LIM KONFERENCIA 2020

/Logisztika
/Informatika
/Menedzsment

Konferenciakötet

BUDAPESTI GAZDASÁGI EGYETEM
ALKALMAZOTT TUDOMÁNYOK EGYETEME

18 57
BGE

Contents

Pató Gáborné Dr. habil. Szűcs Beáta: Distinctive competencies of a good leader - a good logistics manager 3

Dr. Ákos Gubán - Dr. Zoltán Mezei: Framework for public sector development 7

Dr. László Szabó: How smart is a forklift today? 13

Dragan Živanić - Nikola Bodrožić - Nikola Ilanković - Atila Zelić: Possibilities of belt conveyors automated design 16

Dr. Vid Honfi - Dr. Zsolt Illés: PCOVID-19, Home Office, digital learning. Security?. 22

Dr. Gábor Réthi - Dr. Richárd Kása: Reality vs. Perception – How to measure corruption perception?. 25

Vasileva, A. - Jakimovska, K.: Optimization of the logistics process in warehouse based on the Analytics Hierarchy Process 31

Dorina Körtvési - Dr. Krisztina Szegedi: Sustainability analysis of the largest companies in the Hungarian fashion industry. 33

LIM KONFERENCIA 2020

Logisztika, Informatika, Menedzsment
Nemzetközi tudományos konferencia

Főszerkesztő: Dr. Gubán Miklós
Grafikai szerkesztő: Dr. Kása Richárd

Konferencia helyszíne:
Zalaegerszeg - Keresztury Dezső Városi Művelődési Központ
8900. Zalaegerszeg, Landorhegyi u. 21.

Konferencia időpontja:
2020. szeptember 25.

ISBN 978-615-5607-87-5

Distinctive competencies of a good leader - a good logistics manager

Pató Gáborné Dr. habil. Szűcs Beáta
associate professor
University of Pannonia, Faculty of Economics
Department of Supply Chain Management

Abstract

It has already been very important, but today it has become even more unquestionable that organisations need to be alert and adaptable to the expected market needs. However, this kind of proactive response can only be achieved by an excellent leader. This leadership excellence, which results in a distinction from the average, can be identified by Goleman et al.'s (2003) research based on the 5 components of emotional intelligence. The aim of the study is to present a framework of managerial excellence based on emotional intelligence.

Keywords:
excellent leader, emotional intelligence, logistics manager, leader

1. Introduction

Good leaders can be linked to different functional areas of the organization. Among these functional areas, the logistics functional area has an outstanding importance. In this field, a good logistics leader is the basis for successful work. A good logistics manager carries the hallmarks of good leadership competence in any organizational functional area, as the competencies of a good manager can only be linked to functional areas to a small extent. Typically, general managerial competencies are determinants, even if some distinctive professional knowledge is absolutely necessary and functional area specific. Therefore, excellent managers must have a set of competencies, with the help of which – in relation to the external and internal possibilities of the organization – they can turn the employees' capabilities as much as possible for the benefit of the organization, keeping the employee – the people – at the center.

2. The relationship between strategic HR and competencies

The required sets of competencies are presented by different competency models. These models organize a repertoire of competence for efficient, effective and successful work. At the same time, the "carriers" of competencies are the different tasks and activities of work. Competencies are required for these. The assignment of tasks to competencies is included in the task-competence profile of the job. These profiles are defined in the job descriptions that document the job (Pató, 2015, Pató 2017.). The aim is to harmonize the competencies required to fill the position with the competencies of the employees, especially in management positions, to form a coherent unit. (Pató-Kovács-Abonyi, 2021)
Strategic HR planning is responsible for harmonizing competency supply and demand. Its relationship is shown in Figure 1 (Trost, 2020).
Thus, it is the task of HR and the given functional area to define the tasks of a logistics manager who is suitable for the organization and the set of competencies required to perform them at an outstanding level.

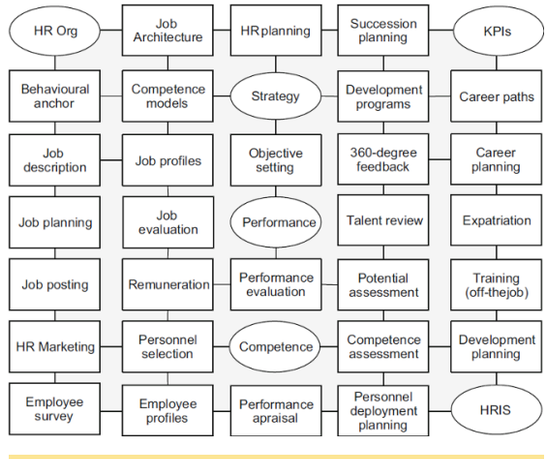


Fig. 1. Full-blown central planning and control (Trost, 2020, p. 17.)

3. Leadership competencies (based on Pató, 2006)

Many experts deal with the characteristics and definition of leadership competencies and successful leaders (Englander - Harsányi - Kovács, 1975; Gordon, 1997). A successful leader's goal is to achieve organizational effectiveness, which is among others based on creating an atmosphere of trust (Cloud, 2014), to which the path leads through mutual satisfaction based on empathy, attention; support, inner-strength and leadership. The competency marks of an excellent leader are nurtured from three sources.

1. The first "suitable leader" competence marks brought from the family, that is the samples that come from childhood and represent the patterns experienced in the family (Juhász, 2013) in the job. The aptitude of a leader, according to Boyatzis (1982), is what largely determines how much human capital benefits (Illés - Szirmai, 2002) different organizations.
2. The second is the "competent leader" (Boyatzis, 1982) competency marks, which are based on intellectual intelligence, that is, the application of acquired knowledge, logical thinking.
3. The third is the "good leader" or "people-centered leader" competency marks, which will be the distinguishing competencies of leadership excellence. These competency marks will be based on emotional intelligence, that is, adequate self-knowledge and the knowledge of others, as well as influencing human relationships based on mutual benefits.

The approach to leadership competencies based on personal characteristics is therefore more people-centered, aiming to define the characteristics of successful and excellent leaders rather than the characteristics needed to perform the job and function effectively. This definition is the basis for the concepts of:

1. "threshold competence" (required of all individuals),
2. "distinguishable competence" (a set of competencies that distinguishes an average from an excellent leader).

Goleman (1998, 2000), Goleman – Boyatzis – McKee, (2003) found similarities between effective, excellent leaders in high emotional intelligence in their research. Emotional intelligence was described by 5 components,

	Definition	Characteristics
Self-Awareness	The ability to recognize and understand your mood, feelings, and drivers and their interactions.	- self-confidence, - realistic self-assessment, - modesty.
Self-Regulation	The ability to control disruptive effects, the postponement of immediate judgment — think before you act.	- trustworthiness and integrity, - comfort with ambiguity, - openness to change.
Motivation	A passion to work for reasons that go beyond money or status. Achieving goals is its characteristics	- strong drive to achieve, - optimism, even in the face of failure - organizational commitment.
Empathy	The ability to understand the emotional makeup of other people. Skill in treating people according to their emotional reactions.	- recognition and care of the senses, - sensitivity, - treatment of customers.
Social Skill	Proficiency in managing relationships and building networks. An ability to find common ground and build rapport.	- effectiveness in leading change, - persuasiveness, - expertise in building and leading teams.

Table 1. The five components of emotional intelligence at work based on Goleman (1998)

such as self-awareness / self-knowledge, self-regulation, motivation, empathy, social ability. These are described in Table 1.

Another approach to leadership competence may be based on functional analysis, which definition is described according to the MCI (Management Charter Initiative) interpretation[1]. The essence of the approach is that the focus is on the tasks that arise during the work, which the manager must perform effectively (Bőgel - Salamonné, 1998). Functional analysis is based on tangible results, performance, and observable behaviour. The essence of competence in this case is what an experienced leader can do in certain roles and functions and can also prove that he can do. (Kiss - Dőri, 1997) The model is based on the description of satisfactory performance and the related performance measurement methodology.

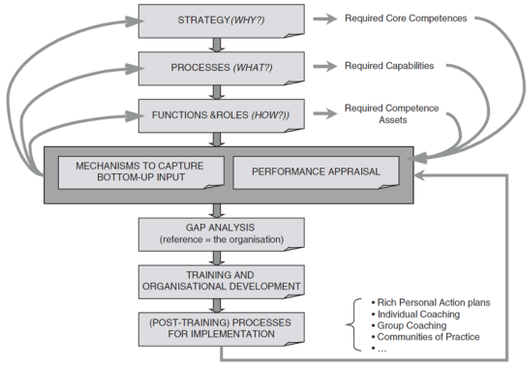


Fig. 2. A Schematic Representation of Systemic Competence Management (Libbrecht & Vandevyvere, 2005, p. 164.)

1 The Management Charter Initiative (MCI) applied first the functional analysis-based method (Kiss - Dőri, 1997)

3.1 Competence management

The continuous maintenance of the set of competencies is of paramount importance, as the needs inside and outside the organization are changing dynamically. This task is performed by organizational competency management. In the framework of competence management, in addition to the training of the individual, the emphasis is on the company as a whole, on "collective learning", thus breaking the boundary between training, coaching and organizational development (Libbrecht & Vandevyvere, 2005, Pató-Kovács-Abonyi, 2021). Figure 2 shows the organizational approach to competency management.

3.2 Leadership competencies during COVID-19

At the time of the current global crisis, we cannot go without saying about the demand for leadership competencies caused by this extraordinary period. The leaders' competencies must respond to the currently raging COVID-19 pandemic, as well as to the resulting economic and market situation, for example by quickly interpreting the situation (Dirani et al., 2020), applying their knowledge effectively and exploiting their competencies and instincts. During pandemic, organizations can be kept moving and flourished by leaders, such as logistics managers who are also responsible for the physical flow of inputs and outputs, who provide defined roles and goals; share leadership; communicate; ensure employee access to technology; prioritize the emotional stability of the employee; maintain the organizational financial condition; and promote organizational resilience.

HR can play a strategic role in assisting and developing managers during a pandemic by providing reliable data; expanding their professional network; supporting innovation; providing the employee with the opportunity for continuous learning; facilitating regular meetings; and creating a platform to celebrate employees (Dirani et al., 2020). Even with the competencies listed here, emotional intelligence is significantly identifiable.

4. Summary

Excellent leaders have always been and are needed, but especially nowadays, if possible, they are even more important. The characteristics of an excellent leader and an excellent logistics leader can be identified with 5 components of emotional intelligence based on Goleman's research. These components can be developed and raised to the desired level through conscious management. Nowadays, the proper management of emotions, the competence of self-control and self-regulation, and the appropriate management of different emotional states based on them are paramount leadership competencies - what distinguishes the average leader from an excellent leader -, both for the leader and the led, keeping in mind the goal to be achieved. At the same time, it is important for leaders to be able to build a team where everyone can capitalize on their professional excellence, be mutually recognized and valued.

5. References

1. R.E. Boyatzis, The Competent Manager - Modell for Effective Performance, John Wiley & Sons, Canada (1982)
2. Bőgel Gy., Salamonné H. A., Vállalatvezetés felsőfokon. Kossuth Kiadó. Budapest (1998)
3. H. Cloud, Határok a vezetés szolgálatában. Harmat Kiadó, Budapest (2014)
4. K. M. Dirani, M. Abadi, A. Alizadeh, B. Barhate, R. C. Garza, N. Gunasekara, Z. Majzun, Leadership competencies and the essential role of human resource development in times of crisis: a response to Covid-19 pandemic. Human Resource Development International, 1-15. (2020) https://doi.org/10.1080/13678868.2020.1780078
5. Englander T., Harsányi I., Kovács Z., Vezetői alkalmasság, vezetési készség. Közgazdasági és Jogi Könyvkiadó, Budapest (1975)
6. D. Goleman, What Makes a Leader. Harvard Business Review. Vol. 76. No. 11-12. pp. 93-104. (1998)
7. D. Goleman, Leadership That Gets Results. Harvard Business Review. Vol. 78. No. 3-4. pp. 78-90. (2000)
8. D. Goleman, R. Boyatzis, A. McKee, A természetes vezető: az érzelmi intelligencia hatalma. Vince Kiadó. Budapest (2003)
9. Gordon T. (1997): Vezetői engedményesség tréning-hogyan válhatunk eredményes vezetővé. Gordon Könyvek. Budapest
10. Illés K., Szirmai P., Az emberi tőke átértékelésének szükségessége. Vezetéstudomány. Vol. 33. No. 9. pp. 29-39 (2002)
11. Juhász, M., Jó, rossz és a beteg vezető személyiségjegyei. https://www.hrportal.hu/hr/jo-a-rossz-es-a-beteg-vezeto-szemelyisegjegyei-20130723.html (Letöltés dátuma: 2020. 09 02.) (2013)
12. Kiss L., Dőri T., Személyzetfejlesztés és Változásmenedzsment. 4. könyv. A vezetői kompetencia fejlesztése. -Contact Business School. The Open University. (1997)

13. S. Libbrecht, P. Vandevyvere,, Systemic Competence Management in Support of the Viability of Organisations, Sanchez, R. and Heene, A. (Ed.) Competence Perspectives on Resources, Stakeholders and Renewal (Advances in Applied Business Strategy, Vol. 9), Emerald Group Publishing Limited, Bingley, pp. 147-168. (2005) https://doi.org/10.1016/S0749-6826(05)09008-6
14. Pató, G. Sz. B., Kovács K., Abonyi, J., A negyedik ipari forradalom hatása a kompetenciacserélődésre, Vezetéstudomány (2021) Megjelenés alatt.
15. Pató, G. Sz. B., Formal Options for Job Descriptions – theory meets practice, Journal of Management Development, Vol. 36. Iss. 8, pp. 1008-1028., (2017) https://doi.org/10.1108/JMD-01-2016-0019
16. Pató, G. Sz. B., The 3D Job Description, Journal of Management Development, Vol. 34 Iss: 4, pp. 406 – 420. (2015) https://doi.org/10.1108/jmd-11-2013-0151
17. Pató G. Sz. B., Kompetenciák, feladatok logisztikai rendszerekben. Pannon Egyetem, Gazdálkodás- és Szervezéstudományok Doktori Iskola, Veszprém (2006)
18. A. Trost, Human Resources Startegies – Balancing Stability and Agility on Times of Digitalization, Future of Business and Finance, Springer International Publishing, ISBN: 978-3-030-30591-8, pp. 1-369. (2020) https://doi.org/10.1007/978-3-030-30592-5

Framework for public sector development

Ákos Gubán, PhD
college professor
Budapest Business School, Department of Informatics

Zoltan Mezei, PhD
University of Pecs, Doctoral School of Regional Policy and Economics

Abstract

Identifying and modelling objects/information flowing through business systems is a key topic in examining the efficacy of public sector administration processes. One of the important scientific results of the research was the development of mathematical models applicable to service processes. It is a process rationalization method based on heuristic simulation that is capable of efficiently reorganizing not only processes but also their connections and the object-flowing between these nodes by reorganizing service processes. Improving public sector processes is a major challenge for those interested in the topic, as public sector processes are highly regulated. This means, on the one hand, the legal environment and, on the other hand, the bound, internal regulation based on it. The purpose of this study is to present a new mathematical framework, which is better suited to the public sector management system, using the previous scientific results (improvement of service processes) in the field of efficiency improvement.

Keywords:
efficiency improvement, public sector, object-flow, modelling, management

1. Introduction

Improving public sector management processes is a major challenge for researchers engaged in this topic, as this area of the national economy is highly regulated. This means on the one hand the legal environment and on the other hand the bound internal regulations based on it. The most common problem with a management process system is the bottleneck node because it is there that the object is most likely to be slowed down, slowed down or damaged. These need to be prioritized and potential process improvements first and foremost.
The main aim of this research was to find the possibility of process improvement within the non-flexible framework. As a precondition for this, a process rationalization method based on heuristic simulation has been developed earlier that is capable of efficiently reorganizing not only processes but also their connections and the flow of objects between these connection nodes by reorganizing service processes (Gubán-Kása, 2014).
By developing a customized methodology presented in this article, it is possible to apply the scientific results of previous research in public sector management processes. In this paper, we limit the concept of public sector management to financial/accounting administration processes and do not address other areas of the budgetary cycle (Sivák-Zsugyel, 2015).
The first part of this study reviews the related literature, and the second part details the efficiency improvement tool adapted to the public sector.

