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Developing new business models from a controller perspective

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The Fourth Industrial Revolution and its effects, the pandemic and the new market trends that are emerging as a result, pose significant challenges for companies. Flexibility is no longer enough, adapting to digitalization, developing a new business model using an integrated work environment and self-service business intelligence are needed. The controller plays a key role in this process, as a business partner is actively involved in building the models. The controller has several new or refocused tools at their disposal, such as multidimensional decision-making procedures, digital reports, scenario analysis, specialized KPIs, and more. This study reviews how these tools can help shape a new business model, and how this digitalization can help.

JEL codes: D24, D81, M10, O10

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1. Introduction

Industrial revolutions have strongly transformed the world economy (among other things). With the 4th Industrial Revolution, we have entered an era of ubiquitous technology, digitization, personalized mass production and social media; the classic large steel producing companies have been replaced by high-tech transnational corporations. The process and technology of traditional manufacturing is undergoing a major change, with new business models emerging. These are due to trends such as urbanization, individualization, digitalisation and demographic change. As in the case of previous industrial revolutions, the standard of the industrialization process of the 4th Industrial Revolution is dominated by technical, technological innovations and the already mentioned giant companies (Bartodziej 2017).

With the completion of the 4th Industrial Revolution, Industry 4.0 has high expectations and challenges for businesses, which COVID-19 has even added to. The ongoing pandemic has caused a crisis that everyone has experienced, and certainly its effects. In addition to the many worries and negative effects, a positive one can also accelerate the spread of Industry 4.0 techniques and technologies. This new coronavirus, SARS-CoV-2 , is not just an economic problem, as it destroys human lives and has social implications to this day. Its effects and consequences are still unpredictable today, but it has certainly had a significant shock effect at all levels of the economy and society, including the lives of businesses.

In managing these effects and consequences in the business, the controller is one of the key figures, whose task is to identify and evaluate business changes and trends. It is safe to say that the role of controlling has increased again. There are plenty of planning and analysis methods that a controller needs to know and apply, a good few of which have come to the fore again. In this study, I review the characteristics of new business models emerging because of digitalization and the planning and analysis tools that can be used well in this period.

2. Features of Industry 4.0

Industrial revolutions always change the structure and composition of the economy, affecting everyday life as well. Today, after the appearance of the loom, the golden age of heavy industry, through the heyday of the oil industry, we have entered a period of technology and social media that is almost interwoven and dominant (Koloszár–Németh 2020). In Industry 4.0 processes, the production processes are optimized and digitized (e.g. production, logistics, quality management, maintenance, etc.) all real time can be tracked. Industry 4.0 is also called megatrends, with the goal of creating intelligent, networked factories (value-creating chains) that enable more efficient, yet personalized manufacturing. The digitization of the operation of machines allows their operation to adapt dynamically and automatically to ever-changing orders and conditions.

At the heart of the system is the ability of production and the machines to recognize themselves the events and change their operation accordingly. Thus, the main features of the new industrial revolution are horizontal integration and end-to-end integration of manufacturing throughout the value chain, as well as the development of vertical integration and networked manufacturing systems. Plants, products and machines communicate with each other via software, so that the processes – at least – partially regulate themselves (Szóka 2018a). Today's market trends and tendencies pose significant challenges for companies. Renewal of technology can bring the expected results by transforming and coordinating structure and processes, but this is a company-wide process which, therefore, has a high-risk challenge (Koloszár 2013). Corporate processes are changing in the global economy that is accelerating from year to year, which means that our dependency on globality is becoming more and more solid. As a result, effective company management is receiving more attention (Pankotay 2017). Moreover, flexibility alone is no longer enough today, intelligent and "learning factories" need to be built. Adapting to digitalization, using an integrated work environment and self-service business intelligence, a new business model needs to be developed (Szóka 2019).

3. Controlling today

The development of controlling and controlling systems took a long time, first the operational procedures and methods, then the strategic controlling system were developed. One of its characteristics is that it is constantly changing, but it can be said that it has a methodology based on a standard approach and well-defined tools (managerial accounting, investment valuation, planning tools, reports, etc.) (Zéman et al. 2014).

