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CONTENT

MAKE IT MOVE: THE EFFECTIVENESS OF USING MOTION TECHNIQUES IN VISUAL MARKETING TRENDS

Lana Mulier[1]

Motion is omnipresent in our daily consumer lives. We are constantly confronted with dynamically moving stimuli in digital commercials, in-store and outside digital signage, video games, and virtual reality applications. For example, objects, products, brand logos, and slogans in visual advertisements often move toward or away from us, animation is frequently used in online advertising to display products and services in action, and motion picture advertising is increasingly being created for mobile video viewing. It is estimated that by 2022, 80% of all online content will be video.

Thus, the potential of moving images is enormous. Moreover, the power of visuals is now more important than ever, with an increasing number of businesses using visual images as their dominant form of content. As such, for marketers to continually understand how their target audience thinks, it is best to use attractive visual images even though it is becoming increasingly challenging to be noticed in the digital advertising clutter. Interestingly, motion design can increase the chances of standing out from the crowd. Moving content is over ten times more likely to be shared on social media than static images.

While marketers frequently use a variety of motion techniques to display their marketing messages, the rationale for these practices and their effectiveness remains largely underexplored. Previous consumer psychology research mainly focused on the perceptions of stimulus distance rather than stimulus motion. However, motion perception affects decision-making processes and behavior. As such, designing effective motion techniques in visual marketing messages requires a better understanding of consumers' reactions to stimuli in motion.

Therefore, we investigate how consumers cognitively, affectively, and behaviorally react to motion in visual marketing trends, as well as their underlying psychological processes. We outline four empirical studies examining consumer responses to four different motion techniques. The first study, *'Please Don't Go: Consumer Responses to Receding Stimuli'* examines the effects of two motion techniques that are commonly used in visual marketing communications but have received limited academic attention in the advertising context, namely approaching and receding motions. Study 2, '*GIF It to Me: The Effect of GIF Marketing on Sense of Urgency and Impulse Buying'*, and Study 3, '*This Way Up: The Effectiveness of Mobile Vertical Video Marketing'*, investigate two recent and popular visual

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marketing trends using motion techniques whose impact has not yet been empirically investigated, i.e. GIF marketing and mobile vertical video marketing respectively. In the final study, *'Food on the Move: The Impact of Implied Motion in Pictures on Food Perceptions through Anticipated Pleasure of Consumption'*, we look at the use of motion in food pictures as a way to influence consumer responses to healthy food.

The findings from these four studies contribute to research on motion perception, animation, advertising effectiveness, visual marketing, and video marketing. The insights can be used by ad executives, marketers, and policymakers to create more effective digital and dynamic advertising. We conclude with relevant suggestions for future research on the use of motion in visual marketing.

INTERNATIONAL COMPETITIVENESS OF SMEs

Esra Bal Kulahi[2]

Along with technological developments, globalization has turned SMEs into key players in global competition. SMEs comprise about 90% of businesses and more than 50% of employment worldwide (World Bank, 2021). They can expand their overseas business through various market entry strategies such as export and foreign distributorship with low-cost operations. As a result, SMEs have become a significant part of international competition regardless of their disadvantages, which is inherently due to their small size when compared to counterparts such as MNEs.

While SMEs represent a significant part of the global value chain, due to their vulnerable structure they encounter various challenges in the internationalization process against demand shocks, global crises and a lack of resources relevant to company size (Lu and Beamish, 2001; Roy et al., 2016; Rahman et al., 2019; Naradda Gamage et al., 2020). A review of previous literature would reveal that the main challenges to SMEs can be classified according to their specific contexts, which can be called western and non-western challenges. These have distinct causes, meaning that the challenges to the western SMEs are more likely to be related to global competition and digitalization whereas non-western SMEs are challenged by the occurrence of MNEs in the host countries, international standards and certifications, lack of basic infrastructure, lack of government policy, lack of R&D, regional conflicts, and insufficient intangible assets such as brand and reputation (Rahman et al., 2019; Le Thanh et al., 2021).

Recent research has focused on the contexts of emerging and developing economies in terms of the international competitiveness of SMEs. However, there are still major common barriers to the global competitiveness of SMEs in both contexts, such as company size, lack of financing and high innovation costs requiring sustainable macro policies for survival. Studies also show that some considerable company-level responses and strategies could be practised by SMEs to alleviate these constraints and barriers, which include adopting e-commerce and e-marketing practices, benefiting from the technology spillover effects of MNEs for SMEs and adopting a global strategy through collaborations with suppliers and local product developments (Del Giudice, 2019).

To conclude, we will discuss the key concepts of the international competitiveness of SMEs in the shadow of the Covid-19 pandemic, which has seriously influenced SMEs. We will address the SMEs' internationalization process, challenges, opportunities and survival strategies in a highly competitive global environment.

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ARTIFICIAL INTELLIGENCE SOCIAL DESIGN THINKING LAB: AUSTRIAN-CZECH REPUBLIC COOPERATION

Jan Závodný Pospíšil[3]

Artificial Intelligence (AI) in SMEs and public administration is a goal of European, national and regional digitization and innovation strategies. However, as data and experience from the partner regions of this project (South Bohemia, Upper Austria, and Vienna) show, the potential of AI is significantly less exploited than in other European and non-European countries. This is most evident in the field of R&D and marginally concerning large company processes. The territorial interconnection of the project partner regions implies many existing relationships and links in the areas of the economy, tourism, education, and social, environmental and public administration. However, several common obstacles hinder the further development of the common territory, including the introduction of new technologies and trends into the processes of SMEs and institutions operating in the border area. Artificial intelligence plays an essential role in this context, as it is a megatrend in the field of digitalization and creates a whole new range of possibilities and opportunities, particularly in the light of current global developments.

The AI Social Design Thinking Lab project aims to create a cross-border network of collaborating entities. Their task will be to jointly identify the possibilities of the practical use of AI, find an appropriate and adequate level of application of this technology to optimize organizations' processes and overcome existing barriers that complicate the implementation of AI in practice.

To support implementing the strategic agenda, AI Social Design Thinking Labs will be established on both sides of the border. This involves the creation of one lab in AT (FH OÖ) and one lab in CZ (JVTP). Assuming the cooperation of all partners in the preparation of the lab concept and the close collaboration between the two labs in their subsequent operation (the specific focus of each lab will emerge from the outputs of WPT1 and allow for deeper insight into the resulting expertise), the labs will be equipped with essential equipment (HW, SW — powerful computer for training AI/ML models — mainly neural networks, with CPU, GPU components. These will be able to demonstrate simple examples of AI applications in primary areas: image processing, audio processing, regression analysis. The computational capacity of the powerful computer can also be remotely provided to other project partners — the equipment can be further adapted according to the WPT1 outputs), and will enable practical demonstrations and testing of AI applications and the implementation of

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introductory awareness/educational modules in the field of AI. The labs will also be a tool for further networking and collaboration.

Accompanying the laboratory concept will be three introductory awareness-raising and educational modules aimed at selected target groups. The concept of the three outreach and educational AI modules will be developed across borders and for different target groups. Through the modules, participants will learn how to handle AI responsibly, overcome barriers and challenges in implementing AI systems, and what implications the use of AI has on companies' business processes and social areas.

AN ALTERNATIVE APPROACH TO CRISIS MANAGEMENT — REACTIVE CRISIS MANAGEMENT AND SYSTEM DYNAMICS

Štěpán Molitor[4]

Abstract

This paper presents an alternative approach to reactive crisis management — a method that enables a holistic view of the company's situation and, at the same time, considers the dynamics of the whole crisis management process. The method used is a case study of a semi-product manufacturer in financial distress. The case situation has been examined using a dynamic business model, a tool, combining business model canvas and causal loop diagram. This research paper is intended as the first phase of broader research. It introduces the system dynamics method for examining a crisis management situation and tests the approach using a case study. The preliminary outputs show that the dynamic business model tool can be used as a new approach to examining crisis management situations. However, follow-up research is needed to fully develop the approach. First, it is necessary to find a method how to clearly identify the key factors and their relationships. Then dynamic model construction and simulation is be conducted to present quantitative outputs.

Key words: distress management; reactive crisis management; system dynamics in management

JEL Classification: H12

Introduction

Company distress is a natural part of the market economy. As defined by Richardson et al. (1994), businesses in crisis/in distress/failing will become insolvent unless appropriate management actions are taken to turn around their financial performance. Companies can end up in trouble for one reason or another because of internal problems and negative external factors. Crises tend to copy the pace of the world and the a — economy — nowadays, a crisis can be considered more or less permanent (Rais, 2007).

Distress management is a well-researched topic. Many renowned professionals dedicated their scientific careers to designing systems to predict business distress as soon and as precisely as possible. Others have developed theories on how to prevent a company crisis — risk management.

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However, despite all their efforts, companies still fail. The questions we must ask are not only 'How to predict company distress?' and 'How to prevent company distress?'. We need to add one more question. We must ask 'How to react to distress?'

This paper examines the reaction of management to a crisis where the business is already in distress and proposes an alternative approach to prediction-focused and static views on crisis management. The main question that this paper aims to answer is: Is there a dynamic approach that could help crisis managers to identify the factors that have the biggest impact on the company in distress?

The theory supports the approach that we cannot look at a company in distress from only one point of view. According to Munoz-Izquierdo et al. (2018), when looking at company failure, we find that to encompass it to a certain extent, we must consider multiple social science disciplines, from finance and accounting to organizational studies and strategy. A corporate crisis is a multidisciplinary phenomenon.

Many companies face difficulties that increase and become more severe over time. Unfortunately, the inability to spot warning signs and proactively react is a very common and costly management mistake, which can bury an otherwise perspective company (PriceWaterhouse Coopers, 2019).

When a business is in distress, the main paradigm shift occurs. Crisis goals are modified from strategic goals (Vašíčková, 2019) and from the main imperative to create value for shareholders, the focus must be shifted to plain survival. To help a business overcome distress and return to prosperity is a task of crisis management (Sahin et al., 2015). Crisis management is a set of approaches, measures and methods used when managerial skills no longer suffice (Vašíčková, 2019).

1 The current approach in crisis management research

Most authors studying corporate crises focus on proactive crisis management. In general, they attempt to design a tool to spot the warning signs of a crisis before it occurs with more precision and sooner than competing methods. The methods mostly utilise internal company information as independent variables (Vašíčková, 2019).

To achieve this goal, scientific methods have been used since the 1960s. These start with the well-known Altman's Z-score, based on discrimination analysis (Altman, 1968) and its modifications, and continue through logit and probit models (e.g. Aziz & Dar (2006) compare these approaches with MDA), recursive discrimination (Frydman et al., 1985), neural networks (Liu, 2014) and the use of machine learning (Wang & Wu, 2017) to predictive models utilising fuzzy logic (Sankhawar et al., 2020).

1.1 Focus on prediction

Even though crisis prediction models have an increasing level of reliability (Altman et al., 2016), not all crises can be successfully predicted. In many cases, management neglects the warning signs long enough to enable the problems to mount and begin to threaten the

company's existence (PriceWaterhouse Coopers, 2019). When the business is already distressed, it is the task of reactive crisis management to turn around the company. However, as seen from the literature review by Vašíčková (2019), this area of research is not the focus for most researchers.

1.2 Study of isolated factors

To predict and explain the business failure, financial ratios have been the most used variables (Altman et al., 2016). However, financial ratios only do not encompass all the symptoms of business failure; other factors also need to be considered (Madrid-Guijarro et al., 2008). Bowman and Helfat (2001) and Collis and Montgomery (1995) discuss the relative importance of external and internal factors that affect corporate distress to determine what to focus on when predicting business downfall.

In extensive research of audit reports by Munoz-Izquierdo et al. (2018), it has been found that the interrelation of both external and internal circumstances explain failure more robustly than either does in isolation. Munoz-Izquierdo et al. (2018) state that macroeconomic data (economic turbulence, monetary policy), market data (demand shift) or non-financial information (e.g. management style, size, age) should be used to explain corporate distress more reliably. Additionally, the necessity to combine both external and internal factors for explaining corporate distress is emphasised (Carter & van Auken, 2006; Loongs & Hughes, 2007; Amankwah-Amoah, 2016).

1.3 A static view of the problem

Management problems are often not of a static nature. Running a business is a process where dynamics is an important factor. This applies even more so to crisis management. However, conventional business models are static by their nature (Cosenz & Noto, 2017). This prevents observing how the situation develops or survives under different scenarios. Khan (2021) claims that organizations going through a crisis will, to survive, need to go beyond traditional methods of business design obtained from static models.

1.4 An alternative approach proposal

The mentioned limits of the conventional approach have been emphasised by many management researchers. To react to the critics, this study proposes an alternative approach. Unlike most researchers in the crisis management field, this study concentrates on reactive crisis management. In accordance with Amankwah-Amoah (2016), Carter and van Auken (2006), Madrid-Guijarro et al. (2008) and Loongs and Hughes, (2007), the study takes a holistic view of the business in distress.

To overcome the problem of a static view of the business (Khan, 2021), the study will seek a method that enables one to observe the dynamics of the business. Therefore, to examine business distress and reactive crisis management, it is needed to propose a method

that considers both the company and its inner and outer surroundings (holistic view) and supports a dynamic view of the business.

An approach that enables to study a company holistically and in a dynamic environment has been proposed by Forrester (1961). In his pioneer study, he introduced dynamic modelling as a method to understand, simulate and examine management problems, while omitting inessentials. In this way, Forrester has revolutionized management science (Wilson, 1997). System dynamics is an approach for capturing the dynamic aspect of complex social and managerial systems (Forrester, 1961).

Dynamic systems are representants of the actual flows (physical, informational) in the system while using system dynamics enables to study non-equilibrium states (Forrester, 1961). Since business distress is, by its nature, a non-equilibrium state, system dynamics is the correct tool to use to better understand the nature of distress and simulate the effects of rescue strategies.

To our knowledge, system dynamics in reactive crisis management research has not yet been used. Although this method has been tested in management research, it has been on a level of a theoretical study (Kleiboer, 1997), standard decision-making modelling (Lyneis, 2012; Nair & Rodriguez, 2013; Hoffman et al., 2015; Hoyme & Farias-Aisner, 2015; Cosenz & Noto, 2017; Schätter et al., 2019) or emergency management (Gonzalez, 2010). Although there has been an attempt to provide a model of reactive crisis management, it resembles a textbook step-by-step guide for crisis managers (e.g. Pal Singh & Chahal, 2015) rather than research built on a theoretical basis. Moreover, this study also focused on a type of disaster (Exxon Valdez, Johnson and Johnson's Tylenol case), rather than a crisis caused primarily by bad management decisions.

2 Data and methods

The goal of this study is to outline a dynamic and holistic view of a particular business in distress and to identify the key aspects that reactive crisis management must focus on to turn around the company's performance. For this purpose, a dynamic model of a distressed company will be created and analysed.

2.1 Model creation steps

When thinking about models, it is necessary not to model a system, but to model a certain specific problem. The boundaries of the model (width, depth), time horizon and key elements of the model (stock and flow variables) and their relationships need to be set (Pelánek, 2011).

First, a structure to map the key elements of a business is to be found. Then, adding the key elements and identifying relationships, a causal loop diagram will be developed, providing a holistic view of the business dynamics. The causal loops form reinforcing and balancing closed feedback loops, which illustrate the business behaviour under dynamically changing conditions.

Then, an analysis of the model will help to find key leverage points, e.g. the points that when changed have the biggest impact on the system behaviour (Pelánek, 2011). A static model will be used as a skeleton, that comes alive by adding the muscles of the system dynamics.

2.2 A dynamic business model as a tool for structural analysis

As a support tool for the structural analysis of the business, Cosenz and Noto (2017) propose to use a static business model canvas, which they animate by using dynamic modelling. They call this type of model a dynamic business model. Cosenz and Noto are among the pioneers of this approach (Schaffer et al., 2019). The dynamic business model is a modified Business Model Canvas. The dynamic business model includes the following elements: partners, strategic resources, value proposition and KPIs, processes, customers, revenue streams and cost structure. The dynamic business model developed by Cosenz and Noto (2017) has been modified to fit the research aim. The elements of the model have been chosen based on the data collected.

