



Michael Kupec, Dagmar Jakubíková, Václav Kupec

Web Personalization And Artificial Intelligence As Tools For Marketing Communications

ABSTRACT

Market relationships have undergone profound changes in the past two decades, which have been accelerated by the crisis of the global pandemic. This has led to a fundamental transformation in the communications not only of businesses but also of governments, organizations, and communities. This study addresses web personalization with an emphasis on artificial intelligence in the context of their use for managing and decision-making in marketing processes in practice. These two techniques tend to be often confused in practice, and for this reason it is helpful to define their positions and mutual interactions. The goal of this article is a theoretical comparison of web personalization and artificial intelligence as part of marketing processes and the proposal of a framework for their use for creators of any online media content. At the same time it sheds light on the meaning and use of web personalization for management in practice and in particular in marketing processes and proposes a model for implementing these techniques that can be used in strategic marketing. This article presents research questions and uses secondary data analysis in the form of literature review and content analysis. The result is categorization of web personalization and artificial intelligence techniques, identifying their mutual links, and proposing an application framework for marketing practice. This article contributes to the discussion by identifying managerial use of defined techniques and their position in strategies for producers of online content and offers a new perspective on the interaction of personalization and artificial intelligence, whereas this approach has not been sufficiently explored in the academic literature.

KEY WORDS

Internet. Personalization. Artificial intelligence. Management. Marketing. Communication.

1. Introduction

Web personalization is a tool used by marketers for the purpose of improving competitiveness, as it allows them to better communicate with existing customers or recipients of marketing information. At the same time it is a tool for acquisition of new customers. The current trend in web personalization is to closely integrate it with artificial intelligence (AI). These are two topics each worthy of research in their own right; nonetheless the technological trend of recent years indicates that artificial intelligence is gaining importance in personalization. Web personalization can operate independently without artificial intelligence, and yet AI increases the potential effectiveness of web personalization for marketing purposes. Likewise, artificial intelligence can understandably be used in many other fields, not only in web personalization. Of course, within the use of marketing tools it is advantageous to use artificial intelligence to support existing managerial strategies or to formulate new strategies tailored directly to the use of AI in personalization.

The importance of web personalization is linked to the growth in accessibility of computer technology and its improvements in quality, whereas it may be assumed that future trends in marketing will be fundamentally impacted by these technologies.¹ Every smartphone and other device connected online is a potential source of data for web personalization. The concurrent growth in internet transmission speeds is leading to more efficient work with large volumes of data, which managers now use in the management and administration of online activities.²

The importance of web personalization and artificial intelligence for markets but also for the functioning of society has been significantly reinforced by the global pandemic crisis caused by the COVID-19 disease. For example, in the year 2020 the Czech Republic reported a drop in gross domestic product (GDP) of 5.6%, whereas in 2019 GDP grew by 2.2%.³ The European Union as a whole reported an decrease in its economy of 6.4%, the largest decrease since 1995.⁴ During the crisis, customers transformed their behaviour, and oriented themselves even more toward consumer activity on the internet.⁵ The result is a fact that managers should reflect on, namely that a customer operating in the online space must inevitably face personalization marketing activities. As the competition must necessarily come to a similar conclusion, the proper setting of these techniques and their use in marketing is one of the key aspects of success for marketing managers at the time of the crisis and, it can be assumed, in the period after the pandemic. This applies to all sectors with steep competition, since as Vrabec states: *“Informatisation and cybernetization of all processes is not a phenomenon that affects only the sphere of industry, but also the whole service sector, the functioning of all institutions and last but not least the labour market.”*⁶ It is therefore an important marketing task to figure out how to balance these techniques in properly implemented management and decision-making in marketing processes⁷ in practice.

¹ SOSIN, A.: How to Increase the Information Assurance in the Information Age. In *Journal of Defense Resources Management (JoDRM)*, 2018, Vol. 1, No. 13, p. 45.; DAVENPORT, T. et al.: How Artificial Intelligence Will Change the Future of Marketing. In *Journal of the Academy of Marketing Science*, 2020, Vol. 48, No. 2, p. 24.

² HU, K.-H. et al.: Identifying the Key Factors of Subsidiary Supervision and Management Using an Innovative Hybrid Architecture in a Big Data Environment. In *Financial Innovation*, 2021, Vol. 7, No. 1, p. 23.; YUAN, Q. et al.: Research on Mixed Planning Method of 5G and LTE. In *3rd International Conference on Information and Computer Technologies (ICICT)*, 2020, p. 489.

³ ČTK: *Česká ekonomika se loni rekordně propadla, letos se vrátí k růstu.* [online]. [2021-09-21]. Available at: <<https://www.ceskenoviny.cz/zpravy/ceska-ekonomika-se-loni-rekordne-propadla-letos-se-vrati-k-rustu/1990527>>; ČESKÝ STATISTICKÝ ÚŘAD: *Hrubý domácí produkt – časové řady ukazatelů čtvrtletních účtů.* [online]. [2021-09-21]. Available at: <https://www.czso.cz/csu/czso/hdp_cr>.

⁴ ČTK: *Ekonomika EU loni kvůli pandemii klesla o 6,4 procenta.* [online]. [2021-09-21]. Available at: <https://www.ceskenoviny.cz/index_view.php?id=1990662>.

⁵ ALMEHMADI, A.: COVID-19 Pandemic Data Predict the Stock Market. In *Computer Systems Science & Engineering*, 2021, Vol. 36, No. 3, p. 451.

⁶ VRABEC, N.: Soft Skills in the Digital Age. In BUČKOVÁ, Z., RUSŇÁKOVÁ, L., SOLÍK, M. (eds.): *Megatrends and Media: Digital Universe*. Trnava : FMK UCM v Trnave, 2019, p. 301.

⁷ LUKÁČ, M. et al.: The Interaction Between the Marketing Communications Audit and Visitors in Museum Facilities. In *Communication Today*, 2021, Vol. 12, No. 1, p. 80.

As the techniques of web personalization and artificial intelligence are often perceived as separate and unrelated techniques (even in the academic literature), despite their close mutual association, it would be fitting to focus on their mutual relationship and the options to apply them as part of the marketing processes of a business. Within the above context, two research questions (Q)/problems (P) emerge:

- Q1/P1_{descriptive}: What is the relationship between web personalization and artificial intelligence in academic literature?
- Q2/P2_{descriptive}: What is the conceptual relationship between web personalization and artificial intelligence?

The goal/aim (A1) of this article is therefore a theoretical comparison of the techniques of web personalization and artificial intelligence in the marketing environment. This goal will be achieved using the following hypotheses (H):

- H1: The techniques of web personalization and artificial intelligence are comparable in terms of academic interest.
- H2: There is a correlation between the techniques of web personalization and artificial intelligence.

2. Literature Review

Focusing on web personalization has never been more pressing than at the time of the global pandemic crisis. Communication with customers is a key factor in such critical moments.⁸ It is web personalization that serves for targeting communications to the end customer⁹ and its efficiency is increased by using artificial intelligence.¹⁰ Its use therefore represents one of the tools that marketing managers can use in their management to handle this complex situation. The reason is that apart from profit, they monitor reputation, positioning, and general awareness of the topic (concept, product, service) they are communicating.¹¹ For this reason it is important to review it also with a view to using techniques for working with artificial intelligence.

Data from the perspective of businesses in the Czech Republic at the turning point of the year 2020 are not yet available, however in 2019 over 30% of companies and businesses carried out sales over the internet, whereas these sales accounted for 30% of all their revenue in the given year, which means that since 2009 the number of sellers increased to the same extent as the share of sales out of the total sales of companies approx. 1.5 times over.¹² And yet customer data for 2020 is available, from which it appears that while the share of buyers on the internet grew at a stable tempo, between 2019 and 2020 this share leapt upward from 39% to 54%.¹³ Here a wide space has thus opened for the use of web personalization and artificial intelligence.

⁸ LEE, S. Y.: Stealing Thunder as a Crisis Communication Strategy in the Digital Age. In *Business Horizons*, 2020, Vol. 63, No. 6, p. 801.; PETRŮ, N., JAKUBÍKOVÁ, D.: The Management of Succession Strategy - Intergenerational Challenge. In *Ad Alta - Journal Of Interdisciplinary Research*, 2015, Vol. 5, No. 2, p. 69.

⁹ GARRIGÓS, I., GOMEZ, J., HOUBEN, G.-J.: Specification of Personalization in Web Application Design. In *Information and Software Technology*, 2010, Vol. 52, No. 9, p. 991.

¹⁰ HUANG, M.-H., RUST, R. T.: Engaged to a Robot? The Role of AI in Service. In *Journal of Service Research*, 2020, Vol. 24, No. 1, p. 30.

