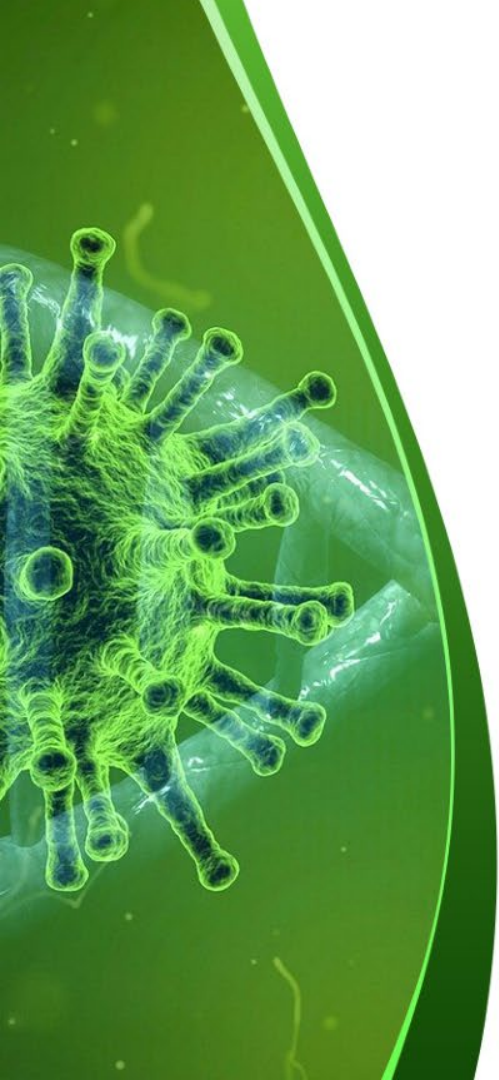


**Design of a Supply chain
Performance monitoring System
for a company in the context of
the COVID-19 pandemic**

Peter Majercak, PhD.

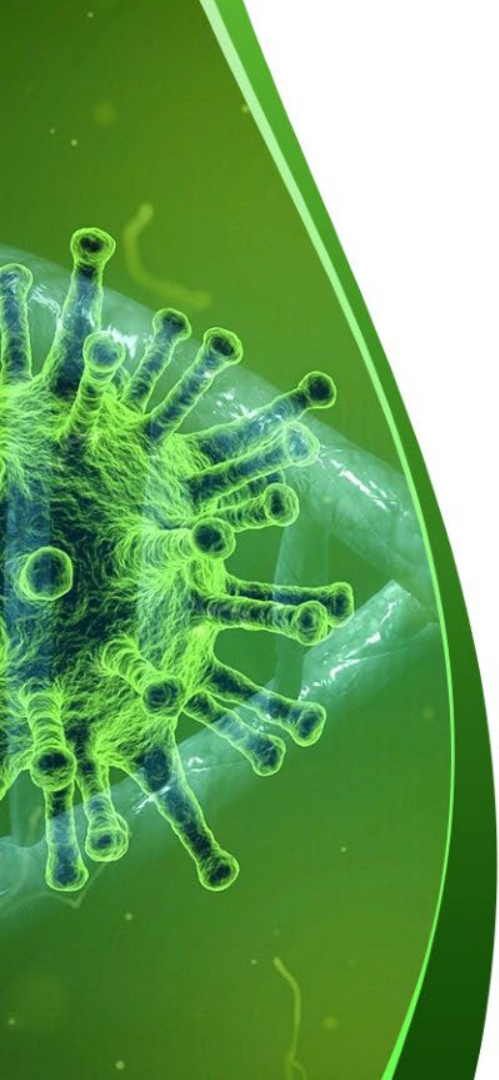
Introduction to theme Supply Chain

- Many companies have realized that through successful logistics management and supply chain, they can offer their customers better services, in better quality and in less time.
- In order to make these efforts as effective as possible, it is necessary to systematically monitor and evaluate the processes and activities within the SC.
- Supply chain management has become one of the most discussed topics in the literature and is considered a key strategic element in many organizations. Nowadays, markets have become more dynamic and are characterized by rapid changes in customer requirements.



Introduction to theme Supply Chain

- However, it can be argued that from a strategic point of view, the goal of SC, respectively supply chain management, is the creation of a competitive chain, while the operational goal is the effective setting of processes.
- It is important to make sure that processes are seen as part of the chain and not isolated. Such an approach requires the companies concerned to focus their goals on achieving the top goal of the chain and not to focus only on local optimals.