In the above structure, the key elements of a business in distress are identified and located to the adjusted dynamic business model canvas.

2.3 Case study

A real case will be used in this study. The case company is a manufacturing company, which convert raw materials into semi-products and sells them to industrial customers. Due to long-term poor management decisions, the company found itself in distress due to a threatening cash flow problem.

The company has multiple financing banks, and some debts are secured by its machinery. Creditors are needed to provide additional financing to finance working capital so the company can continue the manufacturing process. Additional financing is conditioned by providing main creditors with a viable restructuring plan. The company is dependent on a few key suppliers of raw materials. Without the material supply, it would need to stop production and lose its customers. The company is under pressure from suppliers because it fails to pay the business credit when it is due. The information about the company's condition is also an issue for its customers since they have a limited guarantee that they will get their orders on time.

Prior to the study, a financial analysis of the company was conducted where data from public resources and data provided by the management have been used. The key information has been extracted from the statutory and managerial financial statements, business planning and budgets, account payables and receivables statements and key contracts from customers and suppliers.

The building blocks of the model have been chosen based on an analysis of the key drivers of the business (Profit & Loss statement, Working Capital and Cashflow 2019 and 2020 analysis and 3Y business plan modelling). As the output of the business key drivers

analysis, the following building blocks of the dynamic business model have been chosen to be represented in the model:

- Key partners (Creditors, Suppliers)
- Strategic resources (Financial resources, Staff, Machinery, Raw materials)
- Value proposition and KPIs (Company reputation and credibility, Viable restructuring plan, Income)
- Key processes (Manufacturing process – ability to continue)
- Customer segments (Customer gain rate, Customer loss rate, Customers)
- Cost structure (Total costs)
- Revenue streams (Price, Revenues)

To understand the causal relationships underlying the company's business model, a dynamic business model has been developed. These building blocks have been structured in the dynamic business model framework. Then, the causal interdependencies have been identified. The relationships between the building blocks and their directions have been outlined to form a causal loop diagram.

3 Results

The following feedback loops have been identified:

R1: Viable restructuring plan → company reputation and credibility → creditors → financial resources → staff/machinery/raw materials → ability to continue the manufacturing process → customers → viable restructuring plan

Ceteris paribus, where the company comes up with a viable restructuring plan it increases its credibility towards creditors who will agree to provide additional financing. The company can afford to finance its operations and serve customers. This will bring revenues and income and increase financial resources.

R2: Viable restructuring plan → company reputation and credibility → suppliers → raw materials → ability to continue the manufacturing process → customers → viable restructuring plan

Ceteris paribus, where the company comes up with a viable restructuring plan it increases its credibility towards suppliers. They will be willing to supply the company with the raw materials and the company will be able to continue its operations and serve customers. This will support the viable restructuring plan

R3: Viable restructuring plan → company reputation and credibility → customer gain rate → customers → revenues → income → financial resources → staff/machinery/raw materials → ability to continue manufacturing process → customers → viable restructuring plan

Ceteris paribus, where the company comes up with a viable restructuring plan it increases its credibility towards customers and the orders will generate revenue and income. This increases financial resources, and the company can continue its operations. This will positively affect the viability of the restructuring plan.

B1: Ability to continue manufacturing process → total costs → financial resources → staff/machinery/raw materials → ability to continue the manufacturing process

Ceteris paribus, where the company is able to continue the manufacturing process it increases its total costs. The costs decrease financial resources and affect the ability to continue the manufacturing process.

B2: Company reputation and credibility → customer loss rate → customers → revenues → income → financial resources → staff/machinery/raw materials → ability to continue the manufacturing process → company reputation and credibility

Ceteris paribus, where the company loses its credibility customer loss rate is increased, impacting the number of customers. Fewer customers negatively impact financial resources generated from revenues and the company finds it difficult to finance its manufacturing process. This leads to an additional loss of credibility.

From the feedback loops identified, we can observe key leverage points that greatly affect the whole system. The reinforcing loops start with the viable restructuring plan. Balancing loop 1 shows that it is crucial for the company to keep the ability to continue its operations. Balancing loop 2 points to the company reputation.

The model proposes the factors and relationships that are the most important for the company in this situation.

The first proposition is that the company, with the help of a trustworthy restructuring plan, needs to persuade its key stakeholders (creditors, suppliers, customers) that it is willing and able to resolve the crisis.

The second proposition is that the company also needs to focus on the ability to continue the manufacturing process. The presence of the restructuring plan and the ability to continue manufacturing will positively impact the company's credibility.

The third proposition is that the company must be careful about its working capital so it can finance its manufacturing process (Balancing loop 1).

With the help of the model, we have been able to propose three key aspects that management should focus on in its attempts to save the company — a viable restructuring plan, the manufacturing process and working capital management.

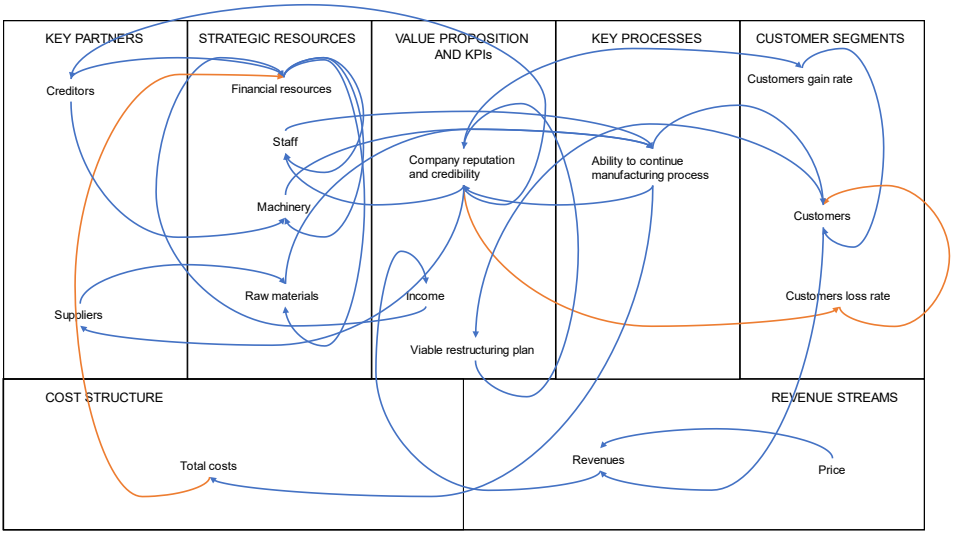
Table 1 | DBM modified

KEY PARTNERS	STRATEGIC RESOURCES	VALUE PROPOSITION AND KPIs	KEY PROCESSES	CUSTOMER SEGMENTS
Creditors	Financial resources			Customers gain rate
	Staff	Company reputation and credibility	Ability to continue manufacturing process	
	Machinery			Customers
Suppliers	Raw materials	Income		Customers loss rate
		Viable restructuring plan		

COST STRUCTURE	REVENUE STREAMS
Total costs	Revenues
	Price

Source: Author's own processing

Schema 1 | Case study feedback loop diagram



Source: Author's own processing

Discussion and conclusions

The study presented an alternative approach to crisis management, as opposed to prediction-focused and static approaches. The presented approach combines a business model canvas, a strategic management tool and system dynamics represented by a causal loop diagram. A case study has been conducted to test this approach.

The dynamic business model can be used to visualize the main components of the system and highlight their relationships. Identifying interconnected chains of factors (causal loops) can help crisis managers to identify crucial factors to focus on when dealing with a crisis. The main question for further research is to find a scientific tool to identify the key factors and their relationships.

Any model is a simplified representation of reality. The relative simplicity of the dynamic business model used can be an advantage in a situation when it is necessary to take quick decisions. Business distress situations are very much so. The oversimplification of the BMC is an advantage in this situation since the problems are being seen clearly and not diluted by irrelevant details. However, the simplicity can also become a drawback. When constructing a model, it is possible that some key aspects or relationships can be missed. Therefore, detailed knowledge about the situation is needed when constructing a model (Wilson, 1997).

Another limitation of the approach used is that a causal loop diagram is just a visual representation of a system. It is not supported by any computations and, therefore, the system behaviour cannot be simulated. The assumptions for the feedback loops work only when other conditions are equal.

This research paper, as the first phase of my research, is intended to challenge the prevailing approach to distress management research and introduce the system dynamics method as an alternative. As demonstrated in the case study, the dynamic business model tool combining a business model canvas and causal loop diagram can show a new perspective of a distress management situation.

Follow up research will be conducted to partially mitigate the limitations, fix the loopholes and develop the approach further. First, the research will focus on finding and testing a tool to identify the key factors of a company in distress and their relationships. Then, future research will work with an extension of the use of system dynamics in crisis management modelling by constructing a dynamic model of a company facing distress. This model will be created in specialised software and the identified stocks and flows will be quantified. This will provide the opportunity to validate the model and conduct simulations to test alternative scenarios.

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TRANSITIONAL COSTS: FROM PAYG TO FUNDING PENSION SCHEMES

Jan Pokorný[5]

Abstract

The current design of pension systems is an important issue. A combination of different schemes in pension systems can help reduce risks. This study examines the transition from a pay as you go scheme to a fully funded scheme. However, this move creates transitional costs. The value of these costs is important because there is the question of finding the source of financing. The costs can be financed by internal or external sources. Thus, transitional costs have fiscal impacts. This study aims to calculate transitional costs and analyse fiscal impacts in the context of the Czech Republic. The calculation in this study provides two scenarios — the status quo and extreme change. Based on the calculations, the potential costs of this change are determined, which amount to 134% of GDP. The limitation of the study is the extremity of the chosen alternatives, which nevertheless shows the significance of the impact on the budget and fiscal policy.

Key words: transitional costs; fiscal impact; pension model; PAYG; pension fund

JEL Classification: H30, H55, J26, J32

Introduction

An ageing population represents an important trend at present and over the following decades. This process has an impact on many phenomes. From the point of view of this study, it is a phenome of financing pension policy.

Pension policy is a form of social protection for elderly people. However, an increasing number of pensioners leads to an increase in costs. Financing these costs is provided through public or private sources. Two basic types of pension schemes can be defined based on the type of financing. The transition from one type to another is associated with transitional costs (Andersen, Bhattacharya & Gestsson, 2021).

Both types of pension schemes are briefly analysed in the next chapter of this study. In addition, transitional costs and fiscal impact are analysed with respect to moves from public to private financing. This issue is practically analysed in the Data and Methods Chapter where the aim of this study and the research methods are also described. The Results and

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Discussion Chapter analyses the outcomes from the Data and Methods Chapter. The Conclusions then summarize the results of the whole work.

1 Literature review

A public pension scheme with unfunded financing is called pay-as-you-go (PAYG). The PAYG scheme is a classic type of pension scheme based on an intergenerational contract. Generation B pays contributions (usually a percentage of their wage), and generation A receives pension benefits. Then the contract continues with other generations. This system is known as a social security system. The second type of financing is a fully funded scheme (FF). In this system, an individual pays a contribution to his or her personal account. Contributions to the account are used for investing. The accumulated value is then used to pay retirement benefits (Díaz-Saavedra, Marimon & de Sousa, 2021).

The risk relationship is defined based on the scheme. The PAYG scheme responds to risks such as demography trends, especially an ageing population, unemployment, and the economic situation. On the other hand, the FF scheme is exposed to financial risk, investment risk, and inflation (Melis & Trudda, 2012).

The reason why attention is paid to the PAYG scheme can be the high public expenditure for this public policy. This reason is moreover emphasized by ageing. Melis and Trudda (2012) add that demographic trends represent a long-term trend in comparison to financial risk.

1.1 From PAYG to FF pension scheme and transitional costs

The demography trend with its financial impact can be an important reason for the transition from a PAYG to FF pension scheme. The PAYG scheme was very popular after World War II. Nevertheless, some countries such as Canada, Denmark, and the United States have begun to create an FF pension scheme that coexists with a PAYG scheme (Boulhol & Lüske, 2019).

A significant change in the move from the PAYG to the FF scheme was made by Chile in 1981. This was followed by Argentina and Mexico (Kay, 2009). The case of Chile was used by World Bank (1994) in their book on the pension system and its diversification. This publication was used as an important background for many states for pension reforms (Potůček et al., 2016). The World Bank provided support for moves from PAYG to FF for many countries (Mesa Lago, 2014).

Later, the example of Chile and the implemented pension reform was also used in post-communist countries. These countries include Hungary and Poland in the late 1990s and in the early 21st century Bulgaria, Estonia and Latvia (Boulhol & Lüske, 2019).

Stanić, Altiparmakov and Bajec (2008) describe reasons to change the design of the pension system that include:

- The transfer of money to financial markets.
- A higher rate of capital appreciation than wage growth in previous periods.

In terms of the diversification of the pension system and risk diversification, both types react differently to different risks (demography has an impact on the PAYG scheme and inflation affects the FF scheme).

However, the transition from a PAYG to an FF scheme results in transitional costs. The incurrence of these costs is determined by the principle on which the PAYG scheme is based. The contribution to the PAYG scheme is sent in whole or in part to the FF scheme. This is called opt-out. As a result, the revenue in the PAYG scheme is reduced. The positive effect is the emergence of private savings, which then have an impact on higher economic growth (Frassi, Gnecco, Pammolli & Wen, 2019).

Different methods can be used to calculate the potential transitional cost. Feldstein and Samwick (1998) and Miles and Iben (2000) expect to maintain the benefit ratio. This is called the current law benefit path. However, Feldstein and Samwick (1998) also use the baseline benefit path. This means that they use a lower benefit ratio after 2030. This reduction is related to the demographic structure.

Stanić, Altiparmakov and Bajec (2008) distinguish between explicit and implicit transitional costs. First, explicit transitional costs represent the financial gap after the introduction of the II pillar with regard to additional financial resources. Implicit transitional costs represent the cost of maintaining the current standard of living.

1.2 Fiscal impact

The incurrence of costs leads to the need to address the issue of the financial resources used. Table 1 shows the value of transitional costs for some countries in various periods. These countries had three basic options, or a combination thereof and initially had a strategy to secure transitional costs:

- increase revenue (taxes, social security or contributions) — this option was chosen by Bulgaria, Estonia, Latvia, Romania, and Slovakia;
- savings in the PAYG scheme (higher retirement age, limiting early retirement or change in indexation — slower growth) — all countries;
- privatisation — Lithuania, and Poland (Bielawska, Chłoń-Domińczak, & Stańko, 2017).

Table 1 | Overall level of transitional costs between 2001 (or reform start) and 2015, % of GDP

Country	Period	Total transitional costs
Poland	2001–2015	17.4
Bulgaria	2002–2015	13.0
Estonia	2002–2015	11.2
Slovakia	2005–2015	10.7
Hungary	2001–2010	9.9
Latvia	2001–2015	6.7
Lithuania	2004–2015	6.4
Romania	2008–2015	4.6

Source: Bielawska, Chłoń-Domińczak & Stańko (2017)

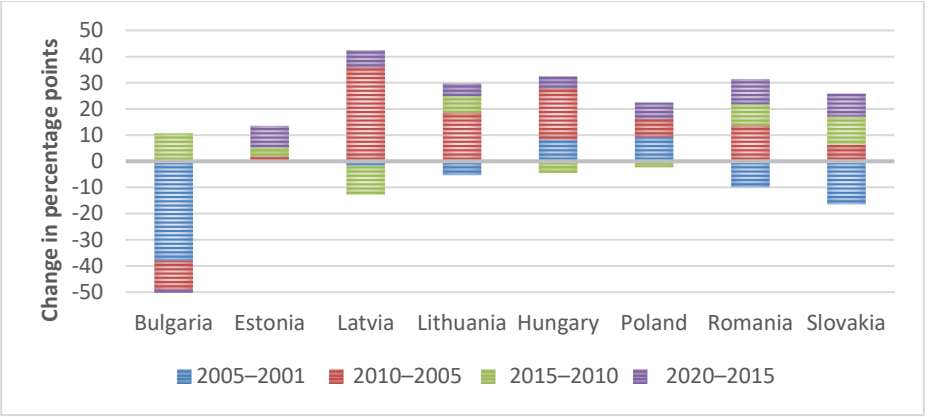
However, the results until 2011 show that some countries use debt financing — Hungary (95% of transitional costs), Romania (84%), and Poland (74%). On the other hand, Lithuania (13%), and Latvia (28%) have the lowest ratio of debt financing (Bielawska et al., 2017).