We now encounter controlling functions and controller roles in every company. The controller's work has its own unique approach and functionality, as well as a toolbox. The task of controlling is to provide the management with analysis and advice, so they can keep the economic aspects in mind maximally while making decisions (Kovács 2017, Fenyves 2019). According to the joint 'Basic Principle' of Internationaler Controller Verein and the International Group of Controlling, controlling is a decision support management activity in the field of goals and expected impacts, with planning, calculation and control subsystems. According to Deyhle,

quoted by them, controlling is a set of goal-oriented management activities, a continuous cooperation between controller and company manager, applied calculation methods and other soft factors (Internationaler Controller Verein, International Group of Controlling 2012). The basic philosophy of controlling is to lead the company towards (increasingly) successful operation through its activity. The way Deyhle put it, only a business where management proactively designates the path it wants to follow will be successful, and if that does not work that way, we will just react to events (Deyhle 2005).

Since 2010, the higher level of the controller role is the business partner. This means that the controller is an accepted partner of managers who participates in management and decision-making processes and is expected to behave proactively. Not only do they support decision-making and take responsibility for achieving the set goals, but they also have decision-making power. The tasks of the controller as a partner is not only to perform the calculations, explain and communicate the differences, but also to support the launch of the actions and monitor their implementation (Fenyves–Tarnóczi 2019).

Digitization is not only a change in competition rules; it can also be an opportunity to take off. To do this, we must first recognize that we need to reap the benefits of digitalisation through innovation such as open innovation, shorter decision paths, lean (start-up) thinking, etc. In performance measurement, traditional KPIs are generally not applicable in the digital business model, so an appropriate measurement system needs to be developed (see below). We need to think about which processes work well and which do not. We need to know which processes can be digitized in the first round, and what we will only be involved in later.

We need to know what resources and conditions are needed to achieve the goal we want to achieve, and how much they cost. Training and retaining a skilled workforce is no longer an issue today, "new hiring is retention", as the saying goes. Digitization, the digital switchover requires a skilled workforce and IT skills.

The next level of controlling reports is Forecasting 4.0, which uses predictive analysis methods and advanced statistical algorithms to produce highly automated forecasts using statistical algorithms that analyze large amounts of data. Forecasting 4.0 takes into account not only company internal data, but also external and poorly structured data and expert reports, as they contain additional information (e.g. detailed market traffic data, weather forecasts, accurate regional statistics, social media data, etc.). This is realized in the interaction of human vs. machine, in addition to statistical forecasting, it also leaves room for expert intervention. During forecasting, machine forecasts and trends can be distinguished, and expert – that is, human – corrections that may override this. By using this, the compulsion to act increases within the company, it can react more actively to market effects, we get proactive analyses instead of analytical-reactive ones, and due to the high automation the preparation, time is reduced to a minimal level (Gulyás 2017).

4. Emergence of new business models

Digitization has brought great changes. In smart factories, intelligent manufacturing systems and processes are interconnected, and communication is the key to their operation. An important change is the decentralization of processes, the flexibility of production and continuous improvement. Digital processes only work if the processes are clearly defined. To do this, detailed process models need to be developed.

An end-to-end approach is emerging, the fulfillment of customer requirements (such as an order) must be monitored throughout the company, and automatic execution must be ensured. Process measurements and reports become automated, as all the necessary data is available. The risk is much lower, and there is no change management, as robots and computers execute instructions accurately and do not need to be convinced of the correctness of this change, so there is less chance of error (Bergsmann–Brenner 2018). Digitization will also affect organizations and working methods, departments and divisions will be eliminated, there will only be roles, jobs, teams and projects. This process will bring about a complete transformation of our economic life, the ever closer interconnection of information technology and automation, resulting in a radical transformation of production methods. With machine-to-machine technology (M2M), machines can also control more complex processes based on the ability to communicate with each other without human intervention (Cseh–Varga 2020). These effects can and need to be countervailed by the initiation of new types of revenue tariffs. These new taxes will not oppress living labour but will either mean newer consumption-traffic taxes or charge the process of automatization. In this way, the dignity of human workforce can be raised by it being free from its tax (Varga–Cseh 2019).

