

GBC GLOBAL BUSINESS CONFERENCE

Global Business Conference 2022 Proceedings

Reshaping Customer-Oriented Business

ISSN 1848-2252



Editors:

Joe Hair, PhD

Zoran Krupka, PhD

Goran Vlašić, PhD

Sep 21st – 24th, 2022
Dubrovnik, Croatia



13th ANNUAL GLOBAL BUSINESS CONFERENCE
Dubrovnik (Croatia), September 21st – 24th, 2022

Editors:

Joe Hair, PhD
Zoran Krupka, PhD
Goran Vlašić, PhD

Program Committee:

Goran Vlašić (University of Zagreb, Croatia), Program Committee Co-Chair
Zoran Krupka (University of Zagreb, Croatia), Program Committee Co-Chair
Amaryllis Audenaert (University of Antwerpen, Belgium)
Monika Bédiová (Mendel University in Brno, Czech Republic)
Mária Bláhová (University of Economics in Bratislava, Slovakia)
Carlos Burcio (ISCTE-IUL, Portugal)
Ronel Du Preez (Stellenbosch University, South Africa)
Joe Hair (University of South Alabama, USA)
Bradley Kalgovas (University of New South Wales, Australia)
Daniela Martinez Laureiro (ETH Zurich, Switzerland)
Jürgen Moormann (Frankfurt School of Finance & Management, Germany)
Pat Obi (Purdue University Northwest, USA)
Iwona Otola (Czestochowa University of Technology, Poland)
Jurica Pavičić (University of Zagreb, Croatia)
Norman Peng (Glasgow Caledonian University, UK)
Cristina Helena Pinto de Mello (ESPM, Brazil)
Aušra Repečkienė (Kaunas University of Technology, Lithuania)
Mario Situm (University of Applied Sciences Kufstein, Austria)
Veronika V. Tarnovskaya (Lund University, Sweden)
Gabriele Troilo (Bocconi, Italy)

Organizing Committee:

Filip Vrhovnik, Organizing Committee chair
Ante Gugić
Krešimir Kežman

Publisher:



Innovation Institute
Zagrebačka cesta 192, Zagreb

For Publisher:

Fran Živković

All contributions were subjected to the double-blind review process by two expert reviewers.

Copyright © 2022 by Innovation Institute. All rights reserved including the right of reproduction in whole or in part in any form.

ORGANIZER



Institut za inovacije
Innovation Institute

GENERAL PARTNER

 **školska knjiga**

Content

Facilitating Employee Creativity: A Mediating Cross-Level Transformational Leadership Process <i>Hanan AlMazrouei</i>	7
Employer Attractiveness in Alpine Destinations. The Influence of Destination-Related Factors <i>Alexandra Brunner-Sperdin, Mario Situm</i>	8
Leadership Development: A Strength-Based Assessment Model as an Option for the Coaching Intervention? <i>Doris Danzig-Jones</i>	10
Environmental Awareness and Social Ethics of Consumption: Influence on Environmental Behavior Conditioned to Consumer Political Positioning <i>Jussara da Silva Teixeira Cucato, Flavio Santino Bizarrias, Vivian Iara Strehlau, Marlette Cassia Oliveira Ferreira, Jussara Goulart da Silva</i>	22
The Gap Between Purchase Intention and Purchase Behavior in the Sustainable Fashion Industry <i>Alexandra Martins Francisco, Carlos Manuel Súcía Burcio</i>	23
Linking Environmental Volatility and Complexity to the Relationship Between Key Account Management Practices and Performance Outcomes <i>Thomas Rainer Fuss</i>	24
Financial Condition of Polish Listed Companies After the Pandemic. Crisis Resilience Study <i>Marlena Grabowska, Iwona Otola</i>	25
Two Stage Stackelberg Duopoly Game with New Technology Investment <i>Nora Grisáková, Iveta Kufelová, Peter Štetka</i>	26
Asymmetric Relationship between Financial Development, Total Factor Productivity, and Economic Growth <i>Supanee Harnphattanusorn</i>	34
The Stimulus-Organism-Response (S-O-R) Paradigm as a Guiding Principle in Environmental Psychology: Comparison of Its Usage in Consumer Behavior and Organizational Culture and Leadership Theory <i>Victoria Hochreiter, Cynthia Benedetto, Marc Loesch</i>	42
Organizational Learning to Push Forward the Digital Transformation: The Case of Digital Innovation Labs <i>Friedrich Holotiuk, Jürgen Moormann</i>	55

Sustainable Production of e-Fuels and Its Social and Economic Impact <i>Mária Kmety Barteková, Daniela Rybárová</i>	56
Effectiveness of eco-innovations in selected countries <i>Iveta Kufelová, Nora Grisáková, Peter Štetka</i>	65
Taxable Agglomeration Rents Across the Spanish Local Labor Markets <i>Jesus Lopez-Rodriguez, Brais Pociña-Sanchez, Laura Varela-Candamio</i>	74
Formal and Informal Tools for the Protection of Intellectual Property Rights in Creative Industries in Central European Countries <i>Helena Majdúchová, Mária Kmety Barteková</i>	75
Strategies for Communication with Stakeholders in Mergers and Acquisitions <i>Sergey Myasoedov, Emil Martirosyan, Teimuraz Vashakmadze, Anastasia Sergeeva</i>	87
Identifying Successful Leaders' Opportunities and Limitations <i>Emad Nasserian, Tatjana Seibt</i>	94
Lending to Women and Lending Risk in Micro-Banks: The Moderating Effects of Patriarchy and Female Leadership <i>Samuel Anokye Nyarko, Leif Atle Beisland, Roy Mersland</i>	105
The response of high-growth enterprises to the crises caused by the Covid-19 pandemic <i>Iwona Otolá, Marlena Grabowska</i>	106
Determining Factors That Influence Brazilian Consumer Using Fintechs <i>Cristina Helena Pinto de Mello, Kaue Augusto Fernandes</i>	107
Digital Vs. Traditional: Selected Views on Creating an Optimal Marketing Communication Mix <i>František Pollák, Peter Markovič, Róbert Világi</i>	123
The Impact of the Fourth Industrial Revolution on Planning and Control Processes in Industrial Enterprises in Slovakia <i>Diana Puhovichova, Nadežda Jankelova</i>	125
Student User-Generated Content as a Communicative Success Factor for Universities – Final Results <i>Peter Schneckenleitner</i>	142
Communication Strategies for Mitigating the Pandemic in Tourism. The Integrated Marketing Communications Approach <i>Maja Šerić, Maria Vernuccio</i>	153

What Factors Influence the Profitability of Tourism Firms? An Analysis for Austrian Hotels and Restaurants <i>Mario Situm, Alexandra Brunner-Sperdin</i>	154
European Market's Cultural Zones of Homogeneity: Hierarchical Clustering Analysis <i>Peter Štetka, Nora Grisáková, Iveta Kufelová</i>	156
The Assessment of Data Analytics Skills and Business Knowledge for Finance Professionals in Context of Business Analytics <i>Andreas Stoller</i>	169
ZalaZONE: is that a complex innovation ecosystem? <i>Csilla Tóth, András Hány, Beáta Fehérvölgyi</i>	189
The Impact of Brand Experience on the Cognitive Dissonance and the Mediating Role of the Perceived Brand Authenticity in the Purchase of Eco-Friendly Products <i>Inga Träger</i>	203
Public Interest Conditions Reshaped: A Critical Analysis of Merger Cases in South Africa <i>Anton van Wyk, Anmar Pretorius, Derick Blaauw</i>	214
Earnings Management and Going Concern During COVID-19: Evidence from IFRS Context <i>Mohammed M. Yassin, Osama S. Sha'aban</i>	215
Implications of Multi-Homing for Multi-Sided Platforms: A Literature Review <i>Goran Vlašić, Kristijan Keleminić, Fran Živković</i>	224

Facilitating Employee Creativity: A Mediating Cross-Level Transformational Leadership Process

Hanan AlMazrouei

United Arab Emirates University

United Arab Emirates

e-mail: h.almazrouei@uaeu.ac.ae

Abstract

An organization's growth is heavily dependent on the creativity of its employees although, unfortunately, not all organizations encourage creativity. Despite its importance, the matter of leadership enhancing employee creativity has not received the attention it deserves. The aim of this study is to examine the cross-level links existing between transformational behaviors exhibited by managers and the creativity displayed by their employees. Surveys were distributed to 225 employees of multinational organizations located in Dubai in the UAE. This study emphasizes the critical role played by transformational leaders to enable employee creativity across levels. This study proposes a three-path cross-level mediating model with two critical processes with job insecurity as a variable at the individual level. By using multi-level structural equation modelling, the study revealed that psychological empowerment functions as a mediator in sequence between the cross-level links. This highlights the importance of transformational leadership as an enabler of employee creativity across levels. We suggest that transformational leadership increases employee creativity through psychological empowerment. This study has offered further insights into the connection between leadership and creativity through the agency of psychological empowerment. We found that job insecurity is negatively related to individual psychological empowerment. We discuss the implications of these findings for both theory and practice.

Keywords

Transformational leadership, psychological empowerment, employee creativity

Employer Attractiveness in Alpine Destinations. The Influence of Destination-Related Factors

Alexandra Brunner-Sperdin

University of Applied Sciences Kufstein
Andreas Hofer-Straße 7, 6330 Kufstein, Austria
e-mail: alexandra.sperdin@fh-kufstein.ac.at

Mario Situm

University of Applied Sciences Kufstein
Andreas Hofer-Straße 7, 6330 Kufstein, Austria
e-mail: mario.situm@fh-kufstein.ac.at

Abstract

The lack of qualified workforce, which is caused by high fluctuation and the leaving of qualified employees to other sectors has already been discussed in the literature before Covid-19 (Stamolampros, Korfiatis, Chalvatzis & Buhalis, 2019) and forced owners of tourism companies to develop strategies to acquire and retain well-trained and motivated employees (Choy & Kamoche, 2021). The growing lack of (younger) skilled employees mainly results from difficulties in reconciling family and professional life as well as from the high degree of physical and psychological stress that work in tourism brings every day (Boukis, Koritos, Daunt & Papastathopoulos, 2020). Moreover, recent studies show that employees attach great importance to conditions such as the social environment and their perception of the workplace (Lefrid, Torres & Okumus, 2022). Employees moreover evaluate the destination (region) itself as an attracting factor for choosing a job in tourism companies (Brunner-Sperdin et al. 2021; Foidl et al. 2020). The present study extends the two-factor theory of Herzberg, Mausner and Snyderman (1959) and includes attracting factors of a destination as a third dimension to the motivational and hygiene factors.

The aim of the study was to understand what factors influence (potential) employees and motivate workers in hospitality and tourism settings in their work by adding destination-related factors as a third dimension of working motivation. Based on previously conducted focus group interviews (Brunner-Sperdin et al., 2021), a questionnaire was designed that focused the attracting factors for a tourism job. An online survey was conducted. Data collection resulted in a final, useable sample of 406 questionnaires. Students in tourism education and employees in tourism companies were asked to participate in the study.

Constructs describing the study model are leadership, corporate culture, social relationships, workplace, payment and destination-related factors. All items were measured on a seven-point strongly agree/strongly disagree Likert-type scale. Hypotheses were tested by using structural equation modeling. Results prove that Herzberg's motivation theory represents a valid and useful basic framework for employer attractiveness research. Our findings confirm a significant, positive impact of regional factors on leadership, corporate culture, social relationships and workplace and thus support the adapted concept of work motivation. As a

result of these findings, it is suggested that managers in tourism and hospitality settings need to consider the destination factors as a supplement to hygiene factors in order to create motivation to apply and to work in tourism.

Keywords

Employer attractiveness, alpine destination, destination factors, hygiene factors, motivation factors

References

1. Boukis, A., Koritos, C., Daunt, K. L., & Papastathopoulos, A. (2020). Effects of customer incivility on frontline employees and the moderating role of supervisor leadership style. *Tourism Management*, 77, 103997.
2. Brunner-Sperdin, A., Foidl-Mehrländer, K., Hartleif, L., Hoffmann, K., Holzweber, M., Jooss, M., Rainoldi, M., & Situm, M. (2021). Tourismuswirtschaft als attraktiver Arbeitgeber. *Tourismus Wissen - quarterly*, 23, 43-47.
3. Choy, M. W. C., & Kamoche, K. (2021). Identifying stabilizing and destabilizing factors of job change: A qualitative study of employee retention in the Hong Kong travel agency industry. *Current Issues in Tourism*, 24(10), 1375-1388.
4. Foidl-Mehrländer, K., Hartleif, L., Hoffmann, K., Holzweber, M., Jooss, M., & Rainoldi, M. (2020). Tourism Workforce Research: Exploring Talent Attraction. Travel and Tourism Research Association (TTRA) 2020 European Chapter Conference Proceedings, 28th-30th September, Innsbruck.
5. Herzberg, F., Mausner, B., & Snyderman, B. B. (1959). *Motivation to Work*. New York: Routledge.
6. Lefrid, M., Torres, E. N., & Okumus, F. (2022). Immigrant hospitality workers: Familism, acculturation experiences, and perception of workplace. *International Journal of Hospitality Management*, 103, 103213.
7. Stamolampros, P., Korfiatis, N., Chalvatzis, K., & Buhalis, D. (2019). Job satisfaction and employee turnover determinants in high contact services: Insights from Employees' Online reviews. *Tourism Management*, 75, 130-147.

Leadership Development: A Strength-Based Assessment Model as an Option for the Coaching Intervention?