Thus, this trend has fiscal consequences. With this in mind, the impact of transitional costs will have to be addressed by internal resources in the future. Therefore, it is a solution to a time issue that is not optimal for the government in the short term. However, this will have its effects on the intergenerational burden.

Figure 1 shows the development of general government gross debt in GDP for individual periods. As can be seen, except for Bulgaria, all countries increased their debt relative to GDP over the period. Thus, the dynamics of debt growth was faster than the dynamics of GDP growth.

Bielawska et al. (2017) conclude that the reform of pension systems is greatly influenced by the fiscal situation of the given country in the sense of the withdrawal from multi-pillar pension systems.

Figure 1 | General government gross debt in GDP (change in percentage points)



Source: Author's own processing based on Eurostat (2021a).

Based on the experience of Central and Eastern Europe, the authors state that: 'A weak political consensus on reform priorities and a lack of strong national fiscal rules dilute the initial concept of financing the transition cost' (Bielawska et al., 2017, p. 89). Fiscal changes then lead to the reduction or complete abolition of the multi-pillar system and a return to the concept, which is based primarily on the unfunded principle (the PAYG scheme).

Ortiz et al. (2018) use the experiences from Latin American countries. Great pressure based on fiscal policy can also be seen in these countries. The pressure is related to transitional costs. The level of the transitional cost was very high for every state, for example, Argentina — deficit growth from 1% in 1994 to 3% GDP in 2001 and estimated for 2040 is 3.6% GDP.

2 Data and methods

The aim of this study is a calculation of the transitional costs and an analysis of the fiscal impact in the context of the Czech Republic. In this study, a literature review on this issue is first used as the research method. Based on the review, the model of transitional costs is used for Czechia. This study, a method of comparison, is used for defining the differences between models and synthesis is used for obtaining the results of the study in Chapter 3.

This study follows research by Pokorný and Hejduková (2021), which was focused on intergenerational contract and solidarity. In this case, it is considered to move from intergenerational contract (the PAYG scheme) to self-security (the FF scheme).

The calculation part of this study comprises four steps. The first is dividing the population into three categories. This provides the age for entry and exit in the labour market. The division affects the numbers active in the labour market and pensioners. The second is a determination of the calculation (formulas). Based on formulas, variables are introduced

(the third step). Calculations in Microsoft Excel are the last step. The partial steps are described in more detail below.

First, the population of Czechia is divided into three categories — youth (up to 21 years), active in the labour market (22–64 years) and pensioners (from 65 years). This division into categories is done based on Table 2.

Table 2 shows people in the labour force per thousand people and the percentage of the population. People in the labour force are defined as employed and unemployed. The percentage of the population shows the active population rate based on age cohorts. These cohorts are calculated based on the dataset from Eurostat (2021b). The results in Table 2 are used to assess the age for entry into the labour market.

Table 2 | People in the labour force in Czechia (2020)

Years	Thousand people	Percentage of population
15–19	0.026	5.4
20–24	0.237	49.3
25–54	4.055	88.7
55–64	0.906	69.6
Total	5.224	85.4

Source: Author's own processing and calculations based on Eurostat (2021b).

Table 2 shows the low participation in the labour force in the age cohort 15–19 years and half participation between age 20–24. Based on this data, 22 years is chosen as the age when a person enters the labour market. The previous study (Pokorný & Hejduková, 2021) considers the gradually increasing retirement age. However, the impact of the gradual increase for this study is not significant. Based on this argument, the transition from the labour market to retirement is considered 65 years. Thus, the model represents simplified links between entry and exit in the labour market.

The goal of this paper is to compare two scenarios. Scenario A shows the pension system without the FF scheme. Scenario B has both pension schemes — the PAYG and FF. In the second scenario, both schemes are completely separated. This means that a person contributes to the PAYG or FF scheme and then he or she has an entitlement to benefits from the PAYG or FF scheme. The FF scheme set up in 2022 is mandatory for new participants in the labour market.

In this study, two formulas are used for calculation. Total pension expenditure *TE* and total pension revenue *TR*:

$$TE = \frac{P_t \, B \, W}{Y} \tag{1}$$

$$TR = \frac{E_t \, C \, W}{Y} \tag{2}$$

Total expenditure only includes expenditure on old-age pensions. Expenditure does not include survivors' and invalidity pensions. For a better comparison, the results are presented in the form of implicit pension debt (IPD). This means the present value is used. The results are discounted at a rate of 2%. This rate is chosen based on the long-time inflation target of the Czech National Bank. This targeting is similar for other central banks as the Fed, Bank of England, Norges Bank, Bank of Canada, and Bank of Japan (CNB, 2021).

Table 3 shows the variables and characteristics used for the calculation of both scenarios. In this case, the previous average benefit ratio is used on the whole monitored period based on the current law benefit path (Feldstein & Samwick, 1998; Pokorný & Hejduková, 2019). The average for the same period (2010–2020) is also used for the employment rate. The data from 2020 is used for other variables. The medium variant of population prediction is used for the prediction.

The data is mostly taken from the Czech Statistical Office except for the amount of the contribution (the Czech Social Security Administration is used) and the employment rate, where data from Eurostat is used.

Table 3 | Variable description

Variable	Statistical indicator	Note	Available time period	Source
E_t	Number of employees	Population (22–64 years) * employment	Population 2022–2101 Employment 2010–2020	CZSO (2021a) Eurostat (2021b)
P_t	Number of pensioners	Population (65+ years)	2022–2101	CZSO (2021a)
B	Benefit ratio	Ratio between pension benefit and wage	2010–2020	CZSO (2021b, 2021c)
W	Wage	Average wage	2020	CZSO (2021c)
C	Contribution	Contribution rate	2020	CSSZ (2021)
Y	Gross domestic product	GDP by expenditure method (current prices)	2020	CZSO (2021d)

Source: Author's own processing
Note: t — time for 2021–2100

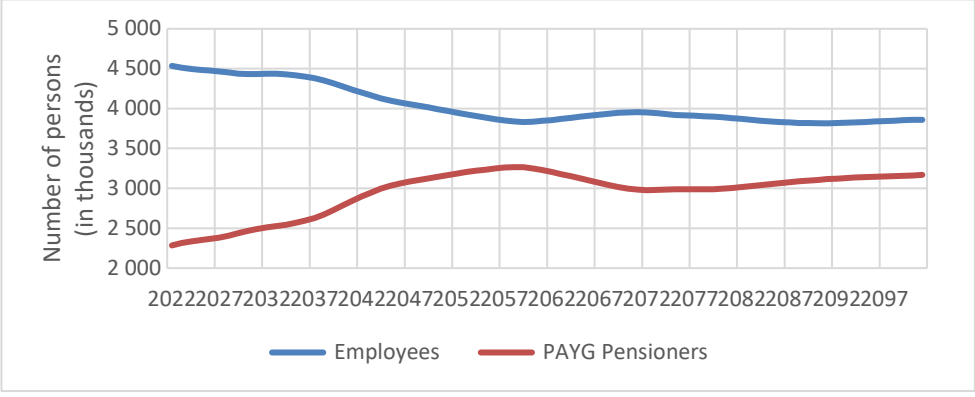
The last step in both scenarios is the calculations. Microsoft Excel was used for the calculation based on formulas and variables in Table 3. Graphs have also been created in Excel for better understanding. The graphs show the calculations for each year.

3 Results and discussion

Scenario A is the pension system without the FF scheme. Thus, this scenario is constructed as the current pension system in Czechia. Figure 2 shows the demographic trend in Czechia. The number of employees will significantly decrease until the 2050s. Then, this indicator remains at similar values. The number of pensioners will be increased in the following decades. The ratio between employees and pensioners will be reduced in the PAYG scheme. This trend will increase the entitlement on the financial sustainability of the pension scheme.

Figure 3 shows scenario B – pension system with the FF scheme. This new scheme is designed as mandatory for new members in the labour market (22 years) since 2022 in this study. The number of employees in the PAYG scheme will be gradually decreasing from 2022 to 2063. The number of pensioners in the PAYG scheme will grow until 2059. From the 2060s there will be a gradual decline with respect to the decreasing members of the PAYG scheme.

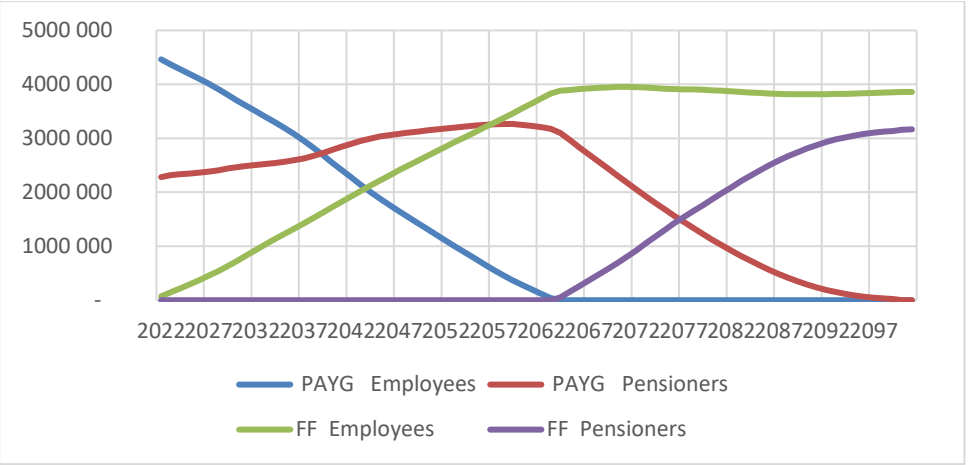
Figure 2 | Scenario A



Source: Author's own processing based on CZSO (2021a).

The opposite trend is evident in the FF scheme. First, employees in the FF scheme will gradually increase from 2022 and the first pensioners in the FF scheme will retire in 2064.

Figure 3 | Scenario B



Source: Author's own processing based on CZSO (2021a).

The impact of scenario B compared to scenario A for the PAYG scheme is:

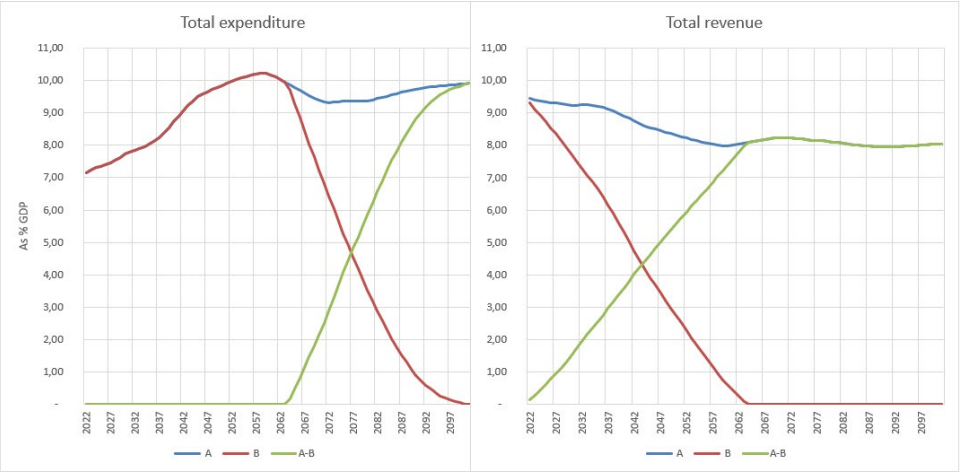
- revenue reduction from 2022 and
- expenditure reduction since 2064.

The consequence of this change is the incurrence of transitional costs.

Based on the data, it is possible to confirm the idea of the current law benefit path by Feldstein and Samwick (1998). Because transitional costs increase up to 2063, costs are then reduced.

Figure 4 shows the development of total expenditure and revenue for scenarios A, B and their differences. These changes have a financial impact on the sustainability of the PAYG scheme. However, it should be noted that these are only old-age pensions. If other types of pensions were included, the costs would increase.

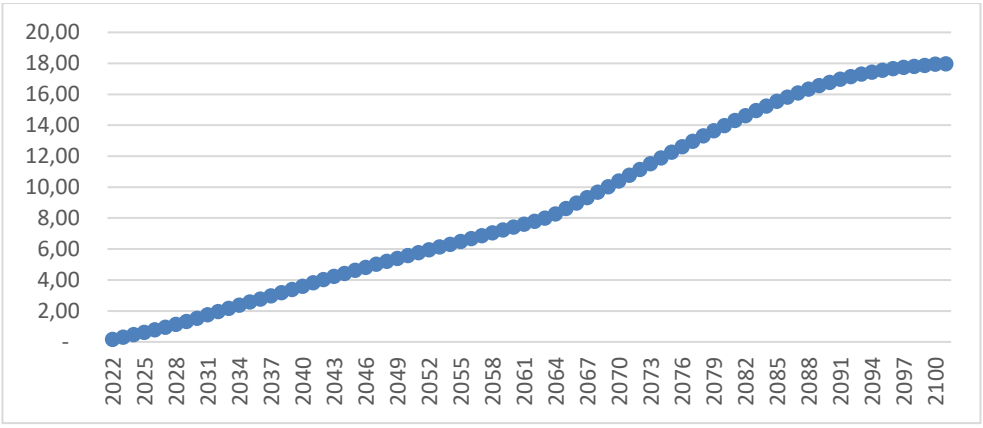
Figure 4 | Total expenditure and revenue 2022–2101



Source: Author's own processing and calculations

Figure 4 can be supplemented by Figure 5 with transitional costs in the percentage of gross domestic product. Figure 5 shows the increase in costs. Then, the costs gradually fall. The level of costs corresponds with the countries of Latin America in the first decades with respect to the pension system. The countries of Latin America combine the PAYG and FF schemes in their system (Ortiz et al., 2018).

Figure 5 | Transitional costs 2022–2101 (in% GDP)



Source: Author's own processing and calculations

Table 4 shows the financial results for the PAYG scheme in scenarios A and B. As expected, transitional costs arise in scenario B. On the one hand, expenditure is lower when scenarios A and B are compared. On the other hand, revenue is higher in scenario A against scenario B. Thus, there is a decline in revenue. The results of these changes are increased costs in scenario B.

Table 4 | Financial results of the PAYG scheme (million CZK)

Scenario	Total expenditure	Total revenue	Difference	Difference (in% GDP)
A	20,589,585	20,090,366	- 499,219	- 8.77
B	16,970,437	8,853,228	- 8,117,209	- 42.54
transitional costs	3,619,147	- 11,237,137	- 7 617 990	- 33.78

Source: Author's own processing and calculations

The financial results of the PAYG scheme in GDP are clear. There is an increase in the implicit pension debt of 133.78% of GDP. This must clearly lead to the issue of financing transitional costs. The solution to this situation can be to use budget resources (tax) or increase these resources (increase the tax rate). An alternative to this solution is the use of external financing sources.