Industry 4.0 means a high degree of product and process variability, which increases the complexity of continuous cost control. Therefore, operational production control, and thus ongoing cost control, becomes even more relevant. The biggest challenge is collecting and verifying cost information at place of value creation, and summarizing and analyzing it into customer-specific modules. Due to the characteristics of the new model, the direction of production management and the method of cost control will change. Instead of the cost of a single piece and the cost of the manufacturing process, it is also necessary to consider how networking the different modules contributes to adding value to the customer.

Instead of one-dimensional decision-making procedures (e.g. optimal capacity utilization for fixed costs), multi-dimensional decision-making procedures are used. The baseline situation and variables are unclear and difficult to quantify, so no clear decision can be made, customer behavior and market reactions must be taken into account. Thus, the same manufacturing processes sometimes show different production costs, because of which the cost structures of digital business models differ significantly from the cost of classic business models. Economic viability (profitability) depends less on the cost side of goods and services (production costs) and the price available on the market (margin), but more on the scalability of the evolving business model (intensity, duration) and business model (Szóka 2018b). It is not easy when multivariate functions need to be incorporated into planning and control models due to customer (or customer group) specific price-selling functions. Dynamic pricing changes goal calculation, and increasing individualization modifies this process. The benefits of Big Data are

immediately apparent in classic quality issues, with sensors (see RFID technology) helping to identify unusual manufacturing conditions at an early stage, thereby predicting potential production downtime, quality defects or other problems (Oehler et al. 2016).

For many companies, this new business model is very different from the old one, as people today buy a service rather than a product. People do not want to own it, just use it for a short time while it is needed, so they do not want to pay for it anymore because they no longer use that device or service. They do not buy a car, they just rent and travel with it, or they do not buy a music album, they just stream music. Of course, this also affects the companies that produce and sell them, which also changes the structure and processing of the data.

If we want immediate and accurate reports, the focus shifts from plan-to-fact comparisons to plan-forecast discrepancies. This requires the automation and robotization of processes and routine work (Robotic Process Automation, RPA). Once we have the database, we can add a user-friendly and self-service BI tool that allows non-controller users to perform analyzes with relatively little IT knowledge. This enables automation of analyses, reports, and the databased decision-making. In this phase, the role of the controller is finally transformed: from the role of data collector and processor to the role of the business partner as a service provider, i.e. it will truly become a Business partner.

The pandemic also affected organizational culture, including a definitive change in our work habits. The introduction of the home office and 1–2 days of work-attendance per week seems to have been integrated into the life of companies in the end. Fewer offices mean lower costs, which can support the purchase of equipment for working from home, as well as increasing flexibility, which of course entails HR and organizational tasks. Where a professional and trust network operates, the company does not suffer from this kind of change.

5. Applicability of planning tools in a changed business environment

There are currently several trends in connection with forecasts and reporting expectations. One is to change the corporate governance system and the related reporting from reactive to proactive, the other is data integration, and the third is digitization. Proactivity is aided by predictive analysis and the use of statistical methods and models. Using them, we can make well-utilized findings from various data sources, and we can make valuable predictions. Based on characteristics, we categorize the available data and, based on past behaviour, we assume a future behaviour. The more known factors (predictors) we have, the more likely the planned outcome will be.

We have less and less time to produce digital report data, and shorter and shorter management cycles require centralized, real-time information, so one of the challenges is to bring reporting and decision closer together, and for this situation-specific KPIs must be identified (Szóka 2019). As a first step, we determine the KPIs that we want to model (e.g. EBITDA, Cash Flow).

