd</sup> objective: The duration of a project from the prototype phase to the final product phase

From the design phase, it must be considered what it can be borrowed from the old platforms so that the production costs will be as low as possible. Any new solution is difficult to implement because it implies changing the machines and processes on the assembly line. To make this transition from one model to another as easy as possible, for each thing that will be borrowed from one vehicle to another, analysis will be made in terms of feasibility, reliability and quality. After the design phase of those new vehicles, several prototypes will be created in order to be sent for testing [15].

For a vehicle to be competitive in the marketplace, it must meet customer expectations, have the best price and comply with all the regulations in force for the commercial areas where they want to be sold.

For the development of a vehicle from the prototype phase to the final product phase, the duration is 12 months on average. Shortening the development duration by 10% would mean a gain of 5 weeks for each product.

To make this process of vehicle testing and homologation more efficient, the action plan is to divide the types of activities into entities according to the development centers and the capacity of the assembly lines for 12 months.

Since the level of pollution has increased in the last 20 years, the regulations are much tougher from year to year, and the manufacturers had to decide to create 3 types of vehicles:

- Thermal vehicles with engines adapted to combat pollution

- Hybrid vehicles, which use an electric motor to reduce pollution in urban traffic jams
- Electric vehicles with 0 CO2 footprint after manufacturing

Thus, this separation by entities will be established mainly according to this factor. Because in Romania there is the engine factory and the assembly plant in Mioveni, the Titu Technical Center and the design offices in Bucharest, Renault Technologie Roumanie will completely take over the thermal part, partially the hybrid part and will help with the design and engineering of electric vehicles.

In this way, the transport of prototypes, their redesign and validation can be optimized. The current process takes around 50 weeks, but this optimization can save 3 weeks for transport, minimum 1 week for redesign and minimum 1 week for validation.

**3<sup>rd</sup> objective: Cost savings that each department can bring through innovation.**

A 1% cost reduction for each product means a profit of 150 euros for each vehicle. At a volume of 1,000,000 vehicles sold, this will mean a profit of 150,000,000 euros.

To improve efficiency and increase the finding of this engineering solution, a bonus system has been proposed for each employee. Global cost reductions for vehicles as well as customer complaints resulting from these savings will be monitored for 12 months. Cost savings without customer impact can be achieved with cheaper parts or solutions that completely replace a more complicated solution.

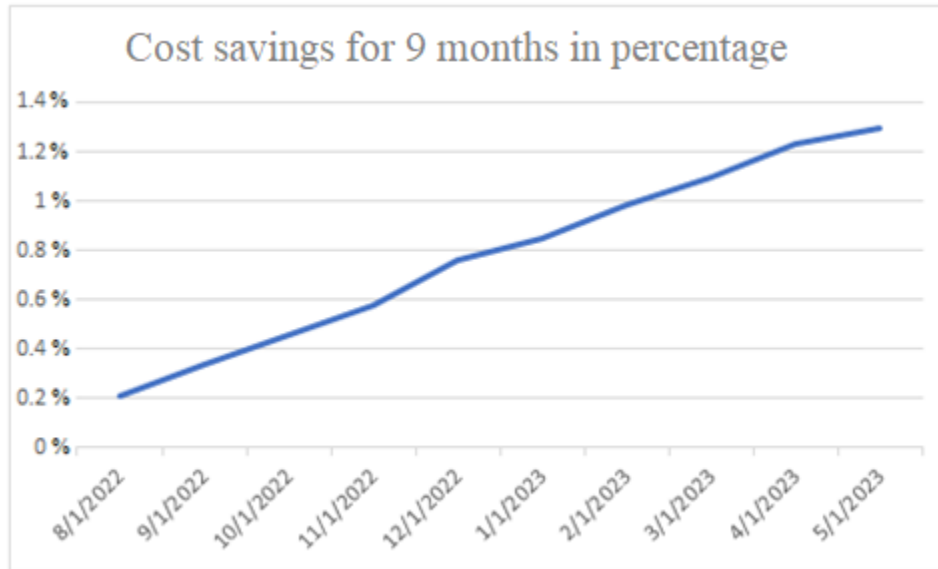
Example:

The use of the ABS computer to determine the pressure in the tires to the detriment of the use of pressure sensors. Basically, instead of 4 physical parts (one pressure sensor for each wheel), a calculation formula will be used. This calculation formula will determine if one of the wheels spins slower than the other 3. This means that the pressure in that tire has changed. Through this solution, cost saving was achieved in the past without impacting the client. Monthly bonuses were granted to the "employee of the month" or the employee who brought the greatest cost savings for a vehicle model in that month. The action plan was implemented since August 2022.

Table. 4. Cost savings [14],[15]



Table. 5. Cost savings for 9 months in percentage [14],[15]



The percentage in the table above was calculated from the average sales value of a vehicle (15,000 euros). No customer complaints were reported following these economic solutions found.

## Conclusions

For the first objective: Measuring the variation over time of the number of tasks at the level of each employee compared to the average:

- The established target cannot be reached with current resources.
- For each employee to have an optimized volume of work, new hires will have to be made or some processes will have to be outsourced.
- By optimizing the workload, employees can give a higher yield, some mistakes caused by the workload can be avoided and people's results, along with performance indicators, will improve.

For the second objective: The duration of a project from the prototype phase to the final product phase

- The established target can be reached and can bring an advantage of at least 5 weeks.
- With the help of a clear distribution of projects under development, dead times will be eliminated, and people's results will increase.
- Competitiveness on the market increases since new products can be launched faster.

For the third objective: The cost savings that each department can bring through innovation.

- The established target was reached and even exceeded after the first 9 months.
- Employee satisfaction is increasing following this bonus system.
- The ratio between the premiums granted and the economy brought by these solutions is in the company's favor.
- Savings on final products have no impact on customers.
- This action plan has a positive impact on people's results as well as performance indicators.

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