2. Literature review

The need for reorganization and reorganization of management processes goes far beyond the history of management literature, not only among practitioners of science but also among practitioners. The need to transform dysfunctional processes is increasingly present in the 21st century, and more sophisticated tools and methods are emerging, but they are all based on old principles (Porter, 1985).
The perception of the functioning of public sector organizations differs in the literature but most authors agree that there is plenty of room for improvement. Expectations and suggestions in most places are meet the objectives of public administration reforms known as new public management. These reforms have two important areas: minimizing state involvement and improving internal operational efficiency (Pálné, 2008).
Public sector organizations are economically monopolized by the 'production' of public goods, which avoids

risk and failure. Due to political influence and lack of competition, public servants are not as open to innovation as those employed in business (Pollit et al., 2007).
The goal of the current government is to look for new ways to reduce the operating costs of public sector organizations, while also stimulating innovation within the organization. In addition to the introduction of new management techniques, administrative procedures and governmental models, the state must not forget to fulfil its basic functions – state, defense, cultural etc. Therefore, fundamental changes can only be achieved at the highest level of government (Kassó, 2008).
This is a special topic in analyzing the efficiency of service systems since the public sector system's organizational environment is much more heavily regulated at process level than that of service systems. Interpreting and measuring efficiency are always possible only with a well-defined goal in mind. In public sector management systems, efficiency is defined as follows (based on Kolozsi-Lentner-Parragh, 2017): if the output state of the system is (or is within a predefined range) the target state expected after the process is completed.
Closed modification service processes are those processes that are subject to truly little change due to external or internal regulatory, or quality assurance reasons. Improvement of such public sector management processes is not possible only by reorganizing the internal business process, in which case other means must be sought to increase the efficiency of the system.
During the analysis of the management systems examined, it was determined that said object is a data, material or resource that flows, can be transformed, and can be measured as information at any junction of the flow. Any event discovered during the administration process that affects the nature of the object information is called a transaction. The time frame for this feature is fixed, has at least one data value (message), and its data content and timestamp cannot be changed. The process is determined by what transactions affect the given object in each time frame, on the examined nodes (Bányai et al., 2015).
In addition, the source object (signal or message) always flows through the system but may be transformed during the process. In fact, it is usually transformed because it also has information property. It is important to justify the above because efficiency improvement in practice is based on modelling the object-flow in public sector management systems (Mezei, 2020).
In examining the hypothesis of the present study, we start from a simple generalization. In general, the flows (e.g., information, material, resources etc.) observed in the processes of public sector management systems are the relocation of the object under investigation (Choi, 1997). These location changes represent changes in the parameters and attributes of an object over time, so flow means the location change of objects – this is called an aspect relative to the system. If the change of location is only virtual, that is, no spatial movement is detected (only changes in the properties of the object can be detected), so in a more general case the processes can be considered as changes in the object – this is called the object aspect.
The latter case can handle several changes without physical movement. The most common case of this is data change, when physical location change (when analyzed from a user point of view) does not take place at all, because from the user point of view the data always stays in the same place, only its 'value' changes. Therefore, in analyses, the flow of an object can be examined in the same way from both aspects, and their results will be the same. Gautam et al., (2017) show a similar approach in segmented models.

3. Object-flow in management systems

In this chapter we introduce the concepts related to the model of independent transformations, the hypothesis, and the mathematical model. Modelling is hereinafter referred to as object, data, tangibles, information, or non-material elements capable of state change in the system under investigation. Attributes that describe objects and have variable values are referred to hereinafter as state attributes.
In our system, it is expedient to perform the examinations at the places where the object changes (e.g., quality control point), that is, the state of the object changes. These locations will be treated as nodes according to the Business Process Amelioration (BPA) methodology. In our study, a node is defined as well-defined system elements into which a value of an attribute of an inbound or internal object can be input. A series of object state changes is hereinafter referred to as a process.
These state changes can themselves be considered as a process system. That is, such process systems will be able to be analyzed using the existing test methodology, if we look at the „changes" they can reveal. If we create a model (based on Veres-Bányai-Illés, 2016), in which state changes can be divided into simple transformations, then practical state change systems will be easily adapted to public sector management systems.
Hypothesis 1 of this article focuses on the objects flowing in public sector administration processes and the analysis of public sector management processes.

$|f_i(t) - a_{i,t_2}| < \varepsilon; f_i(t) - a_{i;t_2} < \varepsilon$ or $a_{i,t_2} - f_i(t) < \varepsilon$. It is enough to deal with the first case; the tests can be applied similarly to the other two cases.

It can be assumed that the velocity of the transformation T effect (state change) is proportional to the difference between the actual (measured) and ideal state (in a given interval). Then the differential equation of the effect and let the current state be a_0 and the ideal state be a_{opt}.

$$\frac{da}{d\tau} = k\Delta a \tag{4}$$

where $\frac{da}{d\tau}$ is the velocity of transformation effect

$\Delta a = a - a_{opt}$ the difference between the state and the ideal state (in its own dimension), k proportionality factor.
The more the current state differs from the optimum, the proportional speed to the optimum is proportional. This is especially valid for management systems. The solution of the simple differential equation (3.4) above

$$a(\tau) = \left(a_0 - a_{opt}\right)e^{k\tau} + a_{opt}. \tag{5}$$

At this moment, the unique effect of transformation can be determined. In this way we also can get whether the 'treatment' is going in a 'good' direction of 'treatment'.
Obviously, a transformation does not necessarily only affect one state but also other states. These will be called side effects (if they are not intentional ones). Thus, a transformation can be generalized as follows:
Let T be transformation and $[t_0, t_0 + \Delta t]$ be the time interval of the effect, the state change function is the property $S_i\ f_i(t)$: $[t_0, t_0 + \Delta t] \to \mathcal{A}$ $(\Delta t > 0)$where $(\Delta t = max(\Delta t_i, 1 = 1{,}2, \dots n)$, i.e. the longest duration of the effect or the duration of the side effects. It is the resulting effect of the transformations at the given time.

3.2 Multiplication of transformations

Let $T_1, T_2, \dots, T_k, (k > 2,\ K \in N)$ be all transformations in the interval $[t_1, t_2]$, $\varphi_{T_i}(t) = \langle a_{1t}^{T_i}, a_{2t}^{T_i}, \dots, a_{nt}^{T_i}\rangle, i = 1{,}2, \dots, k$ effect function. $\mathcal{T} = T_1 x T_2\ x \dots\ x\ T_k$ product of transformations at time t is the effect function that gives the current state system: $\varphi_{\mathcal{T}}(t) = \langle a_{1t}, a_{2t}, \dots, a_{nt}\rangle, t \in [t_1, t_2]$.

3.3 Independence of transformations

Two transformations T_1, T_2 are pairwise independent if the transformations only affect by their own in time interval $[t_1, t_2]$.
Let $\varphi_{T_1}(t) = \langle a_{1t}^{T_1}, a_{2t}^{T_1}, \dots, a_{nt}^{T_1}\rangle$ and $\varphi_{T_2}(t) = \langle a_{1t}^{T_2}, a_{2t}^{T_2}, \dots, a_{nt}^{T_2}\rangle$ be the effect function of the two transformations, and let $\varphi_{T_1T_2}(t) = \langle a_{1t}, a_{2t}, \dots, a_{nt}\rangle$ be the effect function of the transformations together (hereinafter their product). Take the following derived function:

$$opt\left(a_{it}^{T_1}, a_{it}^{T_2}\right) = \begin{cases} a_{it}^{T_k} \text{ if } k = \text{index}\left(\min\{|a_{it}^{T_1} - a_{iopt}^{\square}|; |a_{it}^{T_2} - a_{iopt}^{\square}|\}\right), a_{it}^{T_1}, a_{it}^{T_2} \neq \emptyset \\ a_{it}^{T_1} \text{ if } \quad a_{it}^{T_2} = \emptyset \text{ és } a_{it}^{T_1} \neq \emptyset \\ a_{it}^{T_2} \text{ if } \quad a_{it}^{T_2} \neq \emptyset \text{ és } a_{it}^{T_2} = \emptyset \\ \emptyset \quad \text{otherwise } \square \end{cases} \tag{6}$$

The two transformations are called *independent* (labelled $T_1 \uparrow T_2$), if $a_{it} = opt\left(a_{it}^{T_1}, a_{it}^{T_2}\right)$, each $i = 1{,}2, \dots n$.

From the definition, the relation is symmetrical.
To test the reflexivity, some conditions have to be met. On the one hand, a transformation may appear in the time interval $[t_1, t_2]$ several times at different times, and then their effect on the states will not be independent. (For example, in the case of asymptotic attenuating effects, an impulse may change asymptotic behaviour or the asymptote. In one case, independence would be reflexive if the simultaneous effect would appear as a single effect in the system – that is, the system has a redundancy filter.) This expectation is not realistic, so we can state that the relation is not reflexive. Hereinafter, we use only transformations that are irreflexive.
Examining transitivity is also an important issue. Illustrations of everyday life are often examples that are not transitory. It is conceivable that A and B medicines as well as medicines B and C do not have any effect on each other during the treatments. However, C can have an effect on a component of drug A and they may not be used together during treatment. By examining the above definition, one can construct a case in which transitivity is not fulfilled.

$|f_i(t) - a_{i,t_2}| < \varepsilon; f_i(t) - a_{i;t_2} < \varepsilon$ or $a_{i,t_2} - f_i(t) < \varepsilon$. It is enough to deal with the first case; the tests can be applied similarly to the other two cases.

It can be assumed that the velocity of the transformation T effect (state change) is proportional to the difference between the actual (measured) and ideal state (in a given interval). Then the differential equation of the effect and let the current state be a_0 and the ideal state be a_{opt}.

$$\frac{da}{d\tau} = k\Delta a \tag{4}$$

where $\frac{da}{d\tau}$ is the velocity of transformation effect

$\Delta a = a - a_{opt}$ the difference between the state and the ideal state (in its own dimension), k proportionality factor.
The more the current state differs from the optimum, the proportional speed to the optimum is proportional. This is especially valid for management systems. The solution of the simple differential equation (3.4) above

$$a(\tau) = (a_0 - a_{opt})e^{k\tau} + a_{opt}. \tag{5}$$

At this moment, the unique effect of transformation can be determined. In this way we also can get whether the 'treatment' is going in a 'good' direction of 'treatment'.
Obviously, a transformation does not necessarily only affect one state but also other states. These will be called side effects (if they are not intentional ones). Thus, a transformation can be generalized as follows:
Let T be transformation and $[t_0, t_0 + \Delta t]$ be the time interval of the effect, the state change function is the property $S_i\ f_i(t)$: $[t_0, t_0 + \Delta t] \to \mathcal{A}\ (\Delta t > 0)$where $(\Delta t = max(\Delta t_i, 1 = 1,2, \dots n)$, i.e. the longest duration of the effect or the duration of the side effects. It is the resulting effect of the transformations at the given time.

3.2 Multiplication of transformations

Let $T_1, T_2, \dots, T_k, (k > 2,\ K \in N)$ be all transformations in the interval $[t_1, t_2]$, $\varphi_{T_i}(t) = \langle a_{1t}^{T_i}, a_{2t}^{T_i}, \dots, a_{nt}^{T_i} \rangle, i = 1,2, \dots, k$ effect function. $\mathcal{T} = T_1 x T_2\ x \dots\ x\ T_k$ product of transformations at time t is the effect function that gives the current state system: $\varphi_{\mathcal{T}}(t) = \langle a_{1t}, a_{2t}, \dots, a_{nt} \rangle, t \in [t_1, t_2]$.

3.3 Independence of transformations

Two transformations T_1, T_2 are pairwise independent if the transformations only affect by their own in time interval $[t_1, t_2]$.
Let $\varphi_{T_1}(t) = \langle a_{1t}^{T_1}, a_{2t}^{T_1}, \dots, a_{nt}^{T_1} \rangle$ and $\varphi_{T_2}(t) = \langle a_{1t}^{T_2}, a_{2t}^{T_2}, \dots, a_{nt}^{T_2} \rangle$ be the effect function of the two transformations, and let $\varphi_{T_1T_2}(t) = \langle a_{1t}, a_{2t}, \dots, a_{nt} \rangle$ be the effect function of the transformations together (hereinafter their product). Take the following derived function:

$$opt(a_{it}^{T_1}, a_{it}^{T_2}) =$$

$$\begin{cases} a_{it}^{Tk} \text{ if } k = \text{index}(\min\{|a_{it}^{T_1} - a_{iopt}^{\square}|; |a_{it}^{T_2} - a_{iopt}^{\square}|\}), a_{it}^{T_1}, a_{it}^{T_2} \neq \emptyset \\ a_{it}^{T_1} \text{ if } \quad a_{it}^{T_2} = \emptyset \text{ és } a_{it}^{T_1} \neq \emptyset \\ a_{it}^{T_2} \text{ if } \quad a_{it}^{T_2} \neq \emptyset \text{ és } a_{it}^{T_2} = \emptyset \\ \emptyset \quad \text{otherwise} \end{cases} \tag{6}$$

The two transformations are called *independent* (labelled $T_1 \uparrow T_2$), if $a_{it} = opt(a_{it}^{T_1}, a_{it}^{T_2})$, each $i = 1,2, \dots n$.
From the definition, the relation is symmetrical.
To test the reflexivity, some conditions have to be met. On the one hand, a transformation may appear in the time interval $[t_1, t_2]$ several times at different times, and then their effect on the states will not be independent. (For example, in the case of asymptotic attenuating effects, an impulse may change asymptotic behaviour or the asymptote. In one case, independence would be reflexive if the simultaneous effect would appear as a single effect in the system – that is, the system has a redundancy filter.) This expectation is not realistic, so we can state that the relation is not reflexive. Hereinafter, we use only transformations that are irreflexive.
Examining transitivity is also an important issue. Illustrations of everyday life are often examples that are not transitory. It is conceivable that A and B medicines as well as medicines B and C do not have any effect on each other during the treatments. However, C can have an effect on a component of drug A and they may not be used together during treatment. By examining the above definition, one can construct a case in which transitivity is not fulfilled.

Let $\bar{A}_1 = \bar{A}_2 = \{\emptyset; 0; 1; 2\};\ opt(\bar{A}_1) = opt(\bar{A}_2) = 0;\ \varphi_{T_1}(t) = \langle 1; 0 \rangle;$ and $\varphi_{T_2}(t) = \langle 0; 1 \rangle$; be based on the effect function of the two transformations (6), and be $\varphi_{T_1T_2}(t) = \langle 1; 1 \rangle$;

$\varphi_{T_1}(t)\ x\ \varphi_{T_2}(t) =$

$\langle opt(a_{1t}^{T_1}, a_{1t}^{T_2}); opt(a_{1t}^{T_1}, a_{1t}^{T_2}) \rangle = \langle 0; 0 \rangle \neq$

$\langle 1; 1 \rangle = \varphi_{T_1T_2}(t).$ (7)

So, the independence relationship is not transitive.
The above definition can be extended to the independence of any number of transformations, that is, a transformation is independent of a transformation system if the transformation is pairwise independent of each element of the transformation system, i.e., T and $(T_1, T_2, \dots T_k)$.
It is important to ascertain whether the transformations can be dissociated from the product of independent transformations in case of a joint effect (a given time $t \in [t_1, t_2]$).

Hypothesis 2:
'The product transformation of multiple joint transformation can be decomposed into a product of independent transformations.'

Verification

Let $T_1, T_2, \dots, T_k, (k > 2, K \in N)$ be all transformations in the interval $[t_1, t_2]$, and let $\mathcal{T}$ be their product transformation: with effect function $\varphi_{\mathcal{T}}(t) = \langle a_{1t}, a_{2t}, \dots, a_{nt} \rangle, t \in [t_1, t_2]$. In addition, create the transformations $\hat{T}_i, i = 1,2, \dots n$ with effect function $\varphi_{T_i}(t) = \langle \emptyset; \dots; a_{it}; \dots; \emptyset \rangle$.
Obviously, these transformations will be independent, as their effect functions are applied to
$\varphi_{T_i}(t) = \langle \emptyset; \dots; a_{it}; \dots; \emptyset \rangle; \varphi_{T_{ij}}(t) =$

$\langle \emptyset; \dots; a_{jt}; \dots; \emptyset \rangle.\ i \neq j; i, j = 1,2, \dots k$ and $i < j$,

at

$$opt(a_{lt}^{T_1}, a_{lt}^{T_2}) = \begin{cases} a_{it} & if \quad l = i \\ a_{jt} & if \quad l = j \\ \emptyset & otherwise \quad l \neq i, j \end{cases} \tag{8}$$

therefrom

$\bar{T}_i\bar{T}_j$: $\varphi_{T_i}(t)\ x\ \varphi_{T_j}(t) = \langle \emptyset; \dots; a_{it}; \dots; \emptyset \rangle\ x\ \varphi_{T_i}(t)$

$= \langle \emptyset; \dots; a_{jt}; \dots; \emptyset \rangle$

$= \langle \emptyset; \dots; a_{jt}; \emptyset; \dots; a_{jt}; \dots; \emptyset \rangle$

transformation product can be get, but it matches to $\langle \emptyset; \dots; opt\left(a_{it}^{\bar{T}_1}, a_{it}^{\bar{T}_2}\right); \emptyset; \dots; opt\left(a_{jt}^{\bar{T}_1}, a_{jt}^{\bar{T}_2}\right); \dots; \emptyset \rangle$,

ergo $\bar{T}_1 \uparrow \bar{T}_2$.