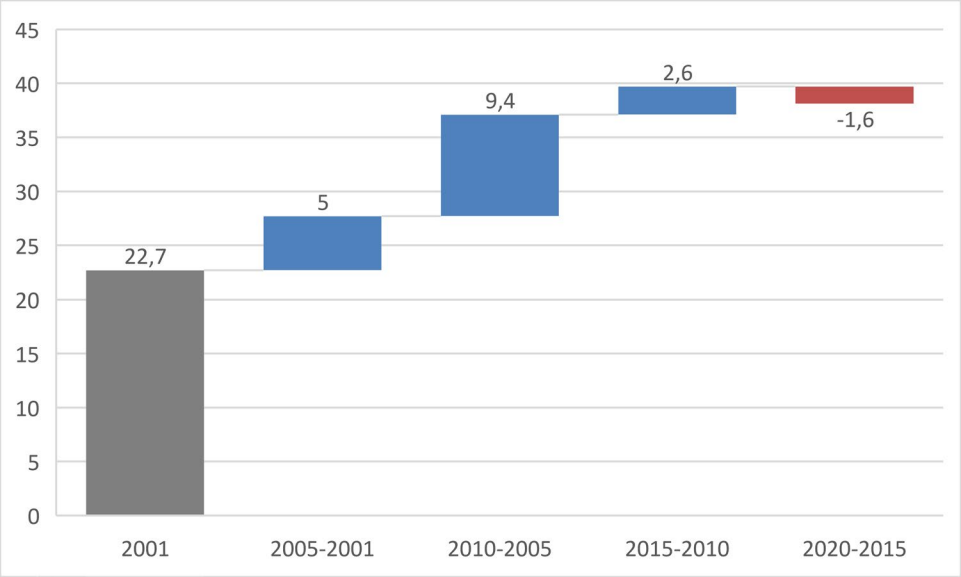
However, this extreme scenario cannot be completely expected. In the case of changes and the introduction of the FF scheme, it is possible to expect an opt-out of the PAYG scheme in the amount of a few per cent as in Slovakia and other countries (Table 1). In such a case, there will be transitional costs, which, however, can be expected at a few tens of per cent of GDP.

On the other hand, the results of this study generally correspond to the results of Brabec and Kubelková (2015). The main results of the study of Brabec and Kubelková (2015) for this study are:

- a pension system with transition is a more expensive system without transition until 2073,
- the transition from the PAYG to FF scheme with a 50-year horizon has a huge impact on public debt, and this change is more expensive compared to the status quo with the PAYG scheme,
- neutral impact of transition on the state budget from 2144.

The differences between studies are affected by the data for calculation. However, Brabec and Kubelková (2015) draw attention to the issue of long-term prediction with respect to economic cycles, political development, and the political changes in the pension system.

Figure 6 | General government gross debt in GDP in Czechia



Source: Author's own processing based on Eurostat (2021a).

Another issue for this reform is the issue of fiscal context and impact due to experience, which is not favourable within the major reforms of the Czech pension system (abolition of Pillar II after three years of operation; Potůček, 2016). Figure 6 shows the evolution of debt. Given the experience of other countries in Central and Eastern Europe, there is scepticism about pension system reform.

Table 5 | Sensitivity analysis

Scenario	Variable	Benefit ratio	Wage	Contribution	Gross domestic product
A	Total expenditure	205,896	X	X	X
	Total revenue	X	200,904	717,513	X
	Difference (in % GDP)	3.62	3,53	12,60	- 0,09
B	Total expenditure	169,704	X	X	X
	Total revenue	X	88,532	316,187	X
	Difference (in % GDP)	2.98	1,55	5,55	- 1,41
A-B	Transitional costs	36,191	112,371	401,326	X
	Transitional costs (in % GDP)	0.64	1,97	7,05	- 1,32

Source: Author's own processing and calculations

Table 5 shows the sensitivity analysis for four variables. These variables impact total expenditure and revenue. The sensitivity analysis is provided to increase the variable by one per cent. Based on scenarios, the results of the analysis differ.

The greatest influence is the change of contribution. A rate increase from 28% to 29% has an impact on total revenue. For scenario A, it has double the impact compared to scenario B. The reason is the declining importance of the PAYG scheme in scenario B. The same reason clarifies the differences between scenarios A and B for variable benefit ratio and wage.

On the other hand, the difference in benefit ratio is not so important (about 0.6% GDP). The explanation is the continuation of the PAYG scheme for decreasing the number of participants. Figure 4 shows these expenditures.

The change in wage has an impact on revenue. This change is lower compared to the change in contribution and is given in the calculation. The change of wage is affected by the rate of contribution.

The last variable is gross domestic product. The change of gross domestic product does not have an impact on total revenue or expenditure. The impact is on quantities in the percentage of gross domestic product.

This study can be further compared with the proposal of the Pension Commission, which was established in 2019. The aim of this commission was a pension reform that would be

fair, comprehensible, and financially sustainable (MPSV, 2019). One of the big problems in the current pension system is the aforementioned financial sustainability: 'The growth of Czech expenditures in % of GDP is thus the highest in the EU in an international comparison over a period of 40 years (except for non-standard Luxembourg)' (MPSV, 2019, p. 27).

However, the results of the Commission focus on the I. pillar and its possible division into a basic part (universal amount, flat rate) and a merit part based on wages. The Commission refers to the pension reform, which is to be implemented shortly after its adoption in order to generate additional revenue (MPSV, 2020).

As a result, the commission does not address the alternative in the form of the II. pillar and the associated costs. Furthermore, the Commission only addressed the expenditure part and notes the need for tax reforms. Thus, the Commission did not address financial sustainability, which was one of the objectives. This result indicates the need for a comprehensive solution to the issue.

The issue of the use of fund financing in the pension system of the Czech Republic was addressed in the report by OECD (2020). The report addresses the allocation of part of the funds to pension savings funds, the performance of pension funds, and the motivation of individuals to switch. However, even this report does not address the issue of transitional costs.

The contribution of the OECD report (2020) to this study is mainly in terms of supplementing fiscal resources to finance the transition costs incurred. An increase in corporate income tax, social security contribution or value added tax rate would affect increasing public revenue in the long term. The assumption is an increase in public revenues of 0.5 percentage points of GDP, except for value added tax, where the increase is 0.4 percentage points of GDP. However, there would be negative effects such as lower GDP, lower employment, and lower real wages.

Conclusions

Transitional costs are an important issue in reforming the pension systems. These costs represent the financial implications of the changes. Transitional costs are mainly associated with a partial or complete change in the design of the pension system. Specifically, it is a transition from the PAYG scheme to the FF scheme.

One of the goals of the design change is to diversify the risks associated with each scheme. Extending the pension system with another scheme can thus enable risk diversification and greater robustness of the entire pension system.

However, transitional costs also represent the fiscal context. As the experience of the countries of Central and Eastern Europe shows, there is a reluctance from governments to make transitional costs that worsen the country's fiscal position.

In this study, a comparison was made between the current state of the pension system and the extreme version of the transition. Based on the results, it is clear that there would be

a several-fold increase in the cost of the entire system. The result is an increase in implicit pension debt by 134% of GDP.

Based on sensitivity analysis, the contribution has the greatest impact on changes. This is followed by benefit ratio and wage. However, this is an extreme version. In the reform, it is possible to expect a milder variant, in which the costs would increase by several tens of per cent of GDP. Based on the experience of Central and Eastern European countries, it can also be stated that based on the Czech fiscal position, there will be no high level of interest in a fundamental change in the pension system, which is evident in the context of the history of the Czech pension system.

Furthermore, the interest in this issue was compared with the results of the Pension Commission and the OECD report. The Commission did not pay attention to the reform under the II. pillar and partial or complete transition. The OECD report reflected fund schemes in the pension system but focused mainly on their voluntary use. Based on this, it can be stated that these issues are not currently reflected by these actors.

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ENTERPRISE ARCHITECTURE FRAMEWORK ADOPTION IN PUBLIC ADMINISTRATION OF CZECHIA — CONFORMITY OF MODELS

Martin Rod[6]

Abstract

At present, public administration commonly utilizes information and communication technologies, so that it is more user-centered, accessible, cost and time effective, etc. However, the transition from E-government to Digital Government entails the necessary cooperation between public administration actors and their respective information systems. The managerial approach of enterprise architecture is used as the means to fulfill this task, as is the case for Czechia. One main concept of enterprise architecture is the usage of architectural models. This paper aims to evaluate the conformity, and the underlying quality, of those models to the Czech public administration enterprise architecture framework. The paper's methodology is based on a quantitative approach with statistical hypothesis testing. The dataset is derived from the repository of the enterprise architectures used and maintained by a central authority. Data origin spans the period from February 2020 to October 2020 and contains 183 vectors/observations. Only one-third of the models comply with the requirements of the architectural framework. The dependence between the framework's type of meta-model used and the conformity of the model is proven. The number of model errors depends on the meta-model used. The results are domain-specific, with a possible generalization to the entire Czech Digital Government, but not other countries. One of the limitations is the relatively limited number of observations. It is also necessary to mention the possible impact of the new legislation, which broadened the number of legal bodies that until then did not need to use enterprise architecture models. Possible corrective actions and recommendations are presented.

Key words: digital government; enterprise architecture adoption; framework model conformance; public administration; information technology governance

JEL Classification: H11, M15

Introduction

Today, it is no longer possible to build information systems (IS) and services on the so-called greenfield, albeit virtually separate and completely new. Thus, medium and large companies that need to provide competitive services for clients must be able to work effectively with the entire portfolio of information systems concerning the company's

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business goals. It is this way of thinking that is behind the origin and development of the so-called enterprise architecture (EA) approach (Lankhorst, 2017).

The multinational company Gartner, which deals with research and consulting in the field of information and communication technologies (ICT), states that in 2022, 80% of all companies in the digital economy sector will be influenced or controlled by the approach of enterprise architecture (Costello, 2019). For other types of companies, at least 40% of them will apply and use the discipline of enterprise architecture. From this point of view, it can be observed that enterprise architecture is currently experiencing a high degree of dynamic development, which is further enhanced by its adoption by individual organizations. When combined with theory and practice, this creates further stimuli.

Current issues in the field of enterprise architecture can be divided into three basic directions (Gampfer et al., 2018):

- understanding enterprise architecture — includes topics such as architectural perspective, styles, content, reference architectures;
- enterprise architecture modeling — intervenes in the field of modeling languages, tools, modeling concepts and outputs;
- enterprise architecture management — includes points such as development and implementation, life cycle and phases, governance, competencies and resources.

This paper mainly focuses on the part of architecture modeling. The formal aspect of model conformance is studied, which means the models are compared with the corresponding meta-model. The additional aspects/dimensions such as formal logical (Babkin et al., 2019) and factual conformance are beyond the scope of this paper. The study is inspired by (Brandt & Hermann, 2013), who presented the approach of the conformance analysis in this context.

1 Theoretical background

In addition to the individual frameworks, with the main one being TOGAF (Hrabě, 2013), the enterprise architecture is accompanied by several other tools. The main ones for strategic management are the balanced scorecard, EFQM: Excellence in Strategy Execution; within the framework of standards and engineering practice, it is ISO 9001 as representatives of good practice frameworks. It is necessary to mention COBIT for IT management and ITIL for services management in particular (Lankhorst, 2017).

The frameworks dealing with enterprise architecture are the subsequent standard, for example, ISO 42010 and the frameworks of Zachman, TOGAF, DODAF (Lankhorst, 2017). A key role is played by TOGAF, which is mainly a managerial framework but has an associated modeling language, ArchiMate, derived from the UML language. This turns the architecture models into graphs, which are made up of nodes and vertices. However, both nodes and edges can take on different semantic meanings. The syntax is also limited (Open Group, 2019). Of course, economic tools and analyzes, such as cost-benefit analysis,

decision-making based on net present value, etc., are also related to the mentioned tools within the framework of managerial decision-making.

One of the problems of enterprise architecture, both in the public and the private sector, is to bridge the state of enterprise architecture implementation to a period when it provides a benefit. Especially in public administration, there is the reluctance of individual participants (authorities), which subsequently discourages the use of standardized procedures (Seppänen et al., 2018). This also applies to practitioners who use a model-driven architecture technique in enterprise architecture models to create the need for its continuity and interoperability (Rod, 2020).

Furthermore, for the implementation of enterprise architecture, the problematic area is the state of non-compliance with the homogeneity of the level of knowledge and maturity of the organization for the shared abilities of architectures to create (Rouhani et al., 2014). This mentioned immaturity is mainly related to the inability to express the content of individual requirements, which is reflected in the construction of inefficient information systems and their poor quality management in terms of their life cycle (Pérez-Castillo et al., 2021). By eliminating this knowledge, disparities in the development, operation and termination of the information system/service would contribute to a more efficient and cost-effective management of the organization/public administration.

1.1. Enterprise architecture in Czech E-government

On the basis that the public power performs only what is permitted by legislative regulations, the implementation of enterprise architecture in the Czech E-government is also directly or indirectly addressed by legal norms.

The Information Strategy of the Czech Republic (IS CR) is the main strategic document for the digitization of public administration. The IS CR is conceptually based on the Digital Czech Republic program, which was legally defined in Government Resolution No. 629/2018. This program presents three main pillars in the form of the documents: Czechia in Digital Europe, Information strategy of the Czech Republic, and Digital Economy and Society. Each document has an agenda and goals (CR, 2018).

IS CR also sets in stone the usage of enterprise architecture via its architectural principles and four documents: Methods of ICT Public Administration Management in the Czech Republic (MICTM), Glossary of eGovernment Terms, National Architectural Framework (NAF), and National Architectural Plan (NAP).

NAF is a key material of enterprise architecture defining the scope and method for modeling public administration architecture. The Czech framework is based on the aforementioned TOGAF and the ArchiMate language, which it further modifies.

The main differences compared to TOGAF and ArchiMate are respectively:

- Localization into the Czech language and adaptation to the conditions of public administration — the emergence of new overloaded elements, such as a legislative act.
- Clear definition of the colors of individual elements according to individual layers — here the basic usage of colors is preserved, 'yellow, blue, green', etc. However, the rule for using any color for any element is allowed if the element needs to be emphasized if the relevant legend is included.
- In contrast to both ArchiMate and TOGAF, the technological layer (architecture) is divided into a platform layer and a communication layer. Furthermore, the application layer according to TOGAF (but in contrast to ArchiMate) is divided into application and data layers.
- Specially constrained meta-models are also defined, covering only some parts of ArchiMate elements.

On the contrary, in other areas, NAF is very compliant with both TOGAF and ArchiMate. For example, ADM (architecture development method) is preserved unchanged and is only assigned a partial interpretation for the context of Czech E-government. The same individual methods and techniques and further meta-models contained in the TOGAF Library are present in NAF (MICR, 2021b).

Figure 5 | Meta-model of overview model of services of four-layer architecture

Source: MICR (2021a), kept in original official localized (Czech) version.

This paper explores one of the main viewpoints of NAF and confronts its theoretical definition with its practical usage by various public bodies. This architectural viewpoint is called *overview model of services of four layer-architecture* (in this paper also called 'view' for short). This view combines selected elements from business, application, platform, and communication layers (Figure 1). The main goal of this view is to represent and highlight the services used and offered (albeit on all the layers). The model is actively used in assessing the level of central shared services used and its interoperability to prevent stand-alone duplicate solutions in the bottom three layers. At the business layer, it functions as a managerial evaluation of the services available to the users.

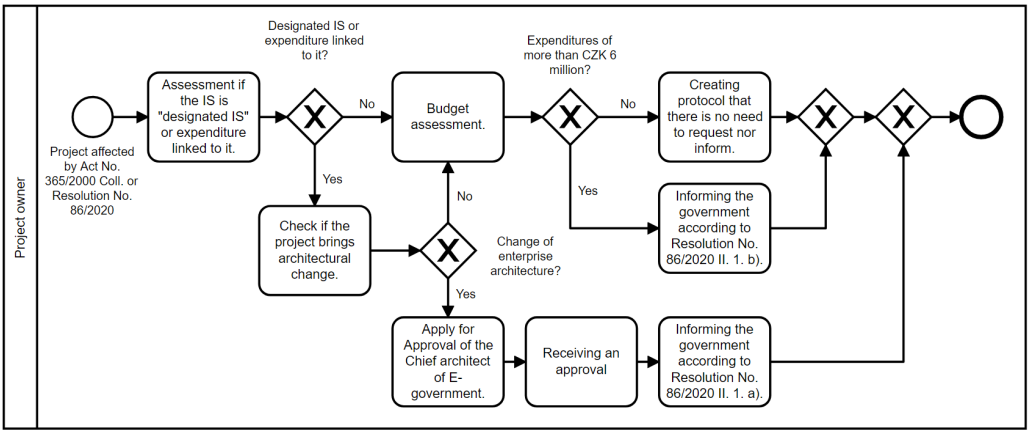
1.2 ICT project approval process

From the legal viewpoint, Act No. 365/2000 Coll. obligates public administration bodies to submit their project proposals to the Ministry (in this context, the Ministry of the Interior, specifically the Department of E-government Chief Architect — DECA) (MICR, 2021b). These projects have to involve changes on the 'designated information system' or be directly linked to it. The term designated information system is defined as an information system that:

- uses reference interface services or provides reference interface services (basically the main executive information systems of the public administration, such as basic registries),
- has links (accessing no-public information about subjects, be it citizens or another corporate body) to other public administration information systems according to the point above, or
- is intended to provide a service with an expected number of users who can access it with a guaranteed identity, at least 5000 per year (CR, 2000).