Doris Danzig-Jones

SMBS University of Salzburg Business School
Sigmund-Haffner-Gasse 18, 5020 Salzburg, Austria
e-mail: doris.danzig-jones@stud.sbg.ac.at

Abstract

This study attempts to explore the successfulness of a strength-based assessment model (SBAM) as a method for strength-based leadership development interventions in organizations. Also called self-report questionnaire (SRQ) it is a model whereby people discover their strengths. Strengths provide the most prominent capacities and provide genuine opportunities to improve manpower. They are beneficial for both organizations and individuals. Employees show improved work performance, higher levels of happiness, less depression and stress and are more self-sustained. Managers use it as a vehicle to develop different leadership styles and to avoid the Peter Principle. The application of strengths can be disadvantageous. It does not necessarily lead to behavioral changes, ignores weaknesses and different definitions of strengths impact the coaching process. Overused strengths produce a negative feedback loop, impact on team performance and limit progress. Underused strengths corrode strengths and derail performance. Strength blindness happens when employees are unaware of their strengths. Pitfalls can be managed through a mitigation strategy and deliberate practice. The CliftonStrengths® SBA is based on psychometrics with high reliability and validity. The individual result of the SRQ questionnaire sets the scene for the coaching intervention. It is a ready to use framework applied beyond borders. Retrieved studies suggests that SBA improves both employee engagement and performance, and resilience. However, it could pose a risk of labelling people' strengths, mislead people's self-image and lacks peer-reviewed scientific studies. And yet SBA are most valuable when applied in combination with other strength-assessment models.

Keywords

Coaching, leadership, leadership development, strength

1. INTRODUCTION

A golden age of coaching is around the corner due to the greater demands in working life to cope with the needs of a changing world (Peterson, 2018). Coaching appears to be a key instrument to support managers in their work (Evers, Brouwers & Tomic, 2006). Yet organizations show reluctance to respond to new ideas and ignore a serious duty for learning and development (Garvey & Williamson, 2002) although there is a need for leadership development (DDI, 2021) because traditional leaders find it more difficult to enact effective leadership solely on their own (Van Velsor & McCauley, 2004). To reach their goal, leaders need to become smart (Jensen, 2015). These challenges can be cured through leadership development (McLaughlin, Vicere & Ziskin, 2019) based on a strength approach that originated from positive psychology (Seligman & Csikszentmihalyi, 2000).

Chapter 2 reviews the literature and starts off with working definitions of coaching, leadership, leadership development and strengths. Section 2.2 argues for strength employment rather than focusing on weaknesses. Section 2.3 provides an overview of the benefits for strength use for individuals and organisations. Section 2.4 illuminates the drawback of strength application based on overuse and underuse, the remedy for both and that strengths can be overrated. Section 2.5 explains the SRQ of CliftonStrengths® and its application in Section 2.6. Section 2.7 provides a general overview of the benefits of SRQs and CliftonStrengths® emphasizing that the combination with other assessment tools is most valuable. Section 2.8 examines disadvantages for coaches, organizations and leadership development, due to different definitions of strengths and that CliftonStrengths® is not peer-reviewed. Finally, albeit drawbacks, SBAMs can be a valuable approach for leadership development.

2. LITERATURE REVIEW

2.1. Definitions

Coaching

'Coaching is all about a journey' emphasizes Whitmore (2017). Coaching is based on a professional contract between a coach and coachee (Bachkirova & Kauffman, 2009) emphasizing a development process characterized by bespoke strategies to produce sustainable personal development involving structured and focused interaction to achieve and maximize individual success (Bachkirova, Cox & Clutterbuck, 2018) rather than disentangling problems (Spence & Grant, 2007).

Although Mollaret & Claudepierre (2016, p. 545) refrain to define the coaching approach through strategies, tools or techniques, they highlight that the coaching process is a multidirectional formal contract with set objectives either on short-term or long term. Signatories are the coach, the coachee and organization.

Leadership

Paradigm of modern leadership started with Thomas Carlyle's Theory of 'Great Man' (Goldberg, Brattin & Engel, 1993). For him leadership was an inherent ability acquired through birthright.

At the doorstep of neoliberalism, Burns (1978) defines leadership as a mutual mobilizing process between leaders and staff whereby motives and values are the driving force for reaching individual and common goals. Rost (1991) proposed a post-industrial paradigm emphasizing an influential and multidirectional relationship between leaders and followers. Towards the end of the 20th century, Drucker, (1996, p. 64) proclaimed: 'the only definition of leader is someone who has followers.

Since the millennium, leadership is defined as a mindset rather than a position (Arnander, 2013), a choice rather than a role (Covey, 2013) and is based on moral authority (Franklin, 2020). It is generally agreed that leadership is built on six underlying domains: 'character, characteristics, people practices, institutional practices, context and outcome' (Mango, 2018, p. 57) and as a means by which leaders influence other people towards collective goals (Zenger, Folkman, Sherwin and Steel, 2012).

Leadership development

The literature distinguishes between leader and leadership development (Day, 2000) although both are interlinked (Van Velsor & McCauley, 2004). Leader development is a more traditional approach defined as expansion of an individual's current and future capacity through self-governing (ability to develop), social (construct and preserve relationship) and work-related competences (strategic thinking) towards efficacy in leadership roles and processes executed in a group of people with shared interests (Van Velsor & McCauley, 2004).

By contrast, leadership development emphasizes a development of teams and organizations rather than just individual capacity building (Day, 2000). Therefore, only when individuals, teams and organizations come together are workplaces effective (Van Velsor & McCauley, 2004).

Strength

Different definitions in different disciplines. Strengths in Positive Psychology as a 'potential for excellence' (Biswas-Diener, Kashdan & Mindhas, 2001, p. 106); a means for optimal performance (Buckingham & Clifton, 2005; Linley & Harrington, 2006a; Wood, Linley, Maltby, Kashdan and Hurling, 2011); pre-programmed capacities (Linley, 2008) and attributes that are naturally given and frequently used (Peterson & Seligman, 2004).

Strength in the leadership domain, as a 'quality of an individual that accounts for successful performance' (Northouse, 2021, p. 127-128) and is a combination of 'traits, abilities, capacities and qualities' (MacKie, 2016, p. 26) that are underpinned by energy and passion (Brook & Brewerton, 2018).

2.2. Reasoning for Employing Strengths

One of the early writers, Haldane (1947), reasoned that strength's use improves rather than wastes manpower and worked out a roadmap for it. Drucker (1996) pointed out that strengths provide genuine opportunities with weaknesses becoming insignificant. Strengths

provide the most prominent capacities for development as it is part of the human matrix (Linley, 2008).

2.3. Benefits of Employing Strengths

Strengths matter. Strength use is beneficial for organizations (Linley, 2008). It is a predictor for improved work performance (Biswas-Diener, Kashdan & Lyubchick, 2017); shows higher levels of happiness and less depression (Seligman, Steen, Park and Peterson, 2005); less stress (Wood et al., 2011; Linley et al., 2010); higher levels of originality and satisfaction (Govindji & Linley, 2007; Proctor, Maltby & Linley, 2011) and facilitates self-sustainability (Linley & Harrington, 2006) and that a strength-based culture might generate favourable implications for both staff regarding happiness and organizations regarding performance (Van Woerkom & Meyers, 2015).

Additionally, strength use is a vehicle to develop different leadership styles like inspirational leadership (Morris & Garret, 2013) and to avoid the Peter Principle (Burkus, 2011). Yet focusing exclusively on strengths is not an easy task as it does not make strengths stronger (Zenger, Folkman & Edinger, 2011). They proposed an alternative approach through non-linear development based on complementary skill development.

2.4. Drawbacks of Applying Strengths

Various disadvantages were found. Insight into people's strengths does not necessarily lead to sufficient behavioral changes (MacKie, 2015) and weaknesses are ignored rather than identified (Linley, 2008). Different definition of strengths impact on the coaching context and how these definitions are applied considerably shape the outcome (Biswas-Diener, Kashdan & Lyubchick, 2017). Strength overuse produces a negative feedback loop (Drake, 2018); impacts team performance (Kaplan & Kaiser, 2009), limits progress and produces negative outcome with increased risks for performance (Brook & Brewerton, 2016).

Yet peoples' 'no strength's use' strategy is a stumbling block. Underplayed strengths that are not realized are even more problematic because their potential lies fallow and as a result strength corrode, remain underdeveloped (Linley, 2008,) and can either disrupt or derail performance (Brook & Brewerton, 2018).

Various reasons are accountable for such strength blindness. People take their strengths for granted (Linley, 2008; Biswas-Diener, Kashdan & Minhas, 2011); have a deficiency of deep mindfulness (Niemic, 2014); are generally unaware, not conscious about their strengths (Kaiser & Kaplan, 2009) and unconnected to their inner self (Linley & Harrington, 2006); they see strengths as ordinary sensation, assuming all people have them (Biswas-Diener, Kashdan & Minhas, 2011) resulting in either belittling or downplaying their strengths, even after people undertook SRQ and saw their strengths in the report (Niemic, 2014).

Pitfalls in strength use can be managed. Overused strengths can be remedied through curbing them with strength temperance through supporting strengths that encourage, for example,

self-discipline (Niemiec, 2014) and through mitigation strategy (Kaplan & Kaiser, 2009): acknowledgement of strengths overuse through review and reflection on top strengths and redirection simply through will power. Wasted strengths can be cured if the motivational factor for underutilized strengths is established by applying deliberate practice to develop these strengths and consolidating through Whitmore's (2017) GROW model. And yet, strengths can be overrated. Research found out that there is no fundamental difference in the potential between average and successful people (Colvin, 2008). Regarding his research findings, the only difference is that successful people practice more. This strategy applied by managers helps employees to improve over time and to excel without being assessed for mistakes.

2.5. CliftonStrengths® Explained

CliftonStrengths® (previously Clifton StrengthsFinder®) was developed for the workplace by Don Clifton, founder of strength-based psychology, and his research team at Gallup, Inc., US (Rath, 2007; Gallup, 2021; Asplund, Lopez, Hodges and Harter, 2009). Clifton was driven to find out what would surface if humanity would focus on the positive things in people instead of focusing and fixing weaknesses (Rath, 2007; Gallup, 2022). CliftonStrengths® is a psychometric tool that measures people's personality and thought processes (Collins, 2022).

SBAM was designed after more than three decades of the 'study of success' in over 30 countries (Hodges & Clifton, 2004) whereby 2 million people were interviewed across different professions (Gallup, 2020a). From his research Clifton extracted 34 most widespread human talents, which he grouped into four domains: executing, influencing, relationship building and strategic thinking (Gallup, 2020a). These 34 themes of talents are the foundation of CliftonStrengths®. Hodges & Clifton (2004) describe the SBAM as the beginning of a person's self-exploration. It is a strategy to discover talent rather than strengths (Quinlan, Swain & Vella-Brodrick, 2012).

Strength begins with talent (Clifton, Anderson & Schreiner, 2006). Talents are defined as an inherent natural aptitude that occurs repeatedly (Hodges & Clifton, 2004). In slightly different phraseology, talent is a reappearing pattern of ideas, emotions and behaviour (Gallup, 2020a). If talent is multiplied by investment of time spent acquiring, applying and advancing skills and knowledge the output is strength Gallup (2020). This formula provides the definition of strength (Clifton & Harter, 2003, p. 114):

“the ability to deliver consistent, near-perfect performance in a given task”.

Consequently, each talent can be developed into strengths if time is invested (Quinlan, Swain & Vella-Brodrick, 2012) and are the most prominent chance for a favorable outcome (Clifton & Harter, 2003). It is recommended to explore the top five most powerful natural talents or signature themes (Gallup, 2020a).

CliftonStrengths® provides a tool for a life-long journey of discovering, developing, and applying strengths (Clifton, Anderson & Schreiner, 2006). This SBAM can be applied in distinct settings for individuals and teams (Hodges & Clifton, 2004; Gallup 2020), and students

(Gallup, 2017). And yet, CliftonStrengths® points at blind spots in its assessment report. This shows that the model is well aware that strengths could be overused and thus provides a guidance on how to overcome this.

CliftonStrengths® is the most widely described SRQ (Hodges & Clifton, 2004) and regarded as a foundation stone for international companies (Biswas-Diener & Dean, 2007). Up until today, over 27+ million people have used this SBAM since the online personality profile was introduced in 2001 (Gallup, 2022a). The widely accepted use of CliftonStrengths® has brought the strength approach into the mainstream discourse of leadership development and performance (Northouse, 2021). Gallup (2020a) provides in *Now, Discover your Strengths* the most comprehensive description of CliftonStrengths® model.

2.6. CliftonStrengths® in Action

A quasi-experimental study was conducted with an experimental group of nine hospitals and a control group of 151 hospitals over a period of three years (Black, 2002). The findings suggest that the employee engagement, previously very low, grew significantly within two years into the intervention in the experimental group compared to the control group.

A second quasi-experimental study was conducted in a large automobile manufacturer aiming to develop personal and team strengths Connolly (2002). Employees participated in CliftonStrengths® assessment, followed by feedback and follow-up sessions of their top five strengths. The intervention was linked to a direct impact on the outcome of the employee's performance, which increased by 6% within one year. Measurements of cause-effect relationship six months into the strength development confirmed that within the study group the productivity grew by 50 per cent compared to the control group.

A third quasi-experiment with pre-/post-survey design was conducted in the health care system (Spiva, Hedestrom, Ballard, Buitrago, Davis, Hogue, Box, Taasobshirazi and Case-Wirth, 2021). Researchers applied two assessment tools: CliftonStrengths® and a multi-rater or 360° Feedback tool (MacKie, 2016) called Multifactor Leadership Questionnaire (Avolio 2010) to find out how strength-based coaching program enhances leadership style and resilience in nurse leaders. Their findings support the hypothesis that strength-based coaching intervention enhances both transformational leadership skills and resilience.

2.7. Benefits of SRQ

SRQ are straightforward. They are a tempting online tool due to the Internet (Stamoulis, 2009). They are less complicated, as nested in a ready-to-use framework with definition of strengths and their classification, administered faster, independent of the coach's expertise and are easy to understand (Linley & Minhas, 2011) because of distinct language (Linley et al., 2010). SRQ are used to set the scene for the coaching intervention, being the starting point for coaching processes (Biswas-Diener, 2010), and are helpful for coachees to understand the model and its usefulness and ease skepticism (MacKie, 2015).