We have verified that the current transformation system can be decomposed by a pair of independent transformation systems.
Since the above assignment can be done for every $t \in [t_1, t_2]$, we define the transformations $\hat{T}_i, i = 1,2, \dots n$ with their effect function:
$\varphi_{T_i}(t) = \varphi_{T_it}; t \in [t_1, t_2]$. Thus, the resulting functions always satisfy the definition of independence so that the generated transformations $\hat{T}_i, i = 1,2, \dots n$ will realise the effects of the original transformations and become independent transformations.
If we accept the above hypothesis, the transformation effect function can be written to the given state in the following form:

$$\varphi_{T_i}(t) = \sum_{j=1}^{k} \alpha_j(t);\ t \in [t_1, t_2]; i = 1,2, \dots n \tag{9}$$

Following the application of the above model simulations, it can be used as a practical efficiency improvement tool for public sector organizations. That is, it helps to map out the framework of the process system, and within it, the basic processes that can operate 'independently'.

4. Results

Improving public sector processes is a major challenge for those interested in the subject, as public sector processes are highly regulated. This means, on the one hand, the legislative environment and, on the other hand, bound internal regulation based on it. By developing the model of independent transformations presented in this study, it is possible to apply the results of previous research to the public sector administration processes.
Research results show that both technical, service, and public sector management systems can be managed together for process improvement. If the processes

revealed in the public sector management processes are examined not from the traditional flow point of view, but from the point of view of internal state changes, their management and improvement can be solved in the same way as with other more flexible service process systems.

The public sector administration processes presented in this study constitute an extreme, unique case for efficiency improvement, as general service systems can be relatively freely modified to operate near optimum. However, public sector management systems are locally limited.

It is only in the first investigations that it comes as a great surprise, if we look more closely at the system outline that we can use to treat public sector systems with the same methods and solutions as any other business process system, with limited efficiency. Process analysis has shown that processes can be handled separately from the point of view of object flow, i.e., they can be significantly improved by using the model of independent transformations.

5. Summary

The bottleneck nodes are the most problematic in a management process system, so focus on these and prioritize possible process improvements here. In practice, this is not conceivable in isolation but requires intervention at all relevant nodes. When implementing organizational changes, it is necessary to apply the model of independent transformations to modify the process only 'in the right direction' and 'without side effects'. Applying the model to a public sector management system can result in greater transparency for responsible departments and easier process improvements without violating regulatory requirements.

A.1 Mathematical symbols

A: conditions set

FF: fluid flow

O: node

S: conditions variable

t: time

T: transformation

$\varphi_{T_1}(t)$: transform function

$\mathcal{T}$: multiplication of transformation

6. References

1. Bányai T – Veres P – Illés B (2015): Heuristic Supply Chain Optimization of Networked Maintenance Companies. *Procedia Engineering, 100:46-55.*
2. Chan SL – Choi CF (1997): A conceptual and analytical framework for business process reengineering. *International Journal of Production Economics, 50(2-3), 211–223.*
3. Gautam S et al. (2017): Segmented point process models for work system – safety analysis. *Safety Science, 95:15-27.*
4. Gubán Á – Kása R (2014): Conceptualization of fluid flows of logistificated processes. *Advanved Logistics Systems: Theory and practice 7(2):27-24.*
5. Kassó Zs (2008): Átláthatóság, elszámoltathatóság, hatékony gazdálkodás. Megbízható számviteli adatok nélkül lehetséges-e? *Önkormányzatok gazdálkodása – helyi fejlesztés (ed. Buday-Sántha A).* Pécsi Tudományegyetem Közgazdaságtudományi Kar, Pécs.
6. Kolozsi PP – Lentner Cs – Parragh B (2017): Központi megújulás és állami modellváltás Magyarországon. *Polgári Szemle, 13(4-6):28-51.*
7. Mezei Z (2020): *Központi folyamatok modelljének helye a szolgáltatási folyamatmodellekben.* Doktori értekezés, PTE Regionális Politika és Gazdaságtan Doktori Iskola: Pécs.
8. Pálné Kovács I (2008): *Helyi kormányzás Magyarországon.* Dialog Campus Kiadó, Budapest.
9. Pollit C, van Thiel S, Homburg V. (ed.) (2007): *New public management in Europe: Adaption and alternatives.* Palgrave Macmillan, Hampshire.
10. Porter ME (1985): *The Competitive Advantage: Creating and Sustaining Superior Performance.* Free Press, New York.
11. Sivák J – Zsugyel J (2015): Központi feladat- és forrásmegosztási gyakorlat értékelése az OECD ajánlásainak és néhány kelet-közép-európai ország tapasztalatainak tükrében. *Prosperitas, 2(1):43-61.*
12. Veres P – Bányai T – Illés B (2016): Route planning among non-pre-defined objects. In *9th International Doctoral Workshop on Logistics (ed. Gerecke A)*, Magdeburg: Otto von Guericke University, pp. 65-70.

How smart is a forklift today?

Dr. László Szabó
associate professor
Budapest Business School, Department of Business Information Technology

Abstract

With the advent of INDUSTRY 4.0, the automation of logistics processes also came to the fore. It brought with it the need to improve existing processes, as other conditions apply to a manual or an automated operation. The cost of automation is typically high, so it is an important question in which processes the development can be financially supported and exactly what kind of development is needed. Automated guided vehicle systems can be a solution to this problem.

Keywords:
forklift, automation, logistics, AGV

1. Introduction

The main vision of the digitization and automation trends is to increase efficiency, but it should not be forgotten that the solutions often relate to one element of the logistics work and have yet to be integrated into logistics systems. A healthy degree of automation can only be determined by conscious, system-wide testing. The desire to have a factory or an assembly hall as automated as possible bears the hallmarks of prestige investments rather than modern, conscious plants.[3]

1.1 Smart forklift

A smart forklift is a forklift that is equipped with hardware that can transmit data using standard telecommunications networks and is thus connected to a network. All of them are collected by the system and can be used for many purposes. You can connect all the forklifts in

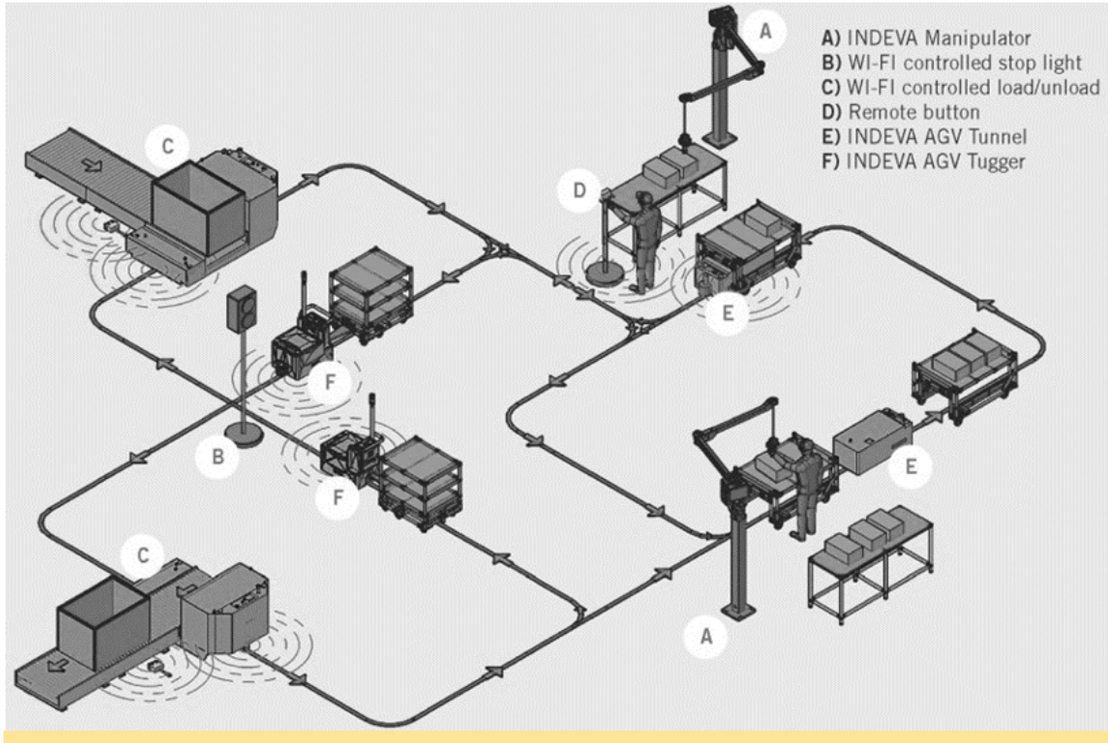


Figure 1. AGV system [4]

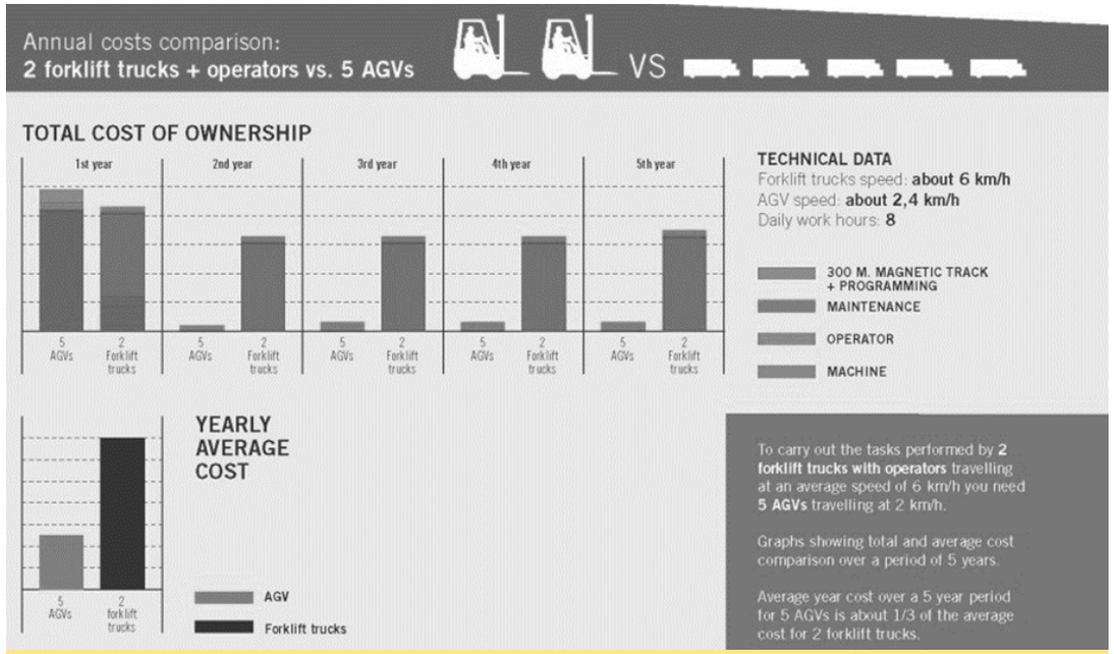


Figure 2. Annual costs comparison [4]

your fleet, collecting data for each truck and easily reviewing all the activities of your company. [6]

2. Automated guided vehicle (AGV)

Automated guided vehicles (AGVs), a type of vehicles that are driverless and programmed to travel on predefined routes to transfer loads, are being widely used in modern material handling systems due to their ability to improve the efficiency and productivity of the systems and decrease human labour. Accordingly, the design, operation and maintenance of the AGV systems have attracted interest from both academic and industrial communities in recent years. [1]

An automated guided vehicle (AGV) is a mobile robot that travels along designated lines or wires on the floor or navigates a specific area using radio waves, cameras, magnets, lasers. (Fig.1) It is most commonly used to transport heavy materials in large industrial buildings or on the outskirts around a factory or warehouse. However, the ways and locations of AGV application are expanding. AGVs can also tow the objects behind them on a trailer, to which they can attach themselves. Trailers can be used to move raw materials or finished products, from which objects can be placed on motor rollers (conveyors). AGVs are used in almost all industries, but are also used to transport food, bedding or medicines in hospitals, for example. [5]

2.1 The future of forklifts

A smart forklift concept can signal when it needs to be serviced, monitor functions such as wheel spin and speed, detect idle time, and improve wheel traction. New technology will mean companies can monitor energy usage, leading to a reduction in the use of fuel. With the integration of automated decision making into forklift technology, the capacity to send data between trucks will prove useful in many ways, including the capacity to detect potential collisions. Monitoring will also make it possible to advise drivers of the ways in which their driving style could be improved. The use of robotic technology in handling materials is something that looks likely to occur in the longer term, as vehicles become more autonomous. [2]

3. Conclusion

Over the past couple of decades, the forklift industry has had to keep up with a world that is constantly changing and adapting, pushing forward with innovation to meet the demands that are presented in the modern-day world. With a changing world and new, more advanced technologies becoming available day by day, the forklift industry is in a unique position wherein there are more efficient (Fig. 2), sustainable ways to get the same jobs done without any of the waste or pollution of days gone by. The future of the forklift industry lies here. [7]

References

1. A R. Yan, S.J. Dunnett, L.M. Jackson, ”Novel methodology for optimising the design, operation and maintenance of a multi-AGV system”, Reliability Engineering and System Safety 178, 130-139 (2018).
2. https://www.forktruckdirect.ltd.uk/future-forklifts-top-five-concepts-forklifts/ (20. Dec. 2020).
3. http://gyartastrend.hu/logisztika/cikk/automatizalas_az_intralogisztikaban (12. Sept. 2020).
4. http://leantechnology.hu/en/agv-automated-guided-vehicle/ (12. Sept. 2020).
5. https://www.okosipar.hu/tegyuk-helyre-az-agv-k-mukodeset/ (30. Oct. 2020).
6. https://toyota-forklifts.hu/allvanyrendszerek/innovativ-logisztika/okostargoncak/ismerje-meg-okostargoncainkat/ (06 Sept. 2020).
7. https://westmercia.co.uk/2020/03/24/future-trends-in-the-forklift-industry/ (10 Sept. 2020).

Possibilities of belt conveyors automated design

Dragan Živanić
University of Novi Sad, Faculty of Technical Sciences
Department of Mechanization and Design Engineering

Nikola Bodrožić
University of Novi Sad, Faculty of Technical Sciences
Department of Mechanization and Design Engineering

Nikola Ilanković
University of Novi Sad, Faculty of Technical Sciences
Department of Mechanization and Design Engineering

Atila Zelić
University of Novi Sad, Faculty of Technical Sciences
Department of Mechanization and Design Engineering

Abstract

The subject of this paper is the automated design of the belt conveyor with supporting structure of aluminum profiles. Belt conveyors with supporting structure of aluminum profiles are devices of continuous transport that are most often used for the transport of light piece material. The main advantages of these conveyors are relatively low resistance to movement, low energy consumption, light and simple construction that takes up little space, high cost-effectiveness, easy maintenance and low operating costs, high reliability, modern design and noiseless operation. By parametric modeling, with appropriate calculations of the basic elements, it is possible to form a quality basis for automated design of these devices, which is presented in this paper.

Keywords:
belt conveyor, calculation of the load-bearing structure, 3D design

1. Introduction

Belt conveyors with a supporting structure made of Al profile („light" conveyors) are devices of continuous transport that are most often used for the transport of piece material or packed boxes in which there is a certain number of transport units, and rarely bulk material. The material is usually transported in a horizontal and slightly inclined direction by means of a rubber conveyor belt, which is the load-bearing and pulling element. They are adaptable to a wide range of applications, from light specific pharmaceuticals products, through boxes and packages in the food and beverage industries. They are also used in manufacturing and process industries, automated systems, etc.
The main advantages of such conveyors are relatively low resistance to movement, i.e., low energy consumption, light and simple construction and as such takes up little space, easy maintenance and low operating costs, high reliability, modern design and noiseless operation. It also has disadvantages such as sensitivity to impacts

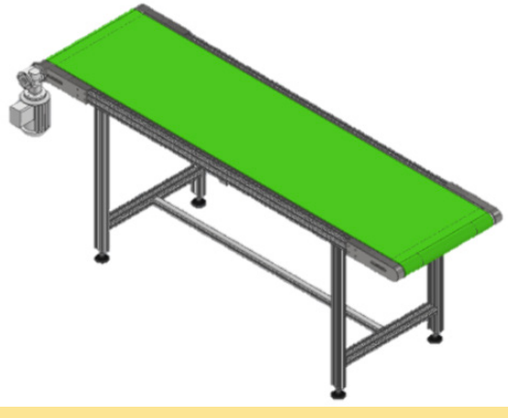


Figure 1. Illustration of a belt conveyor with the supporting structure made of Alu profile

to the structure, inconvenience of forming complex routes in the horizontal plane as well as in space, limited transport slope with standard belts, sensitivity to chemical influences as well as to high temperatures [1].