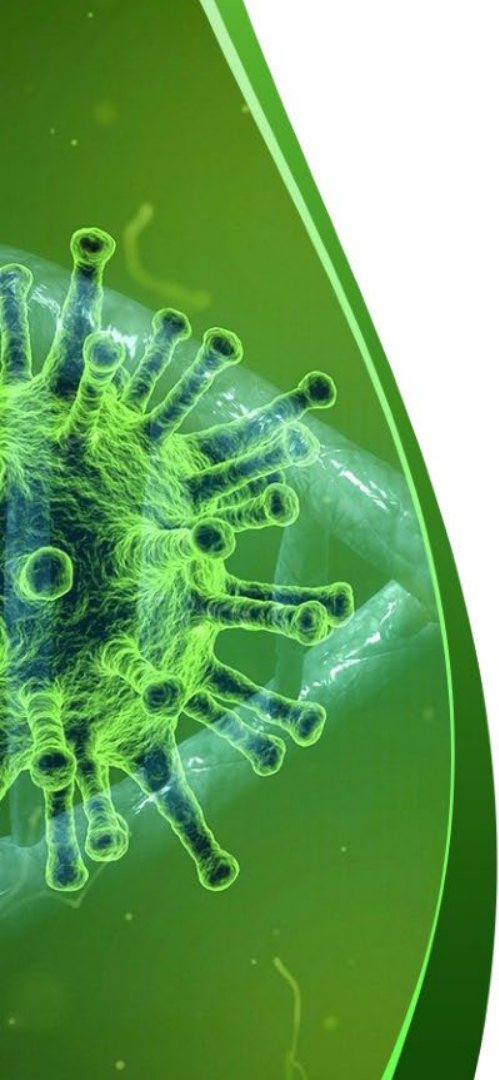
Methods for monitoring Company Logistics Supply Chain

- Until now, the **traditional theory of measuring performance** has in most cases focused on financial indicators such as ROI, cash flow, profits, etc. The disadvantage of the traditional approach is the tendency to retrospectivity, disregard for intangible elements and late evaluation of information.
- Author Majercak, et.al emphasize that one of the major changes in perceptions of performance and productivity is the modernist paradigm that today's businesses cannot compete individually as separate entities, but only as part of a chain. As a result of these changes, it is necessary to create a performance measurement system that will be a combination of financial and non-financial criteria and will take into account the performance of enterprises as part of the SC.



Methods for monitoring Company Logistics Supply Chain

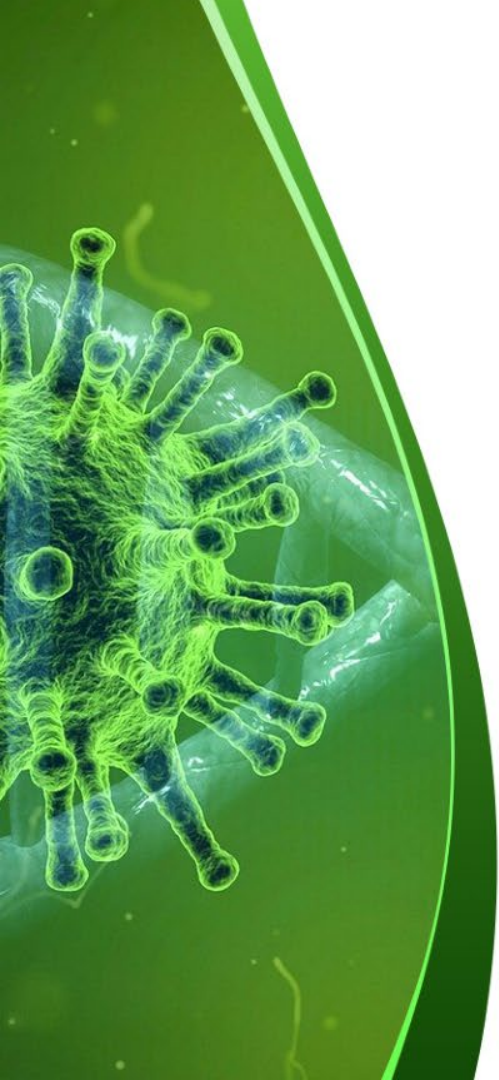
- The innovations in the approach to measuring performance, which have taken place since the 1980s, arose mainly in the name of criticism of traditional methods oriented to the economic result of the company. From a number of modern methods of measuring performance, there are approaches of authors, who set out specific indicators that should provide the most effective achievement of the objectives.
- The field of performance measurement has undergone significant changes in recent decades, and it can be argued that the importance of logistics in the company has grown steadily and so it is logical that more attention has been paid to how to measure its performance and manage this process.