¹¹ ASLAN, E. Ş., DEMIREL, Ç.: The Slogan Effect: The Power Of Brand Discourse in Liking And Purchasing Behaviour. In *Media Literacy and Academic Research*, 2021, Vol. 4, No. 1, p. 70.

¹² ČESKÝ STATISTICKÝ ÚŘAD: Využívání informačních a komunikačních technologií v podnikatelském sektoru za rok 2020. [online]. [2021-09-21]. Available at: <<https://www.czso.cz/csu/czso/vyuzivani-informacnich-a-komunikacnich-technologii-v-podnikatelskem-sektoru-2020>>.

¹³ ČESKÝ STATISTICKÝ ÚŘAD: Využívání informačních a komunikačních technologií v domácnostech a mezi jednotlivci – 2020. [online]. [2021-09-21]. Available at: <<https://www.czso.cz/csu/czso/vyuzivani-informacnich-a-komunikacnich-technologii-v-domacnostech-a-mezijednotlivci-2020>>.

2.1 Web Personalization

Personalization has become an inseparable part of everyday reality for internet users, even though they do not realize it much of the time. It serves for targeting communication at consumers and its impact for the communicating subject can be critical.¹⁴ Because the internet is used in society mostly by individuals – for example, in the Czech Republic alone this accounts for more than three quarters of the population aged 16 to 74 years,¹⁵ which suggests that the influence of personalization affects a substantial part of society. The situation in which online media¹⁶ and profiles on online platforms brings an increasing number of personalized campaigns regardless of whether they are political or commercial is described in academic research.¹⁷ Web personalization is therefore used by commercial organizations and producers of media content¹⁸ to target their customers, whereas the trend is such that customers require responsive communication with the seller or producer of online content.¹⁹ Customers therefore wish to have a dialog with the other party, whereas they are also willing to provide valuable data using this responsive communication, which the business and producer can then use for additional targeting of their campaign. Such data can nonetheless be obtained from customers even without their awareness. Among other things, it is necessary to discuss a wide range of risks associated with web personalization.²⁰

And yet it is necessary to view personalization as a tool that presents a significant advantage and opportunity for businesses and all who have their activity on the internet.²¹ In moments such as the contemporary COVID-19 crisis, such a tool can also bring a competitive advantage that can play a significant role in survival on the market. When the off-line economy is suddenly de facto closed, businesses seek other opportunities to ply their trade. This therefore creates an opportunity to move their activities into the online space if businesses aren't already operating there. If they were already active before the crisis, they can enhance their internet activity. Since it can be assumed that a similar step will be taken by competitors offering a substitute product, the business should seek out a tool for differentiating from the competition. Here a substantial space can thus be found for web personalization. Based on research and academic texts focusing on this topic, it can be said that the proper management of personalization leads to increasing the customer's awareness to purchase a product or goods.²²

¹⁴ GARRIGÓS, I., GOMEZ, J., HOUBEN, G. J.: Specification of Personalization in Web Application Design. In *Information and Software Technology*, 2010, Vol. 52, No. 9, p. 991.

¹⁵ ČESKÝ STATISTICKÝ ÚŘAD: *Informační společnost v číslech*. [online]. [2021-09-21]. Available at: <<https://www.czso.cz/documents/10180/90577061/06100419c.pdf/3f2e4e4e-cbdb-4e6c-8904-c21160ddaea8?version=1.2>>.

¹⁶ BEŽÁKOVÁ, Z., MADLEŇÁK, A., ŠVEC, M.: Security Risks of Sharing Content Based on Minors by Their Family Members on Social Media in Times of Technology Interference. In *Media Literacy and Academic Research*, 2021, Vol. 4, No. 1, p. 53.

¹⁷ METZ, M., KRUIKEMEIER, S., LECHLER, S.: Personalization of Politics on Facebook: Examining the Content and Effects of Professional, Emotional and Private Self-personalization. In *Information, Communication & Society*, 2019, Vol. 23, No. 3, p. 1481.

¹⁸ MADLEŇÁK, A., ŽULOVÁ, J.: *The Right to Privacy in the Context of the Use of Social Media and Geolocation Services*. Budapest : Wolters Kluwer, 2019, p. 32.

¹⁹ ZIEMBA, E. et al.: Prosumers' Engagement in Business Process Innovation – The Case of Poland and the UK. In *Interdisciplinary Journal of Information, Knowledge, and Management*, 2019, Vol. 17, No. 5, p. 119.; MORAVČIKOVÁ, E.: Media Manipulation And Propaganda In the Post-Truth Era. In *Media Literacy and Academic Research*, 2020, Vol. 3, No. 2, p. 23-37.

²⁰ ROUIBAH, K., LOWRY, P., HWANG, Y.: The Effects of Perceived Enjoyment and Perceived Risks on Trust Formation and Intentions to Use Online Payment Systems: New Perspectives from an Arab Country. In *Electronic Commerce Research and Applications*, 2016, Vol. 19, p. 33.

²¹ XUE, J. et al.: See Now, Act Now: How to Interact with Customers to Enhance Social Commerce Engagement? In *Information & Management*, 2020, Vol. 57, No. 6, p. 21.

²² PAPPAS, I. O. et al.: Shiny Happy People Buying: The Role of Emotions on Personalized E-shopping. In *Electronic Markets*, 2014, Vol. 24, No. 1, p. 193.; TYRVAINEN, O., KARJALUOTO, H., SAARIJARVI, H.: Personalization and Hedonic Motivation in Creating Customer Experiences and Loyalty in Omnichannel Retail. In *Journal of Retailing and Consumer Services*, 2020, Vol. 57, p. 2.

2.2 Artificial Intelligence

Artificial intelligence is a field that is developing at a pace similar to that of web personalization. In general it can be said that this refers to a capability to learn, adapt, or understand the environment with which the holder of this feature interacts, whereas the purpose is mostly to achieve a goal.²³ If it is necessary to take a definition with larger overlap into the field of information technology, this consists of the capability of a system to properly interpret external data, to learn from this data, and to use the findings obtained in order to achieve specific goals and tasks through flexible adaptation.²⁴ In the contemporary world artificial intelligence can be encountered quite frequently, it is used, for example, when distinguishing the content of images, in intelligent speakers, or in cars with autonomous driving elements. Its use for marketers is also important for the reason that the internet is saturated with a huge quantity of poor-quality content,²⁵ and therefore AI can be used to mediate specific information for its consumer.

The academic literature exploring artificial intelligence in relation to marketing usage can be sorted into four main categories:²⁶ i) artificial intelligence algorithms, their technical creation and use in specific marketing situations – simply stated, “*technical challenges of AI in marketing*”;²⁷ ii) the psychological response of customers to contact with artificial intelligence – simply stated, “*psychological response to AI in marketing*”;²⁸ iii) use of artificial intelligence in personnel management of companies – “*use of AI in HR*”;²⁹ iv) managerial and strategic challenges associated with artificial intelligence – “*managerial approaches for AI*.”³⁰

With respect to this topic, academic articles and publications that can be classified into the fourth area are essential for the purposes of this text, i.e., managerial approaches for AI. This focus nonetheless presently offers a limited spectrum of published academic articles, even though texts focusing on strategic management and marketing in the context of current perspectives on management have been published. These include, for example, artificial intelligence for the innovation process and its digitization,³¹ its influencing of the organization

²³ LEGG, S., HUTTER, M.: A Collection of Definitions of Intelligence. In *Advances in Artificial General Intelligence: Concepts, Architecture and Algorithms*, 2007, Vol. 157, p. 17.

²⁴ KAPLAN, A. M., HAENLEIN, M.: Siri, Siri, in My Hand: Who's the Fairest in the Land? On the Interpretations, Illustrations, and Implications of Artificial Intelligence. In *Business Horizons*, 2019, Vol. 62, No. 1, p. 15.

²⁵ BIELIK, P., VIŠŇOVSKÝ, J.: Explanatory Journalism – A New Way How To Communicate In Digital Era. In *Media Literacy and Academic Research*, 2021, Vol. 4, No. 1, p. 24.

²⁶ HUANG, M.-H., RUST, R. T.: A Strategic Framework for Artificial Intelligence in Marketing. In *Journal of the Academy of Marketing Science*, 2021, Vol. 49, p. 30.

²⁷ XU, Y. et al.: Electricity Market Empowered by Artificial Intelligence: A Platform Approach. In *Energies*, 2019, Vol. 12, No. 21, p. 1.; DZYABURA, D., HAUSER, J. R.: Recommending Products when Consumers Learn Their Preferences Weights. In *Marketing Science*, 2019, Vol. 38, No. 3, p. p. 365.; CHEN, T.-L., CHEN, F.-Y.: An Intelligent Pattern Recognition Model for Supporting Investment Decisions in Stock Market. In *Information Sciences*, 2016, Vol. 346-347, p. 261.