2. Problem description

According to the project task, for the transport of piece material, in the automotive industry, a belt conveyor with a construction made of aluminium profiles is planned. For the conveyor, it was necessary to calculate and select its characteristic elements, calculate the load-bearing capacity of the structure and perform automated design of the conveyor in a 3D program, for the following data:

- conveyor length of 1 m ÷ 6 m;
- conveyor belt width of 0.5 m ÷ 1 m;
- mass of material per meter of length 10 kg ÷ 100 kg;
- conveyor belt speed maximum 15 m / min or 0.25 m / s;
- supporting structure made of aluminium profile: main support 30 x 60 mm;
- drive mechanism - manufactured by MÄDLER.

3. Approximate belt conveyor calculation

The forces in the belt of a belt conveyor are determined by the method of traversing the contour, moving from one, arbitrarily chosen point in the direction of its movement.
By calculating the resistances on individual parts of the conveyor, starting from the descending point from the drive pulley (point 2), the forces at the marked characteristic points in the function of S_2 are obtained. In this way, a system of equations is obtained whose number is one less than the number of characteristic points. To obtain a solution, it is necessary to introduce another, additional condition. In belt conveyors, on the working side where the belt is supported by rollers, this condition is formed on the basis of criteria that determine the minimum value of force on the working side

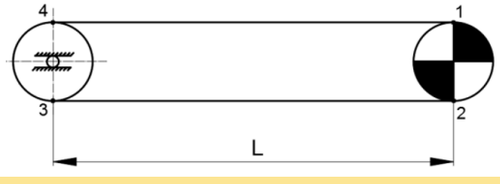


Figure 2. Schematic of the belt conveyor route

of the belt, which ensures that the material does not scatter from the belt due to excessive deflection. This is not the case with the belt conveyors which is calculated here, so this condition will be used to determine the forces in the belt for an approximate calculation, which will serve as the basis for the final calculation[2].

4. Final calculation of the belt conveyor

After an approximate calculation, it is necessary to determine the degree of safety against the slippage of the belt. The theory of load transfer through friction between the pulley and the belt is based on Euler's pattern which defines the ratio of forces in the point where the belt reaches the drive pulley and in the point where the belt leaves the drive pulley at the moment of its beginning to slip on the pulley [3].

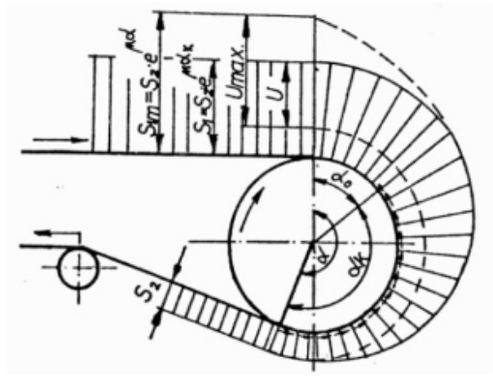


Figure 3. Load transfer mechanism

The degree of safety against slipping is obtained according to the following expression:

$$\varphi = \frac{S_2 \bullet (e^{\mu\alpha} - 1)}{S_1 - S_2} \geq 1,25 \qquad (1)$$

where:

- S_1– force in the point where the belt reaches the drive pulley;
- S_2 – force in the point where the belt leaves the drive pulley;
- μ – friction coefficient between the belt and the drive pulley;
- α – the span angle of the belt around the pulley.

As the calculated degree of safety against slipping is significantly above the permitted value, it means that the conveyor belt itself is overloaded, i.e., it has too much tension force. This can lead to a reduction in its service life, but also to the creation of additional loads on the

shafts and bearings, which may cause the need for larger dimensions of the shafts, and thus the bearings. Due to all the above, the minimum allowable force in the belt was reduced, but in such a way that the level of safety within the allowed limits was still maintained. Based on the degree of safety, the previously calculated forces in the belt are recalculated. The force in the point where the belt reaches the drive pulley, in this case, can be written as the sum of the force in the point where the belt leaves the drive pulley and all resistances along the route:

$$S_1 = S_2 + \Delta S_{2-3} + \Delta S_{3-4} + \Delta S_{4-1} \qquad (2)$$

After correcting the forces in the belt, the actual required power of the electric drive motor was determined according to the following expression:

$$P = \frac{U \cdot v}{\eta} \qquad (3)$$

where:

- U – force equal to the difference between forces in the point where the belt reaches the drive pulley and the point where the belt leaves the drive pulley;
- η – the degree of utilization of the drive mechanism;
- v – the speed of belt motion.

After the required power of the drive was determined, the required and standard power of the drive is given, depending on the mass of material per meter and the length of the conveyor route.

Power $P\ [kW]$		Mass of material per meter					
		10 $[kg]$	20 $[kg]$	30 $[kg]$	40 $[kg]$	50 $[kg]$	100 $[kg]$
Length of the conveyor route	1 $[m]$	0,015	0,025	0,034	0,044	0,054	0,103
	2 $[m]$	0,029	0,049	0,068	0,087	0,107	0,203
	3 $[m]$	0,044	0,073	0,102	0,130	0,159	0,303
	4 $[m]$	0,058	0,097	0,135	0,173	0,212	0,403
	5 $[m]$	0,073	0,121	0,169	0,216	0,264	0,503
	6 $[m]$	0,088	0,145	0,202	0,259	0,317	0,603

Table 1. Required power of the drive

Power $P\ [kW]$		Mass of material per meter					
		10 $[kg]$	20 $[kg]$	30 $[kg]$	40 $[kg]$	50 $[kg]$	100 $[kg]$
Length of the conveyor route	1 $[m]$	0,12	0,12	0,12	0,12	0,12	0,12
	2 $[m]$	0,12	0,12	0,12	0,12	0,12	0,25
	3 $[m]$	0,12	0,12	0,12	0,25	0,25	0,37
	4 $[m]$	0,12	0,12	0,25	0,25	0,25	0,75
	5 $[m]$	0,12	0,25	0,25	0,25	0,37	0,75
	6 $[m]$	0,12	0,25	0,25	0,37	0,37	0,75

Table 2. Standard power of the drive

5. Calculation of supporting structure of a belt conveyor

Within this section, the description of the calculation of the entire supporting structure is described.

5.1 Calculation of the main girder of the load-bearing structure - proof of strength

According to the project task, as the main girder of the belt conveyor, an aluminium profile is used, for which it is necessary to perform a load calculation, i.e., to carry out a proof of the girder strength. The girder is modelled as a simple beam loaded with a continuous load q.

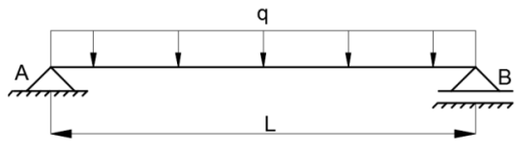


Figure 4. Model of the main girder with two supports

As the conveyor has two longitudinal main girders, one girder was taken for calculation and the load originating from the load was reduced on it. However, the most unfavorable case was taken into account, ie the assumption that 60% of the total load will be transferred to one main girder. The reason for this is the possible incorrect operation of the belt during the operation of the conveyor, ie. its bevel (walking in the longitudinal direction) and uneven load distribution across the width of the belt. In this way, the modeled load goes to the safety side of the structure. Permissible stresses, normal and tangential, are determined on the basis of the following patterns [4]:

$$\sigma_p = \frac{R_{p0,2\%}}{\nu_1} \qquad (4)$$

$$\tau_p = \frac{R_{p0,2\%}}{\nu_1 \cdot \sqrt{3}} \qquad (5)$$

where:

- $R_{p0,2\%} = 200\ \frac{\mathrm{N}}{\mathrm{mm}^2}$ - conventional yield stress of the aluminium profile;
- $\nu_1 = 1{,}5$ - degree of safety for I load case: load during normal operation without wind.

A tabular presentation of the obtained results of calculated stresses is given.

The table shows for which lengths of the conveyor and the mass of material the calculated stress is less than the permissible one, so that the strength is satisfied, which means that the main support will not break. For those lengths of the conveyor and the mass of material where the calculated stress is higher than the permissible one, which means that the main carrier will break, i.e.,

Stress $\sigma_u\ [MPa]$		Mass of material per meter					
		10 $[kg]$	20 $[kg]$	30 $[kg]$	40 $[kg]$	50 $[kg]$	100 $[kg]$
Length of the conveyor route	1 $[m]$	1,06	2,13	3,2	4,26	5,33	10,66
	2 $[m]$	4,26	8,53	12,8	17,06	21,32	42,65
	3 $[m]$	9,6	19,2	28,8	38,4	48	96
	4 $[m]$	17	34,12	51,2	68,25	85,3	**170,61**
	5 $[m]$	26,65	53,31	80	106,63	**133,3**	**266,6**
	6 $[m]$	38,4	76,8	115,17	**153,55**	**191,95**	**383,9**

Table 3. Display of results of calculated stresses

strength is not met; it is necessary to place another support in the middle of the span of the beam. Choosing a larger (stronger) profile is not a solution, because according to the project task, the requirement is that the main girder be made of only one type of aluminum profile. The introduction of the third support gives a statically indeterminate system, which will be discussed in the next section.

5.2 Calculation of the main girder of the load-bearing structure, statically indeterminate system – proof of strength

In the previous section, it was seen that in some cases another support is needed in order for the strength of the main girder to be satisfied, i.e., for the operating stresses to be within the permissible limits.

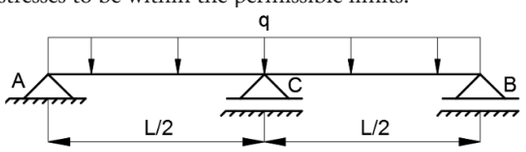


Figure 5. Model of the main girder with three supports

When writing equilibrium equations, it can be seen that this is a system that gives: 4 unknown support reactions - 3 equilibrium equations = single statically indeterminate system[5]. According to the theory of Material Resistance, the reaction of the added support (middle support) is declared to be statically excessive. In order for this system of equations to be solvable, it is necessary to introduce a fourth (supplementary) equation, which represents the geometric condition of deformation, in which it is said that the reaction of the (added) support is equal to zero, i.e.:

$$Y_C = 0 \qquad (6)$$

Based on the theory of Material Resistance, a statically indeterminate system is solved by the principle of superposition given by the following equation:

$$Y_C = Y_C{}^q + Y_C{}^{Y_C} = 0 \qquad (7)$$

A tabular presentation of the obtained results of calculated stresses is given. The Table 4 shows calculated stresses which were greater than the permissible ones when the calculation was done for the structure with two supports and the Table 5 shows calculated stresses which now satisfy the condition when the third support was introduced.

Stress $\sigma_u\ [MPa]$		Mass of material per meter		
		40 $[kg]$	50 $[kg]$	100 $[kg]$
Conveyor length	4 $[m]$	/	/	**170,61**
	5 $[m]$	/	**133,3**	**266,6**
	6 $[m]$	**153,55**	**191,95**	**383,9**

Table 4. Display of results of calculated stresses which were greater than the permissible ones for the structure with two supports

Stress $\sigma_u\ [MPa]$		Mass of material per meter		
		40 $[kg]$	50 $[kg]$	100 $[kg]$
Conveyor length	4 $[m]$	/	/	**42,66**
	5 $[m]$	/	**33,32**	**66,65**
	6 $[m]$	**38,4**	**48**	**96**

Table 5. Display of results of calculated stresses which satisfy the condition when the third support was introduced

5.3 Calculation of the stiffening transverse structure

Stiffening is modeled as a simple beam on two supports, which is loaded with a continuous load q, as in Section5.1.

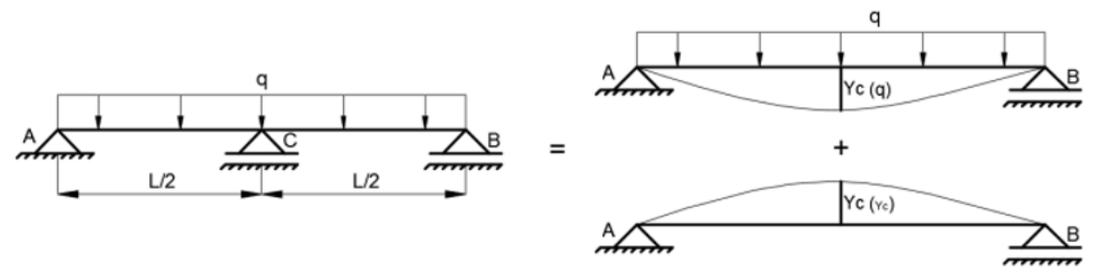


Figure 6. Superposition principle

Figure 7. Load-bearing structure with stiffening

The Fig. 7 shows that there is one transverse stiffening on the conveyor that forms two fields. It is assumed that this stiffening takes over half of the load, and that a quarter of the total load is transferred to the remaining two fields. As the stiffening of the cross section is complex, it is necessary to find the moment of inertia of that cross section, as well as its center of gravity in order to be able to determine the calculated stresses that act in the cross section.

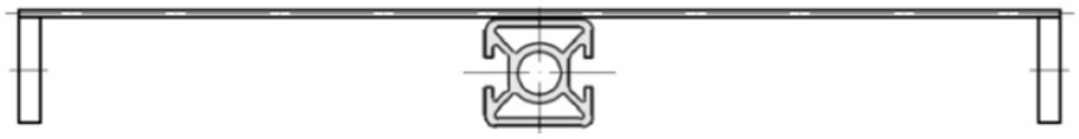


Figure 8. The cross section of the striffening transverse structure

The obtained results are given in the Tab. 6.

Stress σ_u [MPa]		Mass of material per meter					
		10 [kg]	20 [kg]	30 [kg]	40 [kg]	50 [kg]	100 [kg]
Conveyor length	1 [m]	0,28	0,561	0,841	1,122	1,402	2,805
	2 [m]	0,658	1,316	1,975	2,633	3,292	6,584
	3 [m]	1,036	2,072	3,108	4,145	5,181	10,362
	4 [m]	1,414	2,828	4,242	5,656	7,070	14,141
	5 [m]	1,792	3,584	5,376	7,168	8,960	17,920
	6 [m]	2,169	4,339	6,509	8,679	10,849	21,698

Table 6. Display of results of calculated stresses

6. Calculation of the drive shaft

In order to ensure proper operation and to prevent damage to the shaft and unwanted accidents during belt conveyor operation, it is necessary to perform a calculation of the drive shaft. The calculation is performed for the most difficult working conditions, which goes to the safety side of the shaft, i.e., it is assumed that the load that causes bending of the shaft is distributed with 40-60%. This load distribution can occur as a consequence of lateral movement of the belt due to unevenly distributed load on the belt or inhomogeneity of the conveyor belt itself. The calculation of the shaft is performed for the case when the bending moment (M) and the twisting moment (T) are known, which in this case originates from the electric drive motor. The table gives the recommendation of the material for making the shaft, the diameter of the shaft is calculated to be d=25\ mm.

Shaft material		Mass of material per meter					
		10 [kg]	20 [kg]	30 [kg]	40 [kg]	50 [kg]	100 [kg]
Conveyor length	1 [m]	CF53	CF53	CF53	CF53	CF53	CF53
	2 [m]	CF53	CF53	CF53	CF53	CF53	CF53
	3 [m]	CF53	CF53	CF53	CF53	CF53	34CrNiMo6
	4 [m]	CF53	CF53	CF53	CF53	CF53	34CrNiMo6
	5 [m]	CF53	CF53	CF53	CF53	34CrNiMo6	34CrNiMo6
	6 [m]	CF53	CF53	CF53	34CrNiMo6	34CrNiMo6	34CrNiMo6

Table 7. Recommendation of materials for shafts

7. Conclusion

Belt conveyors are continuous transport devices that have been used to transport different types of materials for decades. When designing them, we strive to increase the service life in terms of proper sizing of its parts and proper selection of standard components (bearings, bolts, etc.), reducing costs... The paper defines a modern design of a belt conveyor. Quality basis for preparation of technical documentation in compliance with the rules defined by regulations and standards is also formed. Finally, the paper defines the base for selecting proper conveyor elements relative to working conditions and customer demands.

References

1. D. Živanić, I. Džinčić, R. Đokić, A. Zelić, "Characteristics and Designing of the Belt Conveyor Elements", J. Machine Design, 8(4), 137-140 (2016).
2. N. Ilanković, D. Živanić, "Analysis of influential parameters of measurement accuracy with the belt feeder", J. Publications of the School of Engineering Scienecs, 1897-1900 ISSN 0350-428X (2018)
3. D. Živanić, Continuous and automated transport – script, University of Novi Sad, Faculty of Technical Sciences, Novi Sad, R. Serbia (2019).
4. Z. Petković, D. Ostrić: Metal constructions in machine design 1, University of Belgrade, Faculty of Mechanical Engineering, Belgrade, R. Serbia(1996).
5. D. Živanić, J. Vladić, R. Đokić, "Software development For Calculating and Simulation of Belt Conveyors", 5. International Symposium about forming and design in mechanical engineering KOD, 213-216 (2008)

COVID-19, Home Office, digital learning. Security?