Methods for determining weights

- In the case of evaluation of variants on the basis of several criteria, it is necessary to assign a weight v_i (non-negative number) to each criterion, which expresses the significance of a particular criterion in relation to the other criteria. The final value of the criterion weight must belong to the interval $\langle 0,1 \rangle$, while the sum of the values of all weights must take the value 1 according to relation (1).

$$\sum_{i=1}^n v_i = 1$$



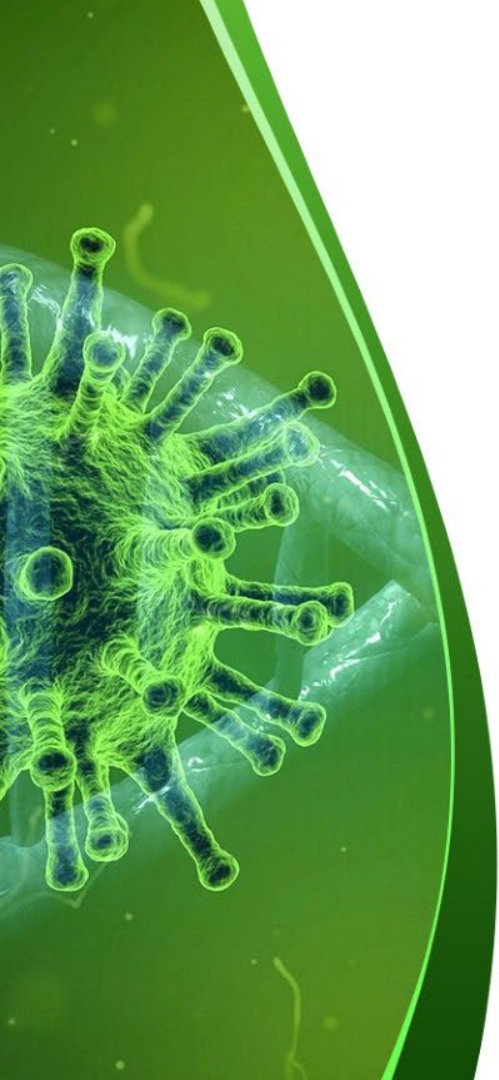
The order method

- This method of determining weights is based on the assumption that several assessors are involved in the process of determining weights. It follows from the above that there are p criteria and q experts. The criteria are arranged in order of importance. The natural numbers $p, p - 1, \dots, 1$ are then assigned to this order so that in the case of the criterion with the highest significance, ie the first criterion in the order is assigned the number p , the less significant criterion, ie the second criterion is assigned the number $p - 1$ and the least important criterion, ie the last criterion in the order is assigned the number 1 . According to the given conditions, the number a_{ij} is the number assigned to the i -th criterion by the j -th expert.

$$v_{ij} = \frac{a_{ij}}{\sum_{i=1}^p a_{ij}} = \frac{a_{ij}}{\frac{p*(p+1)}{2}}$$

- The final final weight of the i -th criterion is then realized according to relation

$$v_i = \frac{\sum_{j=1}^q v_{ij}}{q} = \frac{\sum_{i=1}^p a_{ij}}{\frac{p*(p+1)*q}{2}}$$



Methods of Decision Analysis



- The methods of decision analysis are based on the conditions of certainty regarding the final effect of the decision and on the condition of uncertainty (uncertainty) regarding the estimation of the decision risk. They work with the information obtained in the analysis phase of the problem and measure the effect and risk of the decision according to as many criteria as possible. In general, this means that the methods of decision analysis touch on the problem of so-called multicriteria decision-making resp. multicriteria optimization and therefore the most important step in the decision analysis is undoubtedly the choice of criteria.
- In practice, several different methods are used, which are based on a similar principle. In principle, they deal with the assessment of several variants of solving a specific problem with predetermined criteria and the subsequent determination of the final order of the assessed variants. However, the methods are different in the way of determining the so-called weights of individual criteria and how they numerically evaluate the degree of fulfillment of criteria in the case of individual variants of the solution.

Conclusion

- Implementation of supply chain management and performance measurement logistics is not an easy task but is associated with many obstacles. The supply chain is based on information sharing, strategies, goals and planning. These are all elements that the company does not like to share with its competitors or with its customers. By discovering not only its weaknesses but also its competencies and know-how, it is exposed to a considerable risk of losing control over these data.
- It is important to realize that supply management chain is a complex task and the implementation of performance measurement brings with it a number of complications. Majercak et al. (2013) describe this process as a multifactor process, based on close and long-term cooperation between organizations.





Thank you for reading

Peter Majercak, PhD.
University of Zilina
peter.majercak@fpedas.uniza.sk