CliftonStrengths® shows high reliability and validity (Asplund et al., 2009). Their Technical Report confirmed a test-retest reliability consistency measured over a period of one, three and six months with very few exceptions; Cronbach's alpha between 0.60 and 0.82 and both construct and content validity appear very strong. A newer report (Asplund, Agrawal, Hodges, Harter and Lopez, 2014) confirmed the utility of this SBAM.

CliftonStrengths® can be applied beyond borders. Out of the 500 Fortune companies worldwide, 90% have administered the CliftonStrengths® SRQ in their workplace (Gallup, 2022b). And yet, SRQ are most valuable if used in combination with other assessment models. Stamoulis (2009) recognises the importance to combine SRQs with interviews, because inconsistencies of data are found, which would otherwise have been left uncovered; themes and meanings about coachees can be retrieved by experienced coaches, and interpretations will uncover areas for enquiry that can be addressed.

2.8. Drawbacks of SRQ

SRQ are filled out without the help of the coaches and might pose a risk of labelling people's strengths (Terni, 2015); can assess only predetermined strengths (Linley, 2008, p. 104); missing opportunities for the development of weaknesses (Warren, 2017); might restrain people because of the language used in the model or the model itself (Linley, Nielsen, Wood, Gillett and Biswas Diener, 2010); are less sufficient as the only method to discover strengths when people or circumstances are complex (Stamoulis, 2009, p. 69); neglect dialogue between coach and coachee so the coaching process might be felt artificial (Linley & Minhas, 2011) and mislead people's self-image because feedback is self-assessed (Chamorro-Premuzic, 2016).

SRQ as leadership development tool is a farce. The leadership development industry lacks peer-reviewed scientific studies and is driven by shareholder returns and marketing and sales strategies (Pfeffer, 2015). SRQ is not a Human Resources' (HR) friend. HR strategies are embedded in a 'gap model' based on appraisal talks and on employees' performance (Garvey & Stokes, 2022, p. 51). Such model stresses negative psychological intonation because employees could assume that there is something wrong with them when invited for coaching sessions. As a result, employees enter coaching sessions with a negative touch.

As most research for CliftonStrengths® is done inside Gallup, Inc. it is difficult to retrieve academic literature (MacKie, 2016). Consequently, psychometric qualities such as correlates and consequences are not peer-reviewed (Biswas-Diener, Kashdan & Lyubchick, 2017).

3. CONCLUSION

To conclude, SBAM can be a valuable strategy for leadership development. Employing rather than wasting strengths presents a genuine opportunity because they provide the most prominent potential for the human matrix. Individuals and organizations benefit from strengths use. Applying strengths improves work performance, happiness, satisfaction, is self-sustainable and a vehicle to develop a different leadership style. However, strength overuse

seems to produce negative feedback loop and impacts negatively on personal and team performance. Strengths underuse become a stumbling block as people take them for granted, are unaware and see them as nothing special, resulting in downplaying. But these pitfalls can be managed. Nevertheless, strength can be regarded as overrated.

CliftonStrengths® is a useful tool but evidence is sparse as most research is done in house with little peer-reviewed literature. Yet SRQ are beneficial because they are a ready-to-use framework, straightforward in its administration and are the starting point for the coaching process. CliftonStrengths® seems to show high reliability and validity and can be applied beyond borders. However, SRQ are most valuable when applied in combination with other assessment models.

References

1. Arnander, F. (2013). *We are all Leadership: Leadership is not a position it's a mindset*. Chichester: Capstone Publishing.
2. Asplund, J., Agrawal, S., Hodges, T., Harter, J., & Lopez, S. (2014). *The Clifton Strengthsfinder® 2.0 Technical Report Development and Validation*. Available at: https://wmich.edu/sites/default/files/attachments/u590/2019/cliftonstrengths_technical_report.pdf.
3. Asplund, J., Lopez, S., Hodges, T., & Harter, J. (2009). *The CliftonStrengthsFinder® 2.0 Technical Report: Development and Validation*. Princeton: Gallup Organisation.
4. Avolio, B. (2010). *Full Range Leadership Development* (2nd ed.). London: Sage Publishing.
5. Bachkirova, T., & Kauffman, C. (2009). The blind men and the elephant: using criteria of universality and uniqueness in evaluating our attempts to define coaching. *Coaching: An International Journal of Theory, Research and Practice*, 2(2), 95-105.
6. Bachkirova, T., Cox, E., & Clutterbuck D. (2018). Introduction. In E. Cox, T. Bachkirova & D. Clutterbuck (Eds.), *The Complete Handbook of Coaching* (pp. 29-43). London: Sage.
7. Biswas-Diener, R. (2010). A positive way of addressing negatives: Using strengths-based Interventions in coaching and therapy. In G. Burns, *Happiness, healing and enhancement: Your casebook collection for applying positive psychology in therapy* (pp. 291-302). Boston, MA: John Wiley and Sons.
8. Biswas-Diener, R., & Dean, B. (2007). *Positive Psychology Coaching: Putting the Science of Happiness to Work with Your Clients*. Hoboken, NJ: Wiley and Sons.
9. Biswas-Diener, R., Kashdan, T., & Lyubchick, N. (2017). Psychological Strengths at Work. In L. Oades, M. Steger, A. Delle Fave & J. Passmore (Eds.), *The Wiley Blackwell Handbook of The Psychology of Positivity and Strength-based Approaches at Work* (pp. 34-47). London: Wiley-Blackwell.
10. Biswas-Diener, R., Kashdan, T., & Minhas, G. (2011). A dynamic approach to psychological strength development and intervention. *The Journal of Positive Psychology*, 6(2), 106-118.
11. Black, B. (2001). The road to recovery. *Gallup Management Journal*, 1, 10-12.
12. Brock, J., & Brewerton, P. (2018). *Strengthscope® Handbook: Your guide to achieving success through optimizing strengths and reducing performance risks*. Beauchamp: Troubador Publishing.
13. Brook, J., & Brewerton, P. (2016). *Optimise Your Strengths: Use your leadership strengths to get the best out of you and your team*. Chichester: Wiley.

14. Buckingham, M., & Clifton, D. (2005). *Now, Discover your Strengths: How to Develop Your Talents and Those of the People You Manage*. London: Pocket Books.
15. Burkus, D. (2011). Building the Strong Organization: Exploring the Role of Organizational Design in Strength-Based leadership. *Journal of Strategic Leadership*, 3(1), 54-66.
16. Burns, J. (1979). *Leadership*. New York, NY: Harper & Row.
17. Cameron, K., Dutton, J., & Quinn, R. (2003). *Positive Organizational Scholarship*. Oakland, Berrett-Koehler Publishers.
18. Chamorro-Premuzic, T. (2016). Strengths-Based Coaching Can Actually Weaken You. *Harvard Business Review*. Available at: <https://hbr.org/2016/01/strengths-based-coaching-can-actually-weaken-you>.
19. Clifton, D., & Harter, J. (2003). Investing in Strengths. In: K. Cameron, J. Dutton & R. Quinn (Eds.), *Positive Organizational Scholarship* (pp. 111-121). Berlin: Berrett-Koehler Publishers.
20. Clifton, D., Anderson, E., & Schreiner L. (2006). *Strengths-Quest: Discover and develop your strengths in academics, career, and beyond*. New York, NY: Gallup Press.
21. Collins (2022). Definition of 'psychometric'. Available at: <https://www.collinsdictionary.com/dictionary/english/psychometric>.
22. Colvin, G. (2008). *Talent is Overrated: What Really Separates World-Class Performers from Everybody Else*. London: Nicholas Brealey Publishing.
23. Connelly, S. (2002). All together now. *Gallup Management Journal*, 2(1), 12-18.
24. Covey, S. (2013). Leadership is a choice, not a position. *Business Standard*. Available at: https://www.business-standard.com/article/management/leadership-is-a-choice-not-a-position-stepen-r-covey-109020300076_1.html.
25. Day, J. (2000). Leadership development: A review in context. *Leadership Quarterly*, 11(4), 581-613.
26. Development Dimension International (DDI) (2021). *Global Leadership Forecast 2021*. Available at: <https://media.ddiworld.com/research/GLF2021-final.pdf>.
27. Drake, D. (2018). *Narrative Coaching: Bringing Our New Stories to Life*. Petaluma: CNC Press.
28. Drucker, P. (1996). Your Leadership Is Unique. *Good news: There Is No One "Leadership Personality"*. *Christianity Today International/Leadership Journal*, 17(4), 54-55.
29. Evers, W., Brouwers, A., & Tomic, W. (2006). A Quasi-experimental Study on Management Coaching Effectiveness. *Consulting Psychology Journal: Practice and Research*, 58(3), 174-182.
30. Franklin, R. (2022). *Moral Leadership: Integrity, Courage, Imagination*. New York, NY: Orbis Books.
31. Gallup (2017). *CliftonStrengths for Students: Your strengths journey begins here*. New York, NY: Gallup Press.
32. Gallup (2020). *Gallup Global Strengths Coach: Companion Guide*. Washington, DC: Gallup.
33. Gallup (2020a). *Now, Discover your strengths*. New York, NY: Gallup Press.
34. Gallup (2021a). *Learn How the CliftonStrengths Assessment Works*. Available at: <https://www.gallup.com/cliftonstrengths/en/253676/how-cliftonstrengths-works.aspx>.
35. Gallup (2022). *The History of Clifton Strengths*. Available at: <https://www.gallup.com/cliftonstrengths/en/253754/history-cliftonstrengths.aspx>.
36. Gallup (2022a). *Live Your Best Life Using Your Strengths*. Available at: <https://www.gallup.com/cliftonstrengths/en/252137/home.aspx#:~:text=Live%20Your%20Best%20Life%20Using,at%20work%20and%20everywhere%20else>.

37. Gallup (2022b). *CliftonStrengths for Organizations*. Available at: <https://www.gallup.com/cliftonstrengths/en/253808/cliftonstrengths-for-organizations.aspx>.
38. Garvey, B., & Stokes, P. (2022). *Coaching & Mentoring: Theory and Practice*. London: Sage.
39. Garvey, B., & Williamson, B (2002). *Beyond Knowledge Management: Dialogue, Creativity and the Corporate Curriculum*. Harlow: Pearson Education.
40. Goldberg, M., Brattin, J., & Engel, M. (1993). *On Heroes, Hero-Worship, and the Heroic in History*. Los Angeles, CA: University of California Press.
41. Govindji, R., & Linley, P (2007). Strengths use, self-concordance and well-being: implications for strengths coaching and coaching psychologists. *International Coaching Psychology Review*, 2(2), 143-153.
42. Haldane, B. (1947). A pattern for executive placement. *Harvard Business Review*, 25(4a), 652-663.
43. Hodges, T., & Clifton, D. (2004). Strengths-Based Development in Practice. In A. Linley & S. Joseph (Eds.), *Handbook of positive psychology in practice* (pp. 256-268). Hoboken: Wiley and Sons.
44. Jensen, K. (2015). *Intelligence is Overrated: What You Really Need to Succeed*. Melbourne: Motivational Press.
45. Kaiser R. & Kaplan R. (2009). Then strength run amok. In R. Kaiser (ed.), *The perils of accentuating the positive*. Available at: https://www.organisationalpsychology.nz/content/2_10_13_Perils_CH5_StrengthsRun_Amok.pdf.
46. Kaplan, R., & Kaiser, R. (2009). Stop Overdoing your Strengths. *Harvard Business Review*, 87(2), 100-103.
47. Linley, A. (2008). *Average to A+: Realising Strengths in Yourself and Others*. Coventry: CAPP Press.
48. Linley, A., & Harrington, S. (2006). Strengths coaching: A potential guided approach to coaching psychology. *International Coaching Psychology Review*, 1, 37-46.
49. Linley, A., & Harrington, S. (2006a). Playing to your strengths. *The Psychologist*, 19(2), 86-89.
50. Linley, A., & Minhas, G. (2011). The strengths of the Strengthspotter: Individual characteristics associated with the identification of strengths in others. *International Coaching Psychology Review*, 6(1), 6-15.
51. Linley, A., Nielsen, K., Wood, A., Gillett, R., & Biswas-Diener, R. (2010). Using signature strengths in pursuit of goals: Effects on goal process, need satisfaction, and well-being, and implications for coaching psychologists. *International Coaching Psychology Review*, 5, 6-15.
52. MacKie, D. (2015). Coaching for strength-based leadership. In J. Passmore, *Leadership Coaching: Working with Leaders to Develop Elite Performance* (pp. 211-228). London: Kogan Page.
53. MacKie, D. (2016). *Strength-based leadership coaching in organizations*. London: Kogan Page.
54. Mango, E. (2018). Rethinking Leadership Theories. *Open Journal of Leadership*, 7, 57-88.
55. McLaughlin L., Vicere, A., & Ziskin, I. (2019). Leadership development: The Shift from 'Ready Now' to 'Ready Able'. In A. Wilkinson, N. Bacon, S. Snell & D. Lepak (Eds.), *The Sage Handbook of Human Resource Management* (pp. 179-194). London: Sage Publications.