We determine the factors (inputs) that affect this KPI – these will be the drivers. Using a sensitivity analysis, we examine how these factors affect for KPI, but note that several of these factors may change at the same time. We then analyse the risk factors

and their probability of occurrence and impact on the KPI. Both drivers and risk factors are industry and organization specific, there is no general scheme. After simulating the expected value of the KPI, business responses should be given in light of the results obtained, i.e. actions should be formulated to achieve the strategic goal of the company (Gulyás et al. 2020).

Instead of the classic budget planning, it is recommended to use short scenarios, driver-based scenario planning supplemented with risk analysis, advanced forecasting, or zero-based budgeting. The reporting frequency of the most important KPIs should also be increased; the extra time required for this can be solved by reducing the number and length of meetings. (The controller should not sit in online meetings and webinars all day.) We have to think all the way through how we can build the integrated database that is needed for a good forecasting model; where, how and in how long we obtain internal and external data. It is recommended to integrate scenario modelling into the normal performance management process, shorter-term but more frequent forecasts and performance measurements should be made part of everyday life. If necessary, the product and service portfolio and thus our processes must be adapted to the needs of customers in the new era. It is certain that there will be a greater demand for products supported by digitization services (Tobias–Wenning 2020).

The method of scenario analysis has been known for some time, but some aspects of it need to be modified. On the one hand, it should not only be project-like (as before), but we need to build it into performance management processes, and on the other hand, we need to ask for the support of senior management. This will not be easy, as this method will create long-term and qualitative visions that seem too theoretical. A scenario analysis will be good if we focus on the business causes and measures, their effects and causes can be seen in it. We need to create a baseline (realistic scenario) with existing data and forecasts and modify it to get the alternatives. Variables (drivers) can be volume, capacity utilization, sales, variable costs, and so on. To this we match the second level, what investments are running (with what costs, consequences etc.), and which we will stop if necessary. We map the financial impact of each measure, show how it appears in the scenarios, and determine where the threshold is if it is exceeded, intervention is initiated. This scenario modelling offers a competitive advantage to the company, better decisions can be made faster, and the focus will not be on the present but on the future. Using this, the controller is able to play the role of a Business Partner and emphatically participate in management meetings (Kappes–Klehr 2020).

6. Trends and expectations

It was necessary to move from managing in a previously stable business environment to adapting to a hectically changing environment. Experts interviewed at the IFUA conference in November 2020 were divided, some saying the old days were coming back, others saying that nothing will be the old. (85% of voters say the situation will not be resolved by mid-2022.) There is still no consensus whether the pandemic has been a one-off shock effect or a trend reversal.

In my opinion, digitization, virtualization, automation, artificial intelligence have become part of our lives, new buzzwords are digitization, cost rationalization,

review of cost structures, implementation of structural changes, and increasing employee engagement, companies are willing to invest in these. In the scenarios, almost every medium or large company includes extensive digitization, for which, of course, all activities and processes must be examined.

Organisational culture and behaviour are key factors for TQM, Lean M or LSS, and the borders overlap. Pankotay points out that management, employees and operational performance are closely linked to lean culture. Culture, trust and relational capital are now the cornerstones of cross-border work organisation (Pankotay 2020).

Cost rationalization is also important, but cost cutting should not be confused with cost saving. Cost cutting is only possible for a short time, the execution of customer orders at the expected quality level, and its satisfaction after the crisis, when the market returns to such a low cost level, it can no longer be implemented at an appropriate level. Having no maintenance or training for a short time is workable, but it will backfire in the end, efficiency will deteriorate, machines will break down, and so on. It is certain that bottlenecks need to be investigated, even those that do not yet exist but may arise in the event of collusion under certain circumstances, and an appropriate scenario needs to be developed for these situations. Negative margin products, departments, stores, directions must be separated. The (company and product) portfolio clean-up has started, the companies are focusing on the core activity (Horváth & Partners 2020).