²⁸ PASHENTSEV, E.: Malicious Use of Artificial Intelligence: Challenging International Psychological Security. In *European Conference on the Impact of Artificial Intelligence and Robotics (ECIAIR)*. Oxford : Academic Conferences and Publishing International Limited, 2019, p. 238.; MENDE, M. et al.: Service Robots Rising: How Humanoid Robots Influence Service Experiences and Elicit Compensatory Consumer Responses. In *Journal of Marketing Research*, 2019, Vol. 56, No. 4, p. 535.

²⁹ KONG, H. et al.: Influences of Artificial Intelligence (AI) Awareness on Career Competency and Job Burnout. In *International Journal of Contemporary Hospitality Management*, 2021, Vol. 33, No. 2, p. 717.; VAN ESCH, P., BLACK, J. S., FEROLIE, J.: Marketing AI Recruitment: The Next Phase in Job Application and Selection. In *Computers in Human Behavior*, 2019, Vol. 90, p. 215.; ROTMAN, D.: Making AI into Jobs. In *MIT Technology Review*, 2018, Vol. 121, No. 4, p. 10.

³⁰ FOUNTAINE, T., MCCARTHY, B., SALEH, T.: Building the AI Powered Organization. In *Harvard Business Review*, 2019, Vol. 97, No. 4, p. 63.; HUANG, M.-H., RUST, R. T.: Engaged to a Robot? The Role of AI in Service. In *Journal of Service Research*, 2020, Vol. 24, No. 1, p. 30.

³¹ HAEFNERA, N. et al.: Artificial Intelligence and Innovation Management: A Review, Framework, and Research Agenda. In *Technological Forecasting and Social Change*, 2021, Vol. 162, p. 8.; YAMS, N. B. et al.: Integrated AI and Innovation Management: The Beginning of a Beautiful Friendship. In *Technology Innovation Management Review*, 2020, Vol. 10, No. 11, p. 5.

and management of marketing processes and strategies,³² the management and support of the management portfolio,³³ machine learning for prediction in marketing for mobile technologies,³⁴ AI support of personalized marketing,³⁵ AI in managing communication strategies³⁶ and in-store technologies such as robots, intelligent and reactive display devices, expanded reality, and other technologies for the user comfort of the customer.³⁷

For the purposes of this text it is appropriate to connect theses from existing studies of different individual foci that reflect important elements of AI management in marketing. Such as those that discuss algorithms and artificial intelligence,³⁸ managerial responsibility and results of decision making,³⁹ social and societal impacts,⁴⁰ AI and psychology⁴¹ and the ethical problems associated with AI.⁴²

3. Methods

This text works with literary review and content analysis. Literature review is a tool that allows the preparation of a detailed understanding of the current state of awareness about a given topic, which is based on logical argumentation and rules on the basis of which a synthesis of the individual perspectives can be achieved.⁴³ This synthesis then may reveal links within the monitored phenomenon and the association between these links and components of the given phenomenon,⁴⁴ which can consequently lead to revealing how it works.

The relationship in contemporary academic literature between artificial intelligence and web personalization is addressed in this text using content analysis. Content analysis means sorting words (characters, phrases) according to their content into categories, taking into consideration

-
- 32 JAREK, K., MAZUREK, G.: Marketing and Artificial Intelligence. In *Central European Business Review*, 2019, Vol. 8, No. 2, p. 46-55.; STONE, M. et al.: Artificial Intelligence (AI) in Strategic Marketing Decision-Making: A Research Agenda. In *Bottom Line*, 2020, Vol. 33, No. 2, p. 183.
- 33 ZHANG, X., CHEN, Y.: An Artificial Intelligence Application in Portfolio Management. In *Proceedings of the International Conference on Transformations and Innovations in Management (ICTIM 2017)*, 2017, Vol. 37, p. 86.
- 34 TONG, S., LUO, X., XU, B.: Personalized Mobile Marketing Strategies. In *Journal of the Academy of Marketing Science*, 2020, Vol. 48, No. 2, p. 64.
- 35 KUMAR, V. et al.: Understanding the Role of Artificial Intelligence in Personalized Engagement Marketing. In *California Management Review*, 2019, Vol. 61, No. 4, p. 135.
- 36 ZERFASS, A., HAGELSTEIN, J., TENCH, R.: Artificial Intelligence in Communication Management: A Cross-national Study on Adoption and Knowledge, Impact, Challenges and Risks. In *Journal of Communication Management*, 2020, Vol. 24, No. 4, p. 377.
- 37 GREWAL, D. et al.: The Future of In-Store Technology. In *Journal of the Academy of Marketing Science*, 2010, Vol. 48, No. 2, p. 96.
- 38 SUN, Q., YIN, F.: Study on the Learning Algorithms of Artificial Intelligence. In *2019 5th International Conference on Environmental Science and Material Application*, 2020, Vol. 440, p. 2.; WANG, C.: Research on the Progress of Computer Artificial Intelligence Algorithm. In TONG, X., LIAO, W. (ed.): *Proceedings of the 2016 2nd International Conference of Materials Engineering and Information Technology Applications*. Shanghai : Atlantis Press, 2017, Vol. 107, p. 267.
- 39 KUČERA, D.: Artificial Intelligence in the Context of Managerial Responsibility. In *Proceedings of the 7th International Conference Innovation Management, Entrepreneurship and Sustainability*. Prague : University of Economics, 2019, p. 419.
- 40 TOMASEV, N. et al.: AI for Social Good: Unlocking the Opportunity for Positive Impact. In *Nature Communication*, 2020, Vol. 11, No. 1, p. 5.; PERRAULT, A. et al.: Artificial Intelligence for Social Impact: Learning and Planning in the Data-to-Deployment Pipeline. In *AI Magazine*, 2020, Vol. 41, No. 3, p. 3.
- 41 LEUNG, E., PAOLACCI, G., PUNTONI, S.: Human versus Machine: Resisting Automation in Identity-based Consumer Behavior. In *Journal of Marketing Research*, 2018, Vol. 55, No. 6, p. 818.
- 42 MALYSHKIN, A. V.: Integration of Artificial Intelligence into Public Life: Some Ethical and Legal Problems. In *Vestnik of Saint Petersburg University Law*, 2019, Vol. 10, No. 3, p. 444.
- 43 MACHI L. A., MCEVOY, B. T.: *The Literature Review: Six Steps to Success*. California : Corwin, 2012, p. 3.
- 44 BRYMAN, A., BELL, E.: *Business Research Methods*. Oxford : Oxford University Press, 2011, p. 18.

frequency of occurrence,⁴⁵ type of analysed content, study sample, depth of analysis, and inspection of analysed data and the form of expression of the results of the analysis.⁴⁶

This literature review and content analysis were performed in the period from January to April 2021. Electronic academic sources were used for searching such as the Web of Science, EBSCO, and ProQuest. The following phrases were used for the literature review: *web personalization; personalization of internet; website + personalization; artificial intelligence; AI; machine learning*. On the basis of this data, articles and resources were selected for determining additional relevant articles and resources. As part of the content analysis, the texts searched ranged from the years 2011 to 2020, the literature review was then also conducted on texts published in 2021.

4. Results

This article focuses on categories of techniques for web personalization in the sense of their use in managerial practice. It examines contemporary and past trends, whereas it is considered a set of tools and algorithms that can be applied on the web for the needs of marketing processes. Personalization influences the information displayed to a user in the online environment. The same applies to artificial intelligence, yet it should be taken into account that artificial intelligence is one of the specific and fundamental tools used by certain web personalization techniques.

4.1 Web Personalization Techniques

Academic texts discuss web personalization in the sense that it is a process of changing website structure and content. In this manner it adapts the web to the needs of each individual user, and is therefore flexible and targeted.⁴⁷ The reason is that the development of digital technologies has changed the character of access to various media⁴⁸ and has thrown into relief the need for quality interaction with a user.⁴⁹ The critical piece for adequately performed personalization is the quantity and quality of user data available to a marketing manager performing personalization.⁵⁰

Academic texts differ in their classification of personalization techniques. For example, older literature⁵¹ differentiates solely between recommender systems and recognition filtering. And yet this is dictated by information technology trends and the development of the associated personalization techniques.

⁴⁵ WEBER, R. P.: *Basic Content Analysis*. London : SAGE Publications, 1990, p. 10.

⁴⁶ GAVORA, P.: Obsahová analýza v pedagogickom výskume: Pohľad na jej súčasné podoby. In *Pedagogická orientace*, 2015, Vol. 25, No. 3, p. 345.