56. Mollaret, C., & Claudepierre, C. (2016). Performance and Talent: Essentials of Coaching. In M. Zeuch (ed), *Handbook of Human Resource Management* (pp. 543-570). Berlin: Springer.
57. Morris, D., & Garret, J. (2013). Stengths: Your Leading Edge. In A. Linley, S. Harrington and N. Garcea (Eds.), *Oxford Handbook of positive psychology and work* (pp. 95-105). London: Oxford University Press.
58. Niemiec, R. (2014). *Mindulness and Character Strengths: A Practical Guide to Flourishing*. Göttingen: Hogrefe Publishing.
59. Northouse, P. (2021). *Introduction to Leadership: Concepts and Practice*. London: Sage.
60. Peterson, C., & Seligman, N. (2004). *Character Strengths and Virtues: A Handbook of Classification*. Oxford: Oxford University Press.
61. Peterson, D. (2018). Foreword. In E. Cox, T. Bachkirova & D. Clutterbuck (Eds.), *The Complete Handbook of Coaching* (pp. 27-28). London: Sage.
62. Pfeffer, J. (2015). *Leadership BS: Fixing Workplaces and Careers One Truth at a Time*. New York, NY: Harper Collins.
63. Proctor, C., Maltby, J., & Linley, A. (2011). Strengths Use as a Predictor of Well-Being and Health-Related Quality of Life. *Journal of Happiness Studies*, 12(1), 153-169.
64. Quinlan, D., Swain, N., & Vella-Brodrick, D. (2012). Character Strengths Interventions: Building on What We Know for Improved Outcomes. *Journal of Happiness Studies*, 13(6), 1145-1163.
65. Rath, T. (2007). *Strengthsfinder 2.0 from Gallup and Tom Rath: Discover your CliftonStrengths*. New York, NY: Gallup Press.
66. Rost, J. (1991). *Leadership for the Twenty-First Century*. Westport: Praeger.
67. Seligman, M., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, 55, 5-14.
68. Seligman, M., Steen, T., Park, N., & Peterson C. (2005). Positive Psychology Progress: Empirical Validation of Interventions. *American Psychologist*, 60(5), 410-421.
69. Spence, G., & M. Grant, A. (2007). Professional and peer life coaching and the enhancement of goal striving and well-being: An exploratory study. *The Journal of Positive Psychology*, 2(3), 185-194.
70. Spiva, L., Hedestrom, L., Ballard, N. Buitrago, P., Davis, S., Hogue, V., Box, M., Taasoobshirazi, G., & Case-Wirth, J. (2021). Nurse Leader training and strength-based coaching: Impact on leadership style and resiliency. *Nursing Management*, 52(10), 42-50.
71. Stamoulis, D. (2009). *Senior Executive Assessment: A Key to responsible corporate governance*. Chichester: Wiley-Blackwell.
72. Van Velsor, E., & McCauley, C. (2004). Our View of Leadership Development. In C. McCauley & E. Van Velsor (Eds.), *The Center for Creative Leadership: Handbook of Leadership Development* (pp. 1-22). New York, NY: Jossey-Bass.
73. Van Woerkom, M., & Meyers, M. (2015). My Strengths Count! Effects of A Strengths-Based Psychological Climate on Positive Affect and Job Performance. *Human Resource Management*, 54(1), 81-103.
74. Warren, R. (2017). Strengths-based leadership assessments miss the target - and the species. *Development and Learning in Organizations*, 31(6), 1-3.
75. Whitmore, J. (2017). *Coaching for Performance: The Principles and Practice of Coaching and Leadership*. London: Nicholas Brealey.
76. Wood, A., Linley, A., Maltby, J. Kashdan, T., & Hurling, R. (2011). Using personal and psychological strengths leads to increases in well-being over time: A longitudinal study

and the development of the strengths use questionnaire. *Personality and Individual Differences*, 50, 15-19.

77. Zenger, J., Folkman, J. Sherwin, R., & Steel, B. (2012). *How to Be Exceptional: Drive leadership success by magnifying your strengths*. New York, NY: McGraw-Hill.

78. Zenger, J., Folkman, J., & Edinger S. (2011). Making yourself indispensable. *Harvard Business Review*, 89(10), 84-92.

Environmental Awareness and Social Ethics of Consumption: Influence on Environmental Behavior Conditioned to Consumer Political Positioning

Jussara da Silva Teixeira Cucato

ESPM

Rua Joaquim Tavora, 1240, 04015-013, São Paulo, SP Brazil

e-mail: jussaracucato@gmail.com

Flavio Santino Bizarrias

Uninove University

São Paulo, SP Brazil

e-mail: flavioxsp@hotmail.com

Vivian Iara Strehlau

ESPM

Rua Joaquim Tavora, 1240, 04015-013, São Paulo, SP Brazil

e-mail: vstrehlau@espm.br

Marlette Cassia Oliveira Ferreira

Instituto Federal de Educação Ciência e Tecnologia de São Paulo

São Paulo, SP Brazil

e-mail: marlettecassia@gmail.com

Jussara Goulart da Silva

Universidade Federal de Uberlândia

Uberlândia, Brazil

e-mail: profadmjussara.ufu@gmail.com

Abstract

Despite growing concern about society's impacts on the environment, a gap remains in individuals between attitude and socio-environmentally responsible behavior. This study evaluates the influence of environmental awareness and consumption ethics, conditioned to the individual's political positioning on proactive environmental behavior. A survey was developed whose data were analyzed using structural equation modeling and linear regression mediation tests for hypothesis testing. The results suggest that individuals with more conservative political positioning tend to present results less ethical and less directed to the preservation of the environment.

Keywords

Political positioning, environmental behavior, consumer ethics, consumer behavior

The Gap Between Purchase Intention and Purchase Behavior in the Sustainable Fashion Industry

Alexandra Martins Francisco

IPAM Lab
Lisbon, Portugal

Carlos Manuel Súcía Burcio

IPAM Lab
Lisbon, Portugal
e-mail: carlos.burcio@gmail.com

Abstract

Environmental problems have gained prominence in the daily lives of the world's population. Alongside these problems, sustainability issues arise with equal prominence, with the intention of suppressing them. The fashion industry has been characterized by a high turnover of collections and a short product life cycle, making these products part of fast fashion productions. On the other hand, another concept emerges, called slow fashion, which focuses its concern on a conscious production that respects both the human being and the environment, in all its stages.

In this way, consumers show concern about environmental issues and, therefore, have the intention to buy sustainable fashion products. However, this intention does not always translate into actual behavior, thus creating a gap between the two. This gap is justified through variables such as image and price, the same ones that moderate this relationship. This research was supported by a closed-ended questionnaire and was answered correctly by 226 respondents. The results suggested that purchase behavior is influenced by purchase intention. However, image proved to be a moderator between intention and behavior, negatively. The price, in contrast to what is predicted, positively moderates this relationship and, therefore, when the price increases, respondents tend to buy more.

Keywords

Purchase intention, purchase behavior, fast fashion, slow fashion, sustainability, fashion

Linking Environmental Volatility and Complexity to the Relationship Between Key Account Management Practices and Performance Outcomes

Thomas Rainer Fuss

University of Salzburg Business School (SMBS)
Gustav-Mahler Str. 4, 88444 Ummendorf, Germany
e-mail: ThomasRFuss@aol.com

Abstract

The intended research will extend the relationship marketing theory model of key account management (KAM) practices and its impact on performance outcomes by the mediator variables “environmental volatility” and “environmental complexity”.

Furthermore, the variable set of KAM practices as a part of this research model will be extended by a technological perspective. Concretely, the variables “technology usage” and “social media usage” will be added respectively. The research will follow the approach of mixed-methods – more precisely qualitative expert interviews will be conducted to confirm the transferability of the operationalized variables environmental volatility and complexity in the area of relationship marketing and key account management. These results, in combination with findings in the literature review, will be used to finalize the developed structure equation model of this research. The extension with a macroeconomic perspective through contemplating the environmental factors such as environmental complexity and environmental volatility will give an insight on strengths and dependencies of the interrelation between key account management practices and performances measures as this has not been analyzed so far.

The significance of this research is based on two main pillars: theory based and practice based. First, identified gaps in literature of relationship marketing reveal potential for further contribution to knowledge and theory development. Second, the results will provide relevant data for practitioners that are faced with environmental challenges to identify and apply adequate key account management practices to sustainably maintain and optimize the collaboration with their customers.

Keywords

Key account management practices, environmental complexity, environmental volatility, relationship management, KAM

Financial Condition of Polish Listed Companies After the Pandemic. Crisis Resilience Study

Marlena Grabowska

Czestochowa University of Technology
ul. Armii Krajowej 19b, 42-200 Częstochowa, Poland
e-mail: marlena.grabowska@pcz.pl

Iwona Otola

Czestochowa University of Technology
ul. Armii Krajowej 19b, 42-200 Częstochowa, Poland
e-mail: iwona.otola@pcz.pl

Abstract

The reaction of the enterprises to black swans is crucial to the economic development of a country. The ability of the enterprises to adapt and survive despite sudden shocks and changes in the environment is recognized as its resilience. The resilience of enterprises to the crisis allows them to overcome emerging shocks and remain competitive on the market, as well as maintain a good financial condition. There are many approaches to conceptualizing the resilience of the enterprises in the literature on the subject. Our research focuses on the resilience from financial point of view. The main scientific objective of this paper is an indication which Polish listed companies from selected industries have shown their resistance to the shock caused by the Covid-19 pandemic. Empirical research of Polish listed companies was carried out on the basis of financial statements for the years 2017-2021, divided into stable and unstable periods. The areas of liquidity, operational efficiency and profitability were assessed. Moreover, the market share of these entities, expressed as a measure of concentration, using the Herfindahl-Hirschman index was examined.

Keywords

Resilience, economic shocks, financial condition, Covid-19

Two Stage Stackelberg Duopoly Game with New Technology Investment

Nora Grisáková

University of Economics in Bratislava
Bratislava, Slovakia
e-mail: nora.grisakova@euba.sk

Iveta Kufelová

University of Economics in Bratislava
Bratislava, Slovakia
e-mail: iveta.kufelova@euba.sk

Peter Štetka

University of Economics in Bratislava
Bratislava, Slovakia
e-mail: peter.stetka@euba.sk

Abstract

In this paper we present a two stage Stackelberg-Cournot duopoly game with differentiated production of the companies and investment in innovation. We divide the duopoly game into two stages. Stage 1 we can call the Stackelber stage, where the strategy space is the choice in investment in new technology. We assume, that the leader invests in new technology first, and then follower made the investment. 2nd stage we can call Cournot production phase where the strategy space is the choice of output and investment made in 1st stage is commonly known. We finish this step of our research with numerical example of presented model.

Keywords

Nash equilibrium, duopoly, two-stage game, new technology investment

1. INTRODUCTION

Oligopoly and subsequently duopoly market can be considered as the first step in the transition from a monopoly market to a competitive market structure. The analytical expression of oligopoly equilibrium does not represent a simplification of the problem of a monopoly or a perfect competitive market. It is much more complicated than any of the above market extrema (Grisáková & Štetka, 2022).

The equilibrium, as described by Cournot (1838) represents the first starting point for the so-called Nash equilibrium (Nash, 1951). Friedman (2000) states that Cournot was Nash predecessor. He explains his claim by saying that Cournot vaguely perceived the Nash equilibrium, but did not quite see it¹. The Nash equilibrium is best applied to a game with complete information without repetition. If we consider a situation where companies compete in the market repeatedly, over a long period of time, or have incomplete information, it is necessary to reformulate the basic Nash equilibrium (Dixon, 1951).

Gibbons (1992) states that to find the Nash equilibrium we assume the existence of n companies in the market, each of which determines its strategy a_i from a set of feasible strategies A_i . A company strategy can be a single variable (price, quantity, or investment in research and development), or a vector of variables. In the following description of creating the Nash equilibrium, we will consider a simpler case where companies select only one variable. The payoff function in this case represents the profit of the company π_i as a function of the strategies of other companies $\pi_i = \pi_i(a_1, a_2 \dots a_n)$. The payoff function includes the market environment in which the company is located and embodies all important information about demand, costs and other variables.

The Stackelberg duopoly model is again based on the non-cooperative game of companies. The model was created by Heinrich Stackelberg in 1934 (2011) and is a strategy game in which the leader makes his move first and then the followers choose their strategy after the leader. The model therefore assumes that there is one among the companies operating in the oligopolistic market, which has a strategic position and represents the market leader. Other companies have about the same status and accept the leadership of the market leader. Games in which players do not make their decisions at once are called sequential games, and thus the Stackelberg model is also a model of sequential games.

In Stackelberg oligopoly model, the moment a follower chooses his strategy, he knows the leader's decision about the volume of production he will supply to the market and thus considers this volume to be given - q_1 represents for him an exogenous variable. However, the leader can derive the follower decision and take it into account in making his decision.

In finding the Stackelberg equilibrium in the duopolistic market, we solve two problems: the problem of the leader and the problem of the follower, using the so-called back induction, in which we begin by analyzing the problem of the follower and then the leader. Varian (2010) presents the following procedure for solving the Stackelberg model: The follower wants to maximize its profit function in a form $\max_{q_2} p(q_1 + q_2)q_2 - TC_2(q_2)$, where $TC_2(q_2)$ is the

¹ „Cournot vaguely perceived the Nash equilibrium, but did not quite see it.“ (Friedman, 2000, p. 39)

cost function of the successor. The successor's profit will be derived from the volume of leadership production that is given to him in advance. The successor tries to choose a level of production at which his marginal income will equal the marginal cost. For each possible choice of production level, the leader chooses the volume of his production that would ensure maximum profit. The follower therefore chooses his strategy according to the reaction function, $q_2 = r_2(q_1)$. The leader knows that any of his activities will affect the production volume of the follower, so he should be aware of his influence on the successor when choosing his production volume. The leader (assuming he will be the first company) maximizes its profit function in shape $\max_{q_1} p(q_1 + q_2)q_1 - TC_1(q_1)$; for $q_2 = r_2(q_1)$, where $TC_1(q_1)$ is a leader cost function.