Dr. Vid Honfi
college professor
Milton Friedman University
Department of Methodology and Informatics

Dr. Zsolt Illési
college assosiate professor
Milton Friedman University
Department of Methodology and Informatics

Abstract

In the spring of 2020, the term COVID-19 became widespread worldwide. It has become the most important thing to reduce the virus's effects, whether at an individual or societal level. As a result of the spread of the new virus, entirely new forms of behaviour became commonplace, bringing radical changes in all areas of life. As a result of working from home, digital education has become commonplace. In this article, we examine the extent to which working from home and digital learning has become safer, and how to protect against hazards in a similar situation.

Keywords:
COVID, home office, security

1. Introduction

The company managers' primary consideration is to keep or increase work efficiency when considering introducing or retaining the home office's work. Also, the information security of confidential data handled in work is essential, but this was often not given enough attention during the pandemic's first wave. (1). Ignoring such security considerations is always a significant risk for a given company. Under the austerity measures introduced worldwide due to COVID-19, the number and type of cyber-attacks that exploit it has skyrocketed, as evidenced by numerous international surveys.
Member countries' number of phishing attacks and malware increased significantly in the first quarter of 2020 (Fig. 1).
Ransomware targeted aid organizations, medical companies, manufacturing, transportation, educational software, and government institutions in the spring of 2020.

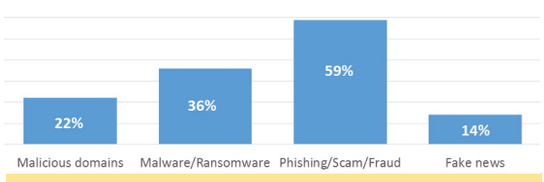


Figure 1: Distribution of the key COVID-19 inflicted cyber threats based on Interpol member countries feedback (2.).

These figures are a severe warning, especially in the light of another survey. According to the IBM Cost of a Data Breach Report 2020 (3.), an IT incident's average detection and response time are 280 days. Still, the detection and response time of an incident caused by a malicious attack is 315 days (Fig. 2).

2. Is working home office secure?

The home office has spread exponentially in almost days. Still, neither the businesses nor the people themselves were prepared for such a significant and rapid change.
The closure due to the coronavirus epidemic quickly forced the everyday use of digital solutions that had been with us for a long time. The company's head decides whether the activity can be done effectively from home online. When approving the work from home, some vital aspect is necessary to make the right decision. These are the following: how to control the work tools, the employees, the efficiency of work, furthermore should be considered the information security risks of working from home should be addressed, as well as rules and conditions governing their management. Based on these, the home office's information security aspects means considering whether confidential, sensitive data that

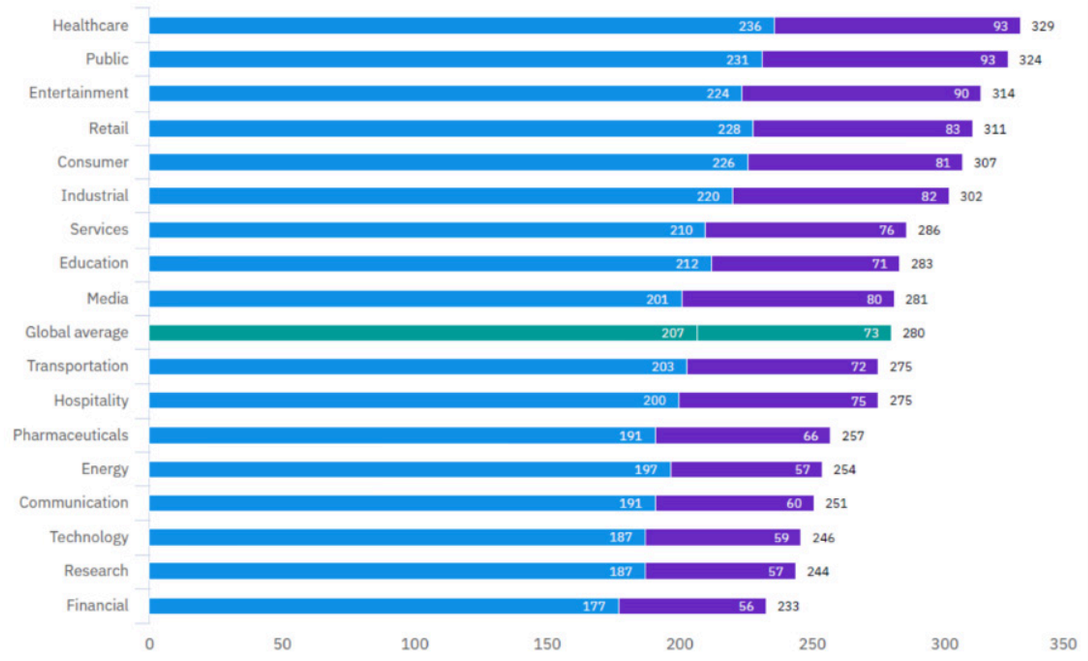


Figure 2: Average time to identefy and contain malware attacks

occurs during work in a corporate office environment can be maintained if the employee operates from home instead of the office environment. A Deloitte Research survey examined whether an employer's cyber and data security measures allow an employee to work efficiently from home. 55% of respondents said clearly yes, 35% said mainly yes, while 8% said they did mostly not, and only 2% said they did definitely not. (4.).
However, according to our survey, which based on 250 respondents, the Hungarian reality is significantly different. The main findings of our survey are the follows:
Nearly 60% of employees surveyed use their computer to work from home.
About a quarter of respondents do not know what security protocol is set up on home network devices.
Nearly 30% of respondents say deficiencies in the home wireless network limit work efficiency.

3. Considerations for increasing security

Home office work security is crucially determined by the IT infrastructure used and the way it is used. The main elements of this:

3.1 The endpoint workstation of an employee, who working from home;
An important question is whether the computer is used by anyone other than the employee, and if so, for what purpose? It is necessary to separate each user's data from each other; the computer's use is ensured with different user accounts. In our opinion, the same awareness and safety rules that characterize the office work environment can never be guaranteed when using a computer commonly with family members.

3.2 Home internet service and its settings;
It is a direct experience that home, wired and wireless networks are congested due to home use; their communication stability is weaker, resulting in more unreliable internet connection and communication. Risks include the security of the Internet connection. The capabilities and vulnerabilities built into the router by the manufacturer, the settings made by the service provider but not necessarily known to the user, and the security of the WiFi protocol used, its settings or possible vulnerabilities.

3.3 The central (server-side) device or application to which you connect online;
The administrator's job is to set up the appropriate secure remote communication if an employee is not connected to the server from the corporate wired network but via a remote Internet connection. Employee login trusted identification, and rights management are configured by the corporate administrator and are thus no different for corporate or home working.
3.4 Internet connection and communication and

its tools
If an employee at home needs to attend a meeting remotely, they need an application that supports proper teamwork. Their minimum standard features are chat, voice and video connection communication, and screen sharing. Support software controls, additional features, and security features may vary by application. The following may pose an information security risk:

- interception of the communication,
- unsolicited participation of unauthorized persons in the meeting,
- unauthorized access to data and information saved by the application,
- unauthorized use of or access to camera recordings,
- the appearance of non-meeting participant persons on the switched-on cameras, etc.

4. Conclusion

To reduce the risks of working from home, we suggest that companies pay more attention to the following:
They should articulate the control of employees 'home assets and address control gaps as an expectation.
Home internet service should always be treated as an unreliable item.
Video discussions and the associated GDPR rethinking are urgently needed.

5. References

1. Zs. Horváth, Information Security Aspects of Home office, MAGYAR MINŐSÉG XXIX. 08-09. th. (2020)
2. INTERPOL Shift in targets from individuals to governments and critical health infrastructure 4th August 2020, https://www.interpol.int/en/News-and-Events/News/2020/INTERPOL-report-shows-alarming-rate-of-cyberattacks-during-COVID-19
3. IBM Security, Cost of a Data Breach Report 2020,
4. Deloitte Research, Cyber crime – the risks of working from home, https://www2.deloitte.com/ch/en/pages/risk/articles/covid-19-cyber-crime-working-from-home.html

Reality vs. Perception – How to measure corruption perception?

Dr. Gabor Réthi
assistant professor
Budapest Business School, College of Finance and Accountancy
Department of Management

Dr. Richard Kása
senior researcher
Budapest Business School, College of Finance and Accountancy
Department of Management

Abstract

In our article, we go over the aspects between the perception of corruption and the assessment of its level, because in common language – and sometimes in the literature – we find incorrect statements regarding the determination of the level of corruption due to the differences between actual and perceived corruption. The following questions arise in this regard: What is corruption? What do we think of it? What factors influence corruption? What are the challenges of investigating the perception of corruption? How do we investigate corruption in research?

Keywords:
corruption, perception, measurement

1. Mi a korrupció? Mit tartunk korrupciónak?

A szakirodalom gyakran különbséget tesz az alacsony jövedelmű országokban és a magasabb jövedelmű országokban tapasztalható korrupció kiváltó okai között. Az alacsony bérszínvonal és a rossz munkakörülmények növelik a korrupció esélyét, míg a nyugati (magasabb jövedelmi szint) társadalmakban a korrupciót inkább tekintik kivételnek, mint megszokásnak (Caiden, 2001).
A hagyományos gazdasági megközelítésekben megismerhető elméletek által leírt hatásai sem mindig értelmezhetők egyértelműen. A korrupciós definíciók tengerében azonban azt a hasonlóságot, közös pontot fedezhetjük fel, hogy mindig valamilyen fajta hatalommal való, egyik fél számára hátrányos visszaélésről beszélnek a kutatók. Mindig is nagy figyelmet szenteltek a kutatók a korrupció meghatározásának. Szinte mindegyik korrupcióval foglalkozó könyv, cikk a fogalom lehatárolásával indítja vizsgálódását. Az egyik leggyakrabban hivatkozott és használt definíciót Huntington (1989) adja meg: „a közhivatalnokok elfogadott normától történő deviáns viselkedése magánérdekeik érvényesítése érdekében." A szerző azt is megállapítja, hogy „a korrupció nyilvánvalóan létezik minden társadalomban, de nyilvánvalóan gyakoribb egyes társadalmakban, mint másoknál, és néha gyakoribbak a fejlődő társadalmakban, mint máskor". A (köz)szervezetekben azt a gyakorlatot tekintjük korrupciónak, amikor a vezetők gazdasági vagy egyéb előnyök elérésére használják pozíciójukat. De Graaf (2007) hívja fel a figyelmet arra, hogy e szerint a definíció szerint a korrupció egy társadalmi konstrukció: korrupt az, amit korruptnak tekintünk adott helyen és időben. Ezen állítását azzal támasztja alá, hogy az ún. „elfogadott normák" időről-időre változnak. A korrupció kérdésére nem mindig lehet egyértelmű választ adni. Adott helyen és időben a normák nem mindenki által ugyanabban az értelemben használtak, elfogadottak. (Gondoljunk csak bele, hogy egyeseket „kevésbé" korruptnak tekintünk, másokat korruptabbaknak. De felvetődik ekkor a kérdés, hogy a korrupció megítélésében mekkora szerepet játszik a korrupciós tevékenységben megjelenő számszerűsíthető, „forintosítható" összeg.)
Ami azonban minden esetben közös pontként megjelenik, hogy a korrupciót rossznak tekintjük: mindig a megfelelőnek tartott morális viselkedéstől eltérő, deviáns magatartásként jelentkezik. Az azonban, hogy milyen struktúrájú megközelítések segítségével próbáljuk meg jellemezni ezt a társadalmi jelenséget, nagy változatosságot mutat. A korrupció elleni harc igen nehéz, mivel egy olyan komplex jelenségről beszélünk, ami mind horizontálisan, mind vertikálisan átszövi a társadalom rendszerét.
Ahhoz, hogy megértsük a korrupció jelenségét, fontos

tisztában lennünk azzal is, hogy mit, milyen tevékenységeket tekintünk korrupciónak. Ezzel kapcsolatban az egyik legszélesebb körben használt korrupciós „tevékenység lista" az ENSZ korrupcióellenes egyezményében található. Eszerint az alábbiakat tekintjük korrupciónak (ENSZ, 2008):

- Országos szervek hivatalos személyeinek megvesztegetése (15. cikk)
- Külföldi hivatalos személyek és nemzetközi közjogi szervezetek tisztviselőinek megvesztegetése (16. cikk)
- Vagyontárgy hivatalos személy általi elsikkasztása, jogtalan elsajátítása vagy egyéb eltulajdonítása (17. cikk)
- Befolyással üzérkedés (18. cikk)
- Hivatali visszaélés (19. cikk)
- Jogellenes meggazdagodás (20. cikk)
- Megvesztegetés a magánszektorban (21. cikk)
- Vagyontárgy elsikkasztása a magánszektorban (22. cikk)
- Bűncselekményből származó jövedelmek tisztára mosása (23. cikk)
- Elrejtés (24. cikk)
- Az igazságszolgáltatás akadályozása (25. cikk)

2. Milyen elmei vannak a korrupciónak?

Szántó és Tóth (2008) a korrupciót diadikus tranzakciók alapelemeiből indultak ki a korrupció megértésének vizsgálatakor. Ebben ez értelmezésben a korrupciót sajátos cserefolyamatként értelmezik, melynek az alábbi elemei határozhatók meg:

- Korrumpáló (a korrupciós ajánlat kezdeményezője)
- Korrumpált (a korrupciós ajánlat elfogadója)
- Megvesztegetési díj (amit a korrumpáló felajánl)
- Előny (amit a korrumpált elfogad, nyer)

A szereplők sokfélék lehetnek ezekben a helyzetekben: egyének, csoportok, intézmények. Az említett cserefolyamat ezen szereplők közötti kapcsolatokban az egyes szereplőtípusok kombinációiként alakulnak.
A megvesztegetési díj és előny lehet: anyagi és nem anyagi.

3. A korrupció mérésének fő megközelítései

A korrupció mérése nagy kihívást jelent. Mivel a korrupció bűncselekmény, pontos adatok gyűjtése legalább annyira kihívást jelent, mint bármely más bűncselekményről szóló bizonyíték gyűjtése. Az illegális magatartás rejtve van, és az áldozatok nem mindig hajlandók vagy nem képesek bejelenteni a hatóságoknak a korrupciós eseményt. Ennek több oka lehet, úgy, mint a megtorlástól való félelem, a bevált gyakorlattal szembeni ellenállástól való vonakodás, vagy mert valamilyen mértékben felelősséget éreznek a résztvevők. A korrupciót tapasztalók kevésbé jelentik a bűncselekményt az illetékes hatóságoknál, mint más bűncselekmények áldozatai.
Amikor a korrupció mérésének kezdetekor a releváns bizonyítékok összegyűjtésének nehézsége elősegítette a közvetett megközelítések alkalmazását, amelyekben a mérés nem az érdeklődésre számot tartó jelenség előfordulásán, hanem más értékelési módszereken alapult.

3.1. A fő közvetett módszerek

Az egyik módszer a szakértői értékelések: ebben a megközelítésben egy kiválasztott szakértői csoportot kérnek fel, hogy adjon értékelést a korrupció tendenciáiról és mintáiról egy adott országban vagy országcsoportban. A szakértői értékelések alapgondolata az, hogy összefoglaló információkat gyűjtsön egy kiválasztott embercsoporttól, akik ismerik a vizsgált témát. A korrupció kapcsán ezeket a módszereket az integritás, a kormányzás és a versenyképesség értékelése keretében alkalmazták.
Az összetett indexek a különféle statisztikai adatok egyetlen mutatóba történő egyesítésének módszerét képviselik. Ezt a megközelítést gyakran használják a többdimenziós fogalmak tömör számszerűsítésére vagy a különböző forrásokból származó adatok összegyűjtésére. Az elmúlt évtizedekben számos összetett indexet javasoltak a korrupcióról és a kapcsolódó kérdésekről. Míg az ilyen indexek elvileg bizonyítékokon alapuló mérőszámokból származhatnak, elsődleges adatforrásként elsősorban szakértői értékeléseket és észlelési felméréseket használtak. A korrupció kapcsán az összetett mutatók tartalmazzák a proxy mutatókat is (pl. Igazságszolgáltatási függetlenség, sajtószabadság, adminisztratív terhek stb.), Amelyek inkább kockázatértékelést nyújtanak, mint a jelenség tényleges szintjének mérőszámát.