⁴⁷ GARRIGÓS, I., GOMEZ, J., HOUBEN, G.-J.: Specification of Personalization in Web Application Design. In *Information and Software Technology*, 2010, Vol. 52, No. 9, p. 991.; KALAINAMA, K., KUSHWAHAB, T. R.: How Does Web Personalization Create Value for Online Retailers? Lower Cash Flow Volatility or Enhanced Cash Flows. In *Journal of Retailing*, 2018, Vol. 94, No. 3, p. 265.

⁴⁸ GRACOVÁ, S. et al.: Comparison of Television Broadcasting for Children and Youth in a Public Broadcaster in the Slovak and Czech Republic During the Covid-19 Pandemic. In *Media Literacy and Academic Research*, 2020, Vol. 3, No. 2, p. 49.

⁴⁹ VRABEC, N., BŔTOŠOVÁ, L.: The Concept of Learning-by-Doing in the Context of Media Education and School Quality Assessment. In *Communication Today*, 2020 Vol. 11, No. 1, p. 140.

⁵⁰ WANG, J. et al.: The Application of Data Mining Technology to Big Data. In *IEEE International Conference on Computational Science and Engineering*. Los Alamitos, CA : IEEE Computer Society, 2017, p. 284.

⁵¹ ADOMAVICIUS, G., TUZHILIN, A.: Towards the Next Generation of Recommender Systems: A Survey of the State of the Art and Possible Extensions. In *IEEE Transactions on Knowledge and Data Engineering*, 2005, Vol. 17, No. 6, p. 734.

For the needs of this text, the classification specified by Kupec⁵² is used, which corresponds to contemporary trends and knowledge of web personalization. This categorization differentiates personalization techniques into four main categories: recommender systems, collaborative filtering, contextualization, and customization. The main categories of personalization above contain various techniques, the overarching listing of which based on the above literature review is as follows:

- Recommender systems: Rule-based systems; content-based filtering; remarketing; pers. newsletters; hybrid recommender systems.
- Collaborative filtering: Memory-based collaborative filtering; model-based collaborative filtering.
- Contextualization: Responsive web; server communication with the customer; localization.
- Customization: Content customization; product configuration; price adaptation; support of task completion.

4.2 Artificial Intelligence Techniques

The text also focuses on artificial intelligence, which like web personalization must sorted by techniques that can be used in a company.⁵³ This is achieved by joining various academic resources on the basis of literature review, whereas these resources were also divided into four specific groups, see Chapter 3.1.

Artificial intelligence can be divided into three categories: mechanical artificial intelligence; artificial intelligence capable of decision making on the basis of “hard” data; artificial intelligence capable of responding to user emotions, preferences, and positions.⁵⁴ Each of the three categories of artificial intelligence is used for a different purpose in business management, whereas certain applications used by marketing staff and managers can use multiple types of artificial intelligence together.

- Mechanical artificial intelligence (mechanical AI): Using automation, data is collected about the market, environment, employees, customers, competition, etc. In other words, it is used for simple tasks that are repeated frequently. Used to provide a basis for decision-making and management. This is unilateral artificial intelligence.
- Artificial intelligence capable of its own decision-making (decision-making AI): This includes, for example, machine learning, nervous system simulations, etc., it can analyse unstructured data and make decisions from it, it can seek out patterns and relationships in the data. This is unilateral artificial intelligence.
- Artificial intelligence capable of responding to the specific user (emotion AI): Designed as bilateral artificial intelligence, i.e. compared to the other two types of AI, it not only collects data but also returns it to the user. It is capable of analyzing the feelings and emotions of the specific individual and responding to it in a suitable way. The most familiar examples include chatbots.

⁵² KUPEC, M.: Use of Internet Personalization in Crisis Communication. In KVETANOVÁ, Z., BEZÁKOVÁ, Z., MADLEŇÁK, A. (eds.): *Marketing Identity 2020: COVID-2.0*. Trnava : FMK UCM v Trnave, 2020, p. 331.

⁵³ TOMÁŠKOVÁ, A., HAVLÍČEK, K.: Family Enterprises and Their Support through Subsidies. In *European Research Studies Journal*, 2018, Vol. 21, No. 2, p. 23.

⁵⁴ HUANG, M.-H., RUST, R. T.: A Strategic Framework for Artificial Intelligence in Marketing. In *Journal of the Academy of Marketing Science*, 2021, Vol. 49, p. 30.

4.3 Content Analysis

This is followed by content analysis, which has the goal of finding a link between artificial intelligence and web personalization in relation to the how they appear in contemporary academic literature. This content analysis contains not only basic phrases (see chapter 2) but also articles and academic texts containing the individual techniques of web personalization and artificial intelligence sorted above in this chapter.

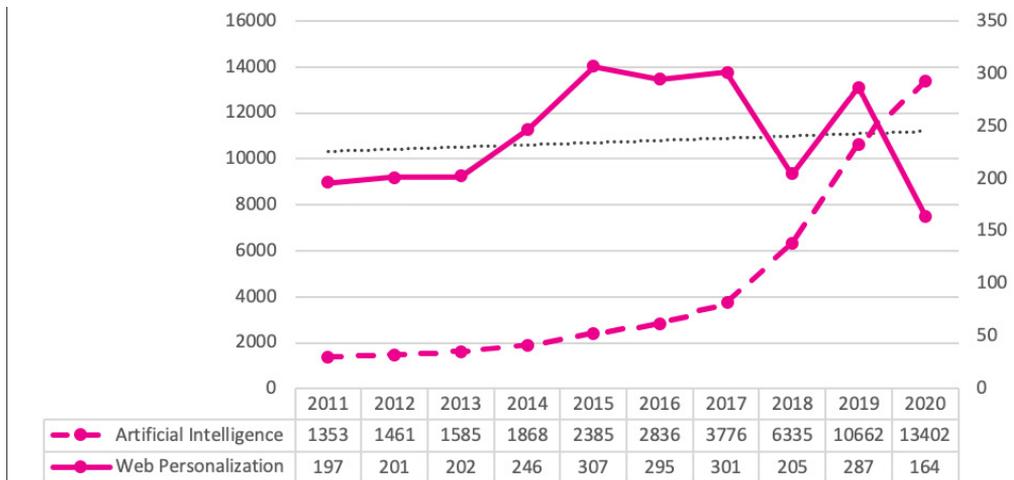


FIGURE 1: Number of academic texts focused on web personalization and artificial intelligence from 2011-2020

Source: own processing, 2021

The graph in *Figure 1* captures the outcome of the content analysis, i.e. texts from the years 2011-2020 that address web personalization and texts that address artificial intelligence over the same timeframe. For the number of texts on web personalization there is also a line graph to give a better idea of the long-term trend in the number of these texts. Because the number of texts on artificial intelligence is an order of magnitude higher (particularly in the more recent years of the reference period), web personalization is depicted on the next axis. Given that 2021 is still in progress, it was not included in the content analysis in order not to distort the graph. The year 2021 was not included in the literature review.

From the literature review and content analysis the finding emerged that web personalization is not central to expert interest in terms of academic research when compared with artificial intelligence. The topic of artificial intelligence is more heavily examined, by an order of magnitude (in 2020 there were 13.402 texts about AI compared to 164 texts about web personalization), moreover the trend of interest in this topic increases every year. While web personalization has shown a slight growth in academic interest over the past ten years, whereas it has been somewhat declining in recent years, artificial intelligence as a topic has shown marked growth in interest particularly in the last four years. Hypothesis H1 is therefore not confirmed. The high number of academic texts about artificial intelligence in the year 2020 cannot be explained solely by increased interest as a result of the COVID-19 crisis, since as the graph indicates, the tendency toward increasing interest is ongoing. In the texts web personalization and artificial intelligence appear alongside each other. A link exists between both topics in the academic literature, which confirms hypothesis H2.

It can be stated for research question Q1/P1 that almost all texts on web personalization in some way address artificial intelligence = of course, at the level of the usability of this technique as part of personalization, not as a substitute for it. The opposite of course does not apply. Texts on artificial intelligence often make no mention of personalization. This

situation is noteworthy given the fact that web personalization as a field is on the rise and its use is nowadays common in companies active on the internet, which can be said for artificial intelligence only partially. Companies use it rather as part of a technology solution, often as a part of web personalization. This indicates an area that should be examined and expanded academically.

4.4 Usage of Defined Techniques in Marketing

As was stated above, technological advancement impacts the operation of modern societies in a fundamental way. The commercial environment has completely transformed as a result of ownership of personal computers, smartphones, and the internet access contained therein. All of this means that companies have had to respond with a change of business and managerial approaches, which is reflected in strategic decision-making and management in general.