2. MODEL

In this section we describe the basic idea of our model, our extension of basic Cournot model with production differentiation, company's differentiation via their different marginal cost and in new technology investment and our base assumptions. In our work we assume a duopoly model with differentiated products of duopoly companies whose inverse demand (price – sales) function are linear in the form as Matsumoto and Szidarovsky (2010) or Grisáková and Štetka (2022) assumed for several companies in the market:

$$p_k = \alpha_k - q_k - \gamma q_l, k = 1, 2, k \neq l \quad (1)$$

In this function α_k is the coefficient measuring the quality of the k -th consumed product, γ is the coefficient measuring the degree of product differentiation. In the model we have 2 assumptions previously made by Matsumoto and Szidarovsky (2010):

Assumption 1:

$|\gamma| < 1$ the products of companies in the oligopoly are not perfect substitutes or complements

$\gamma \neq 0$ the production of companies is not independent of each other

If we consider $\gamma = 1$, possibly $\gamma = -1$, it would mean that the products of companies are perfect substitutes, complements

Assumption 2:

Firms have linear cost functions with a zero-level constant, which means that their marginal costs ($MC_k, k = 1, 2$) are constant for any volume of production. In order to exclude negative production in the model, we assume that $MC_k > 0$ and $\alpha_k - MC_k > 0, k = 1, 2$. The second inequality represents the net quality of the company's production. This assumption holds for companies before their innovation process.

2.1. Stackelberg - Cournot Two Stage Game

In presented paper, we divide the duopoly game into two stages. Stage 1 we can call Stackelberg innovation phase where the strategy space is the choice of investment in new technology. Two company carry out the noncooperative game around new investment for

higher revenues in the future. In this game we assume, that the first company is a leader and he made his investment as first. The follower determines his input after observing the opponent's decision. Stage 2 we can call Cournot production phase where the strategy space is the choice of output and in this stage the choices about investments are common knowledge. In 2nd stage the companies made their decision simultaneously.

Let's consider investment efforts in new technology of company k , ($k = 1,2$) denotes by x_k . Then the effective marginal cost of firm k can be represent as

$$MC_k(x_k) = MC_k - x_k, k = 1, 2 \quad (2)$$

Where MC_k represent the marginal cost of company k , ($k = 1,2$) without investment in new technology and $\alpha_k > MC_k > 0, k = 1,2$. We consider quadratic investment function of company k , ($k = 1,2$) expressed as $I(x_i) = \delta x_k^2/2, k = 1,2$, where δ is a parameter about the technical innovation cost of firm k (the same function was used by Zhou at all (2020) for R&D activities of duopoly companies).

2.2. Model Construction and Solution

With following our model description and our assumptions profit of each firms can be expressed by equation (3). We can say, that companies maximize their profit with respect to their investment expenditure.

$$\begin{aligned} \pi_1(q_1, q_2, x_1, x_2) &= [\alpha_1 - q_1 - \gamma q_2 - (MC_1 - x_1)]q_1 - \delta x_1^2/2 \rightarrow \max \\ \pi_2(q_1, q_2, x_1, x_2) &= [\alpha_2 - q_2 - \gamma q_1 - (MC_2 - x_2)]q_2 - \delta x_2^2/2 \rightarrow \max \end{aligned} \quad (3)$$

The marginal profit of each firm at point (q_1, q_2) are given by

$$\begin{aligned} \frac{\partial \pi_1}{\partial q_1} &= \alpha_1 - 2q_1 - \gamma q_2 - (MC_1 - x_1) \\ \frac{\partial \pi_2}{\partial q_2} &= \alpha_2 - 2q_2 - \gamma q_1 - (MC_2 - x_2) \end{aligned} \quad (4)$$

In order to maximize each firm's profits, we set $\frac{\partial \pi_1}{\partial q_1} = 0$ and $\frac{\partial \pi_2}{\partial q_2} = 0$. If we express from first derivative q_1 and from the second one q_2 , we get reaction function of duopolies (5).

$$\begin{aligned} q_1(q_2, x_1, x_2) &= \frac{\alpha_1 - MC_1 - \gamma q_2 + x_1}{2} \\ q_2(q_1, x_1, x_2) &= \frac{\alpha_2 - MC_2 - \gamma q_1 + x_2}{2} \end{aligned} \quad (5)$$

After solving equations (5) or $\frac{\partial \pi_k}{\partial q_k} = 0, k = 1,2$ simultaneously for q_1 and q_2 we obtain Cournot outputs of firms in following form:

$$\begin{aligned} q_1^C(x_1, x_2) &= \frac{-2(\alpha_1 - MC_1) + \gamma(\alpha_2 - MC_2) - 2x_1 + \gamma x_2}{(\gamma^2 - 4)} \\ q_2^C(x_1, x_2) &= \frac{-2(\alpha_2 - MC_2) + \gamma(\alpha_1 - MC_1) - 2x_2 + \gamma x_1}{(\gamma^2 - 4)} \end{aligned} \quad (6)$$

Now we have an optimal solution of Cournot game, that means for second stage of our game, where investment expenditures are known. Now we have to calculate the first stage of the game, that means we try to find Stackelberg equilibrium in the space (x_1, x_2) , when the first company is leader and the second one is follower.

First, we substitute equations (5) into second expression of equation (3)

$$\pi_2(q_1, q_2, x_1, x_2) = [\alpha_2 - q_2 - \gamma q_1 - (MC_2 - x_2)]q_2 - \delta x_2^2/2 \rightarrow \max$$

where

$$q_1(x_1, x_2) = \frac{-2(\alpha_1 - MC_1) + \gamma(\alpha_2 - MC_2) - 2x_1 + \gamma x_2}{(\gamma^2 - 4)} \quad (7)$$

$$q_2(x_1, x_2) = \frac{-2(\alpha_2 - MC_2) + \gamma(\alpha_1 - MC_1) - 2x_2 + \gamma x_1}{(\gamma^2 - 4)}$$

Then we calculate a derivative of π_2 with respect to x_2 and set it to zero ($\frac{\partial \pi_2}{\partial x_2} = 0$). Then the optimization problem of the follower has a unique solution as

$$x_2(x_1) = \frac{8(\alpha_2 - MC_2) - 4\gamma(\alpha_1 - MC_1) - 4\gamma x_1}{\gamma^4 \delta - 8\gamma^2 \delta + 16\delta - 8} \quad (8)$$

Now we can put equations (6) and (8) into profit maximization of first company – first expression of equation (4), equal the partial derivative of π_1 with respect to x_1 to zero ($\frac{\partial \pi_1}{\partial x_1} = 0$). Then the optimal action of the leader and follower in first stage of a game are

$$x_1 = \frac{8(\alpha_1 - MC_1)\mu_1 - (\alpha_2 - MC_2)\mu_2}{\rho}$$

$$x_2 = \frac{(\alpha_1 - MC_1)\mu_3 + (\alpha_2 - MC_2)\mu_4}{\rho} \quad (9)$$

Where

$$\rho = 32[\gamma^2 \delta (8\delta^2 + 6\delta - 1) - (1 - 2\delta)^3] - \gamma^4 \delta^2 [\gamma^2 \delta (4^2 - \gamma^2) + 24(1 - 4\delta)]$$

$$\mu_1 = \gamma^4 \delta^2 + 4\gamma^2 \delta (1 - 2\delta) - 4(1 - 2\delta)^2$$

$$\mu_2 = 4\gamma^5 \delta^2 + 8\gamma \delta [\gamma^2 (1 - 4\delta) - 4(1 - 2\delta)]$$

$$\mu_3 = 4\gamma^3 \delta^2 (8 - \gamma^2) + 32\gamma \delta (1 - 2\delta)$$

$$\mu_4 = 8\gamma^4 \delta^2 + 16\gamma^2 \delta (1 - 4\delta) + 32(1 - 2\delta)^2$$

As a last step we substitute solution (9) to equation (6) and then, the equilibrium solution in the Stackelberg-Cournot game is obtained in following form:

$$q_1 = \frac{(\alpha_1 - MC_1)[48\gamma^2 \delta^2 (1 - 2\delta) - \rho_1] - (\alpha_2 - MC_2)[\rho_2 + 6\gamma^3 \delta^2 (1 - 6\delta)]}{\rho}$$

$$q_2 = \frac{-(\alpha_1 - MC_1)[\rho_2 + 8\gamma^3 \delta^2 (1 - 2\delta)] - (\alpha_2 - MC_2)[\rho_1 + 8\gamma^2 \delta (12\delta^2 - 6\delta + 1)]}{\rho} \quad (10)$$

Where

$$\begin{aligned}\rho_1 &= 2\gamma^6\delta^3 + 4\gamma^4\delta^2(1 - 6\delta) + 32\delta(1 - 2\delta)^2 \\ \rho_2 &= \gamma^5\delta^3(12 - \gamma^2) - 32\gamma\delta^2(1 - 2\delta)\end{aligned}$$

We can see, that the analytical solution of this two-stage game is difficult for general conclusion and further analyzing. Therefore, in next section we show a numerical solution of presented two stage model.

3. DISCUSSION AND MODEL NUMERICAL SOLUTION

In previous part of our article we presented two stage Stackelberg – Cournot duopoly game. Oligopoly markets are well known in the practice. Almost each industry is an oligopoly market. In present world there are no pure perfect competitive market or monopoly. Therefore, it is very useful to expand “classic” oligopoly models presented by Cournot or Bertrand and throw them analyze the company’s decisions.

We present a two stage Stackelberg – Cournot duopoly game, where production of oligopolies is differentiated (but they are no perfect substitutes or complements), marginal cost of each company is different, that means, they have different production technologies. In addition, we assume, that these two firms would like to invest in new technology and after investment they expect cost reducing.

This paper deal with random parameter values, but we can find real application of our model. For example, as Grisáková et al. (2022) shows, the telecommunication industry could be an oligopoly market with differentiated production. In their model coefficient which measure the quality of production α_k is presented with ARPU (Average Revenue Per User) of each mobile operator company, marginal costs are operating cost per one active SIM card of each companies. In this industry we can imagine for example investment in new 4G signal transmission. Some application with R&D investment we can find for example in the work of Zhou et al. (2020), Long and Huang (2020) or earlier D’Aspremont and Acquemi (1988) and other.

To provide some numerical evidence of presented model, we assume, following parameters values: coefficient measuring the quality of production of the companies $\alpha_1 = 15.8$; $\alpha_2 = 10.9$, degree of production differentiation $\gamma = 0.77$, fix marginal cost of companies $MC_1 = 0.166$; $MC_2 = 0.106$ and technical innovation cost parameter $\delta = 0.4$. With these parameters’ duopolies maximize their profit:

$$\begin{aligned}\pi_1(q_1, q_2, x_1, x_2) &= [15.8 - q_1 - 0.77q_2 - (0.166 - x_1)]q_1 - 0.4x_1^2/2 \rightarrow \max \\ \pi_2(q_1, q_2, x_1, x_2) &= [10.9 - q_2 - 0.77q_1 - (0.106 - x_2)]q_2 - 0.4x_2^2/2 \rightarrow \max\end{aligned}$$

And their reaction functions are:

$$q_1(q_2, x_1, x_2) = \frac{15.634 - 0.4q_2 + x_1}{2}$$

$$q_2(q_1, x_1, x_2) = \frac{10.794 - 0.4q_1 + x_2}{2}$$

Cournot outputs, result of the second stage of the game, as a function of investment expenditure are

$$q_1^c(x_1, x_2) = \frac{31.268 - 10.794\gamma + 2x_1 - \gamma x_2}{3.4071}$$

$$q_2^c(x_1, x_2) = \frac{21.588 - 15.634\gamma + 2x_2 - \gamma x_1}{3.4071}$$

Now let's play the leader-follower game, first stage, where first company is leader and second one is follower. Follower maximize following profit:

$$\pi_2 = 0.1446x_2^2 + (3.2907 - 0.2653x_1)x_2 + 0.0511x_1^2 - 1.2669x_1 + 7.8653 \rightarrow \max$$

The unique solution of optimization problem of the follower is

$$x_2(x_1) = 0.9176x_1 - 11.3801$$

The optimal action of the leader and follower with respect to investment expenditures is $[x_1; x_2] = [63.2549; 54.6611]$ and the optimal quantities offered by duopolies on the market is $[q_1; q_2] = [33.3237; 15.8979]$.

4. CONCLUSION

This research investigates a nonlinear investment competition game between duopoly firms. We found the equilibrium quantities as a two-stage game. In the first stage, all firms determine the level of their investment expenditure and its efforts to cost reduction. In this stage we assume a Stackelberg leader-follower game, when the first company is leader and the second follows its decision. In the second stage we suppose that all firms compete in the market with a Cournot form to determine the outputs to maximize themselves profits. For better real situation describing by the model, we assumed differentiated production of a duopoly and also that companies use different production technology represented by their different marginal cost before investment.

For our future research we would like to investigate, if our solution is stable for different expectations of companies about future market situation. Other way of our research could move in involving marketing variables in the model and influence consumer's decisions about one company preferring.

Acknowledgements

The article is an (partial) output of research project VEGA MŠ: Diffusion and consequences of green innovations in imperfect competition markets, VEGA 1/0646/20, doc. Ing. Nora Grisáková, Ph.D.

References

1. Cournot, A. A. (1838). *Recherces su les Principes Mathématiques de la Théorie des Richesses*. New York, NY: Macmillan.
2. D'Aspremont, C., & Jacquemin, A. (1988). Cooperative and Noncooperative R&D in Duopoly with Spillovers. *The American Economic Review*, 5(78), 1133-1137.
3. Dixon, H. D. (2001). *Surfing Economics*. New York, NY: Palgrave Macmillan.
4. Friedman, J. W. (2000). The legacy of Augustin Cournot. *Cahiers d'économie politique*, 37, 31-46.
5. Gibbons, R. (1992). *Game theory for applied economics*. Princeton: Princeton University Press.
6. Grisáková, N., & Štetka, P. (2022). *Equilibrium and Stability in Markets with Differentiated Production*. České Budějovice: Vysoká škola evropských a regionálních studií.
7. Long, J., & Huang, H. (2020). A Dynamic Stackelberg–Cournot Duopoly Model with Heterogeneous Strategies through One-Way Spillovers. *Discrete Dynamics in Nature and Society*, 11.
8. Matsumoto, A., & Szidarovszky, F. (2010). *Price and Quantity Competition in Differentiated Oligopolies Revisited*. Retrieved from <http://www2.chuo-u.ac.jp/keizaiken/discuss.htm>
9. Nash, J. (1951). Non-Cooperative Games. *The Annals of Mathematics*, 54, 286-295.
10. Stackelberg, H. (2011). *Market Structure and Equilibrium*. Boston, MA: Springer.
11. Varian, H. R. (2010). *Intermediate Microeconomics. A modern approach*. New York, NY: W. W. Norton & Company.
12. Zhou, W., Zhou, J., Chu, T., & Li, H. (2020). A Dynamic Duopoly Cournot Model with R&D Efforts and Its Dynamic Behavior Analysis. *Complexity* (Article ID 9634878), 19.