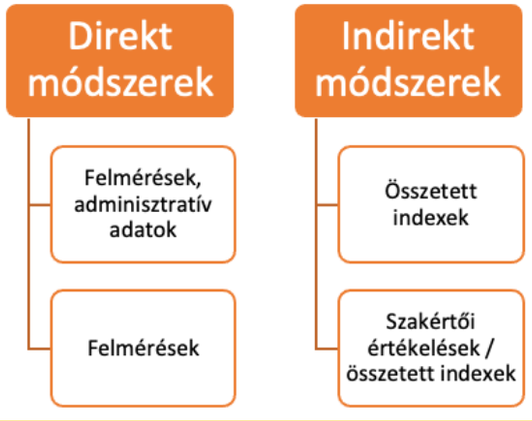
Előnyök és hátrányok

Az elmúlt két évtizedben számos közvetett korrupciós értékelést végeztek (ideértve a Transparency International korrupció-észlelési indexét, a Világbank kormányzati mutatóinak korrupció-ellenőrzési mutatóját és a globális integritás-indexet a Globális integritás). Az ilyen értékelések eredménye gyakran a média, a politikai döntéshozók és a nagyközönség jelentős figyelmét keltette fel. Hasznos eszközök voltak a korrupció elleni küzdelem előmozdítására és a kérdés nemzetközi ismertségének növelésére.

A közvetett módszereken alapuló értékeléseknek azonban vannak érvényességük és relevanciájuk szempontjából fontos gyengeségeik. Az összetett mutatók szakértői értékeléseinek és metrikáinak felépítése szubjektív feltételezések sorozatán alapul, mint például a változók vagy források kiválasztása és a heterogén adatok kombinálásához használt algoritmus meghatározása. Ezenkívül a közvetett módszerek nem használhatók a szakpolitikák kialakításához szükséges lebontott adatok vagy a korrupcióról szóló részletes információk előállítására.

3.2. A korrupció észlelésének vagy a korrupció tapasztalatának mutatói

A korrupció mérésének másik fontos megkülönböztetése az, hogy a módszerek a korrupció észlelésének vagy a korrupció tapasztalatának mutatóin alapulnak-e.
Az észlelésen alapuló mutatók szubjektív véleményeken és a korrupció szintjének felfogásán alapulnak az állampolgárok, az üzleti képviselők, a köztisztviselők vagy az adott ország egyéb érdekelt felei között, beleértve a kiválasztott szakértői csoportokat is.
A tapasztalaton alapuló mutatók megpróbálják felmérni a korrupció tényleges személyes tapasztalatait. A tapasztalatokon alapuló mérési eszközök megkérdezik az állampolgárokat vagy a vállalkozásokat, hogy vesztegetést fizettek-e, vagy egyéb korrupciót tapasztaltak-e.
Bár lényeges az adott kérdés közéleti megértése szempontjából, fontos megjegyezni, hogy a korrupcióval



1. ábra: A korrupció mérésének fő megközelítései

kapcsolatos közvéleményt nem szabad a korrupció tényleges szintjének mutatójaként használni. Az adott témával kapcsolatos egyéni véleményeket különböző tényezők befolyásolják, és nem feltételezhető, hogy a korrupció észlelése elsősorban a korrupció tapasztalatain alapul.

A korrupció mérésére szolgáló mintafelmérések használatának előnyei és hátrányai

Előnyök közé sorolható:

- Objektív bizonyítékok és módszertan alapján
- A korrupt magatartás részleteinek elérhetősége (például érintett állami tisztviselő; mikor, hogyan)
- Adjon meg politikával kapcsolatos és cselekvésre alkalmas információkat
- Az adminisztratív statisztikák hiányos jelentésének problémáinak leküzdése
- Az adatok összehasonlíthatósága
- Bontott adatok a különböző népességcsoportokról
- Mikrodata elérhetősége

Hátrányai:

- A nem nyilvánosságra hozatal hatása, amely azt jelenti, hogy egyes szereplő nem hajlandó beismerni a társadalmilag nem kívánatos és illegális magatartást
- Lehetséges jelentési elfogultság
- A költségével kapcsolatos fenntarthatósági kérdések

4. Milyen tényezők befolyásolják a korrupciót?

A korrupció komplexitása miatt, annak vizsgálata előtt, célszerű megvizsgálni azon tényezőket, melyek befolyással lehetnek a korrupciós szint alakulására. Az ebben a témában született tanulmányok estében látható, hogy mind gazdasági, mind egyéb puha tényezőket azonosítanak a kutatók. A vizsgálatok jó része elméleti jellegű, és kevés a nagyobb időhorizontot átfogó tanulmányok száma is.
A korrupció tárgyalása kapcsán fontos kiemelni Treisman munkásságát, akinek 2000-ben publikált tanulmányát alapvető, megkerülhetetlen kiindulópontnak tekintik a kutatók. A korrupció mérésekor igen nehéz empirikus kutatást végezni. Minden rendelkezésre álló adat érzékelési index, melyeket magánvállalatok és nemzetközi szervezetek gyűjtöttek elemzők és átlagemberek körében történt felmérés alapján. Azonban ezek az értékek korántsem tekinthetőek objektívnek. Továbbá, ezen indexek is torzított információval szolgálhatnak, hiszen a korrupciós érzékelési indexek elsősorban a külföldi befektetők számára nyújtanak kockázatértékelési információt. A korrupció vizsgálata során használt változók csoportját tekintve, megállapítható, hogy a korrupciós szint meghatározásához a következő indexeket, mutatószámokat alkalmazzák a tanulmányok: CPI, BI, WCR, ICRG, GRAFT, és WB. Ezek közül a BI (Business International), az ICRG (International Country Risk Guide), a WB (World Bank Index), és a WCR (World Competitiveness Report) olyan egyszerű korrupció észlelési indexek, melyek forrása az egyének

	Treisman (2000)	Ades és Di Tella (1999)	La Porta et al. (1999)	Fisman és Gatti (2002)	Adserà, Boix és Payne (2003)	Brunetti és Weder (2003)	Persson, Tabellini és Trebbi (2003)
Korrupciós index	CPI, BI	WCR, BI	ICRG	ICRG, WCR, CPI	GRAFT	ICRG, WB, CPI	CPI
Gazdasági fejlettség	-*	-*	-*	-*	-*	-	-*
Oktatás		-					-**
Politikai jogok	-	+			-*	+	-
Piacszabályozás	+						
Természeti erőforrás	+	+					
Gazdasági nyitottság	-	-*		-		-*	-*
Protestáns vallás	-*		-		+		-*
Etnikai-nyelvi osztottság	+		+	+		+	-
Brit jogrendszer	-*		-*		-		
Brit gyarmati örökség	-*						
Folyamatos demokrácia	-*						
Információszabadság						-*	
Újságforgalom					-*		
Decentralizáció (föderalizmus)	+*			-*	+		
Többségi rendszer					-		-*
Politikai instabilitás	+				+*		+

1. táblázat: A korrupciót meghatározó főbb tényezőket leíró tanulmányok

körében felvett adatokból származik, amelyek érvényessége elmarad az összetettebb korrupciós indexekétől: CPI és GRAFT (Kaufmann, Kraay, & Zoido-Lobatón, 1999b).

A CPI a már említett Transparency International által használt index. A Passaui Egyetemen dolgozták ki a mutatót 1995-ben (Lambsdorff, 1995; 1998a; 1998b), mely az adott ország állami szektorában érzékelt korruptság mértéke alapján rangsorolja az országokat. Összetett mutató, a „felmérések felmérése", mely különböző független és elismert intézetek által készített szakértői és üzleti felmérések korrupcióval kapcsolatos adataira épít. A CPI az egész világról származó nézeteket tükröz vissza, beleértve olyan szakértők véleményét, akik az értékelt országokban élnek. Ahhoz, hogy egy ország/terület a rangsorban szerepeljen, minimum három CPI-forrás felmérésében kell szerepelnie. Azonban az indexben való szereplés nem a korrupció létének a bizonyítéka, hanem sokkal inkább az információk hozzáférhetőségétől függ. Az eredeti skála 0-tól 10-ig terjed; minél nagyobb értéket kap egy adott ország, annál kevésbé tekinthető korruptnak. Emiatt gyakori, hogy egyes tanulmányok, elemzések az eredmények inverzét használja.

A GRAFT Kaufmann és munkatársai (1999a; 1999b) által kidolgozott korrupciós index. Az index 11 különböző forrásból származó egyéni korrupciós tényezőkből származó aggregátum. Az eredeti skálán -2,5 és 2,5 közötti értékeket vehet fel az index; minél nagyobb az érték, annál magasabb a korrupciós szint.

Az alábbiakban az ismertebb korrupcióval kapcsolatos tanulmányok által említett befolyásoló tényezőket láthatjuk.

Az 1. táblázatban látható, hogy az említett tanulmányok a gazdasági fejlettség és a korrupció között negatív kapcsolatot állapítanak meg. E mellett egyes tanulmányok más gazdasági magyarázó változókat is bevonnak – legtöbbször a GDP/fő adatokat használják erre a célra. A többi magyarázó változó szerzőről-szerzőre változik attól függően, hogy milyen változókat tartanak fontosnak a korrupcióval kapcsolatban. Sőt, az is előfordul, hogy ugyanaz a változó más szignifikanciával, illetve más irányú hatással szerepel különböző tanulmányokban. Ez a kutatások eltérő beállításai miatt fordulhatnak elő.

Ez látható, amikor La Porta, Lopez-de-Silanes, Shleifer és Vishny (1997; 1999) egy adott ország jogrendszerét, illetve a vallási hovatartozást korrupciós tényezőként azonosítja, míg Adserà, Boix és Payne (2003) tanulmányában ugyanezen változók veszítenek statisztikai szignifikanciájukból, és inkább azt emelik ki, hogy a napi sajtó diffúziója demokratikus kontextusban hogyan képes jelentősen csökkenteni a korrupciót. Brunetti és Weder (2003) is negatív kapcsolatot talál a korrupciós szint és az állampolgárok informáltsága között (információszabadság).

Ades és Di Tella (1999) a gazdasági nyitottságot, mint a relatíve alacsony korrupciós szint észlelésének egyik elsődleges tényezőjeként kezeli. Leite és Weidmann (1999) is hasonló következtetésre jut, illetve pozitív kapcsolatot talált egy ország természeti erőforrásokkal való ellátottsága és a korrupció között. Treisman (2000) ugyanennek a tényezőnek a törékenységéről ír.

A kormány szerepének (decentralizáció) megítélése is egy hasonlóan megosztó kérdéskör. Fisman és Gatti (2002) negatív korrelációt talált a korrupcióval való kapcsolatában (a fiskális decentralizáció alacsonyabb korrupcióhoz vezet), míg Treisman (2000) is hasonló kapcsolatot fedezett fel. Persson, Tabellini és Trebbi (2003) az választási szabályokat tartották fontos tényezőnek, mellyel azt vizsgálták, hogyan befolyásolják a ezen szabályok a korrupciós szintet. Adserà, Boix és Payne (2003) azonban nem találta statisztikailag szignifikánsnak ezt a változót.

Treisman (2000; 2007) munkái a legkimerítőbbek a többi említett tanulmánnyal összevetve, ugyanis ő igyekszik a lehető legtöbb magyarázó változót bevonni és azokkal vizsgálni a korrupció természetét.

5. Összegzés

Jól látható, hogy a korrupció jelenségének vizsgálata több aspektust érint. Értelmezésekor pedig még inkább ingoványos talajra tévedünk. A korrupció észlelésével foglalkozó kutatások esetében számolnunk kell azzal, hogy azok mindig „terhesek" lesznek a válaszadó, értelmező szubjektivitásától. Fontos mindkét oldal megemlítése, hiszen nemcsak a vizsgálati alanyok, de a kutató személye is torzíthatja az interpretációt.

A téma érzékenységéből adódóan az őszinteség is megkérdőjelezhető a fentebb említettek okok miatt. A társadalmi normáknak való megfelelés fontos aspektusa az őszinteség kérdésének, ugyanakkor nemzetközi összehasonlításkor érdemes szem előtt tartani, hogy a társadalmi normák rendszere kultúráról kultúrára változik.

A kutatások további jelentős kihívása a „befolyásoltság" kiszűrése. A válaszadók nemcsak a vélt vagy valós társadalmi normáknak való megfelelés miatt ódzkodhatnak az őszinte válaszadástól, hanem más referenciacsoport képviselőinek, esetleg hatalmi, függelmi viszonyban lévő személynek való megfelelés is kialakíthatja ezt a kényszert.

Végül, de nem utolsó sorban, az egyik legnagyobb kihívást az jelenti, hogy a vizsgált jelenségnek kivétel nélkül negatív a megítélése, így vizsgálata is nehézkes.

6. Irodalomjegyzék

1. La Porta, R., Lopez-de-Silanes, F., Schleifer, A., & Vishny, R. (1997). Trust in Large Organizations. The American Economic Review, Papers and Proceedings, 87(2), 333-338.
2. La Porta, R., Lopez-de-Silanes, F., Schleifer, A., & Vishny, R. (1999). The Quality of Government. The Journal of Law, Economics and Organization, 15(1), 222-279.
3. Caiden, G. E. (2001). Dealing with Administrative Corruption. In T. L. Cooper (Szerk.), Handbook of Administrative Ethics (old.: 429-455). New York: Marcel Dekker.
4. Lambsdorff, J. G. (1995). Korruption im Außenhandel. Wirtschaftsdienst — Zeitschrift für Wirtschaftspoli, 75(6), 320-326.
5. Lambsdorff, J. G. (1998a). Korruption im Ländervergleich. In M. Pieth, & P. Eigen (szerk.), Korruption im internationalen Geschäftsverkehr. Bestandsaufnahme, Bekämpfung, Prävention (old.: 169-197). Basel, Frankfurt am Main: Luchterhand.
6. Lambsdorff, J. G. (1998b). Corruption in comparative perception. In A. K. Jain (Szerk.), Economics of Corruption (old.: 81-109). Massachusetts: Kluwer Academic Publishers.
7. Sampford, C. J., Shacklock, A., Connors, C., & Galtung, F. (szerk.). (2006). Measuring Corruption. Hampshire: Ashgate Publishing Ltd.
8. De Graaf, G. (2007). Causes of Corruption: Towards a Contextual Theory of Corruption. PAQ, Spring, 39-86.
9. Leite, C., & Weidmann, J. (1999). Does Mother Nature Corrupt? Natural Resources, Corruption, and Economic Growth. International Monetary Fubd Workin Paper, 99(85).
10. Sequeira, S. (2012. február). Advances in Measuring Corruption in the Field. Letöltés dátuma: 2013. január 11, forrás: Sandra Sequeira, London School of Economics személyes oldala: http://personal.lse.ac.uk/sequeira/Chapter_Corruption_Sequeira_February.pdf
11. Treisman, D. (2000). The causes of corruption: a cross-national study. Journal of Public Economics, 76, 399-457.
12. Treisman, D. (2007). What Have We Learned About the Causes of Corruption from Last Ten Years of Cross-National Empirical Research? Annual Review Political Science, 10, 211-244.
13. Szántó, Z., & Tóth, I. J. (2008). Üzleti korrupció Magyarországon – többféle nézipontból. Budapest: Transparency International.

14. Adserà, A., Boix, C., & Payne, M. (2003). Are You Being Served? Political Accountability and Quality of Government. The Journal of Law, Economics, and Organization, 19(2), 445-490.
15. Ades, A., & Di Tella, R. (1997). The New Economics of Corruption: a Survey and Some New Results. Political Studies, 45(3), 496-515.
16. Ades, A., & Di Tella, R. (1999). Rents, Competition, and Corruption. The American Economic Review, 89(4), 982-993.
17. Brunetti, A., & Weder, B. (2003). A free press is bad news for corruption. Journal of Public Economics, 87(7-8), 1801–1824.
18. ENSZ. (2008). Az Egyesült Nemzetek Szervezete Korrupció Elleni Egyezménye.
19. Fisman, R., & Gatti, R. (2002). Decentralization and corruption: evidence across countries. Journal of Public Economics, 83(3), 325–345.
20. Hall, T., & Yago, G. (2000). Estimating the Cost of Opacity Using Sovereign Bond Spreads. Policy Brief. California: Milken Institute.
21. Huntington, S. P. (1989). Modernization and Corruption. In A. Heidenheimer, & V. Levine (szerk.), Political Corruption: A Handbook (old.: 377-388). New Brunswick: Transaction Publishers.
22. Johnston, M. (2001). Measuring corruption: numbers versus knowledge versus understanding. In A. K. Jain (Szerk.), The Political Economy of Corruption (old.: 157-179). London: Routledge.
23. Kaufmann, D. (1998). Research on corruption: critical empirical issues. In A. K. Jain (Szerk.), Economics of Corruption (old.: 129-176). Massachusetts: Kluwer Academic Publishers.
24. Kaufmann, D., Kraay, A., & Zoido-Lobatón, P. (1999a). Aggregating Governance Indicators. World Bank Policy Research Working Paper 2195.
25. Kaufmann, D., Kraay, A., & Zoido-Lobatón, P. (1999b). Governance Matters. World Bank Policy Research Working Paper 2196.
26. Mauro, P. (1995). Corruption and Growth. The Quarterly Journal of Economics, 110(3), 681-712.
27. Persson, T., Tabellini, G., & Trebbi, F. (2003). Electoral Rules and Corruption. Journal of the European Economic Association, 1(4), 958-989.