7. Conclusions

Industry 4.0 is already a part of our lives, the change and its pace is enormous, development is dynamic everywhere, it is difficult to predict what planning and analysis tools we will use in, say, 1–2 years from now. As the saying goes, only in trouble can we see who our real friend is, we have seen in a crisis why it is so important to have a good controller or a well-functioning controlling system.

The speed of the system, and of course the speed and flexibility of the decision-maker, has now become key, and digitalisation tools can support these. Many new, breakthrough "digitization" techniques have emerged in recent years – it is enough to think about mobile data entry and reporting or Big Data and data mining. There is a consensus in the industry that the opportunities offered by the crisis should be seized and treated as opportunities, and that strategic, long-term developments should be implemented, and the focus should be placed on the right place.

The saying 'Cash is King' has become popular again; a crisis is a crisis, so the daily liquidity position is an important factor everywhere. Several planning and analysis tools that have been known for a long time have reappeared, but they can be used well in the given situation – again, we use and modify them boldly.

References

Bartodziej C. J. (2017): *The Concept Industry 4.0. An Empirical Analysis of Technologies and Applications in Production Logistics.* Gabler Verlag, Germany. DOI 10.1007/978-3-658-16502-4 ISBN 978-3-658-16501-7

Bergsmann, S., Brenner, M. (2018). Prozessmanagement im digitalen Zeitalter. From https://www.horvath-partners.com/de/media-center/artikel/detail/prozessmanagement-im-digitalen-zeitalter/ Accessed: April 15, 2021

Cseh, B. – Varga, J. (2020): Taxation and Humans in the Age of the Fourth Industrial Revolution – Financial and Ethical. *Acta Universitatis Sapientiae European and Regional Studies*, *17*: 103-117. DOI: 10.2478/auseur-2020-0005

Deyhle, A. (2005): *A controller praxisa*. Budapest, IFUA Horváth & Partners Kft.

Fenyves, V. (2019): Controllerekel szembeni munkaerőpiaci elvárások vizsgálata *Controller Info*, 7, 4, 33-40.

Fenyves V. and Tarnóczi T. (2019): Examination of the expectations of controllers on the labour market. *Corporate Ownership and Control*, 17, 1, 60-70.

Gulyás, A. – Budaházi, B. – Szórádi, B. (2020): Driver alapú szcenáriómodellezés. Menedzsment és Controllin Portál. https://www.controllingportal.hu/driver-alapu-szcenariomodellezes/ Accessed: April 19, 2021

Gulyás, A. (2017): Forecasting 4.0: Miért érdemes a jövő előrejelzési módszerét használni? https://www.controllingportal.hu/forecasting-4-0/ Accessed: April 15, 2021

Horváth & Partners (2020): CxO Insights – eMBCF: Shape the New Normal. Top Priorities to emerge stronger from the Corona Pandemic. https://www.horvath-partners.com/de/media-center/studien/cxo-insights-top-priorities-to-emerge-stronger-from-the-corona-pandemic/ Accessed: April 21, 2021

Internationaler Controller Verein, International Group of Controlling. (2012) Alapvetés. https://www.icv-controlling.com/fileadmin/Verein/Verein_Dateien/Grundsatzpapier/Grundsatzpapier_UNGARISCH.pdf Accessed: April 14, 2021

Kagermann, H., Wahlster, W., Helbig, J. (2013): Umsetzungsempfehlungen für das Zukunftsprojekt Industry 4.0. Abschlussbericht des Arbeitskreises Industry 4.0. Deutschlands Zukunft als Produktionsstandort sichern. pp.17.-85. https://www.acatech.de/publikation/umsetzungsempfehlungen-fuer-das-zukunftsprojekt-industrie-4-0-abschlussbericht-des-arbeitskreises-industrie-4-0/ Accessed: April 21, 2021

Kappes, M. – Klehr, D. (2020): Simulation und Szenarien-Modellierung: Controllinginstrument in Krisenzeiten und darüber hinaus.
https://www.haufe.de/controlling/controllerpraxis/simulation-und-szenarioanalyse-als-controllingwerkzeuge_112_518806.html Accessed: April 26, 2021