The second legal act playing a role in central ICT project approval is Government Resolution No. 86 from 27 January 2020, which expands the circle of applicants for the obligation to request the standpoint of DECA. The resolution further specifies the procedure and the expenditure limit. The Office of the Government of the Czech Republic has to be informed about projects that exceed the expenditure limit (or the project involves changes to the designated information system) (CR, 2020).

Figure 6 | Formalization of ICT project approval — view of the project owner, BPMN



Source: Author's own processing

It must be noted, that with the aforementioned law and resolution, the term 'architectural change' plays a role. Architectural change is defined as a crucial change of functionalities and/or changes to system interfaces. In contrast, the simple replacement of a piece of hardware with another is not an architectural change. From a business process point of view, the approval of projects at the central level may lead to one of the three main workflows (Figure 2).

The projects themselves are categorized by documentation that must be appended for DECA approval. This mechanism divides projects into multiple categories A, B1, B2, B3, and C. The B1 and C designated projects do not have architecture models (MICR, 2021a).

2 Data and methods

A quantitative approach was used to assess conformity, where the descriptive statistics are first evaluated. The statistical testing of prepared hypotheses then follows. The hypotheses are derived from and paired with the main research questions (Table 1). For the statistical evaluation, the free application R is used; for more see (R Core Team, 2021).

Table 5 | Research question and corresponding hypothesis

ID_RQ	Research question definition	Corresponding hypothesis	ID_H
RQ1	Are views conformant with the corresponding rules of NAF?	(No need for statistical testing, the descriptive statistic suffice)	-
RQ2	Is there any relation between the view conformity and other factors?	The meta-model used affects the conformity of the view.	H1
		The view elements count affects the conformity of the view.	H2
		The meta-model used is linked with the errors in the whole model.	H3
		Differences between public bodies/departments can be distinguished.	H4

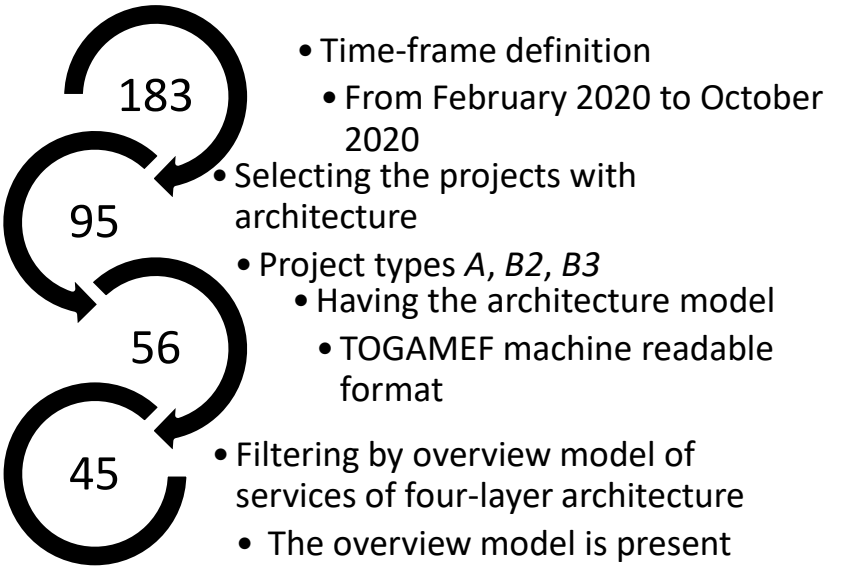
Source: Author's own processing

The central repository of the Department of the E-government Chief Architect (DECA) was used for the analysis of model conformity (MICR, 2021b). Projects sent in their initial version for approval to DECA were used as main data units making up the primary data set (Figure 2). The repository does not include only the projects per se but is also linked with their corresponding enterprise architecture models. The projects were limited to the period from 1 February 2020 to 31 October 2020 of their acceptance to DECA.

The start date was based on a significant legislative change when the mentioned amendment to Act No. 365/2000 Coll. and Government Resolution No. 86/2020 came into force. October was chosen as the end date when the interval provides a sufficient number of primary data. This deadline was further influenced by the time possibilities for research and data processing, which occurred at the end of 2020 (November and December). The dataset spans a range of nine months.

During the mentioned period, 183 available projects with their documentation were assessed. It is necessary to remove type B1 and type C projects from this number, as they do not contain enterprise architecture models. This action reduced the number to 95. Subsequently, projects that did not contain enterprise architecture models or were not in the prescribed TOGAMEF (The Open Group Architecture Model Exchange File) format were removed. This action reduced the number in the dataset to 56.

Figure 7 | Dataset acquisition — architecture model selection procedure



Source: Author's own processing

The last step was to eliminate the projects that do not contain an overview model of the four-layer architecture services defined by the framework. The final data set thus obtained includes 45 projects and related architecture models. This dataset with six identified variables (Table 1) is then explored and analyzed.

Table 6 | Variables in final dataset and description

Variable	Type	Description
ID	Nominal	Artificial key/unique identifier.
Department of public administration	Nominal	Inclusion of the applicant in the organizational structure of public administration.
Type	Nominal	Indication of the type of project and its form A/ B2/ B3. (No B3 type was present/passed the selection criteria. Therefore, the B3 type is not present in the final dataset.)
View conformant?	Nominal (dichotomic)	Deciding whether the view is in accordance with the NAF metamodel. Yes/No.
Meta-model used	Ordinal	Type of metamodel used in the whole architecture model (not just the view). Classification: usage of all ArchiMate language/NAF concepts (Full), first simplified according to NAF (Simplified1), secondly simplified according to NAF (Simplified2).

Elements count in view	Quantitative (numeric)	How many elements are in the view.
Error count in the whole model	Quantitative (numeric)	How many errors are in the whole architecture model — this means the use of constraints or other constructs compared to the rules of the ArchiMate language. The error number is taken over the Archi application and its reporting tool.

Source: Author's own processing

As can be observed, the main representations in the dataset are department-like public bodies. Regarding the types of projects, type A is prevalent (39 occurrences). The conformity of the view is fulfilled in only 15 cases. The rest of the models (30 views) are inconsistent (Table 3).

In 22 project applications, a twice simplified (reduced) meta-model according to NAF was used for the overall architecture description. In 15 cases, the full ArchiMate language meta-model was used. The remaining 8 applications used a simplified meta-model for the first time according to NAF.

Table 7 | Data set basic descriptive statistics

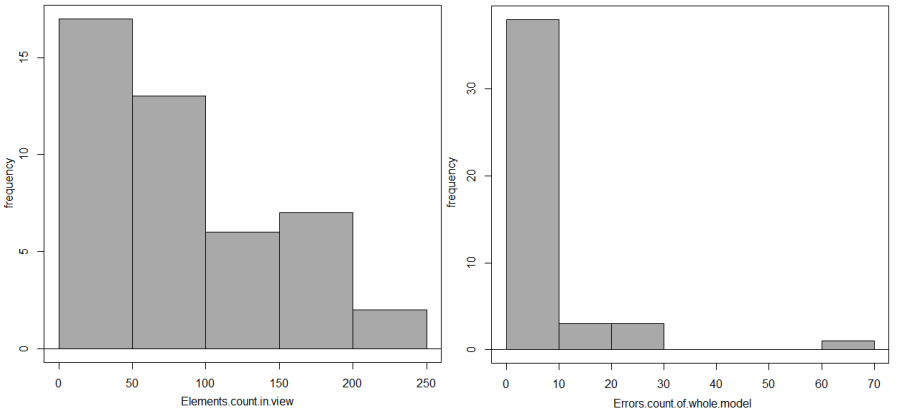
Variable	**Category**					**Frequency**
Department of public administration	Dep. of Transport:					9
	Dep. of Regional Development:					7
	Dep. of Interior:					7
	Dep. of Labor and Social Affairs:					6
	Non-dep. central public bodies:					3
	Dep. of Agriculture:					3
	Other:					10
Type	A:					39
	B2:					6
View conformant?	No:					30
	Yes:					15
Meta-model used	Full:					15
	Simplified1:					8
	Simplified2:					22
Variable	**Min.**	**1st Qu.**	**Median**	**Mean**	**3rd. Qu.**	**Max.**
Elements count in view	5	29	68	84	135	241
Error count in the whole model	0	0	0	4.62	2	66

Source: Author's own processing

The distribution of the view model elements count is roughly exponential. The views with the smaller count of elements predominate. Model errors are also exponentially distributed

and will most likely correlate with the unexpressed feature corresponding to the total number of architectural elements (Figure 4). This affects the possible statistics tests in the fashion of either transforming the data to achieve normality (e.g. logarithmic transformation) or using non-parametric tests.

Figure 8 | Plotted histograms of both quantitative variables



Source: Author's own processing

3 Results

Half of the examined public administration bodies use a secondly simplified meta-model (Simplified2) from the NAF. On the contrary, the full meta-model is used only in about one-third of cases. Only in one-third of the models is the overview model of the services of four-layer architecture conformant. The most common mistake is the contamination of the model with elements that do not belong to the meta-model. These were mainly a composite element for location and the addition of an aspect of motivational architecture. A formal assessment of the supplied models in terms of validation function revealed that most models are free of gross errors. However, for example, one architecture model has 66 errors. It can be safely concluded that the answer to RQ1 is that there is indeed a significant group of non-conformant models.

3.1 Hypothesis testing

Non-parametric tests were used for statistical testing. Due to the somewhat limited number of observations, two levels of significance (5% and 10%) are proposed. While the 5% level is arbitrarily accepted (Cowles & Davis, 1982), the 10% level is considered as a reference. The final verdict regarding the validity of the hypotheses is made as a synthesis of all available information. That is a synthesis of the statistical testing with the author's expert knowledge based on the evaluation of the descriptive analysis and its graphs.

H1 — The metamodel used affects the conformity of the view

The null hypothesis was chosen as the opposite of the hypothesis examined (in this case, the alternative). Thus, the null hypothesis takes the form H1_0: The model used does not affect the conformity of the view.

In this case, Fisher's exact test was used; the p-value is 0.0687. Therefore, at the 10% level of significance with a 90% confidence interval, the null hypothesis can be rejected and thus confirm the alternative hypothesis. The meta-model used affects the subsequent conformity of the model. At the 5% level of significance with a 95% confidence interval, the null hypothesis cannot be refuted.

Looking at the frequency table, it can be concluded that if the alternative hypothesis is valid, the implementation of the influence is that the use of a simplified meta-model increases the probability that the resulting view will be valid/conformant to the NAF.

H2 — The view elements count affects the conformity of the view

To test the truth of this hypothesis, due to the testing of the relationship between quantitative and two-level qualitative variables, the two-sample Wilcoxon test is used. In the first approach, a variant of the null hypothesis H2_0 is as follows: *Number of view elements has no relation to the correctness of the view*. The alternative hypothesis is therefore two-sided, which states that such a relationship exists.

In this case, the p-value is equal to 0.0406, both at the 10% significance level with a 90% confidence interval and at the 5% significance level with a 95% confidence interval, so the null hypothesis is rejected. Thus, the alternative hypothesis where the number of elements of the view affects the conformity is confirmed.

In this way, the alternative hypothesis is proven, but it is not possible to comment on the direction. Therefore, let the alternative hypothesis be that *with the increasing elements count of the view, the probability of no conformant view increases*. Thus, the null hypothesis H2I_0 states that *the higher count of view elements has no relation to its conformity, or it is increasing the probability for the view to be conformant.*

In this test, the p-value is 0.0203. It follows that both at the 10% significance level with a 90% confidence interval and the 5% significance level with a 95% confidence interval, the null hypothesis can be rejected. As the number of model elements increases, the probability increases that the resulting model will not be consistent with the view meta-model in NAR.

H3 — The meta-model used is linked to the errors in the whole model

Compared to the previous hypothesis, the relationship is between quantitative and qualitative more than the two-level variable. Thus, the Kruskal-Wallis nonparametric test was used to test this relationship. The null hypothesis H3_0 corresponds to the statement that *the number of errors in the whole model does not depend on the meta-model used*.

After performing the test, the p-value is equal to 0.0779, at the 10% significance level with a 90% confidence interval the null hypothesis is rejected, and the alternative hypothesis is confirmed. At the 5% significance level with a 95% confidence interval, the null

hypothesis could not be refuted. By observing the data, it is possible to specify the direction of the alternative hypothesis. The more complex meta-model used increases the total number of model errors.

H4 — Differences between public bodies/departments can be distinguished
Testing the fourth hypothesis encounters a low amount of data. Respectively, the data is distributed into many categories. The subsequent transformation of data into only department-like and non-department-like public bodies does not help. The data set would be meeting the minimum criteria for non-parametric tests, but its results would be highly inconclusive. Thus, in terms of data sets, this hypothesis cannot be evaluated.

Discussion and conclusions

Summarizing the results with hypothesis testing and the author's evaluation, the hypotheses H1, H2, and H3 could overall be concluded as proven. H4 remains open and has not been evaluated (Table 4). When linking back the hypotheses to the research questions, it can be observed that selected model views are non-conformant when initially sent to DECA. This non-conformity is also related to the ambition of individual authors/public bodies and their (lack of) capabilities to use more complex full meta-models (Table 5).

Table 8 | Hypotheses — evaluation

ID_H	Author's evaluation	Test, α = 0.1	Test, α = 0.05	Test used
H1	Stands	Stands	Unconfirmable	Fisher's exact test
H2	Stands	Stands	Stands	Two-sample Wilcoxon test
H3	Stands	Stands	Unconfirmable	Kruskal–Wallis test
H4	Not evaluable	-	-	-

Source: Author's own processing

Table 9 | Research questions — evaluation

ID_RQ	Research question definition	Author's evaluation
RQ1	Are the views conformant with the corresponding rules of NAF?	No, the views are in multiple occurrences non-conformant. Around 66% of views are faulty.
RQ2	Is there any relation between the view conformity and other factors?	Three direct relationships were found: With the simpler meta-model used there is a higher probability of conformant view. Having a lower element count also positively affects the model conformity. More complex models have a higher error rate.

Source: Author's own processing

The meta-model of the overview model of services of four layer-architecture is often not followed and thus non-conformant. Recurring mistakes, such as the use of location elements, suggest the idea of changing the meta-model of a view that is more in line with needs and actual practice.

In the current state, the discussed model views are prone to be faulty, in that their automated evaluation is currently out of the question. From the data sample, it can be observed that the public administrative bodies do not currently have sufficient architectural modeling capabilities. A recommendation would be to use the simpler meta-models to counter this lack of proficiency. At the same time, training should be provided to transfer modeling knowledge from DECA as a capable central authority to the other public administration bodies.

It can be concluded that the view is not correctly adopted in the landscape of the enterprise architecture of the Czech E-government. These results were consulted with DECA. In its last update (March 2021), DECA retired the overview model of four layer-architecture services. For now, DECA is using the structured table-like alternative instead.

Modifications of the given view and its integration into NAF could be the next research topic. It is also possible to extend this approach of conformity evaluation to other architectural viewpoints. Another direction would be a more detailed analysis of model usage from the perspective of human-computer interaction and/or its automation.