The use of web personalization and artificial intelligence technologies is now a common part of interactions between seller and customer and the producer and recipient of media content. Sometimes customers are not even aware of it, which in such cases is often the goal (these consist of different solutions for sellers), at other times they access it voluntarily, and are even willing to pay for it (various assistance applications).

There are many examples of popular applications and tools that use both technologies. In the case of consumer use, this consists for example of various personal assistants (e.g. Siri, Alexa, Cortana), music applications (Spotify, Deezer, Pandora), financial planning (Olivia), smart home solutions (Google Nest, Nest), machine translation (DeepL) etc. Other tools using these techniques include serious games intended for pedagogical and academic work.⁵⁵

For practical use, the more popular tools using artificial intelligence and web personalization include solutions for business needs (e.g. Fluid AI), electronic trade and digital marketing (Sentient), process automation (Amazon MTurk), facial recognition (Haystack), legal assistance (Legal Robot), and credit assessments (Lenddo). The rapid growth of these tools corresponds to the substantial improvements in their precision. In this respect, a turning point came in the year 2016, when artificial intelligence surpassed human sight in the field of facial recognition. This year, the error rate in recognition dropped from 30% in 2010 to 4%, where AI surpassed the human eye, which has an error rate of 5%.⁵⁶

As far as marketing processes and web personalization are concerned, it is typically used at moments when a manager has a sufficient quantity of information about customer data on the basis of data collection. At such moments traditional marketing tools are available on which the mined data can be applied. It is usually possible to the marketing mix, for example. It depends on what personalization tool is selected. It may therefore appear that the customer modifies the marketing mix themselves with their own reactions (often unwittingly), or that the marketing mix is customized to them on the basis of data previously obtained. In other words, it consists either of online customization or static. As a rule, however, these techniques overlap. In this way, artificial intelligence and personalization also overlap.

It is then necessary to use a high level of personalization, which cannot get by without artificial intelligence. AI can be considered a main factor in the success of web personalization at an advanced level. Artificial intelligence has therefore shifted the use of web personalization from a rule-based system to a system based on deep learning from available and mined data

⁵⁵ VRABEC, N.: The Concept of Soft Skills Clusters and Descriptive Indicators in the Process of Gamification. In KUSÁ, A., ZAUŠKOVÁ, A., BUČKOVÁ, Z. (eds.): *Marketing identity: Offline Is the New Online*. Trnava : FMK UCM v Trnave, 2019, p. 998.

⁵⁶ KUMAR, V. et al.: Understanding the Role of Artificial Intelligence in Personalized Engagement Marketing. In *California Management Review*, 2019, Vol. 61, No. 4, p. 16.

(for example, model-based collaborative filtering).⁵⁷ If a seller properly takes advantage of these technologies, it leads to the creation of special links between the seller and the customer, which as a result contributes to increases in competitiveness and a high likelihood of commercial success.

The success of such web personalization processes is of course strongly linked to the manner in which data is obtained about customers and the depth, precision, and overall quantity of such information. And here artificial intelligence has its own irreplaceable role, which contributes not only to the above but also to effective implementation of knowledge obtained on the basis of data mining. Overall it may be stated that suitable use of artificial intelligence and web personalization plays a role in the creation of positive relationships of the customer to the seller and its product, which has a direct link to the strategic and marketing management of the organization.

For easier identification of the use of web personalization and artificial intelligence techniques in management and decision making in the marketing processes of the company, it is appropriate to create a framework usable for strategic marketing, i.e. for planning, organization, control,⁵⁸ etc. The following Three-Stage cycle, which includes the following phases: marketing research; marketing strategy; marketing activity; is a supplementation of research conducted by Huang⁵⁹ focused on artificial intelligence. The application of web personalization techniques offers the managerial aspect the new perspective of the aforementioned three-stage cycle. The proposed cycle in *Figure 2* also uses Kotler's⁶⁰ approach to marketing strategies. The proposed framework also confirms H2 as it captures the specific links between the techniques of web personalization and artificial intelligence. It is also a descriptive answer to research question Q2/P2.

Marketing research is found in the first phase of the cycle. The widest palette of personalization techniques can be applied in marketing research; all four techniques are found in this grouping. The same applies to artificial intelligence techniques, for which all three are applied here. Personalization and AI are used here for data mining, market analysis, and grasping customer emotions and feelings.

The second phase of the cycle describes the formulation of marketing strategies. For the three steps of marketing strategy, which are segmentation, targeting, and positioning, different personalization techniques and artificial intelligence techniques are used. Mechanical artificial intelligence and collaborative filtering are used in segmentation, where the market is divided into target groups of customers and the description of those groups.⁶¹ Its uses include but are not limited to searching and identifying new customer groups in unsorted data.

In targeting, the goal is to choose from the segments specified in the previous step those market segments that are most advantageous for the seller and most accessible in terms of ease of reach. For such recommendations of the best segments, it is appropriate to use decision-making artificial intelligence and personalization tools, specifically collaborative filtering and recommender systems, although contextualization also plays a role.

Positioning is a step in marketing strategy in which a company tries to create certain feelings, perceptions, and opinions toward its own products and services (or the brand, the company, etc.). It could be described as the infusion of opinion on the product, and is sometimes interpreted as "*placement/embedding in the mind of the customer.*" In other words, it does not mean working with products, but with impressions and opinions that the customer creates about the products. It relates closely to building image and is an important part of increasing the competitiveness of a company. For these reasons, emotional artificial intelligence used in conjunction with collaborative filtering, recommender systems, contextualization, and customization is a suitable tool for proper positioning.

⁵⁷ MULLAINATHAN, S., SPIESS, J.: Machine Learning: An Applied Econometric Approach. In *Journal of Economic Perspectives*, 2017, Vol. 31, No. 2, p. 87.

⁵⁸ KUPEC, V. et al.: Conceptual Comparison of Internal Audit and Internal Control in the Marketing Environment. In *Sustainability*, 2021, Vol. 13, No. 12, p. 13.

⁵⁹ HUANG, M.-H., RUST, R. T.: A Strategic Framework for Artificial Intelligence in Marketing. In *Journal of the Academy of Marketing Science*, 2021, Vol. 49, p. 30.

⁶⁰ KOTLER, P.: *Moderní marketing: 4. evropské vydání*. Praha : Grada, 2007, p. 89.

⁶¹ KOUDELKA, J.: Segmentation of Czech Consumers as for Their Relationship to Organic Foods. In *Agricultural Economics*, 2013, Vol. 59, No. 8, p. 348.

The third phase of the proposed cycle consists of marketing activity, which uses mechanisms of standardization, personalization, and rationalization. Each of these mechanisms can be used either independently or in combination with other mechanisms. The decision of which web personalization and artificial intelligence techniques to use for a specific mechanism of marketing activity is a key task of business management.



FIGURE 2: The three-stage cycle for use of Web Personalization (WP) and Artificial Intelligence (AI) in the marketing management of a company

Source: own processing incorporating Huang 2021

For example, payments and delivery of goods are functions that can mine from the standardization using mechanical artificial intelligence and collaborative filtering, one example being automatic monitoring of payments and deliveries. Digital marketing⁶² can mine from personalization using decision-making AI; here the above recommender systems can be mentioned. Customer service and immediate interaction with the customer can use relationalization through emotion artificial intelligence⁶³ and all the personalization techniques; one example include chatbots, which can converse with the customer and provide them a certain level of customer service.

In order to monitor the use of web personalization and artificial intelligence from the perspective of marketing management in greater detail, the Three-Stage cycle for use of web personalization and artificial intelligence in the marketing management of a company must be expanded to include a specific marketing tool.

For this purpose the marketing mix (the 4P method) is integrated into the existing Three-Stage Cycle, specifically in the phase of marketing activity. This leads among other things to balancing the entire model, which expands to a perspective of the entire company as well as the customer (if the 4C method has been applied).

Whereas *Figure 2* defines the various strategic elements and their interrelation within the entire Three-Stage Cycle, *Figure 3* expands marketing activities to include product, price, place, and promotion, in which the use of mechanical artificial intelligence and personalization is implemented for standardization, decision-making artificial intelligence for personalization, and emotion artificial intelligence and personalization for relationalization, whereas everything is supplemented by various practical examples and scenarios. These examples also supplemented the remaining two phases of the Three-Stage Cycle.

⁶² PETRŮ, N., KRAMOLIŠ, J., STUHLÍK, P.: Marketing Tools in the Era of Digitization and Their Use in Practice by Family and Other Businesses. In *Economics and Management*, 2020, Vol. XXIII, No. 1, p. 199.

⁶³ HUANG, M.-H., RUST, R. T.: A Strategic Framework for Artificial Intelligence in Marketing. In *Journal of the Academy of Marketing Science*, 2021, Vol. 49, p. 30.