Koloszár, L. – Németh, N. (2020): The Characteristics of the Fourth Industrial Revolution: Buzzword, Hype or a Radical Change? *E-CONOM* 9(1): 91-104. https://doi.org/10.17836/EC.2020.1.091

Koloszár, L. (2013): *Vállalati információs rendszerek.* Nyugat-magyarországi Egyetem Kiadó, Sopron, http://publicatio.nyme.hu/666

Kovács, B. (2019): A controlling-folyamatok hatékonyságának mérése és növelése. *E-CONOM* 8(1): 27-37. DOI: 10.17836/EC.2019.1.027

Kusper G., Radványi T. (2011): Programozás technika. Digitális Tankönyvtár, Oktatási Hivatal, Felsőoktatási Elemzési Főosztály.

https://www.tankonyvtar.hu/hu/tartalom/tamop425/0038_informatika_Projektlabor/ch01s08.html Accessed: May 10, 2021

Miniszterelnöki Kabinetiroda (2020): A vírusról. https://koronavirus.gov.hu/virusrol Accessed: April 15, 2021

Oehler, K. – Schmidt, W. – Seufert, A. (2016): Moderne Wertorientierung und Big Data. *Controller Magazin Aufgabe 3*. Internationalen Controller Verein, München 99. 62–69. ISSN 1616-0945

Pankotay, F. M. (2017): Vállalati hatékonyságmérés kritikája a közszférában. In: Keresztes G. (Ed.) Tavaszi Szél 2017 tanulmánykötet II. Miskolc Magyarország 2017.03.31.-04.02. Doktoranduszok Országos Szövetsége, 382–396

Pankotay, F. M. (2020): The Large German Companies Effect On The Lean Employment Of Hungarian SME's. In Proceedings of the 35th International Business Information Management Association (IBIMA) Education Excellence and Innovation Management: Vision to Sustain Economic Development during Global Challenge Conference1-2 apr. 2020. Seville Spain Soliman, Khalid S [Editor] (pp. 7496–7503). ISBN: 9780999855141

Szóka, K. (2018a): Controlling elvárások és változások az Ipar 4.0-val összefüggésben. *Controller Info*, 6, 3, 34–37.

Szóka, K. (2018b): The changing controlling - expectations and changes in the context of Industry 4.0. In: Zéman, Z. – Magda, R. (eds.) *Controller Info Studies II*. Budapest, Magyarország: Copy & Consulting Kft., 47–59.

Szóka, K. (2019): Az új üzleti modell kialakításának feladatai a kontroller számára a negyedik ipari forradalom kihívásaihoz igazodva. *Gazdaság és Társadalom,* 2: 45–58. DOI: 10.21637/GT.2018.02.03

Tobias, S. – Wenning, A. (2020): A legjobb pillanat az áttervezésre: CFO-agenda újratöltve. IFUA Horváth & Partners. https://www.horvath-partners.com/fileadmin/horvath-partners.com/assets/05_Media_Center/PDFs/WP-PDFs_fuer_MAT-Download/20200423_Updated_CFO_Agenda_HU.pdf Accessed: May 10, 2021

Varga, J. – Cseh, B. (2019): A negyedik ipari forradalom várható hatásai a felszabaduló emberi munkaerőre. In: LIMES:, II. Rákóczi Ferenc Kárpátaljai Magyar Főiskola (ed.) LIMES: II. Rákóczi Ferenc Kárpátaljai Magyar Főiskola tudományos évkönyve : „50 éves a közgazdasági Nobel-díj" - A számvitel és pénzügy tudományok hatása a gazdasági folyamatok fejlődésére Beregszász, Ukrajna : II. Rákóczi Ferenc Kárpátaljai Magyar Főiskola, 371-380.

Zéman, Z. – Tóth, A. – Miskolczi, T. (2014): Napjaink hazai controlling helyzete és annak felsőoktatási vetületei. *Controller Info* 2, 1, 9-15. ISSN 2063-9309