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RECRUITERS' PERCEPTION OF CHATBOT TECHNOLOGY WHEN HIRING A JOB CANDIDATE

Helena Řepová[7]

Abstract

This paper describes problems from the point of view of both recruiters and candidates. It focuses on the candidates' perception and the occurrence of verbal abuse in online job interviews mediated by a chatbot, and also the recruiters' skills and readiness to accept new technology as a part of their job. In the first phase, analysis was conducted, and verbal abuse occurrence was identified from records of actual job interviews with a chatbot from the Czech Republic and these records were categorized. In the second phase, I develop a questionnaire testing the proposed research questions with Czech recruiters about major factors of technology usage in the framework of Unified Theory of Acceptance and Use of Technology (UTAUT). Research is ongoing; results are currently a work in progress. This study may help recruiters consider various ways of handling chatbot implementation and profane candidates. Accordingly, the implementation of improvements before a chatbot launch that respects candidates' needs and minimizes triggers for profanity will be possible.

Key words: chatbot; verbal abuse; technology acceptance

JEL Classification: M12

Introduction

The new recruitment chatbot technology transforms the recruitment process, enabling communication without capacity problems and with possible customization. Chatbots search for job candidates on social media, initiate a dialogue with structured interview questions and also screen the candidates. They can attract candidates, provide a larger candidate pool and maintain a conversation without delays. Chatbots provide a new tool for conducting job interviews with candidates with many benefits for companies. Nevertheless, the research on candidate and recruiter perception is as new as chatbots are to recruitment.

Automatization changes the way candidates are attracted and screened at the beginning of the recruitment process. Applicants conduct the job interview online at any time with a communicating robot. Chatbots send job interview questions and candidates reply online with one click for the predefined answers. The chatbot collects the answers, and the recruiter then assesses the candidate pool. New technology brings new aspects for candidates and recruiters, although not all of them are positive.

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The first major aspect is missing nonverbal communication cues and the candidates can also suffer from a lack of opportunity to show their potential to the recruiter. Third, the candidates lack the opportunity to express themselves due to the chatbot dialogue management system based on neurolinguistic programming providing predefined answers. Finally, applicants facing a robot instead of a human recruiter can feel disrespected or threatened by a robot mind. Consequently, candidates communicate differently with chatbots than human recruiters. We can even find profane, sexual, and abusive comments addressed to the chatbot, so-called verbal abuse.

If we compare face-to-face job interviews with humans to chatbots, the difference in the occurrence of verbal abuse is significant. Possible answers for causes of verbal abuse by job candidates towards robots have roots in psychological, sociological and other profound theories (dehumanization, anthropomorphism etc.). This article presents triggers in the theoretical framework of a candidate's reaction towards the recruitment process and summarises them. The summary helps identify the occurrence of potential job candidates with aggressive impressions and consequently helps categorize substantial aggressive conduct.

RQ1a: What is the actual occurrence of verbal abuse by potential job candidates in chatbot mediated job interviews?

RQ1b: What are the logical groups of reactions with signs of verbal abuse in chatbot mediated job interviews?

We see chatbots replacing recruiters and due to the competition in the job and/or product market, recruiters have to raise their skill level to succeed and start using amenities typical in the era of Digital Recruitment 3.0 (Black & van Esch, 2019), hence recruiters' skills are shifting towards IT and marketing. The implementation of chatbots is demanding and challenging due to the lack of experience and because the implementation of AI recruitment tools such as chatbots easily results in failure and/or recruiter disappointment. Some recruiters gladly accept that they can exclude the task of conducting job interviews from their daily schedule. Job interviews are led by a chatbot resulting in a complete datasheet filled with a pool of candidates ready to be processed. Nowadays, we do not know if recruiters are willing to accept technological changes and the associated work to lead chatbot implementation projects. Sparse attention has been paid to the obstacles and expectations of these new recruitment tools. This paper presents issues on the recruiters' side and examines the recruiters' new way of work while they experience and adapt to new situations in the hiring process.

RQ2a: Do the facilitating conditions have a major positive impact on the recruiter's usage behaviour?

RQ2b: The influence of facilitating conditions on usage behaviour is moderated by a) age, b) experience, c) education, and d) managerial position so that the effect is stronger for older, more experienced, less educated and low positioned recruiters.

1 Candidates' reaction and verbal abuse

AI-enabled recruiting is popular among candidates due to its convenience (24 hour and anywhere job interview), nevertheless digital recruitment has limitations and may affect candidates' reactions (Esch & Mente, 2018). Candidates perceive Internet-based recruitment positively. But the perceptions of job applicants undergoing video job interviews showed more negative reactions than face-to-face interviews (McCarthy et al., 2017).

A lack of resources calls for recourse to theories regarding applicant reactions and digital selection procedures, not oriented to chatbots in recruitment, but digital selection procedures (DSP) in general. Studies confirmed several disadvantages of DSPs such as that they were viewed less favourably and were difficult to regulate and understand a dialogue (Greg et al., 2013). Candidates can express emotions even without the context of other communication aspects such as body language, pauses, intonation and hints. Candidates also found DSPs creepy and less personal (Langer et al., 2017).

If we take into consideration the finding that fairness perceptions increase with job-relatedness (Gilliland, 1993), as a major predictor of fairness perceptions (Bauer et al., 1998), we have to look at candidates' expectations and personalities. Even though we know that neuroticism can explain negative perceptions such as defence and aggression, it is not the complete answer. Honkaniemi et al. (2013) confirmed that the relation between personality and reactions cannot be explained easily and we have to focus on the whole personality. Moreover, it seems reasonable to expect that human-robot interaction entries have an effect on the perceived fairness of candidates with a connection to affective behaviour such as verbal abuse. Challenges to human chatbot interaction influencing candidates' reaction theory and fairness perception model have not yet been developed.

The real issue is not the total elimination of negative perceptions with affective behaviour afterwards, but an understanding of whether those who hold negative perceptions are desirable applicants. The situation is more complicated because reactions to tests are not just reactions to the procedure itself but reactions to being evaluated (Fiske, 1967). We also have to differentiate between candidates' reactions that are typical in regular recruitment processes (affective and cognitive states and general perceptions about testing and selection (Ryan & Ployhart, 2000) and reactions caused by digital selection procedures (DSPs).

1.1 Triggers of verbal abuse

Verbal abuse has several causes but a conflicting factor is that job applicants are likely to provide precise information about themselves when they are aware of receiving assessment afterwards (Kornilova & Novikova, 2012). Yet, the occurrence of verbal abuse in chatbot human job interviews is common. Therefore, this paper identifies six triggers as part of the candidate's reaction framework.

First, regulation and understanding the conversation in combination with natural language processing (NLP) used to speed up the communication and processing the data afterwards (Ryan & Derous, 2019) can be a factor influencing increased profanity. Second,

a trigger can be found in the personality of the candidate, which forms their reaction (Brenner, Ortner & Fay, 2016). This is supported by Chan and Schmitt (2004), who proposed that personal characteristics might be highly relevant to reactions to new technology.

A third trigger is the level of perceived fairness during a hiring procedure (Ötting & Maier, 2018). The second and third factors are also confirmed by Hausknecht, Day and Thomas (2004) in the Hausknecht model by two out of their four categories (in literature known as personal characteristics and perceived procedural characteristics).

A chatbot as part of AI may give rise to recruitment concerns and the consequences of an invasive hiring process (Ryan & Ployhart, 2000) in a company. Therefore, the fourth factor is the phenomenon of an overall invasive selection procedure, which has far more negative effects on the recruitment result than verbal abuse.

The fifth trigger in the framework of the theory of a candidate's reaction is technological acceptance and the sixth is a would-be conversation with so-called crypto minds. On one hand, candidates may perceive robots as social actors (Reeves & Nass, 1996) or, according to McClure (2017), candidates can be amazed, scared, curious, or surprised by their intrusion. Wegner and Gray (2016) describe emotions such as guilt, shame, envy, embarrassment, and pride, which can easily transform into aggressive or profane behaviour.

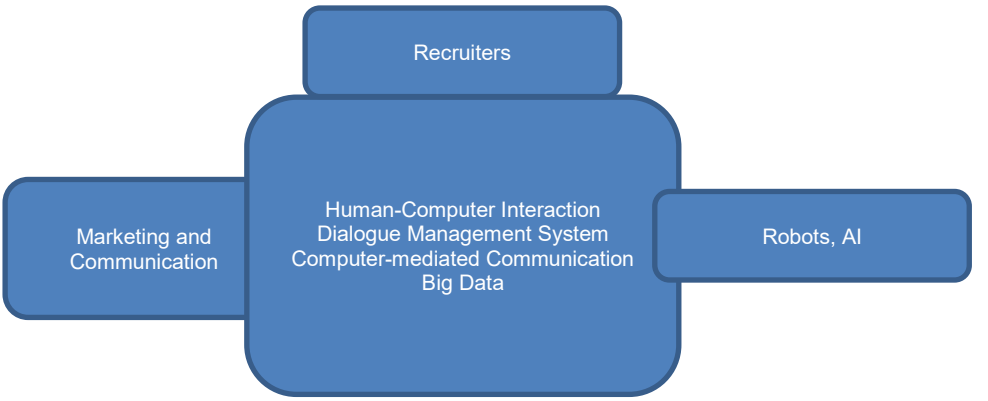
1.2 Recruiters and AI recruitment implementation

Nowadays, recruiters have more options to attract, source and select candidates; therefore, the term optimal hiring procedure attracts a lot of attention. The competitive battleground on the job market makes companies keep up with new recruitment trends (O'Donovan, 2019). We can identify two essential reasons that cause new forms of procedures in recruitment. The first is the external influences from the market such as technological amenities, emphasis on candidate experience and job/market competition. The second is internal changes such as the demand for high performers, new professions or fully qualified people. Moreover, recruitment is full of routine processes with much manual work so many recruiters find it exhausting and welcome automation. Nevertheless, if we examine the numbers, then technological amenities (e.g. robot process automation, application tracking system, Human Resources Information system) are used by half the companies, but only a quarter of these have already started with AI and robots (Shank et al., 2019). Extra difficulties come with the ability of management to delegate tasks and processes to AI, which is unnatural to humans due to the limited capacity for information processing (Heng, 2014). If we exclude other advantages and expectations of AI recruitment such as overcoming reliance on intuition and subjectivity (Highhouse, 2008), the form of cybervetting and biases, the long-term burden of recruitment, and being out of the equation, this article raises the question of if recruiters accept the shift in technology direction or tend to be more resistant to it.

1.2.1 Recruiters and skills

Recruiters' jobs do not get any easier with the increase in technologies if we consider newly desired skills. Technological amenities lighten the burden of repetitive administrative tasks, but recruiters' required skills are changing. We can see two basic shifts (Figure 1) into IT literacy and sales and marketing with the emphasis on Human-Computer Interaction and big data analysis. T-shaped skills of recruiters are the new level.

Picture 1 | Shifts in skills



Source: Author's own processing

Chatbots are a desirable help for recruiters although are also their replacement. Some recruiters prefer interviewing candidates themselves to chatbot led interviews resulting in an excel sheet with a pool of candidates. Recruiters as the main creators of chatbots have to factor in the whole system of job interviews. Such a complex system with specific rules includes time sensitivity and consideration of goal management, which is the basic concept of effective expert system preparation simulating a recruiter chatbot. A recruitment chatbot is an imitator of actual human recruiters not having the ability to immediately adapt during the screening of candidates. Also, obstacles with candidates have to be learnt to be overcome, such as their unwillingness to cooperate (not answering questions, prolonging answers, changing the subject). The structure and dialogue management system design is crucial and the first milestone towards success.

The second component required is a robust knowledge base, human-computer interaction interface and other context-based dialogue management (NLP, dialogue system design, context-based reasoning (CxBR) (Hung et al., 2009). Recruiters also must take into consideration that chatbot communication lacks nonverbal aspects, conversations are full of acronyms, abbreviations and subject changes (Werry, 1996). Moreover, recruiters represent their employers' branding messages and personal marketing strategy and how they communicate with candidates directly or via chatbots influence a candidate's perception. As

we can see, the limitations of the successful implementation of chatbot recruiters are growing.

1.2.2 Recruitment model update

Recruitment models help maintain complex processes and outline options; nevertheless, they do not provide new steps originating in the use of AI in recruitment. Some recruitment models define framework (Breaugh, 2008), other models e.g. 11 steps (Thebe & Van der Waldt, 2014), are more process-based, which is more suitable for the addition of extra steps recently discovered in chatbot use.

If a recruiter sets up a chatbot when selecting a method of recruitment, the recruiter has to change some of the steps in the recruitment model as he/she works with the chatbot in symbiosis. The initial six recruitment model steps do not change under the new circumstances (identify the job vacancy, make a job description, details and performance of the job, consultation of the recruitment procedure, search the sources of recruiting, choose the method for recruiting). An extra three steps are added as part of the seventh 'develop strategy' process, which must be put in use at least during the first implementation. Later on, we can see a parallel step to place advertisements in the appropriate places, which is a chatbot campaign.

The ninth step of the recruitment model — 'ensure there are enough time/ application blanks for applicant' has to be supported with an extra four substeps (collection of candidates and records of job interviews, answering questions given by candidates, continuous assessment of chatbot function as a recruiter, continuous assessment of advertisement of a chatbot). The last two steps of the recruitment process are not affected by the usage of chatbot mediated job interviews.

We can see there are at least eight new extra activities in comparison with the traditional recruitment process. Moreover, companies have limited experience with these technologies. Therefore, a company has to consider the benefits and costs of such implementation. The initial investment can be beneficial in the following cases:

1. The company is a job agency.
2. A company with a typical vacancy in the growth phase or a position with high fluctuation.
3. Other recruitment methods have failed, and their candidate pool is on social media.

The actual effect of using chatbots is initially greater control over the recruitment process and outputs (time for reaction, information to candidates, structure of the job interview, KPI metrics and control over recruiter (chatbot). Studies have confirmed chatbots attract more high achievers while poorly suitable candidates give up the procedure so customization and personalization increase the candidate pool. Chatbots help to maintain a better overview of key performance indicators and data analytics tools and enable better decision-making regarding candidates (Bafaro et al., 2017). On the other hand, studies about the efficiency of chatbot recruitment are not available, so the dilemma about the quality of candidates and

efficiency prevails. As we can see, the limitations of AI implementations predominate the outcomes. We can now focus on what chatbot mediated job interviews can bring to companies.

1.2.3 Advantages and disadvantages of chatbot mediated job interviews for recruitment

Recruiters use information gained from the social media profiles of potential job candidates to evaluate a person's job suitability (cybervetting) regardless of ethics and job relevance (Brown & Vaughn, 2011). However, candidates underestimate the above-mentioned issues as they believe it will not happen to them (Curran et al., 2014). Studies have proven the discrimination of women (versus men) and black and Hispanic (versus white population) (Van Iddekinge et al., 2016) even though the criterion-related validity is low (McCarthy et al., 2017). Recruiters can diminish the issues by following two rules. First, in the selection phase, the recruiters should not use data collected by a chatbot from profiles of PJC for subjective judgement, which was proven by predictive validity as a selection limitation factor. Second, recruiters should only use professional profiles available on social networks (like LinkedIn) (Becton et al., 2019). Either way, chatbots can prove better for cybervetting than recruiters since chatbots are primary data and information collectors. Wisskirchen et al. (2017) also suggest a more positive view, arguing that a chatbot has no emotions and its decisions are based on facts rather than judgment (Bafaro et al., 2017).

We can find two recurring views in studies on the problem of bias in recruitment and chatbots can help overcome this. One aspect is positive and represents the bright future of the elimination of bias through technologies (Bafaro et al., 2017). Opposers emphasize that the algorithms are part of the minds of people, stressing that they are the ones who create chatbots (Wright & Atkinson, 2019).

The main concern for recruiters to overcome is the effect of rememberable potential job candidates and the possibility of unrecognised potential. Imagine the difference if a recruiter remembers details or reads the information gained by a chatbot in the database with many other applicants. Chatbots cannot recognise PJC uniqueness/potential and remember it just like a human recruiter would. We can consider this phenomenon a technology gap and a possible source of frustration for candidates.

1.2.4 Recruiters' acceptance of technology

The main reason for the limitation in the implementation phase of AI can be answered by the technology acceptance theories. The most complex of these is the Unified Theory of Acceptance and Use of Technology (UTAUT), which identifies and evaluates the possible success of implementation with structured factors (Venkatesh et al., 2003).