Asymmetric Relationship between Financial Development, Total Factor Productivity, and Economic Growth

Supanee Harnphattananusorn

Kasetsart University
Bangkok, Thailand
e-mail: supanee.h@ku.th

Abstract

This paper investigates the asymmetric relationship between financial development, total factor productivity, and real GDP growth in Thailand. We employ the nonlinear auto distributed lag (NARDL) framework developed by Shin et al., (2014) to investigate the link between financial development, total factor productivity, and GDP growth. Using NARDL allow us to capture short-run and long- run nonlinearities effects of financial development and total factor productivity on economic growth through positive and negative partial sum decomposition of financial development and total factor productivity. Furthermore, it can be test for short and long run asymmetric effect of the relationship. We use the yearly data for the period from 1960-2020. The result shows the evidences of asymmetric effects of positive and negative changes in financial development and total factor productivity on economic growth in the long-run, where as there is no asymmetric relationship in the short-run. The result suggests that positive change in financial development proxied by domestic credit to private sector (% of GDP) contributes negatively to GDP growth.

Keywords

Financial development, total factor productivity, economic growth, NARDL

1. INTRODUCTION

Financial sector is the important sector in the economy for decades. The contribution by financial development to economic growth has been proven (see Aziakpono, 2011). Schumpeter (1911) highlights that financial development plays an essential role in stimulating economic growth by redirecting funds towards innovative projects; thus, reducing the volume of low return investment due to premature liquidation. This implies that an efficient financial system can boost savings, higher investment, efficient allocation of financial resources, and, significantly, rapid economic growth (Gibson & Tsakalotos, 1994).

There are many empirical evidences show the relationship between financial development and economic growth (Aziakpono, 2011). However, most of evidences assume that the relationship between financial development and growth is symmetrical and they have used linear methods such as VECM (vector error-correction model), linear autoregressive distributed lags (ARDL), vector autoregressive (VAR), and linear cointegrating regression and ignored possibility of non-linear relationship.

Recently studies review the important role of non-linearity relationship between financial development and economic growth, for examples, Odugbesan et al. (2021) shows that there are dynamic asymmetric effects of financial development on growth in Ghana (Chen et al., 2020) explores the asymmetric impacts of financial development, government expenditure, and inflation on economic growth in Kenya. They found that positive shocks in financial development in the short run and its negative shocks in the long run increase and decrease economic growth, respectively. Mohammad NaimAzimi (2022) explores the asymmetric effects of capital and money markets indicators on economic growth in China using the non-linear ARDL method. He found that except for capital market indicators, namely, market capitalization, stock market turnover, and the total stock traded that exhibit asymmetric long-run effects on economic growth, all other indicators, both for money market and capital market variables are significantly asymmetric in impacting economic growth in the short-run.

In this paper, we aim to investigate and provide more empirical evidences of asymmetric effect of changes (both positive and negative) in financial development and total factor productivity on economic growth. The rest of the paper is organized as followed: Section 2 provides data and methodology. Section 3 describes the results. Conclusion is presented in Section 4.

2. DATA AND METHODOLOGY

We collect *real GDP* and *tfp* data from penworld table from 1960 to 2020. Real GDP is based on year 2017 and for *tfp* as well. For financial development following Udeagha and Ngepah (2021), proxied by domestic credit to private sector (% of GDP), it is collected from bank of Thailand. To investigate the relationship between financial development and economic growth, a model augmented with total factor productivity, *tfp*, is employed for economic growth control variable. Then, we hypothesize the long-run equilibrium relationship between economic growth and financial development as following:

$$lrgdp_t = a_0 + a_1 credit_t + a_2 tfp_t + e_t \quad (1)$$

where *lrgdp*, *credit*, and *tfp* denote for real GDP in natural logarithm, domestic credit to private sector (% of GDP), and total factor productivity, respectively. Following Pesaran et al. (2001) the error correction form of the linear ARDL model of eq. (1) can be considered as the following asymmetric long-run regression

$$\begin{aligned} \Delta lrgdp_t = & \beta_0 + \beta_1 lrgdp_{t-1} + \beta_2 credit_{t-1} \\ & + \beta_3 tfp_{t-1} + \sum_{i=1}^{m-1} \delta_{1i} \Delta lrgdp_{t-i} \\ & + \sum_{i=0}^{r-1} \delta_{2i} \Delta credit_{t-i} + \sum_{i=0}^{q-1} \delta_{3i} \Delta tfp_{t-i} \end{aligned} \quad (2)$$

Following Shin et al. (2014), we decompose the changes of independent variables (*credit* and *tfp*) into partial sum processes of both positive and negative components to capture their asymmetric impacts on economic growth. The components are shown as following;

$$\begin{aligned} credit_t^+ &= \sum_{i=1}^t \Delta credit_i^+ = \sum_{i=1}^t \max(\Delta credit_i, 0) \\ credit_t^- &= \sum_{i=1}^t \Delta credit_i^- = \sum_{i=1}^t \min(\Delta credit_i, 0) \\ tfp_t^+ &= \sum_{i=1}^t \Delta tfp_i^+ = \sum_{i=1}^t \max(\Delta tfp_i, 0) \\ tfp_t^- &= \sum_{i=1}^t \Delta tfp_i^- = \sum_{i=1}^t \min(\Delta tfp_i, 0) \end{aligned}$$

where Δ represents the difference operator, $credit_t^+$, $credit_t^-$, tfp_t^+ , and tfp_t^- denote, the partial sum processes of positive (increases) and negative (decreases) changes in financial development and total factor productivity in the period t, respectively. This methodology allows us to investigate the impact of a decrease in the financial development and total factor productivity on the economic growth compared to the impact of an increase in the financial development and total factor productivity on the economic growth.

The NARDL model is obtained by extending eq. (2) and replacing *credit* and *tfp* by $credit_t^+$, $credit_t^-$, tfp_t^+ , and tfp_t^- . The NARDL is shown in eq. (3)

$$\begin{aligned} \Delta lrdgdp_t = & \beta_0 + \beta_1 lrdgdp_{t-1} + \beta_2^+ credit_{t-1}^+ + \beta_2^- credit_{t-1}^- \\ & + \beta_3^+ tfp_{t-1}^+ + \beta_3^- tfp_{t-1}^- + \sum_{i=1}^{m-1} \delta_{1i} \Delta lrdgdp_{t-i} \\ & + \sum_{i=0}^{r^+-1} \delta_{2i}^+ \Delta credit_{t-i}^+ + \sum_{i=0}^{r^-1} \delta_{2i}^- \Delta credit_{t-i}^- \\ & + \sum_{i=0}^{q^+-1} \delta_{3i}^+ \Delta tfp_{t-i}^+ + \sum_{i=0}^{q^-1} \delta_{3i}^- \Delta tfp_{t-i}^- + \varepsilon_t \end{aligned} \quad (3)$$

The asymmetric or nonlinearity is incorporated into the model by partial sum decomposition of financial development and total factor productivity variables. The coefficients $\delta_{2i}^+, \delta_{2i}^-$ and $\delta_{3i}^+, \delta_{3i}^-$ capture the short-run adjustments of positive and negative changes in financial development and total factor productivity to economic growth, respectively. We use Schwarz's Bayesian Information Criterion (SBIC) to choose the optimal lag length specification of the models.

Using an F Bound test statistics, we test the joint null hypothesis $H_0: \beta_1 = \beta_i^+ = \beta_i^- = 0; i = 2, 3$ against the alternative hypothesis $H_1: \beta_1 \neq \beta_i^+ \neq \beta_i^- = 0; i = 2, 3$. The long-run cointegration between variables exists if the null hypothesis of Bound test statistics (H_0) is rejected.

To test whether there are long-run asymmetric relationship between financial development and economic growth, we use F-statistic (Wald test) and normalize the coefficients β_2^+, β_2^- and β_3^+, β_3^- by β_1 . The null hypothesis for long-run asymmetric relationship is $H_0:$

$$-\frac{\beta_2^+}{\beta_1} = -\frac{\beta_2^-}{\beta_1}, -\frac{\beta_3^+}{\beta_1} = -\frac{\beta_3^-}{\beta_1}$$

which states that the effect of financial development and total

factor productivity on economic growth are symmetry in the long-run. If null hypothesis is accepted, this imply that there is no evidence of long run asymmetric relationship between financial development and economic growth. Similarly, the short-run effects of financial development and total factor productivity on economic growth is captured by

$$\sum_{i=0}^{r^+} \delta_{2i}^+, \sum_{i=0}^{r^-} \delta_{2i}^-, \sum_{i=0}^{q^+} \delta_{3i}^+, \text{ and } \sum_{i=0}^{q^-} \delta_{3i}^-$$

, respectively. To test short-run asymmetric relationship we test

$$\text{the null hypothesis; } H_0: \sum_{i=0}^{r^+} \delta_{2i}^+ = \sum_{i=0}^{r^-} \delta_{2i}^-, \sum_{i=0}^{q^+} \delta_{3i}^+ = \sum_{i=0}^{q^-} \delta_{3i}^-$$

which requires the Wald test as well.

Rejecting the null hypothesis implies that there exists short run asymmetric relationship between variables.

As point out by Chen et. al. (2020), the NARDL has three advantages. First, it decomposes the regressors into their respective partial sum of positive and negative squares and observes their effects with (out) addition of the dummy incarcerating shifts in regimes while significantly reporting their asymmetric behaviors. Second, it integrates bound testing into the long run and synchronously estimates with the short run while preserving the data-generating processes, resulting in robust estimates. Third, is its ability to investigate the temporal dynamics in growth as it tries to adjust from a backdrop concocted by short-run dynamics and initial disequilibrium to new-found stability (the dynamic multiplier).

3. RESULT

Table 1 presents the descriptive statistics of the variables used in the paper. Economic growth proxied by log of real GDP has an average value of 12.560 and reaches a maximum of 14.022 over the period 1960-2020. Over the same period, credit proxied for financial development has an average value of 71.426 (% of GDP) and reaches a peak of 166.503 (% of GDP). Base on the standard deviation, the variation of credit is high. The average of total factor productivity

(*tfp*) is 0.641. The maximum and minimum are 1.031 and 0.337, respectively. Furthermore, the Jarque-Bera statistics affirms the normality of all data series which indicates the suitability of the data for empirical analysis.

Table 1: Descriptive Statistics

	<i>lrgdp</i>	<i>credit</i>	<i>tfp</i>
Mean	12.560	71.426	0.641
Median	12.795	83.369	0.614
Maximum	14.022	166.504	1.031
Minimum	10.415	10.122	0.337
Std. Dev.	1.104	43.403	0.181
Skewness	-0.442	0.103	0.226
Kurtosis	1.934	1.871	2.370
Jarque-Bera	4.793	3.345	1.504
Probability	0.091	0.188	0.471

Source: Authors' calculations

The NARDL requires that all variables should not be cointegrated at order I(2). As shown in Table 1, both the Augmented Dickey Fuller (ADF) and the Phillips–Perron (PP) tests are employed for unit root test and level of cointegrated order of variables. The tests results demonstrate that all variables are non-stationary at level I(0) and they are all stationary at first different I(1) thus, there are no I(2). Then we can apply the NARDL for our study.

Table 2: Unit roots test

variables	Augmented Dickey Fuller (ADF)		Phillips–Perron (PP) tests	
	individual intercept and trend		individual intercept and trend	
	At level	At 1 st difference	At level	At 1 st difference
	Prob.	Prob.	Prob.	Prob.
<i>lrgdp</i>	0.9466	0.0000***	0.9745	0.0000***
<i>credit</i>	0.2167	0.0421**	0.6376	0.0287**
<i>tfp</i>	0.7126	0.0000***	0.6066	0.0000***

*, ** and *** statistical significance at 10%, 5% and 1% levels, respectively

Source: Authors' calculations

The bounds of critical value of F(PSS) are shown in Table 2. The F statistics from the estimation, 9.394, exceed the upper bound critical values I(1) at the 5% significance level. We reject the null hypothesis of co-integration. It can conclude that there is long-run cointegration among the variables in the NARDL model.

Table 3: Critical Value for Cointegration test

Test Statistic	10%		5%	
	I(0)	I(1)	I(0)	I(1)
F-statistic	2.45	3.52	2.886	4.01

Source Pesaran et al. (2001)

The results of the NARDL is reported in Table 4 which is composed of four parts; Part I: co-integration results, Part II: positive and negative long-run asymmetric relationship, Part III : Wald Long-run and Short-run Asymmetry tests (F-Wald test), and Part IV: diagnostic tests.