Optimization of the logistics process in warehouse based on the Analytics Hierarchy Process

Vasileva, A.
Ss. Cyril and Methodius University in Skopje,
Faculty of Mechanical Engineering- Skopje,
Skopje, North Macedonia

Jakimovska, K.
Ss. Cyril and Methodius University in Skopje,
Faculty of Mechanical Engineering- Skopje,
Skopje, North Macedonia

Abstract

Optimization is an important aspect of lowering costs, removing and relieving repetitive movements that result in time-saving of the logistics processes. The way to retrieve optimization solutions therefore depends on creativity, information, but first on mathematical methods. The question is how could the logistics processes be optimized in the warehouse? This study is a brief overview of the general criteria for optimization, selecting the most suitable alternative. The positive side of the Analytics Hierarchy Process is that parameters that are not related can be compared and still be evaluated with the same values. In addition, in order to recognize the importance of the main aspects of actions for optimizing processes in the warehouse, a brief overview is given the significance of some impact issues, which should be approached from the health and workers' safety perspective.

Keywords:
Analytics Hierarchy Process (AHP), logistics, optimization, warehouse

1. Introduction

Almost every sphere of warehousing is affected by logistics processes. The final price is significantly affected by all areas of warehouse logistics. Getting the right goods and opportunities or management sizes that could be used to increase efficiency. Two ways in which one can act are rationalization of the time needed for logistics processes and rational use of mechanization and warehouse materials. In our country, choosing smart technology is a tough task and a big risk. In that direction, information on primary logistics processes in warehouses is provided in the first part of this paper. The second section gives us alternatives for optimizing warehouse logistics processes. In our situation, the third part gives us the answer to which process needs to be optimized. The results of the AHP method will be analyzed and discussed in the last part of the research paper.

2. Optimization of the primary warehouse processes

Trends in material handling are currently moving in the direction of automatic saving and energy saving. First of all, trolleys are increasingly replacing automatic trolleys with a driver. Technological challenges for any warehouse are autonomous or ‚self-driving' vehic-

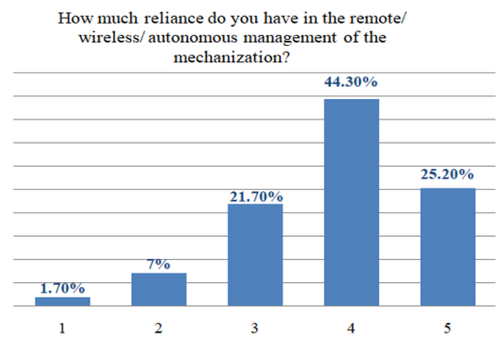


Figure 1. Survey- Reliance in remote autonomous mechanization management

les. The main question is how workers will respond to autonomous vehicle adaptation, knowledge, and development. IoT knowledge, pressure and restrictive regulations motivated many users not to invest in autonomous mechanization [1]. The answerers are divided by our online survey on the question of how much reliance you have on remote/wireless/autonomous mechanization management (see Fig.1). Expensive investments are one further factor that discourages the implementation of autonomous mechanization.
The warehousing strategy aims to reduce the cost of transport and providing customer services [2]. Reorganization or increasing the efficiency of logistics processes by reducing cross-docks and minimizing double handling is another way of optimization [3]. Cross docks are the first sign of an inefficient flow of products and the wrong optimization strategy [4]. Genetic algorithms are used to bypass the cross docks in some situations [5]. On the other hand, there are a lot of advantages in the lean implementation, such as waste elimination, worker satisfaction and low errors, but working in lean implementation areas can sometimes be boning for some employees after such a time and can result in ineffective further stagnation.

3. Solution method- AHP analysis

Four primary processes in warehouse logistics will be compared, by using AHP analysis [6]. We will compare scores from 1 to 5 (scores are randomly placed) so that we can compare and demonstrate how specifically we can determine in any case which logistics process is most necessary to optimize. In our situation, it is important to determine when (in which processes) it is most necessary to perform, regardless of which type of optimization will be chosen [7].
According to the results we have got (see Fig. 2), it is noted that, in our situation, putting away the optimization has the greatest influence (59%). Storage optimization is the second largest by influence (25%), picking optimization is in third place by influence (11%) and receiving (5%).

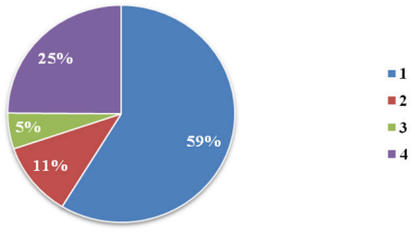


Figure 2. Weight factors (W)

4. Conclusion

In our case, with our values in the decision matrix, according to the AHP analysis, it can be said that the greatest attention should be paid to putting away optimization. The way this process is optimized depends on the teams of the employees, the strategy of the company, and, of course, the funds available. This analysis could be used to recognize which logistics process in the appropriate case, needs to be optimized. In addition, research and analytical development contribute to practical application and simplification. The required analysis enables rounding, i.e. finding a practical and simple conversion approach.

5. References

1. J. Karasek, " An Overview of Warehouse Optimization", International Journal of Advances in Telecommunications Electrotechnics Signals and Systems 2 (3) 111-117 (2013) [doi:10.11601/ijates.v2i3.61]
2. B.A., Vidro, Warehouse logistics and internal distribution optimization, Instituto Superior Técnico– Universidade Técnica de Lisboa, Portugal (2011).
3. N. Faber, M. B. M. de Koster, and A. Smidts, "Organizing warehouse
4. management," Int. J. Oper. Prod. Manag., vol. 33, no. 9, pp. 1230–1256,
5. 2013
6. N. Faber et al., "Organizing warehouse management" Int. J. Oper. Prod. Manag. 33 (9) 1230-1256 (2013).
7. T. Giuffrè et. al. "Automated Vehicles: a Review of Road Safety Implications as a Driver of Change", 2 27th CARSP Conference, Toronto (2017).
8. R. de Koster, et al. "Design and control of warehouse order picking: A literature review," Eur. J. Oper. Res. 182 (2), 481- 501 (2007).
9. T.L. Saaty, The Analytics Hierarchy Process, McGraw- Hill, New York (1980).
10. R., Sarraf et al., Integration and Comparison of Multi- Criteria Decision Making Methods in Safe Routr Planner, Elsevier Ltd (2020).

Sustainability analysis of the largest companies in the Hungarian fashion industry

Dorina Körtvési
PhD Scholar
Doctoral School of Entrepreneurship and Business
Budapest Business School University of Applied Sciences

Dr. Krisztina Szegedi, PhD
Associate Professor
Department of International Commerce and Logistics
Budapest Business School University of Applied Sciences

Abstract

The past recent years, fashion industry has been under spotlight due to its significant impact in terms of negative environmental and social consequences. The literature of investigating Hungarian CSR, business ethics and sustainability in fashion industry is limited, we intend to provide a comprehensive picture with a snapshot about the Hungarian market, analysing the 15 largest fashion brands' actions and initiatives through a content analysis gaining data only from the information available on their Hungarian official website. Our results show that the chosen large companies are committed to sustainability at different levels, applying CSR and business ethics practices, acknowledging the importance of environmental and social concerns of fashion industry, integrating the principle of several Sustainable Development Goals, their activities in Hungarian language are slight and generally, the local stakeholders are not involved into this process.

Keywords:
corporate social responsibility, sustainability, business ethics, fashion industry

1. Introduction

Nowadays, the fashion industry has more and more economic concept approach. At the same time, it has a cultural, self-expressive, symbolic role, but it is important to see that fashion items and products appear on the market as products of the economic sector (Jacometti, 2019).
It is crucial to distinguish the textile, apparel or fashion and clothing industry. The first one includes every subtype of textiles, from the fibres to the final product, while clothing industry produces only clothe items designed to wear or cover a human body. The focus this research strongly relates to the apparel or fashion industry, that consist of a wide-range pieces of clothes, but also accessories, footwear bags, etc. (Johnson, et al., 2009).
Expressing the volume of the fashion industry in numbers, the worth of global retail apparel market is estimated as a 1.4 trillion USD global industry, accounting for the 2% of the world GDP, providing job opportunity for approximately 3 million people (STATISTA, 2020). While large companies dominate the international market, the European Union is an outstanding example where fashion industry remains a SMEs based industry. It plays a diverse role in the European Union, employing 3 million people. The import volume at a European level was approximately 177 billion EUR in 2019 (STATISTA, 2020). The Hungarian market is characterised by consumers buying clothing items from fast fashion brands, it means it is mostly inexpensive clothing produced rapidly and the presence of large or multinational companies is stronger than the SME sector.
By facing serious social and environmental challenges, the COVID - 19 virus, erupting in 2020, further aggravated the apparel sector situation by economically hitting the industry. Although the fashion sector might face with a more sustainable future despite the financial crisis and drop it experiences, by putting the emphasize on the need of restructuring the supply chain, integrate new innovative solutions, strengthening partnership and online sales, sharing best practices (UNIDO, 2020).

2. The complexity of the business ethics, CSR and sustainability in the fashion industry

2.1 Business ethics in the fashion industry

Business ethics (also known as corporate ethics) is a form of applied ethics embracing ethical principles, behaviour, and actions arising in the business society significantly from the 1970s (Abend, 2016). (Kolb R. , 2008:432) describes business ethics as the "written and unwritten codes of principles, determined by the corporation's values and culture that govern decisions and actions within the company".

Due to the continuously increasing emphasise of self-regulation and legally binding requirements and restrictions, having a code of ethics referring to a written document, become more and more popular in the corporate sector, summarizing all ethical principles, values and rules for the internal and external partners as well to set out behavioural standards. In the fashion industry, human rights issues, lack of equal opportunities, fair and ethical working conditions, enforced child labour are only some of those global issues that seek solutions from the companies (Fernandez & Chamacho, 2015). As the second largest industrial pollutant, ethical expectations for the fashion industry are becoming increasingly significant (European Commission, 2019).

2.2 CSR and fashion industry

CSR traces back to the late 20th century originated from the USA and dozens of definitions (Dahlsrud, 2006) attempts to describe the responsibility that businesses are being expected to carry out by the society. One of the most acknowledged experts of CSR is (Carroll, 2016) distinguishes four dimensions in his firstly launched book in 1979. However, the four main pillars remain the core of modern CSR, the corporate sector aspects might have changed substantially with newly appeared issues due to the constantly renewing context of the companies, new stakeholders, different national legislation (Pérez & Rodriguez-del-Bosque, 2013) and globalization: ethical responsibility, environmental responsibility, philanthropic responsibility, and economic responsibility.

The drivers of implementing CSR for fashion brands mostly relate to the distinctive characteristics of the industry, offering a broad variety of products on a market that experiences constantly low prices, while companies suffering from the pressure of competition. Both qualitative and quantitative researches analyse the CSR role on the apparel industry, however their number is low. The fashion industry is oftentimes attacked by its unethical supply chains, enormous demand of global transportation, raw material exploitation, chemical usage, and also associated with poor labour standards, violated human rights, hidden production procedures, weak waste management and many other facts (Hjort & Bagheri, 2006). The costumers' pressure extorted deliberate reaction from brands. Under the increasing pressure, many brands adopted CSR practices to restructure their supply chains. Although, CSR communication became popular, (Morgan & Birtwistle, 2009) the underlying systems or documentations only in few cases can be generalised as regular practice.

Summarizing the main characteristics if fashion industry, according to (Turker & Altuntas, 2014), (Caniato, et al., 2012) and (Urbanita, et al., 2017):

- Apparel industry items are integral part of production and consumption, furthermore, are elements of consumer identity and social relationship networking
- It is a resource-, and labour-intensive industry, characterized by outsourced production and cheap labour work especially affecting developing countries
- Compared to other high-risk industrial sectors, the political restriction targeting the fashion are restrained. Repelling overconsumption or promoting sustainability mostly depends on the companies' commitment and not necessarily controlled or revised by local governments.

In the case of fashion industry, CSR might be interpreted as an umbrella concept, covering a wide spectrum of challenges that occur as social and environmental issues, marketing concerns, management, and organisational obstacles (Thorisdottir & Johannsdottir, 2020).

2.3 Sustainable Development and SDGs

SD was developed for the first time in Bruntland report in 1987 (United Nations, 1987). Specifically, sustainable development is a way of organizing society so that it can exist in the long term. This means taking into account both the imperatives present and those of the future, such as the preservation of the environment and natural resources or social and economic equity. SD might be interpreted in the corporate sector a triple bottom line (TBL) concept, meaning, companies ought to commit themselves to focusing as much on social and environmental concerns as they do on profits.

In 2015, all United Nations member states created the broadest initiative, reconstituting the Millenium Development Goals and replacing it by Sustainable Development Goals for a better future for all by 2030 within the framework of 2030 Agenda (UN, 2017). The 17

Figure 1. The Sustainable Development Goals launched by the United Nations in 2015
Source: (United Nations, 2015)

goals are broadly covering all the economic, social and environmental challenges and issues raised by the globalisation that need to be addressed the next one and half decade (UNDP, 2019).

The business society have specific tools, such as their resources, technologies, researches and knowledge to achieve sustainable development improvements to specify their CSR and business profile creating a holistic framework for global SDGs (Cordova & Celone, 2019).

3. Research aim, and methodology

The aim of the research is to gain a comprehensive picture and understand the CSR, business ethics and sustainability commitments of the 15 largest Hungarian fashion brands by revenue in 2019 through their Hungarian website analysis. Although we suggest that these companies having influential reputation at an international stage, practice and integrate efforts in terms of all the three areas, we aim to investigate if they intend to involve the local market players due to proper communication. The main focus is an analysis for a market snapshot that could provide a basis for further sustainability, CSR and business ethics analysis. To make an order by revenue among the companies, the research is based on OPTEN and Céginfó database.

The study intends to find answers to the following research questions:

1. Does the topic of sustainability, corporate social responsibility and business ethics appear in the operation of large fashion companies in Hungary?
2. Are there any interconnections to the United Nations Sustainable Development Goals regarding their sustainability, corporate social responsibility and business ethics contents?
3. What kind of concrete initiatives or actions they launch?

The sample includes the 15 largest Hungarian fashion clothing and footwear trading companies by revenue in 2019. Most of the companies have German origin (Deichmann, New Yorker, Orsay, Peek&Cloppenburg, Takko), three Hungarian companies (Playersroom, Háda, Sportdirect), two Polish brands (CCC, Reserved), one French (Decathlon), one Spanish (ZARA), one Swedish (H&M), one Austrian (Hervis) and a half German half Belgian (C&A). Regarding their main activities, 9 companies have retail trade services of clothing profile, 2 brands are footwear and leather retails, 1 is other retail sale in non-specialised store, 1 is retail sale of textiles, 1 is retail sale of second-hand goods, and 1 is retail sale of sporting equipment.

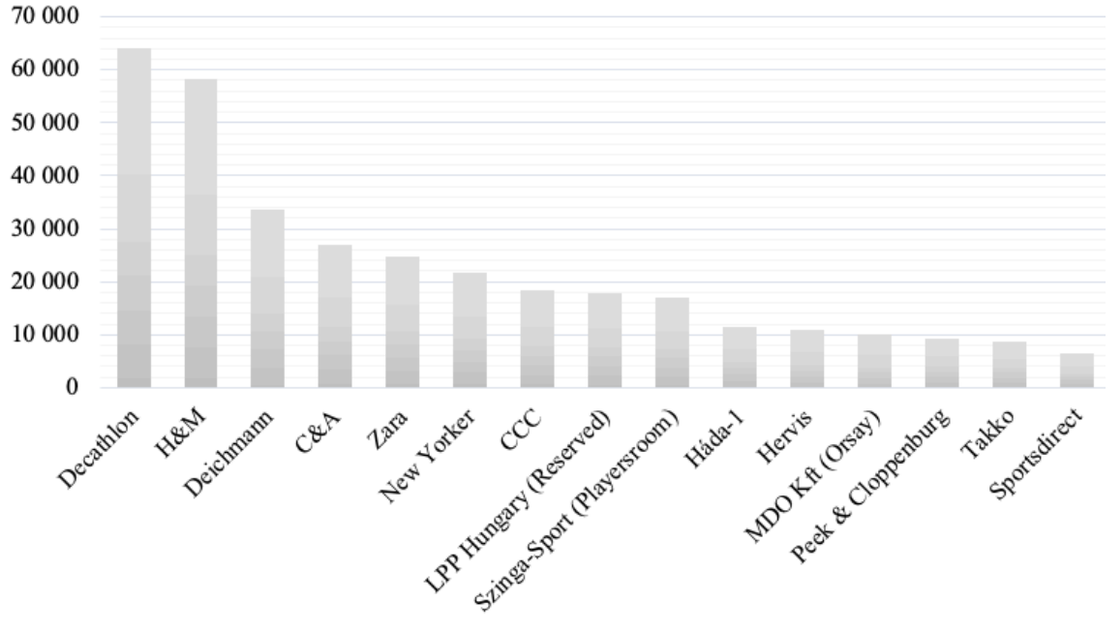


Table 1. 15 largest fashion companies by revenue in Hungary, 2019
Source: Compiled by the authors based on Céginfó and Opten database, 2019

As research methodology, the study employs content analysis, a suitable method to systematically gather and analyse large amount to document and information, especially from the corporate sector, focusing on sustainability information. Applying conceptual analysis when the concept of the documents is similar and based on it, a further explanations and conclusions can be presented as research result (Vourvachis & Woodward, 2015).