Artificial Intelligence		Mechanical	Decision-making	Emotion	
Web Personalization		collaborative filtering, recommender systems, contextualization, customization	collaborative filtering, recommender systems, contextualization	collaborative filtering, recommender systems, contextualization, customization	
Marketing Management	Marketing Research	Data collection	Marketing analysis	Customer understanding	
		continuous automated collection customer data and its processing	identification of the competition and competitive advantages	utilization of customer emotions for understanding existing – and prediction of future – needs and desires	
Artificial Intelligence		Mechanical	Decision-making	Emotion	
Web Personalization		collaborative filtering	collaborative filtering, recommender systems, contextualization	collaborative filtering, recommender systems, contextualization, customization	
Marketing Management	Marketing Strategy	Segmentation	Targeting	Positioning	
		identification of new patterns of customer behaviour and preferences	recommending the best of target markets	direct targeting of customer emotions such that the product resonates with the customer	
Artificial Intelligence		Mechanical	Decision-making	Emotion	
Web Personalization		collaborative filtering	collaborative filtering, recommender systems, contextualization	collaborative filtering, recommender systems, contextualization, customization	
Marketing management	Marketing Activity		Standardization	Personalization	Relationalization
	Marketing mix	Product	automation of processes when performing customer needs	adaptation of products to customer needs	understanding and satisfying customer needs and desires
		Price	automation of the process of specifying prices and payments	adaptation of prices according to willingness of the customer to pay	interactive price negotiation
		Distribution place	automation of customer access to the product	adapting first contact and customer interaction	adaptation of the customer environment such as to enable him to gain and engage
		Promotion	automation of communication with the customer	adaptation of promotion to each customer	adaptation of communication on the basis of customer emotions, preferences, and reactions

FIGURE 3: The three-stage cycle for use of web personalization and AI in the marketing management of a company with specific scenarios stated

Source: own processing incorporating Huang 2021

It must be noted that all the techniques mentioned can be used by subjects operating on the internet either individually or in various combinations to capitalize on the synergistic effect of such an approach. The marketing mix in this expanded Three-Stage Cycle is applied according to the theories of Kotler,⁶⁴ who defines them as the summary of four tactical marketing tools: product, price, place, and promotion. If the marketing mix is revised into the 4C format – consumer, cost, convenience, and communication – nothing at all changes in the entire model.

⁶⁴ KOTLER, P.: *Moderní marketing: 4. evropské vydání*. Praha : Grada, 2007, p. 89.

5. Discussion

The proposed Three-Stage Cycle using web personalization and artificial intelligence in the marketing management of a company offers marketing managers a framework for strategic and systematic use of web personalization and artificial intelligence in marketing. The problem in managerial use of defined techniques is the fact that managers who decide on the use of the given techniques must differentiate which of the referenced technologies is most effective for the given situation in terms of their own competitiveness. This requires an ability to orient in collected data, to analyse it, and to make the right decisions on the basis thereof. For this it is necessary to know how to identify the competition and their use of web personalization and AI techniques, as well as to identify the behaviour and characteristics of existing and potential customers. The results show differences in the approach to web personalization and artificial intelligence research (H1 – unconfirmed hypothesis) and their mutual relationship (H2 – confirmed hypothesis).

The research conducted reveals the limits that can be seen in the recency of results given the rapid growth of this field, as well as the fact that there is not at present a sufficiently wide base of academic studies focused on the integration of web personalization and artificial intelligence. It would be good to support a precise differentiation of web personalization and artificial intelligence, and the determining of a correlation, with future research directly in company practices. It would also be appropriate to support research by assessing the behaviour of a suitable sample of customers in their confrontation with the techniques of web personalization and artificial intelligence. Quantification of such data would lead to clarification of the theory cited. Despite these limitations, the results presented clarify current understanding of web personalization and artificial intelligence.

The perspectives of the issues addressed can be seen in the confrontation of the proposed Three-Stage Cycle with other marketing tools and theories. The analysis could also be expanded to a longer timeframe and include in the literature reviewed not only academic articles but also articles from non-academic literature. Another possible direction for growth of this outlined concept is its supplementation with moral and ethical questions related in particular to interference with user privacy. Both techniques analysed reach into the social/societal area, where they can be used for polarization of societies, influencing public thought, etc. The complexity of the topic examined is also given by the fact that in the online environment the behaviour of individuals as a rule differs from their behaviour in the real environment.

6. Conclusion

The use of internet personalization and artificial intelligence is part of new strategies and approaches in the marketing communications available in the online environment and that manage to effectively increase the competitiveness of subjects operating on the internet by appealing to new customers (clients, recipients of information, etc.) It achieves this by targeting information and identifying not only entire customer groups but also the specific needs of the individual, forming bonds with existing customers, building a close relationship to a brand, product, or idea, and using additional techniques that create a positive impression on the customer.

The goal of this article (A1) is a theoretical comparison of the techniques of web personalization and artificial intelligence in marketing processes of subjects active on the internet. Secondary data analysis using literature review and content analysis is used to achieve this goal. From the results presented, responses may be formulated to the questions posed and problems documented (Q1/P1, Q2/P2). This article offers a complex perspective on the techniques of web personalization and artificial intelligence on the basis of current academic

thought. It presents a literature review and content analysis, and proposes its own Three-Level Cycle of use of web personalization and artificial intelligence in marketing management, which is applicable in practice for marketing managers as it can be used as a framework for the strategic application of the techniques in question. Its benefit is a targeted approach to the techniques of personalization and AI and their integration with the individual phases of the marketing process.

The development of information technology has led to web personalization in connection with AI becoming an important topic for research and practice. Their importance has been confirmed by the global COVID-19 crisis. In a situation where certain marketing techniques (those operated in the real-world environment) cannot be applied, personalization has proven a precise, relatively inexpensive, accessible, and effective tool of marketing communication that can also be widely available. This is also the reason why personalization needs to be constantly subjected to critical review.

Web personalization represents an effective tool for support of business activities from the perspective of a marketing manager. From all the facts stated in this text, the conclusion can be drawn with certainty that the use of web personalization and artificial intelligence has one significant benefit. This is the fact that if a customer wishes to avoid their influence, they would have to remain offline. Which, as the data referenced in this text and elsewhere would indicate, fewer and fewer do.

Acknowledgment: *The result was created in solving the project “Digital Audit and Risk Management in the Industry 4.0 Environment” (7427/2020/02 IGA VŠFS) using objective oriented support for specific university research of the University of Finance and Administration and as part of the EEA project “Higher Education Teachers’ Digital Literacy Improvement” (EHP-CZ-MOP-2-003 EHP).*

Literature and Sources

ADOMAVICIUS, G., TUZHILIN, A.: Towards the Next Generation of Recommender Systems: A Survey of the State of the Art and Possible Extensions. In *IEEE Transactions on Knowledge and Data Engineering*, 2005, Vol. 17, No. 6, p. 734-749. ISSN 1041-4347.

ALMEHMADI, A.: COVID-19 Pandemic Data Predict the Stock Market. In *Computer Systems Science & Engineering*, 2021, Vol. 36, No. 3, p. 451-460. ISSN 0267-6192.

ASLAN, E. Ş., DEMIREL, Ç.: The Slogan Effect: The Power of Brand Discourse in Liking and Purchasing Behaviour. In *Media Literacy and Academic Research*, 2021, Vol. 4, No. 1, p. 70-88. ISSN 2585-8726.

BEZÁKOVÁ, Z., MADLEŇÁK, A., ŠVEC, M.: Security Risks of Sharing Content Based on Minors by Their Family Members on Social Media in Times of Technology Interference. In *Media Literacy and Academic Research*, 2021, Vol. 4, No. 1, p. 53-69. ISSN 2585-8726.

BIELIK, P., VIŠŇOVSKÝ, J.: Explanatory Journalism – A New Way How to Communicate in Digital Era. In *Media Literacy and Academic Research*, 2021, Vol. 4, No. 1, p. 24-37. ISSN 2585-8726.

BRYMAN, A., BELL, E.: *Business Research Methods*. Oxford : Oxford University Press, 2011.
Český statistický úřad: *Informační společnost v číslech*. [online]. [2021-09-21]. Available at: <<https://www.czso.cz/documents/10180/90577061/06100419c.pdf/3f2e4e4e-cbdb-4e6c-8904-c21160ddaea8?version=1.2>>.

Český statistický úřad: *Využívání informačních a komunikačních technologií v domácnostech a mezi jednotlivci – 2020*. [online]. [2021-09-21]. Available at: <<https://www.czso.cz/csu/czso/vyuzivani-informacnich-a-komunikacnich-technologii-v-domacnostech-a-mezi-jednotlivci-2020>>.