Table 4: Estimation Results

Part I: Cointegration result					
	Coef.		Std. Err.	t	P>t
<i>lrgdp</i> (-1)	-0.576	***	0.194	-2.970	0.005
<i>credit</i> (+) (-1)	-0.002	***	0.000	-4.400	0.000
<i>credit</i> (-) (-1)	-0.001	***	0.000	-3.000	0.005
<i>tfp</i> (+) (-1)	0.505	*	0.285	1.770	0.085
<i>tfp</i> (-) (-1)	-0.423	**	0.165	-2.560	0.015
<i>D(lrgdp</i> (-1))	0.107		0.197	0.540	0.589
<i>D(lrgdp</i> (-2))	-0.086		0.181	-0.470	0.639
<i>D(credit</i> (+))	0.001		0.001	0.550	0.586
<i>D(credit</i> (+) (-1))	0.001		0.001	1.120	0.272
<i>D(credit</i> (+) (-2))	0.002		0.001	1.350	0.185
<i>D(credit</i> (-))	0.001		0.002	0.450	0.656
<i>D(credit</i> (-) (-1))	-0.002		0.002	-0.930	0.360
<i>D(credit</i> (-) (-2))	0.003	**	0.001	2.550	0.015
<i>D(tfp</i> (+))	1.350	***	0.156	8.670	0.000
<i>D(tfp</i> (+) (-1))	-0.043		0.418	-0.100	0.920
<i>D(tfp</i> (+) (-2))	0.030		0.389	0.080	0.939
<i>D(tfp</i> (-))	0.419		0.299	1.400	0.169
<i>D(tfp</i> (-) (-1))	0.677	**	0.295	2.300	0.028
<i>D(tfp</i> (-) (-2))	0.900	***	0.283	3.180	0.003
<i>lnk</i>	0.498	***	0.145	3.430	0.002
<i>cons</i>	-0.033		0.338	-0.100	0.922
Part II: Long-Run Asymmetric statistics effects					
	coef.		F-stat	P>F	
<i>credit</i> (+)	-0.003	***	12.03	0.001	
<i>credit</i> (-)	0.002	*	6.224	0.017	
<i>tfp</i> (+)	0.877	***	13.64	0.001	
<i>tfp</i> (-)	0.735	*	7.082	0.012	
Part III: Wald Long-run and Short-run Asymmetry tests					
	F-stat		P>F		
<i>W_{LR} credit</i>	3.091	*	0.087		
<i>W_{SR} credit</i>	0.121		0.730		
<i>W_{LR} tfp</i>	25.76	***	0.000		
<i>W_{SR} tfp</i>	0.6598		0.422		
Part IV: Diagnostic Tests					
	stat.		p-value		
Portmanteau test up to lag	19.58		0.8108		
Breusch/Pagan heteroskedasticity test	5.753		0.0165		

Ramsey RESET test (F)	6.553	0.0013
Jarque-Bera test on normality (chi2)	2.365	0.3065

*, ** and *** statistical significance at 10%, 5% and 1% levels, respectively

Source: Authors' calculations

Table 4 shows that both increases and decreases in financial development and total factor productivity have statistically significant asymmetrical effects on economic growth in the long run. The result suggests that financial development contributes negatively to GDP growth (change of ln real GDP). More specifically, the NARDL estimation results show that a higher financial development causes a decrease in economic growth in the long run, whereas a lower financial development induces an increase in economic growth in the long run. Based on the NARDL model, a 1% increase in financial development results in 0.003% decrease in economic growth. On the other hand, a 1% decrease in financial development leads to a 0.002% increase in economic growth in the long-run. This may be capital market is a good substitute for banking sector, since external financing from capital market has lower cost than loan or credit from financial institution, especially, commercial banks. A decrease in private credit ratio may occur because firms and investors move out from bank-based finance toward capital market-based finance for their external financial support, especially over the last two decades. Based on the results, we may suggest the other proxy for financial development which is stock market capitalization to GDP.

The estimated of long-run coefficients on a total factor productivity are shown that both the positive and negative change in total have statistically significant positive effect on economic growth. A 1% increase or decrease in total factor productivity has significantly increase economic growth by 0.877 or 0.735, respectively, showing the increase in total factor productivity is larger than the decrease in total factor productivity on economic growth. This is because, Thailand total factor productivity has continuously improved over the past four decades.

The Wald F-test for asymmetry long-run relationship confirm long-run asymmetric effects of financial development and total factor productivity on economic growth with statistically significant at 10% and 1%, respectively. However, the Wald test for short-run asymmetry shows that we cannot reject the null hypothesis of symmetry relationship meaning that there is no asymmetric effect of financial development and total factor productivity on economic growth in the short-run. Overall, the results imply that the response of economic growth on positive change and negative change in financial development and total factor productivity are different only in the long-run.

The diagnostics test for autocorrelation, heteroskedasticity, and misspecification problems are employed by Breusch-Godfrey Serial Correlation LM test, Breusch/Pagan heteroskedasticity test, and Ramsey RESET test, respectively. All the tests show that we cannot reject the null hypothesis of no autocorrelation, no heteroskedasticity, and no misspecification error indicating the reliability and consistency of the empirical results. Additionally, the Jarque-Bera statistic shows that we cannot reject the null hypothesis of normality implying that the residuals of the model are normally distributed.

4. CONCLUSION

The study investigates the asymmetric effects relationship of financial development and total factor productivity on Thailand economic growth during 1960 to 2020 using the nonlinear auto distributed lag model. The financial development is proxied by domestic credit to private sector (% GDP). The result shows that there exist asymmetric effects of positive change and negative change in financial development and total factor productivity on economic growth in the long run, where as there are no asymmetric effects in the short-run. The results also show that positive change in financial development causes a decrease in economic growth in the long run, whereas negative change in financial development induces an increase in economic growth in the long run. Moreover, both positive and negative change in total factor productivity enables long-run economic growth.

References

1. Alenoghena, R. O., Saibu, O. M., & Adeoye, B. W. (2020). Financial Development and Economic Growth in Nigeria: Asymmetric Cointegration and Threshold Analysis. *Forum Scientiae Oeconomia*.
2. Aziakpono, M. J. (2011). Financial Development and Economic Growth: Theory and a Survey of Evidence. *Studies in Economics and Econometrics*, 35(1), 15-44.
3. Chen, H., Duncan, O., Hongo, M., Ssali, W., Simiyu Nyaranga, M., & Wairimu Nderitu, C. (2020). The Asymmetric Influence of Financial Development on Economic Growth in Kenya: Evidence From NARDL. *Sage Open*, 10(1).
4. Gibson, H. D., & Tsakalotos, E. (1994). The scope and limits of financial liberalization in developing countries: a critical survey. *Journal of Development Studies*, 30(3), 578-628.
5. Muazu, I., & Alagidede, I. P. (2020). Asymmetric effects of financial development on economic growth in Ghana. *Journal of Sustainable Finance & Investment*, 10(4), 371-387.
6. Odugbesan, J. A., Sunday, T. A., & Olowu, G. (2021). Asymmetric effect of financial development and remittance on economic growth in MINT economies: an application of panel NARDL. *Future Business Journal*, 39(7).
7. Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16, 289-326.
8. Schumpeter, J. A. (1911). *The theory of economic development*. Cambridge, MA: Harvard University Press.
9. Shin, Y., Yu, B. C., & Greenwood-Nimmo, M. (2014). Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework. In: R. Sickels and W. Horrace (eds.), *Festschrift in Honor of Peter Schmidt: Econometric Methods and Applications* (pp. 281-314). Berlin: Springer.
10. Udeagha, M. C., & Ngepah, N. (2021). The asymmetric effect of trade openness on economic growth in South Africa: a nonlinear ARDL approach. *Economic Change and Restructuring*, 54(2), 491-540.

The Stimulus-Organism-Response (S-O-R) Paradigm as a Guiding Principle in Environmental Psychology: Comparison of Its Usage in Consumer Behavior and Organizational Culture and Leadership Theory

Victoria Hochreiter

University of Latvia and SMBS – University of Salzburg Business School
Parscher Str. 3 / Top 1, 5023 Salzburg, Austria
e-mail: victoria.hochreiter@gmail.com

Cynthia Benedetto

University of Latvia and SMBS – University of Salzburg Business School
Mommsenstr. 55, 10629 Berlin, Germany
e-mail: cynthia.benedetto@gmx.de

Marc Loesch

University of Latvia and SMBS – University of Salzburg Business School
Regerstr. 54, 81541 München, Germany
e-mail: marcloesch@gmx.de

Abstract

The Stimulus-Organism-Response (S-O-R) paradigm developed by Mehrabian and Russell in 1974 is a guiding principle of environmental psychology theory and transferred from consumer to organizational behavior. The S-O-R model suggests that internal feelings or behavior of an organism (person) are caused by the external environment (stimuli). This internal processing of the stimulus can be conscious or unconscious and includes perceptions and environmental interpretations, which influence someone's feelings. This influence further triggers an emotion that leads to a response. The S-O-R paradigm is a leading concept in various global management theories and is therefore a model mostly developed and used in various research fields. This paper presents an analysis in form of a systematic literature review of prior and current research dimensions of the S-O-R model in branding theory and consumer behavior and compares the usage of the model in branding theory to the usage of the model in organizational behavior and leadership theory. Besides a short summary of similarities of the same model used in both research fields, three main differencing correlations and characteristics have been developed and described. The main differencing factors are the motivation and aim of usage of the model itself, the process and relation of the stimuli-organism-reaction stages and furthermore certain moderating variables and influencing factors throughout the process, such as marketing, branding on the one hand or leadership and organizational culture on the other hand.

Keywords

Consumer behavior, Stimulus-Organism-Response, organizational culture, leadership styles, decision-making

1. INTRODUCTION

The Stimulus-Organism-Response (S-O-R) paradigm developed by Mehrabian and Russell in 1974 is a guiding principle of environmental psychology theory and transfer from consumer to organizational behavior. The S-O-R model suggests that internal feelings or behavior of an organism (person) are caused by the external environment (stimuli). This internal processing of the stimulus can be conscious or unconscious and includes perceptions and environmental interpretations, which influence someone's feelings. This influence further triggers an emotion that leads to a response (Mehrabian & Russell, 1974).

The S-O-R model is often used in environmental psychology theory and studies since the model helps to understand the reasons behind a person's behavior (Mehrabian & Russell, 1977). The S-O-R paradigm is moreover a guiding principle in various global management theories, and it is therefore a model mostly developed and used in various research fields (Parkinson & Turner Schenk, 1980).

This paper presents an analysis of prior research dimensions of the S-O-R model in branding theory and consumer behavior and compares the usage of the model in branding theory to the usage of the model in organizational behavior and leadership theory. Therefore, the aim of this paper is to extend the knowledge of the Stimulus-Organism-Response (S-O-R) paradigm and to conduct a comparison in terms of usage in various fields of research including the investigation of similarities.

2. LITERATURE REVIEW

One of the most used and basic behavioral scientific models of decision-making are black-box models, which deal with cognitive aspects of decision-making (Freyer, 2011, p. 104-107). One model, which derived from the black-box approach of decision-making, is the S-O-R model. This structural model examines three main terms, namely the Stimuli, the Object/Organism, and the individual Reaction/Response. The aim of this model is to examine the origin and formation of decisions, as well as to identify the psychological and mental thought processes of consumers (Bieger, 2006, p. 101-110). The S-O-R model divides the concept of a person's involvement in three types and reveals that the environment is a stimulus (S), which consists of a series of signs that cause a person's internal evaluation (O) and are said to cause and generate two types of behavioral responses (R): approach or avoidance (Mehrabian & Russell, 1977; Meffert et al., 2008, p. 100).

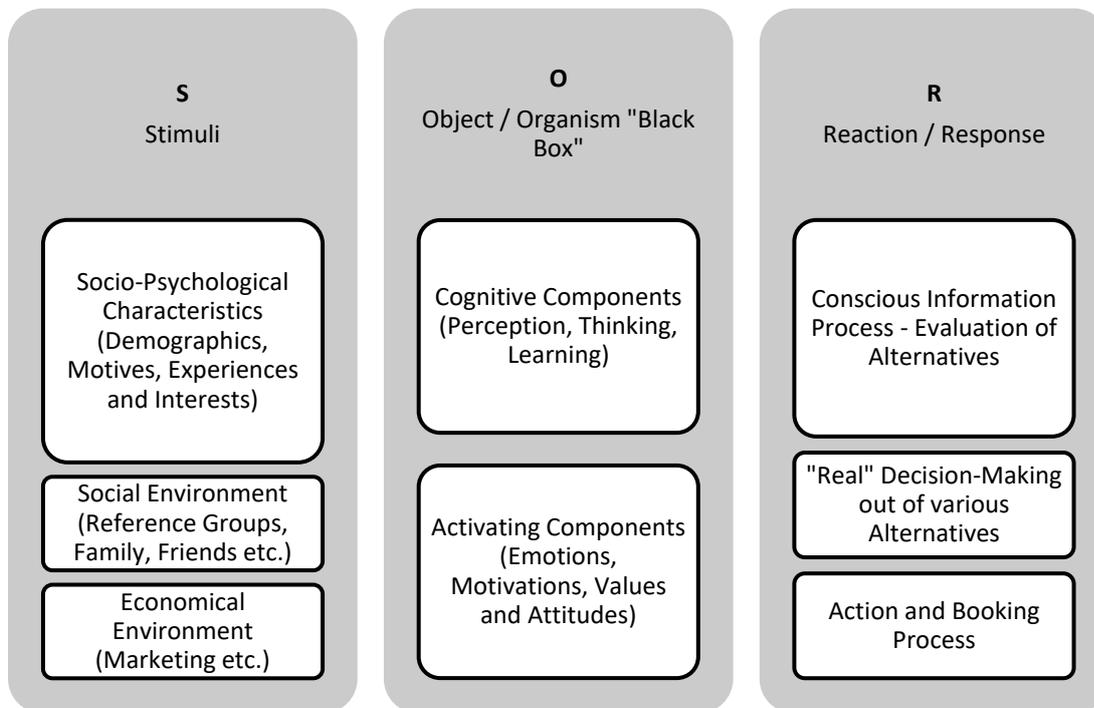
The three main stages of the S-O-R model are (cf. Decrop, 2006, p.29; Freyer, 2011, p. 107; Bieger, 2006, 101):

- *Stimuli*: External, as well as internal information and inputs stimulate someone to do/decide/buy something. These stimuli are influences from both social and marketing environments, as well as from the consumer's socio-psychological characteristics (demographics, experiences, interests, and motives).
- *Object / Organism*: These inputs create activating and cognitive constructs and thus an awareness set of a product and decision can be further developed. The personal

attitude of someone towards the already gained and perceived stimulus plays a major role in this field and thus may or may not lead to the reaction phase itself.