The data collection through content analysis was based on the official Hungarian website of those 15 companies, and their annual reports. The reason of the specific narrowing down is to analyse the quantity and the quality of information available for the Hungarian market stakeholders.

The research takes into account that companies use diverse names for their reports, such as CSR report, corporate social responsibility report, sustainability report, code of ethics, citizenship report, etc. therefore the paper gathered all the documents and written materials targeting to manage and channel communication about their environmental or social sustainability practices. Altogether in case of 5 out of 15 companies we found relating content in Hungarian language, while all the selected large companies have materials available in other language.

4. Research results

The analysation of the found contents was coded and conjugated by the Sustainable Development Goals provided framework. According to the analysed content, no concrete SDG-related actions or initiatives were mentioned, although a sustainability and responsibility consciousness is observable, which in a wider sense can be connected to SDGs.

The most integrated SDG in case of the 15 fashion industry brands is the responsible consumption and production (SDG12), which is about to abolish the boundary between the economic and environmental interests of the business sphere and harmonize their activities by reversing the current consumption and production trends. It is followed by the SDG13 creates a framework for climate action with specialized numeric goals to achieve. SDG17 as partnership for the goals, acknowledging the importance of cooperation and outlining the no one left behind core-principal of the overall SDG program. 3 out of the 15 companies have related content to SDG8, promoting decent work and economic growth but also involves the opportunity of technological improvements, which is probably mean the restructuring of the labour market and eradicate inequalities.

Regarding the research results, the analysis compared it to the Dow Jones Sustainability Assessment – the most significant SD assessment system – report. In generally, industrial sectors are putting their focus on good health and well-being, quality education and sustainable cities and communities. As it is visible in the table above, the fashion industry has a completely different approach, focusing on responsible consumption and production,

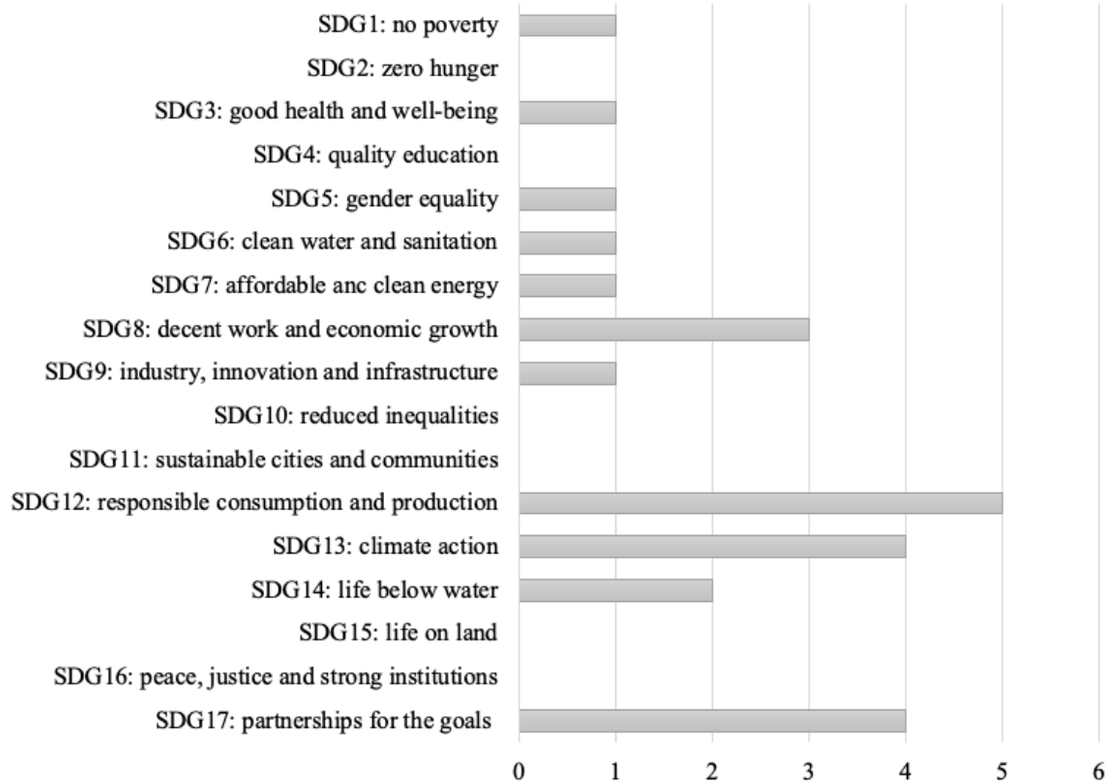


Table 2. SDGs focus in the 15 largest fashion companies in Hungary, 2020
Source: Compiled by the authors

climate action and partnership for the goals (Jus, 2017). The Table 3. illustrate the number of concrete actions and initiatives promoted by the brands, also available in Hungarian language. Some international brands, like Deichmann, H&M, C&A, Orsay and Peek&Cloppenburg pay attention to inform the Hungarian stakeholders, while Hungarian companies, such as Háda, Playersroom and Sportdirect do not have any CSR or sustainability related achievements.

Linking the companies' practice-oriented actions to the Table 2. SDGs. The main tool with brands intend to achieve conscious consumption by providing eco-friendly models to consumers. Reserved conduct approximately 1300 internal audit in their factories to guarantee the environmental protection through the compliance with binding rules by applying recycled polyester. Orsay produces label-marked fashion products informing the costumers that the company constantly improve the production chain therefore they access sustainably acceptable clothe items and make easier to make conscious choices. SDG13 motivates companies for new transportation alternatives (Deichmann takes advantage by delivering their products on ships and trains), introduce innovative packaging and wrapping systems (Reserved) or reorient the raw material selection (Orsay). SDG17 covers a wide range of partnership network of companies, whether they are locally or internationally acknowledged. The Orsay, for example, is a member of Partnership for Sustainability Textiles multi-stakeholder initiative to build up a sustainably functioning water consumption system, furthermore Orsay already reacted to the COVID-19 by signing the International Labour Organization Action Call. The C&A joined the Better Cotton Initiative and contributed to the Organic Cotton Accelerator contract to support the production and usage of bio cotton. C&A performs outstanding among the chosen companies in term of SDG8 promoting decent work and economic growth. The supply chain involves more than 1 million employees and almost 800 suppliers. The key focus areas of the brand are ensuring appropriate working conditions and safety.

5. Conclusion

As an individual, one can never be convinced that a cloth item with green label is better than one without.

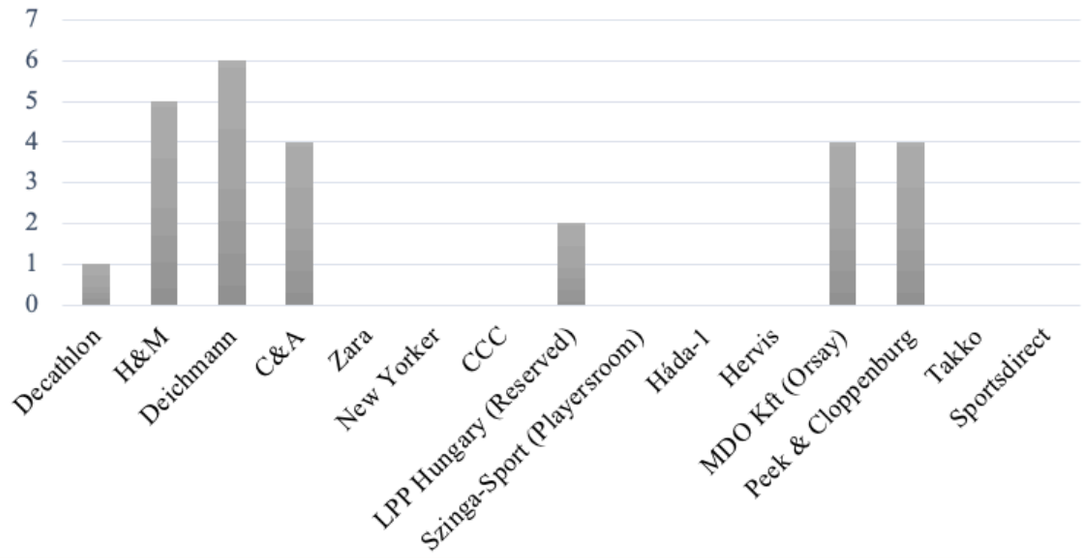


Table 3. The numbers of SDGs related concrete actions/initiatives in the 15 largest fashion companies in Hungary, 2020
Source: Compiled by the authors

However, the sold pieces produced in a (more) sustainable way send a message to the retailer.

The study analyses the current conditions of best practices and shared information, knowledge in terms of CSR and business ethics communication. Regarding the first research questions, these companies are internationally committed in terms of corporate social responsibility and business ethics, however local stakeholders are not involved. Communication with the Hungarian market and consumers is incomplete or partial. Answering the second research question, there is no concrete interconnection with the UN Sustainable Development Goals, companies rather focus on sustainably running businesses and pollution reduction than on CSR activities, less attempts invested in tackling social issues, such as human right challenges. Compared to other industries, the fashion industry lags far behind regarding institutionalization in terms of CSR, business ethics or sustainable development. Furthermore, results show a clear shift resulting that companies mostly specialize their report system to sustainable development by making it part of a responsive CSR approach. As the third question of the research analysed, wide-range initiatives and actions can be found in their practices, targeting different and complex social and environmental issues to be solved.

The limitation of the study comes from is nature, examining the 15 brands' sample and how they carry out their communication relating to sustainability based on their CSR and business ethics practices available in Hungarian language. Therefore, future analysations would be worthful as far as general awareness, responsibility and market players' expectations are expected to increase as initiatives in the fashion industry. Another research direction would be the small- and medium sized companies, where – based on preliminary researches – the emphasise is more significantly in innovative solutions, new raw materials, and the importance of circular economy is stronger.

Disclosure

The authors declare there is no conflict of interest. The research was conducted with the purpose to present its results on the LIM Conference 2020 on 25th September.

6. References

1. Abend, G., "How to Tell the History of Business Ethics." Zeitschrift für Wirtschafts-und Sozialwissenschaften, 17(1), pp. 42-76. (2016) [doi: 10.5771/1439-880X-2016-1-42]
2. Caniato, F., Caridi, M., Crippa, L. & Moretto, A., "Environmental sustainability in fashion supply chains: An exploratory case based research." International Journal of Production Ecnomics, 135(2), pp. 659-670. (2012) [doi: https://doi.org/10.1016/j.ijpe.2011.06.001]
3. Carroll, A. B., "Carroll's pyramid of CSR: taking another look." Journal of Corporate Social Responsbility , 1(3), pp. 2-8. (2016) [doi: 10.1186/s40991-016-0004-6]
4. Cordova, M. & Celone, A., "SDGs and Innovation in the Business Context Literature Review." Sustainability, 11(24), p. 7043. (2019) [doi: https://doi.org/10.3390/su11247043]
5. Dahlsrud, A., "How Corporate Social Responsibility is Defined: an Analysis of 37 Definitions." Corporate Social Responsibility and Environmental Management, 15(1), pp. 1-13. (2006) [doi: https://doi.org/10.1002/csr.132]
6. European Commission, "Support Report Mapping Sustainable Fashion Opportunities for SMEs", Luxembourg: European Commission. (2019)
7. Fernandez, J. & Chamacho, J., "Effective Elements to Establish an Ethical Infrastructure: An Exploratory Study of SMEs in the Madrid Region." Journal of Business Ethics, 138(1), pp. 113-131. (2015) [doi: 10.1007/s10551-015-2607-3]
8. Hjort, P. & Bagheri, A., 2006. Navigating towards sustainable development: A system dynamics approach. Futures, 38(1), pp. 74-92. [https://doi.org/10.1016/j.futures.2005.04.005]
9. Jacometti, V., Circular Economy and Waste in the Fashion Industry. Laws, 8(4), pp. 27-40. (2019) [doi: 10.3390/laws8040027]
10. Johnson, B., Nagasawa, R. & Peters, K., Clothing Style Differences: Their Effect on the Impression of Sociability. Journal of Family and Consumer Sciences, 6(1), pp. 58-63. (2009) [doi: 10.1177/1077727X7700600107]
11. Jus, M., 2017. DJSI Push Companies to Achieve the SDGs. [Online] Available at: https://www.indexologyblog.com/2017/09/21/djsi-push-companies-to-achieve-the-sdgs/ [Accessed 17 08 2020].
12. 1Kolb, R. W., Encyclopedia of Business Ethics and Society. 1st Edition ed. London: SAGE Publications. (2008) pp. 739
13. Morgan, L. & Birtwistle, G., "An investigation of young fashion consumers' disposal habits." International Journal of Consumer Studies, 33(2), pp. 190-198. (2009) [doi: 10.1111/j.1470-6431.2009.00756.x]
14. Patrao Neves, M., "Ethics, as a philosophical discipline." In: H. t. Have, ed. Encyclopedia of Global Bioethics. New York: Springer, pp. 1-17. (2016)
15. Pérez, A. & Rodríguez-del-Bosque, I., "Measuring CSR Image: Three Studies to Develop and to Validate a Reliable Measurement Tool", Journal of Business Ethics, 118(2), pp. 3-44. (2013) [doi: 10.1007/s10551-012-1588-8]
16. STATISTA, 2019. STATISTA. [Online] Available at: https://www.statista.com/statistics/417725/eu-european-union-textile-clothing-industry-employment-by-segment/
17. STATISTA, 2020. STATISTA. [Online] Available at: https://www.statista.com/outlook/244/100/fashion/worldwide[Accessed 12 08 2020].
18. STATISTA, 2020. Value of the apparel market in Europe 2017-2022, [Online] Available at: https://www.statista.com/statistics/678243/apparel-market-value-in-europe/ [Accessed 20 08 2020]
19. Thorisdottir, T. & Johannsdottir, L., 2020. Corporate Social Responsibility Influencing Sustainability within the Fashion Industry. A Systematic Review. Sustainability, Volume 12, pp. 1-64. [doi: 10.3390/su12219167]
20. Turker, D. & Altuntas, C., 2014. Sustainable supply chain management in the fashion industry: An analysis of corporate reports. European Management Journal, 32(5), pp. 837-849. [doi: 10.1016/j.emj.2014.02.001]
21. UN, 2017. Sustainable Development Goals Knowledge Platform. [Online] Available at: https://sustainabledevelopment.un.org/post2015/transformingourworld [Accessed 25 01 2020].
22. UNDP, 2019. United Nations Development Programme. [Online] Available at: https://www.undp.org/content/undp/en/home/sustainable-development-goals.html [Accessed 24 01 2020].
23. UNIDO, 2020. Will COVID-19 accelerate the transition to a sustainable fashion industry?. [Online] Available at: https://www.unido.org/stories/will-covid-19-accelerate-transition-sustainable-fashion-industry [Accessed 20 08 2020].
24. United Nations, 1987. Report of the World Commission on Environment and Development , New York: United Nations.
25. United Nations, 2015. United Nations Sustainable Development Goals. [Online] Available at: https://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/ [Accessed 11 09 2020].
26. Urbanita, A., Chiaroni, D. & Chiesa, V., 2017. Towards a new taxonomy of circular economy business models. Journal of Clener Production, Volume 168, pp. 487-498. [doi: 10.1016/j.emj.2014.02.001]
27. Vourvachis, P. & Woodward, T., 2015. Content analysis in social and environmental reporting research: trends and challenges. Journal of Applied Accounting Research, 16(2), pp. 166-195. [doi: https://doi.org/10.1108/JAAR-04-2013-0027]