Český statistický úřad: *Hrubý domácí produkt – časové řady ukazatelů čtvrtletních účtů*. [online]. [2021-09-21]. Available at: <https://www.czso.cz/csu/czso/hdp_cr>.

- Český statistický úřad: *Využívání informačních a komunikačních technologií v podnikatelském sektoru za rok 2020*. [online]. [2021-09-21]. Available at: <<https://www.czso.cz/csu/czso/vyuzivani-informacnich-a-komunikacnich-technologii-v-podnikatelskem-sektoru-rok-2019-aktualni-mesic-roku-2020>>.
- ČTK: *Česká ekonomika se loni rekordně propadla, letos se vrátí k růstu*. [online]. [2021-09-21]. Available at: <<https://www.ceskenoviny.cz/zpravy/ceska-ekonomika-se-loni-rekordne-propadla-letos-se-vrati-k-rustu/1990527>>.
- ČTK: *Ekonomika EU loni kvůli pandemii klesla o 6,4 procenta*. [online]. [2021-09-21]. Available at: <https://www.ceskenoviny.cz/index_view.php?id=1990662>.
- DAVENPORT, T. et al.: How Artificial Intelligence Will Change the Future of Marketing. In *Journal of the Academy of Marketing Science*, 2020, Vol. 48, No. 2, p. 24-42. ISSN 0092-0703.
- DZYABURA, D., HAUSER, J. R.: Recommending Products when Consumers Learn Their Preferences Weights. In *Marketing Science*, 2019, Vol. 38, No. 3, p. 365-541. ISSN 0732-2399.
- FOUNTAIN, T., MCCARTHY, B., SALEH, T.: Building the AI Powered Organization. In *Harvard Business Review*, 2019, Vol. 97, No. 4, p. 63-73. ISSN 0017-8012.
- GARRIGÓS, I., GOMEZ, J., HOUBEN, G.-J.: Specification of Personalization in Web Application Design. In *Information and Software Technology*, 2010, Vol. 52, No. 9, p. 991-1010. ISSN 0950-5849.
- GAVORA, P.: Obsahová analýza v pedagogickom výskume: Pohľad na jej súčasné podoby. In *Pedagogická orientace*, 2015, Vol. 25, No. 3, p. 345-371. ISSN 1211-4669.
- GRACOVÁ, S. et al.: Comparison of Television Broadcasting for Children and Youth in a Public Broadcaster in the Slovak and Czech Republic During the Covid-19 Pandemic. In *Media Literacy and Academic Research*, 2020, Vol. 3, No. 2, p. 48-62. ISSN 2585-8726.
- GREWAL, D. et al.: The Future of In-store Technology. In *Journal of the Academy of Marketing Science*, 2010, Vol. 48, No. 2, p. 96-113. ISSN 0092-0703.
- HAEFNERA, N. et al.: Artificial Intelligence and Innovation Management: A Review, Framework, and Research Agenda. In *Technological Forecasting and Social Change*, 2021, Vol. 162, p. 1-10. ISSN 0040-1625.
- HU, K.-H. et al.: Identifying the Key Factors of Subsidiary Supervision and Management Using an Innovative Hybrid Architecture in a Big Data Environment. In *Financial Innovation*, 2021, Vol. 7, No. 1, p. 1-27. ISSN 2199-4730.
- HUANG, M.-H., RUST, R. T.: Engaged to a Robot? The Role of AI in Service. In *Journal of Service Research*, 2020, Vol. 24, No. 1, p. 30-41. ISSN 1094-6705.
- HUANG, M.-H., RUST, R. T.: A Strategic Framework for Artificial Intelligence in Marketing. In *Journal of the Academy of Marketing Science*, 2021, Vol. 49, p. 30-50. ISSN 0092-0703.
- CHEN, T.-L., CHEN, F.-Y.: An Intelligent Pattern Recognition Model for Supporting Investment Decisions in Stock Market. In *Information Sciences*, 2016, Vol. 346-347, p. 261-274. ISSN 0020-0255.
- JAREK, K., MAZUREK, G.: Marketing and Artificial Intelligence. In *Central European Business Review*, 2019, Vol. 8, No. 2, p. 46-55. ISSN 1805-4854.
- KALAINAMA, K., KUSHWAHAB, T. R.: How Does Web Personalization Create Value for Online Retailers? Lower Cash Flow Volatility or Enhanced Cash Flows. In *Journal of Retailing*, 2018, Vol. 94, No. 3, p. 265-279. ISSN 0969-6989.
- KAPLAN, A. M., HAENLEIN, M.: Siri, Siri, in My Hand: Who's the Fairest in the Land? On the Interpretations, Illustrations, and Implications of Artificial Intelligence. In *Business Horizons*, 2019, Vol. 62, No. 1, p. 15-25. ISSN 0007-6813.
- KONG, H. et al.: Influences of Artificial Intelligence (AI) Awareness on Career Competency and Job Burnout. In *International Journal of Contemporary Hospitality Management*, 2021, Vol. 33, No. 2, p. 717-734. ISSN 0959-6119.
- KOUDELKA, J.: Segmentation of Czech Consumers as for Their Relationship to Organic Foods. In *Agricultural Economics*, 2013, Vol. 59, No. 8, p. 348-360. ISSN 0169-5150.

- KOTLER, P.: *Moderní marketing: 4. evropské vydání*. Praha : Grada, 2007.
- KUČERA, D.: Artificial Intelligence in the Context of Managerial Responsibility. In *Proceedings of the 7th International Conference Innovation Management, Entrepreneurship and Sustainability*. Prague : University of Economics, 2019, p. 419-431.
- KUMAR, V. et al.: Understanding the Role of Artificial Intelligence in Personalized Engagement Marketing. In *California Management Review*, 2019, Vol. 61, No. 4, p. 135-155. ISSN 0008-1256.
- KUPEC, M.: Use of Internet Personalization in Crisis Communication. In KVETANOVÁ, Z., BEŽÁKOVÁ, Z., MADLEŇÁK, A. (eds.): *Marketing Identity 2020: COVID-2.0*. Trnava : FMK UCM v Trnave, 2020, p. 331-341.
- KUPEC, V. et al.: Conceptual Comparison of Internal Audit and Internal Control in the Marketing Environment. In *Sustainability*, 2021, Vol. 13, No. 12, p. 1-18. ISSN 2071-1050.
- LEE, S. Y.: Stealing Thunder as a Crisis Communication Strategy in the Digital Age. In *Business Horizons*, 2020, Vol. 63, No. 6, p. 801-810. ISSN 0007-6813.
- LEGG, S., HUTTER, M.: A Collection of Definitions of Intelligence. In *Advances in Artificial General Intelligence: Concepts, Architecture and Algorithms*, 2007, Vol. 157, p. 17-24.
- LEUNG, E., PAOLACCI, G., PUNTONI, S.: Human versus Machine: Resisting Automation in Identity-based Consumer Behavior. In *Journal of Marketing Research*, 2018, Vol. 55, No. 6, p. 818-831. ISSN 0022-2437.
- LUKÁČ, M. et al.: The Interaction Between the Marketing Communications Audit and Visitors in Museum Facilities. In *Communication Today*, 2021, Vol. 12, No. 1, p. 80-95. ISSN 1338-130X.
- MACHI L. A., MCEVOY, B. T.: *The Literature Review: Six Steps to Success*. California : Corwin, 2012.
- MADLEŇÁK, A., ŽULOVÁ, J.: *The Right to Privacy in the Context of the Use of Social Media and Geolocation Services*. Budapest : Wolters Kluwer, 2019.
- MALYSHKIN, A. V.: Integration of Artificial Intelligence into Public Life: Some Ethical and Legal Problems. In *Vestnik of Saint Petersburg University Law*, 2019, Vol. 10, No. 3, p. 444-460. ISSN 1019-8962.
- MENDE, M. et al.: Service Robots Rising: How Humanoid Robots Influence Service Experiences and Elicit Compensatory Consumer Responses. In *Journal of Marketing Research*, 2019, Vol. 56, No. 4, p. 535-556. ISSN 0022-2437.
- METZ, M., KRUIKEMEIER, S., LECHERER, S.: Personalization of Politics on Facebook: Examining the Content and Effects of Professional, Emotional and Private Self-personalization. In *Information, Communication & Society*, 2019, Vol. 23, No. 3, p. 1481-1498. ISSN 1468-4462.
- MORAVČÍKOVÁ, E.: Media Manipulation and Propaganda in the Post-Truth Era. In *Media Literacy and Academic Research*, 2020, Vol. 3, No. 2, p. 23-37. ISSN 2585-8726.
- MULLAINATHAN, S., SPIESS, J.: Machine Learning: An Applied Econometric Approach. In *Journal of Economic Perspectives*, 2017, Vol. 31, No. 2, p. 87-106. ISSN 0895-3309.
- PAPPAS, I. O. et al.: Shiny Happy People Buying: The Role of Emotions on Personalized E-shopping. In *Electronic Markets*, 2014, Vol. 24, No. 1, p. 193-206. ISSN 1019-6781.
- PASHENTSEV, E.: Malicious Use of Artificial Intelligence: Challenging International Psychological Security. In *European Conference on the Impact of Artificial Intelligence and Robotics (ECIAIR)*. Oxford : Academic Conferences and Publishing International Limited, 2019, p. 238-245.
- PERRAULT, A. et al.: Artificial Intelligence for Social Impact: Learning and Planning in the Data-to-Deployment Pipeline. In *AI Magazine*, 2020, Vol. 41, No. 3, p. 3-16. ISSN 0738-4602.
- PETRŮ, N., JAKUBÍKOVÁ, D.: The Management of Succession Strategy - Intergenerational Challenge. In *Ad Alta-Journal of Interdisciplinary Research*, 2015, Vol. 5, No. 2, p. 69-73. ISSN 1804-7890.
- PETRŮ, N., KRAMOLIŠ, J., STUHLÍK, P.: Marketing Tools in the Era of Digitization and Their Use in Practice by Family and Other Businesses. In *Economics and Management*, 2020, Vol. XXIII, No. 1, p. 199-214. ISSN 1212-3609.