This article suggests insufficient facilitating conditions (support, accessibility, knowledge, voluntarism) as critical factors triggering technology acceptance, and uses behaviour success (El et al., 2016). Another adverse condition limiting the implementation

of chatbot technology is the high ratio of junior level employees in recruiter positions and minimal experience with IT projects, therefore the mediating effect of maturity will be examined.

2 Methods

RQ1a: What is the actual occurrence of verbal abuse by PJC in chatbot mediated job interviews?

The target population were actual job applicants with chatbot job interview experience from the Czech Republic. These candidates applied for both low and high profile jobs, some of which required a university degree. In the first phase, I collected the data set from a Czech chatbot developer. The dataset consists of 6,583 records of job interview dialogue from individual job applicant reactions with four different companies representing production industry, retail and fast foods. I conducted analyses of written messages with the focus on identifying verbal abuse in the following subcategories: flirt, criticism, offensive language, despise, ridicule, provocation, sex offers. The content will be validated by an external check.

RQ1b: What are the logical groups of reactions with signs of verbal abuse in chatbot mediated job interviews?

I identified the reactions with verbal abuse from the collected data. Regardless of the amount of data, I decided to start with an empirical-to-conceptual taxonomy development approach. Seven categories of verbal abuse were used as the initial empirical basis (Nickerson et al., 2013) such as flirt, criticism, offensive language, despise, ridicule, provocation, sex.

The evaluation will be conducted by a series of card closed sorting rounds and a check for reliability of the agreement measures (Soranzo & Cooksey, 2015).

RQ2a: Do the facilitating conditions have a major positive impact on the recruiter's usage behaviour?

RQ2b: The influence of facilitating conditions on usage behaviour is moderated by a) age, b) experience, c) education, and d) managerial position such that the effect is stronger for older, more experienced, less educated and low positioned recruiters.

The target population for this study are recruiters from the Czech Republic. Data will be collected by an online survey (Qualtrics). Participation will be supported by email invitation, social networks and cooperation with chatbot developers. The online survey will contain close-ended questions. The data used in this study will be collected from three sections of the survey: UTAUT model (see Appendix 1), chatbot mediated job interview use and demographic data. In the demographics section, I will collect information about gender, age, position, education, management level and experience. The respondents will be asked to rate UTAUT items on a 7-point Likert scale ranging from 'I strongly disagree' to 'I strongly

agree'. Experience will be measured with a dichotomous variable (yes/no) indicating whether the respondent received training on chatbot technology in recruitment.

3 Results

I have identified 4.06% of verbal abuse messages towards a chatbot, i.e. 267 out of 6,583 transcripts with written reactions towards chatbot contained verbal abuse signs. Table 1 shows the descriptive statistics for both the communicating and non-communicating job candidates. Only 16% of candidates wrote messages to the chatbot, i.e. 6,583 cases from the 41,144 reactions. Another 84% of candidates (34,561) did not write any messages to the chatbot. If we take the whole candidate pool (with and without reaction), the verbal abuse occurrence then drops to 0.65%. The data has not yet been validated by an external check.

Table 1 | Basic overview of sample

Chatbot job interview	Number of job interview scripts	Frequency	Verbal abuse	Verbal abuse in communication
With active communication	6,583	16%	267	4.06%
Without active communication	34,561	84%	0	0
Total	41,144	100%	267	0.649%

Source: Author

Table 2 | Verbal abuse in chatbot mediated job interviews

Verbal abuse	Firm 2	Firm 3	Firm 4	Total	Frequency	Total frequency
Flirt	4		31	35	13.1%	0.53%
Criticism		7	7	11	4.1%	0.17%
Offensive language	2	8	154	164	61.4%	2.49%
Mockery			7	7	2.6%	0.11%
Ridicule	1		6	7	2.6%	0.11%
Provocation	1		4	5	1.9%	0.08%
Sex		1	34	35	13.1%	0.53%
Total	8	16	243	267	100.0%	4.06%
Frequency per firm	3.0%	6.0%	91.0%	100.0%		
Reactions totally	0.12%	0.24%	3.69%	4.06%		6583

Source: Author

Table 2 shows the majority of verbal abuse in chatbot mediated job interviews is represented by offensive language by 61.4% and sex and flirt with 13.1% each, together covering 87.6% of all verbal abuse reactions. Research is ongoing and the results are not evaluated. The findings are currently a work in progress.

4 Discussion

This study aimed to investigate verbal abuse in chatbot mediated job interviews as a new way of attracting and preselecting candidates and to measure the occurrence of verbal abuse for a better understanding of the size of the problem. To achieve this goal, I analyzed the scripts of real job interviews with candidates in the Czech Republic from records of 6,583 job interviews and categorized the verbal abuse reactions. It is obvious from this data that candidates in job interviews with chatbots behave more abusively than in other forms of interviewing procedures. Most notably, to my knowledge, this is the first study to investigate verbal abuse in chatbot mediated job interviews. These results add to and go beyond, previous research findings on regular day-to-day communication with chatbots and we can establish that an abusive command of language is another type of reaction in online communication with chatbots in job interviews.

The previous studies analyzed day-to-day conversation with a communicating robot. The first study indicated a 10% occurrence of abusive language in human to chatbot conversations with a frequency of 11% with signs of sex (Angeli & Brahnam, 2008), which corresponds with my finding in the category sex with 13%. The second study has more similarities with job interviews because the participants were aware their command of language was evaluated. The profanities then decreased to 1.2% (Park & Salvador, 2018). These results tend to be in sync with the current study where the small differences can be explained by the importance of job interviews in comparison with day-to-day communication and the possible effect of the candidate's impression management.

The last study calculated that profanities are not part of human to chatbot communication in 20% of cases (Hill et al., 2015). This divergence can be explained by the random selection of the sample; the current study used all the available data. Finally, each study had non-identical results but do show similar tendencies. Also, if we compare the respondent's samples, we can find supporting evidence on the possibility that the gender and age of the respondents play a major role in the occurrence of verbal abuse.

We know the digital selection procedure is not favoured by candidates — some of them find it creepy and less personal (Langer et al., 2019). Nevertheless, the current results should raise questions about how job candidates perceive chatbot mediated job interviews. To identify the reasons, we can start with the fact that chatbot mediated job interviews are on the rise, so the experience of job candidates is minimal. Uncertain candidates' expectations can trigger coping mechanisms such as defensiveness in such a stressful situation (Langer et al., 2019).

Another possible explanation is found in Potosky's (Potosky, 2008) aspects of interactivity and social bandwidth, which in general, are lower in digital selection procedures. Chatbot job interviews are written with predefined answers, therefore, the interaction is lower than in face-to-face or video job interviews. The crucial difference is the type of recruiter because the candidates now face a robot instead of a human recruiter. On one side, we can emphasize that the candidates have limited possibilities to interact, but once the candidates can talk to a chatbot it simulates the same moment in face-to-face job interviews, where candidates are given the space to talk to the recruiter.

At this point, the effect of chatbot mediated job interviews on company organization attractiveness is missing. Innovative companies implement chatbots as a cost-saving instrument. This equation can easily be harmed by the decrease of attractiveness with an effect on organization intentions according to the Gilliland model (Gilliland, 1993).

The results of this study cannot be taken as evidence for the rejection of profane candidates as the connection to counterproductive work behaviour is still unclear. However exploratory, this study may provide some insight into profane candidates and as the first step to address the reasons behind this phenomenon and add verbal abuse as part of the list of affective behaviour in candidates reaction theory.

Several potential limitations of the present study should be noted. The data was not yet evaluated to minimize researcher bias, prejudice and subjective judgment.

A second limitation is the insufficient demographic details about the candidates, which could help to define a profile.

Future studies should address the perception of candidates and identify grounds for such behaviour with the connection to the decision about employability.

Conclusions

Companies now rely on new technologies in recruitment with high expectations although chatbot implementation can easily fail due to the lack of experience and skills of the recruiters. Apart from listing the drawbacks that can lead to poor implementation and cause profanity, this research exposes six triggers of profanity in candidates' reactions to chatbot recruiters. This research advances the model of a candidate's perception of the fairness of new technology in job interviews and constitutes a step forward in understanding the reaction towards robot recruiters. The findings are currently a work in progress and we will have to wait for further discoveries.

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Appendix

UATAT Questionnaire:

Performance Expectancy

PE1: Chatbot mediated job interviews technologies are useful in recruitment in general

PE2: Using chatbot mediated job interviews enable recruiters to accomplish tasks more quickly

PE3: Chatbot mediated job interview technologies would improve recruiters' performance

PE4: Chatbot mediated job interview technologies would increase recruiter's productivity

Effort Expectancy

EE1: My interaction with chatbot technology would be clear and understandable

EE2: It would be easy for me to become a skilful system exploiter

EE3: I would find chatbot technology easy to use

EE4: Learning to operate chatbot technology will be easy for me

Social Influence

SI1: People who influence my behaviour think that it would be easy for me

SI2: People who are important to me believe that I should use chatbot technology

SI3: Management would motivate me to use chatbot technology

Facilitating conditions

FC1: I have the reasons and resources necessary to use chatbot technology

FC2: I have the knowledge necessary to use chatbot technology

FC3: Chatbot technology is not compatible with other systems I use

FC4: A specific person (or group) is available for assistance with chatbot technology difficulties

FC5: It would be good to use chatbot technology in work, even if it is not compulsory

FC6: Management does not require me to exploit chatbot technology during work time

FC7: It is compulsory to use chatbot technology in work

FC8: I would voluntarily be using chatbot technology

Attitude toward using technology

ATT1: Using chatbot technology is a good idea

ATT2: Exploitation of chatbot technology makes the job more interesting

ATT3: Exploiting chatbot technology is fun

ATT4: I will use chatbot technology with pleasure

Self-efficacy

SE1: If there was no one around to tell me what to do

SE2: If I could call someone for help if I got stuck

SE3: If I had a lot of time to complete the job for which the software was provided

SE4: If I just had the built-in help facility for assistance

Anxiety

ANX1: I feel apprehensive about using chatbot technology

ANX2: Inappropriate exploitation of chatbot technology could lead to huge information loss

ANX3: I hesitate to use chatbot technology for fear of making mistakes I cannot correct

ANX4: Chatbot technology is somewhat intimidating to me

Behavioural Intention

BI1: I intend to use chatbot technology in the next 12 months.

BI2: I predict I will use chatbot technology in the next 12 months

BI3: I know that I will use chatbot technology in the next 12 months
BI4: I always try new advanced technologies
BI5: I have to buy and own devices of the instant generation
BI6: I will not regret spending money on chatbot technology
BI7: I want to have the most advanced means of communication

THE VALUE OF A COMPANY PROFILE ON A SOCIAL NETWORK: CASE STUDY FROM THE HOTEL INDUSTRY

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Abstract

Business profiles on social networks have become company assets and, therefore, the subject of purchase or sale. But what method for the valuation of the social network profile should be chosen? This study aims to compare the current approaches for the valuation of Instagram business profiles. The study deploys the case study method and is based on quantitative and qualitative data. A company with an active profile on Instagram was selected for the analysis. We collected the quantitative data from the Instagram business profile and analyzed the value of this profile by using several valuation approaches. Subsequently, an interview with a social media manager of the analyzed company was conducted. The study shows that it is important for the company to orientate in the variety of methods for valuing business social media profiles as according to the results of the quantitative analysis, when calculated using different methods, the value can greatly differ. The results of the qualitative analysis show that there is no single correct methodology, but there are approaches appropriate for particular industries and particular valuation purposes. The main limitation of the study is that results cannot be generalized because the work is built like a case study. In addition, research is only conducted for one market area, so the results can differ for a company with other services. The originality of this study lies in the comparative analysis and adaptation of the asset valuation techniques to the assessment of the company's profile on the social network. This study provides the basis for subsequent extended research with a larger sample and analyzes the value of social media profiles on further networks such as Facebook and TikTok.

Key words: business valuation; Instagram; intangible assets; social media marketing

JEL Classification: M31, M41

Introduction

The era of the digital economy has brought a new type of capital, which economists call digital capital. A company's digital asset is the resources that underlie the processes of creating new products and services for the digital economy (Melnik & Antipova, 2020). Digital capital takes two forms. The first is tangible assets, such as servers or software. The

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second is intangible assets, which make up a large part of the digital economy. Evaluation of intangible assets, for example, software, property rights, goodwill and others is not a new topic for science (Bughin & Manyika, 2013). However, it has introduced a new type of asset to the market, such as a profile on social networks such as Instagram, YouTube, and Facebook. The presence of a company profile in social networks is a prerequisite for successful commercial activity. A profile on social networks is a modern advertising tool that has low costs and a wide potential customer reach. During the operation of the profile, the manager assesses how appropriate the investments were for their creation, what is the book value of this asset and how much money can be obtained from its sale.

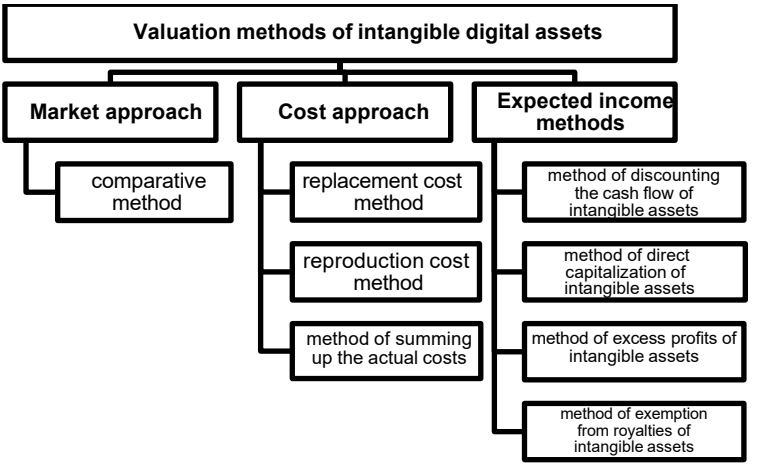
The issue of assessing intangible assets is not new and has been frequently discussed in the academic community. The assessment of intangible assets is presented in sufficient detail in the book by the Czech author Miloš Mařík (2018), who describes in detail the existing methods of assessing traditional intangible assets. The theoretical foundations, as well as the main metrics for evaluating intangible assets, are presented in the scientific article by A. Damodaran (2010) who presents a comparative analysis of existing assessment methods and provides their practical use. The issues of the impact of intangible assets on the total value of a company have been studied in sufficient detail in the academic sphere (Tahat et al., 2018; de Vasconcelos et al., 2019; Falson, 2019). The research results confirm the growing role of intangible assets in the development of modern companies. Most of the authors pay attention in their works to specific types of intangible assets, such as intellectual capital (Ioniță, 2020), know-how (Rodionov et al., 2020), human capital (Cavalcanti et al., 2020; Seo & Kim, 2020) and goodwill (Podhorska et al., 2019). The founder of the valuation of intangible digital assets is Roberto Moro Visconti. In his scientific work, the author analyzes in detail all the existing methods of evaluating digital assets and shows their place in the company's financial flows (Moro Visconti, 2020). Most of the studies on the valuation of intangible assets are theoretical or represent a comparative analysis and are not supported by empirical data. An even smaller number of authors pay attention to intangible digital assets and, consequently, their valuation. The main purpose of this study is to evaluate the value of a company's profile on Instagram using various methods of evaluating intangible assets. The results obtained were presented to the company's manager to assess the adequacy and reality of the results of each evaluation method.

1 Valuation methods of intangible digital assets

The valuation of intangible assets can be divided into two approaches — empirical and analytical. Empirical approaches are based on the observation and comparison of market prices for intangible assets. Analytical approaches are based on financial methods of asset valuation (expected profit, costs incurred or reproduction of an asset) (Moro Visconti, 2020). The main element in determining the cost of a profile on a social network is the assessment of the ability to generate financial flow. Conducting an assessment requires an objective calculation of the value of the digital property, which is complicated by two factors. The

first is the need for continuous development of the company's website or profile. The second is the many characteristics and metrics that have a direct impact on the market value of a digital asset.

Figure 9 | Valuation methods of intangible digital assets



Source: Authors' own processing based on Moro Visconti (2020), Mařík (2018) and Damodaran (2010).