- ROTMAN, D.: Making AI into Jobs. In *MIT Technology Review*, 2018, Vol. 121, No. 4, p. 10-17. ISSN 1099-274X.
- ROUIBAH, K., LOWRY, P., HWANG, Y. The Effects of Perceived Enjoyment and Perceived Risks on Trust Formation and Intentions to Use Online Payment Systems: New Perspectives from an Arab Country. In *Electronic Commerce Research and Applications*, 2016, Vol. 19, p. 33-43. ISSN 1567-4223.
- SOSIN, A.: How to Increase the Information Assurance in the Information Age. In *Journal of Defense Resources Management (JoDRM)*, 2018, Vol. 1, No. 13, p. 45-57. ISSN 2068-9403.
- STONE, M. et al.: Artificial Intelligence (AI) in Strategic Marketing Decision-Making: A Research Agenda. In *Bottom Line*, 2020, Vol. 33, No. 2, p. 183-200. ISSN 0888-045X.
- SUN, Q., YIN, F.: Study on the Learning Algorithms of Artificial Intelligence. In *2019 5th International Conference on Environmental Science and Material Application*, 2020, p. 1-7.
- TOMASEV, N. et al.: AI for Social Good: Unlocking the Opportunity for Positive Impact. In *Nature Communication*, 2020, Vol. 11, No. 1, p. 1-6. ISSN 2041-1723.
- TOMÁŠKOVÁ, A., HAVLÍČEK, K.: Family Enterprises and Their Support through Subsidies. In *European Research Studies Journal*, 2018, Vol. 21, No. 2, p. 23-37. ISSN 1108-2976.
- TONG, S., LUO, X., XU, B.: Personalized Mobile Marketing Strategies. In *Journal of the Academy of Marketing Science*, 2020, Vol. 48, No. 2, p. 64-78. ISSN 0092-0703.
- TYRVAINEN, O., KARJALUOTO, H., SAARIJARVI, H.: Personalization and Hedonic Motivation in Creating Customer Experiences and Loyalty in Omnichannel Retail. In *Journal of Retailing and Consumer Services*, 2020, Vol. 57, p. 1-10. ISSN 0969-6989.
- VAN ESCH, P., BLACK, J. S., FEROLIE, J.: Marketing AI Recruitment: The Next Phase in Job Application and Selection. In *Computers in Human Behavior*, 2019, Vol. 90, p. 215-222. ISSN 0747-5632.
- VRABEC, N.: Soft Skills in the Digital Age. In BUČKOVÁ, Z., RUSŇÁKOVÁ, L., SOLÍK, M. (eds.): *Megatrends and Media: Digital Universe*. Trnava : FMK UCM v Trnave, 2019, p. 301-314.
- VRABEC, N.: The Concept of Soft Skills Clusters and Descriptive Indicators in the Process of Gamification. In KUSÁ, A., ZAUŠKOVÁ, A., BUČKOVÁ, Z. (eds.): *Marketing identity: Offline Is the New Online*. Trnava : FMK UCM v Trnave, 2019, p. 998-1013. ISBN 978-80-572-0038-3.
- VRABEC, N., BÔTOŠOVÁ, L.: The Concept of Learning-by-Doing in the Context of Media Education and School Quality Assessment. In *Communication Today*, 2020 Vol. 11, No. 1, p. 140-148. ISSN 1338-130X.
- WANG, C.: Research on the Progress of Computer Artificial Intelligence Algorithm. In TONG, X., LIAO, W. (ed.): *Proceedings of the 2016 2nd International Conference of Materials Engineering and Information Technology Applications*. Shanghai : Atlantis Press, 2017, p. 267-271.
- WANG, J. et al.: The Application of Data Mining Technology to Big Data. In *IEEE International Conference on Computational Science and Engineering*. Los Alamitos, CA : IEEE Computer Society, 2017, p. 284-288.
- WEBER, R. P.: *Basic Content Analysis*. London : SAGE Publications, 1990.
- XU, Y. et al.: Electricity Market Empowered by Artificial Intelligence: A Platform Approach. In *Energies*, 2019, Vol. 12, No. 21, p. 1-21. ISSN 1996-1073.
- XUE, J. et al.: See Now, Act Now: How to Interact with Customers to Enhance Social Commerce Engagement? In *Information & Management*, 2020, p. 1-28. ISSN 0378-7206.
- YAMS, N. B. et al.: Integrated AI and Innovation Management: The Beginning of a Beautiful Friendship. In *Technology Innovation Management Review*, 2020, Vol. 10, No. 11, p. 5-18. ISSN 1927-0321.
- YUAN, Q. et al.: Research on Mixed Planning Method of 5G and LTE. In *3rd International Conference on Information and Computer Technologies (ICICT) 2020*, p. 489-493.
- ZERFASS, A., HAGELSTEIN, J., TENCH, R.: Artificial Intelligence in Communication Management: A Cross-national Study on Adoption and Knowledge, Impact, Challenges and Risks. In *Journal of Communication Management*, 2020, Vol. 24, No. 4, p. 377-389. ISSN 1363-254X.

ZHANG, X., CHEN, Y.: An Artificial Intelligence Application in Portfolio Management. In *Proceedings of the International Conference on Transformations and Innovations in Management (ICTIM 2017)*, 2017, Vol. 37, p. 86-104.

ZIEMBA, E. et al.: Prosumers' Engagement in Business Process Innovation – The Case of Poland and the UK. In *Interdisciplinary Journal of Information, Knowledge, and Management*, 2019, Vol. 17, No. 5, p. 119-143. ISSN 1555-1237.

Authors



Ing. Bc. Michael Kupec

University of West Bohemia
Faculty of Economics, Department of Marketing, Trade and Services
Univerzitní 22,
306 14 Plzeň,
CZECH REPUBLIC
m.kupec@seznam.cz

Michael Kupec graduated in Business Management and Economics with a degree in Mechanical Engineering and a degree in Education. He is currently a PhD student at the Faculty of Economics, University of West Bohemia, where he is working on Internet personalization and related topics. In addition to publishing and scientific work, he is focused on modern style of education. He gained business experience in international automotive companies in Australia and Czechia.

Assoc. Prof. Ing. Dagmar Jakubíková, Ph.D.

University of West Bohemia
Faculty of Economics,
Univerzitní 22,
306 14 Plzeň,
CZECH REPUBLIC
dagmar.jakubikova@seznam.cz



Dagmar Jakubíková is the author of textbooks and professional articles in the field of marketing and marketing applications, tourism, spa, franchising, corporate culture and ethics. She specializes in strategic marketing and marketing applications. She has completed international internships and lectured at universities in Europe, Asia and the USA. She gained professional experience in change management in Canada.



PhDr. Ing. Václav Kupec, Ph.D.

University of Finance and Administration
Faculty of Economics,
Estonská 500,
101 00 Prague 10,
CZECH REPUBLIC
vkupec@mail.vsfs.cz

Václav Kupec studied economics and management, international studies, and pedagogical science, earning a Ph.D. in Marketing Communications. He is currently the Head of the Multidisciplinary Projects Laboratory at the University of Finance and Administration and an Assistant Professor at the Prague University of Economics and Business. In addition to his teaching activities, he collaborates on a number of international projects and regularly publishes and presents at conferences. He has long been involved in audit activities as a senior auditor.