The global practice of asset valuation suggests that intangible assets can be valued using three well-known valuation methods (Figure 1). Some types of intangible assets, such as patents or know-how, are difficult to evaluate because it is necessary to use not only quantitative but also qualitative methods for evaluation (Gómez Arroyave et al., 2019). Legal nuances, information asymmetry, and unaccounted-for costs play an important role in the valuation of such assets. The value of intangible assets is subject to temporary variability. Temporary variability, in turn, is considered in the risk that affects the valuation of an intangible asset.

The choice of methods for evaluating intangible assets depends on the objectives of the assessment, the available data for analysis, as well as on the type of assets. Nevertheless, each evaluation approach used should theoretically lead to similar results. However, in practice, the evaluation results may differ. Below is a more detailed analysis of each of the assessment approaches presented in Figure 1.

1.1 Market method

This consists of the fact that the value of an asset is calculated based on market information about the purchase or sale of the asset (Moro Visconti, 2020). It is worth noting that the application of a comparative approach is very difficult since the objects of intangible assets are often original and have no analogues in the market or in competing companies or

intangible assets are sold together with other assets, and not separately. Accordingly, there is a need to allocate the amount paid for the estimated IA from the transaction value, and it can be very difficult to do this. As a rule, the market approach uses data from the exchange, where similar intangible assets are represented.

1.2 Cost methods

According to this approach, the value of intangible assets is the sum of the costs incurred to create or reproduce an intangible asset. Often, economists do not see the difference between the replacement cost method and the reproduction cost method. However, the difference is that the replacement cost is based on the market valuation of an identical IA, and the reproduction cost is based on the historical cost of actual costs (including depreciation) when creating a similar IA. The replacement cost method contains reaching the asset's value by orientation on the present-day cost, in an arms-length matter, of changing that asset with an analogous asset in a comparable situation (plus, if suitable, expense of any taxes due). The main principle of the method is that a buyer is not willing to pay extra for the chosen asset, but also, the seller would not agree on smaller price for that exact asset. The method can be used to value both an entire business and its individual assets (Ripinsky & Williams, 2015). Replacement cost can be described as the sum of money needed for the production to change a vital asset for another one for the same or upper price. Replacement cost may vary, depending on the market worth of components that will be used to recreate the asset. As part of the cost approach, the following methods are used to assess the value of intangible assets and intellectual property objects: the method of summing up the actual costs; the replacement cost method; the reproduction cost method (Moro Visconti, 2020).

The method of summing up the actual costs — the method of summing up the actual costs applies to the intangible assets that are created by the copyright holders themselves. The essence of this method is to sum up all the expenses incurred in relation to an intangible asset.

The replacement cost method — the basis of this method is the identification of the value of the rights to intangible assets with the costs of its reconstruction, considering a reasonable amount of profit. Such a reconstruction involves a complete copy of the calculation of the estimated object of intellectual property and accounting for the costs of its legal protection.

The reproduction cost method — this method assumes that an analogy of the intellectual property object being evaluated with similar consumer properties is used for evaluation. The calculated cost considers the costs of bringing the intellectual property object — an analogy that replaces the estimated intellectual property object — to a state ready for further use for the planned purposes. Such costs may be the costs listed in the cost of creation method, which consider the amount of remuneration only for the people who contributed to the acquisition of a substitute intellectual property object and brought it into a state suitable for further use for the planned purposes. The method of reduced costs in calculating the current market value of the valuation object is to recalculate the actual past costs for the creation

and preparation for the use of the valuation object to the current value, considering the change in money over time.

The main disadvantage of the cost approach is the discrepancy between the costs at present and the cost in the future. The essence of the problem lies in the fact that the existing methods of assessing intangible assets in the framework of the cost approach do not fully consider the inflationary change in the purchasing power of money, as well as the ability of money to generate income if it is invested in alternative projects.

1.3 Expected income methods

The income approach assumes that the value of an asset is equated to the net discounted value of the flows generated by this asset, or to the discounted value of the costs that were avoided when owning this asset (Parr & Smith, 2005; Moro Visconti, 2020). In other words, the value of an asset depends on its ability to generate income. Therefore, to apply a profitable approach, it is first necessary to predict additional flows created by an intangible asset. The income approach in the valuation of intangible assets is used on the condition that it is possible to receive income from an intangible asset. The benefits from the use of an intangible asset are determined based on a direct comparison of the amount, risk and time of receipt of the cash flow from the use of the asset with the amount, risk and time of receipt of the cash flow that the rightsholder would receive if the intangible asset was not used. Valuation of the market value of an intangible asset using the income approach is carried out by discounting or capitalizing cash flows from the use of an intangible asset (Uzma et al., 2010).

The method of discounting the cash flow of intangible assets — for valuation items that bring cash flows from the use of an intangible asset for equal periods of time that are not equal in value to each other, the value is determined by discounting future cash flows from the use of an intangible asset (Schauten et al., 2010). The determination of the market value of an intellectual property based on discounting includes the following basic procedures: valuation of the amount and time structure of cash flows generated by intangible assets; determining the value of the corresponding discount rate; calculation of the market value of intangible assets by discounting all cash flows associated with the use of intangible assets. At the same time, discounting is understood as the process of bringing all future cash flows from the use of an intangible asset to the valuation date at a discount rate determined by the appraiser. When calculating the discount rate for cash flows generated by the estimated intellectual property, it is necessary to consider following: the risk-free rate of return on capital; the amount of the risk premium associated with investing capital in the acquisition of the estimated intellectual property; the rates of return on capital of investments with a similar risk level.

The method of direct capitalization of intangible assets — for valuation items that bring in cash flows from the use of an intangible asset for equal periods of time, equal in value to each other or changing at the same rate, the value is determined by capitalizing future cash flows from the use of an intangible asset. Determining the market value of an intangible

asset based on capitalization includes the following basic procedures: determination of cash flows; determining the value of the corresponding cash flow capitalization rate; calculation of the market value of intangible assets. Capitalization is defined as the determination of the value of all future equal or changing at the same rate amounts of the cash flow from the use of an intangible asset for equal periods of time at the date of the valuation. The calculation is made by dividing the amount of the cash flow from the use of an intangible asset for the first period after the valuation date by the appropriate capitalization rate determined by the appraiser. When calculating the capitalization rate for cash flows, the following should be considered: the value of the discount rate; the most likely rate of change in the cash flow and the most likely change in its value.

The method of excess profits of intangible assets — the profit advantage is understood as the additional profit generated by the estimated IA. The profit advantage is formed either in comparison with enterprises that produce similar products, but without the use of the estimated intangible asset, or in comparison with the production of products by the same enterprise, but before the use of the estimated intangible asset (Moro Visconti, 2020). The essence of this method is to predict and evaluate in monetary form the profit advantage that arises throughout the entire period of use of an intangible asset, bring it to its current value, and sum it up, which will be the value of the intellectual property object being evaluated.

The royalty exemption method is used to estimate the value of patents or licenses. The patent owner grants another person the right to use an intangible asset for a certain fee (the royalty). Royalties are expressed as a percentage of the total revenue received from the sale of goods produced using an intangible asset (Reilly & Schweihs, 2016). According to this method, the value of an intangible asset is the current value of the flow of future royalty payments over the economic life of the patent or license. The amount of royalties is determined based on market analysis. The method of exemption from royalties exists in three modifications that differ in the calculation base (gross revenue, additional profit, gross profit).

2 Data and Methods

The methodology of this study is a case study. An analysis of the literature has shown that there are three approaches to assessing the value of intangible assets, namely: market, cost, and income. Each approach has several evaluation methods. As part of this study, the authors conducted an analysis using all the available methods. Thus, the case study is based on the analysis of these methods from three approaches to the assessment of intangible assets, namely the hotel profile in the Instagram social network. Below are the calculation formulas:

Table 1 | Calculation formulas

	Method	Calculation formula
Expected income methods	Method of discounting the cash flow for intangible assets	$VIA = \sum_{i} \frac{CF_i}{(1+r)^i}$
	Method of direct capitalization of intangible assets	$VIA = \frac{CF_0}{r_k}$
	Method of exemption from royalties for intangible assets	$VIA = \sum_{n=1}^{T} \frac{(V_n * r_n * C_n) * (1 - TR)}{(1+d)^n} + BD$
	Method of excess profits from intangible assets	$VIA = \sum_{t=1}^{T} \frac{\Delta\Pi_t}{(1+r)^t}$
Cost approach	Method of summing up the actual costs	$VIA\ (C_t) = C_1 + C_2 + C_3 + C_4 + \cdots + C_n$
	Replacement cost method	$VIA = K_d \sum_{i=1}^{T} C_i * \alpha_{ti} * K_i$
	Reproduction cost method	$VIA = \sum (R_i * K_i)$
Market approach	Comparative method	Comparative analysis of market prices

Source: Authors' own processing

The data for the study has both quantitative and qualitative characteristics. Quantitative data includes such data as accounting statements, profile KPIs (the number of subscribers, the number of days of operation of the profile, the number of likes, the number of sales, the volume of audience engagement). Qualitative data includes such data as the structure of the company's balance sheet, the results of an interview with the SMM manager of the hotel, as well as external and internal information from the Internet (reviews, a news feed, etc.). It is worth noting that for intangible assets with an indefinite useful life, depreciation is not accrued; such intangible assets include the company's profile on the social network.

The design of the study is in the following sequence. The first step was the collection and initial analysis of quantitative and qualitative data of the company for further work. The second step was to evaluate the cost of the hotel profile using the evaluation methods listed in Table 1, each of which relates to one of the three evaluation approaches. The third step was a comparative analysis of the results obtained. The fourth step was an interview with the hotel manager responsible for maintaining the profile; the results of the profile cost assessment were presented to the manager. The recommendations were made based on the

calculations received and taking into consideration the information received from the manager.

3 Results

The results of calculating the cost of the profile according to the different approaches and methods are presented in Table 2. The calculation was not carried out in a profitable way due to the lack of information about the cash flows in the company's profile. The profile does not bring money to the hotel, since Instagram does not allow to book, pay for and sell hotel services. From the data in Table 2, the value of the company's profile is very different depending on the valuation method used. The highest cost of the profile (262,951 CZK) is observed in the profitable approach. This is followed by a costly approach where the values obtained according to this approach do not differ much from each other (135,021 and 141,660 CZK). The lowest cost of the profile is observed in the methodology of the market approach (36,380 CZK). For a more detailed analysis of the methods of evaluating the company's profile on Instagram, an interview was conducted with the hotel manager, whose profile was evaluated by the authors of the study.

Table 2 | Results of calculating the value of the company profile

	Method	Value of company profile (CZK)
Profitable approach	Method of discounting the cash flow of intangible assets	0
	Method of direct capitalization of intangible assets	0
	Method of exemption from royalties for intangible assets	0
	Method of excess profits from intangible assets	262,951
Cost approach	Method of summing up the actual costs	141,660
	Replacement cost method	135,021
	Reproduction cost method	135,021
Market approach	Comparative method	36,380

Source: Authors' own processing

Have you estimated the value of your company's profile on Instagram before? The company does not evaluate the value of the company's Instagram profile. As a rule, the manager considers the costs of maintaining the profile, pays attention to their expediency, and controls the profitability of these costs. A possible reason why the company does not estimate the cost of the profile is that it is quite difficult to estimate the income that the profile brings. A further important fact is copyright or the owner of this asset. As a rule, the owner of the profile is the social network itself, that is, the company does not receive all the rights to this asset.

How much of your marketing expenses do you allocate to maintaining an Instagram profile? The costs of maintaining the company's Instagram profile are commensurate with the content of the website. An Instagram profile allows you to share news, interact with the audience, and conduct marketing activities. Among other things, a special place for expenses is occupied by targeted advertising as well as the costs of interaction with bloggers. For a hotel, an Instagram profile is a necessity today; the share of expenses for maintaining a profile is up to 20% of the total amount of marketing expenses.

What role does your Instagram profile play for your company? How much income does your Instagram profile bring you? It is not possible to estimate the income from the Instagram profile. Yes, there is a store function for selling goods directly through Instagram, but this is not quite suitable for the hospitality industry. As a rule, hoteliers try to track the movement of the client (from where the client came to the hotel) through a system of promo codes. They create a unique promo code for social networks, which allows you to find out whether this client came through Instagram or Facebook. For the hotel, the Instagram profile is a tool that allows you to attract attention, declare yourself on the market and thereby raise the level of sales. In other words, Instagram leads the client to the company and then the sales manager or to specialized services (Booking.com or the hotel's website) to make a sale and bring cash to the hotel.

Are the presented results of the company's Instagram profile assessment objective in your opinion? Which of the presented approaches most accurately reflects the real value of the company's profile on Instagram? The market value of the profile is the reality of today; no one will pay more than the average market value. However, the market price often does not reflect the real cost of the Instagram profile. Content creation, the work of a graphic designer and retoucher, the salary of an SMM manager, targeted advertising, advertising from bloggers — all these costs can often not be estimated when selling at auction. A cost-based approach to assessing the cost of a profile is optimal for the company owner. The dynamic assessment will allow you to track the level of costs for maintaining the profile. The revenue approach in a specific example showed how the company's revenues changed with the appearance of the profile. However, the question arises — is this the merit of the profile on Instagram or a new employee of the sales department? The real value is shown exclusively

by the market approach, the price at the auction considers the specifics of the profile (industry), the parameters of audience activity, the success of marketing campaigns and much more. The market approach is optimal for the buyer. It is necessary to find a middle ground between the interests of the owner and the buyer in the issue of evaluating the value of the company's profile in the social network.

Do you plan to track changes in the value of your company's profile in the future? If so, what approach will you use? The assessment of the hotel's profile in the social network was conducted for the first time and helped not only to understand how much this profile can be sold for but also to calculate the costs of creating this profile. It is the calculation of total expenses that is relevant for the hotel. Estimating the cost of the profile in accordance with the cost approach will help the hotel control the level of expenses and, consequently, the profitability of these expenses.

Discussion and conclusions

The results presented several areas for discussion. It is problematic to assess the economic benefits of using Instagram in the context of the hotel business. Undoubtedly, an Instagram profile brings economic benefits, but companies use the profile primarily for marketing purposes, increasing brand awareness and, consequently, for interaction with the audience (customers).

A comparative analysis of various approaches to assessing the value of a profile as an intangible asset has shown that the most viable is the market and cost approaches. The results of the interview with the hotel manager showed that for business owners who maintain a profile on Instagram, the most appropriate approach is a costly one. The methods of the cost approach represent the sum of the total costs of creating a profile. The cost-based approach in dynamics enables to control the share and amount of costs for maintaining the profile and can be used by business owners as a tool for monitoring and evaluating profitability. In turn, the real price of the profile is represented by the market approach, which is based on a comparative analysis of similar profiles placed at the auction. The market approach considers all the specifics of the profile (involvement, activity, scope of the profile) and is optimal for a potential buyer or an external stakeholder.

The results obtained allow us to state that today there are no approaches and methods for correctly estimating the cost of a company's profile in a social network. Each of the approaches (methods) uses a limited list of factors (coefficients) that cannot most accurately and objectively represent the cost of the profile. The market approach considers the supply and demand in the sales market. The cost approach is based only on the costs incurred, the amount of which often depends on the company's industry, as well as on the knowledge and skill of the SMM manager. The income approach is based on the calculation of the cash flow, which is problematic in the context of evaluating a profile on a social network.

There is a need to accurately determine the company's profile in social networks as an intangible asset. Small businesses (especially retail) have been using Instagram as their main trading platform for several years and therefore receive income. Instagram constantly makes updates and goes towards the business; perhaps functions will be presented soon and possibly for other forms of sale. There is also a need to modernize the methods of cost estimation, a symbiosis of the market and cost approach. A mixed approach will be able to consider not only internal but also external factors, which in turn will enable to determine the cost of a profile more objectively in a social network.

As a direction for future research, we can recommend increasing the number of profiles for evaluation, expanding the number of industries, as well as evaluating the cost of a profile on various social networks. For a more qualitative and in-depth study, we can note an attempt to evaluate with a mixed approach, which will bring new theoretical and practical advantages.

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