- *Reaction / Response*: The reaction phase starts with the conscious information processing phase and thus the start of the real decision-making process.

Figure 1: S-O-R-Model



Source: Authors illustration, adapted from Crompton (1992, in Decrop, 2006, p. 30); Freyer (2011, p. 107)

Based on the framework shown in figure 1 the model can be transferred to various research fields.

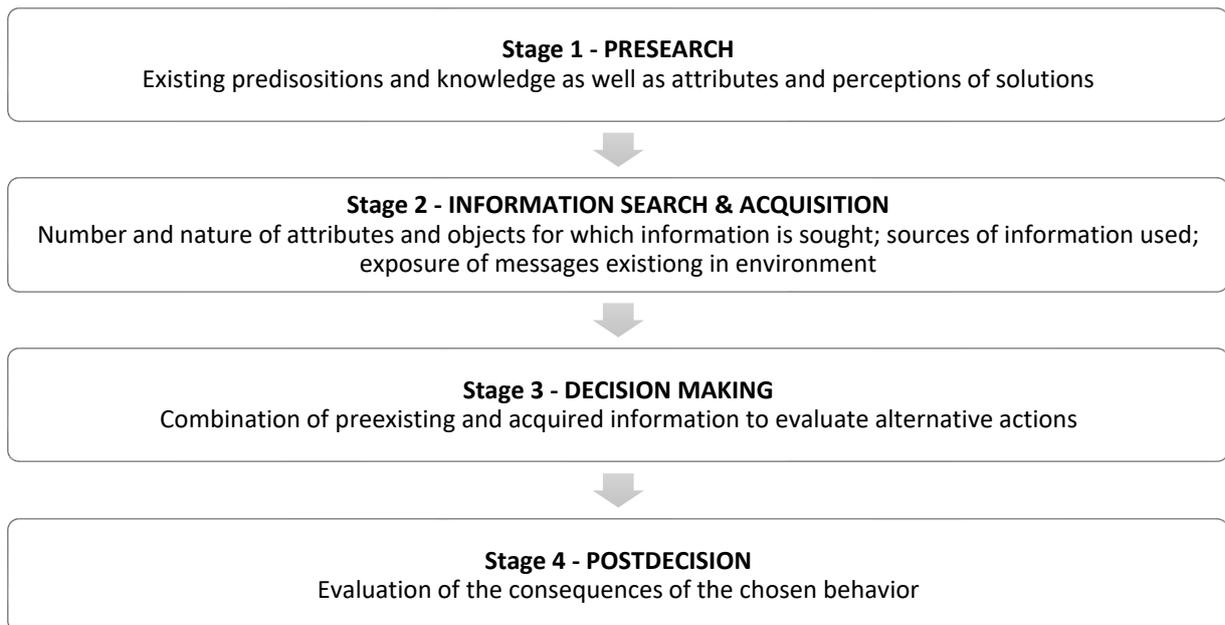
2.1. The S-O-R Paradigm as a Guiding Principle of Purchasing Behavior

Based on the classical neo-behaviorist S-O-R paradigm of learning theory, which was explained by Mehrabian & Russell in 1974, the researchers Houston and Rothschild re-developed the paradigm in 1977 with a clear focus on consumer involvement and purchasing behavior as well as decision making. The concept of consumer involvement has existed in social psychology literature for many years and Houston and Rothschild divided this multidisciplinary concept into three types and four stages of decision-making (Parkinson & Turner Schenk, 1980). Houston and Rothschild hypothesized that the complexity of decision-making processes (to be labeled as "Response Involvement") is a function of the situation ("Situational Involvement") and the individual's past experience (Enduring Involvement), while being mediated by communications stimuli (Houston & Rothschild, 1977, p. 3-4).

Houston and Rothschild (1977, p. 4) moreover determined these influencing factors within a decision process, which is modeled in four stages. The first stage is about research and refers

to existing knowledge and experiences that a consumer brings into the situation. This knowledge and existing predisposition lead to an either active or passive behavior for the second stage, namely information search and acquisition. The information acquired combined with the prior knowledge results in a decision making, which will be evaluated in a post decisions phase by the decision maker. The discrepancy between expected and actual behavioral outcomes is a phenomenon mediated by involvement (Houston & Rothschild, 1977, p. 4-5).

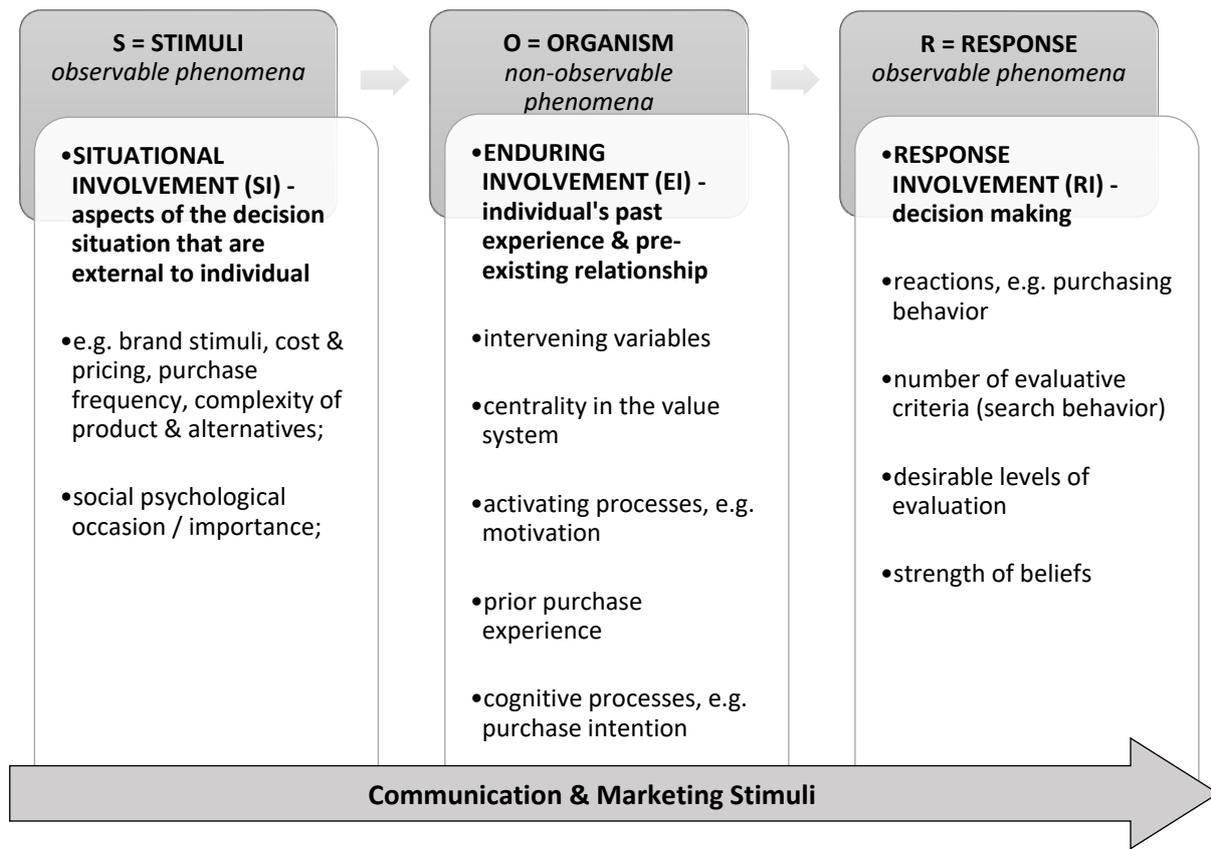
Figure 2: Consumer Decision Process



Source: Authors illustration, based on Houston & Rothschild (1977).

Kroeber-Riel and Weinberg (2003) translated the three types of involvement and the process of Houston & Rothschild into marketing-related stages and integrated the particularities of brand stimuli, intervening processes and purchasing behavior, as shown and summarized in the following figure 3.

Figure 3: Neo-Behaviorist S-O-R model



Source: Authors illustration, adapted from Houston & Rothschild (1977); Kroeber-Riel & Weinberg (2003, p. 30)

Kroeber-Riel and Weinberg (2003, p. 30) moreover developed the theory that the motivation and intention to purchase a good or service is activated due to the individual exposure to external occurrences of brand stimuli dimensions combined with an existing consumer's knowledge about a brand. Intervening variables, such as perceived norms, attitudes, impressions, and the image of the brand have been integrated in this field of research.

Another model of Trommsdorff and Teichert (2011) indicates that internal and non-observable instances mediate the relation between a stimulus and subsequent processes. Trommsdorff and Teichert moreover state that the cognitive formation of (purchase) intention is based on moderating effects such as perceived norms and personal attitudes. This theory indicates that the image towards a brand and products or service, as well as social attitudes are central influencing factors in S-O-R models. This moreover leads to the prioritization and importance of the position of brand knowledge in consumer behavior theory (Trommsdorff & Teichert, 2011, p. 127-145).

As most of these recent models and research theories of the S-O-R paradigm explain, an observable stimulus (S) leads to activation and an interplay with existing knowledge about the source of the stimulus (O) and furthermore leads to a certain intended and actual consumer behavior (R). In the field of consumer and purchasing behavior the factor of brand knowledge, which is defined and consisting of the two components of brand awareness and brand image (Keller, 1993), plays one key role in the use of S-O-R models. Keller states

“perhaps a firm’s most valuable asset for improving marketing productivity is the knowledge that has been created about the brand in consumer’s minds” (Keller, 1993, p. 2). Thus, it can be summarized that the understanding of the existing brand associations held about a product or service is crucial in the field of consumer purchasing behavior. This sum of associations linked to a brand lead to multidimensional impressions and the formation of an image towards a brand, which consequently frames a consumer’s attitude about the source of the stimulus (Kroeber-Riel & Weinberg, 2003, p. 198; Foscht & Swoboda, 2009, 190ff).

2.2. The Impact of the S-O-R Theory in Organizational Culture and Leadership

The S-O-R(-C) theory in the research field of Organizational Culture & Leadership is based on the theory of Mehrabian and Russel of 1974 and focuses on social motivation and the two types of behavioral responses (R) – approach or avoidance (Gable, 2006):

- Approach theory: People tend to approach environments that make them happy and comfortable. For example: an employee wants to continue to work in an organization, which has the best interests in mind because it creates a pleasant experience.
- Avoidance theory: People tend to avoid environments and settings that enhance unhappiness. Factors such as personal control over situations, the range of responsibilities, workload, and work-life-balance influence the perceived behavior towards the environment.

The approach and avoidance distinction have been heavily investigated and various researchers (Gable, 2006 or Gable & Impett, 2012) state that the relation between humans is formed by certain approach and avoidance motives and thus people’s social goals and tendencies to approach incentives and avoid threats (Gable & Impett, 2012, p.4).

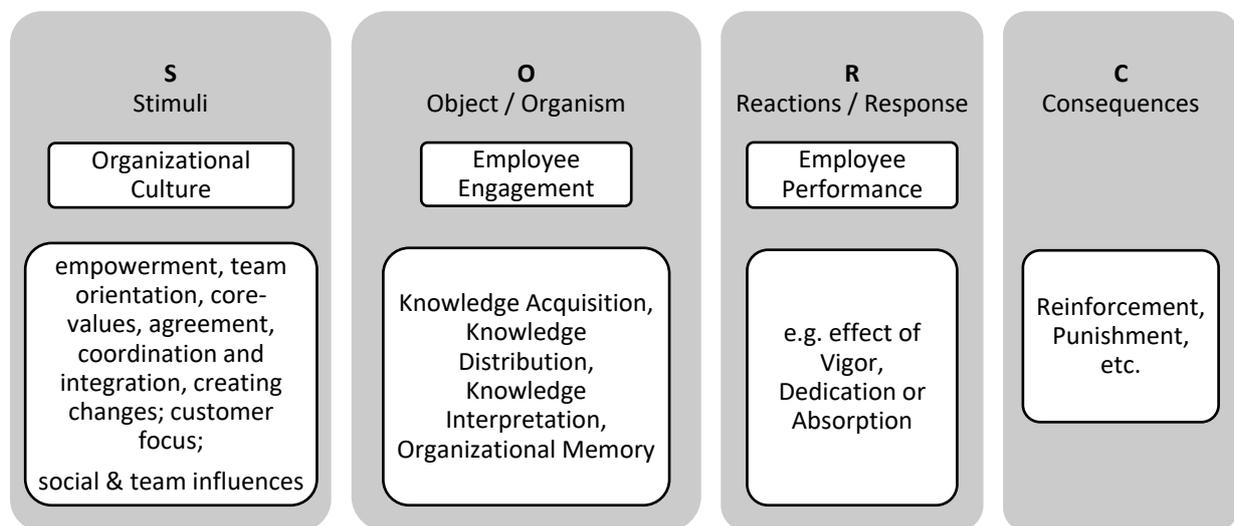
Adopted from the environmental psychology theory, the S-O-R framework within the field of Organizational Culture & Leadership does not focus on the influence of an image of a brand and product on the consumer behavior and purchasing intention, but, on the relationship between the single effects and their dependencies between integrated individuals (Hasan et al., 2021). Another main factor that has been adopted in this stimulus-response research is the integration of the function of consequences (“C”) and thus the development from the S-O-R to S-O-R-C theory. Following the ideas of Skinner’s theory of learning (e.g., Skinner 1966, 1969), systematic modification of behavior must start with the consequences such as rewarding and punishment. Within this classical leadership approach, it was the leader’s disposal to increase desired and reduce undesired behavior by offering certain rewards or threats. Nowadays this approach is regarded as limited to observable behavior and has been criticized due to the lacking integration of cognitive aspects. Therefore, a new social learning theory has been developed whereas social, and mental aspects, as well as the factor of emotional intelligence have been integrated as variables which form the consequences a certain kind of behavior might cause (cf. Winkler, 2010).

The intervening variable of social influence is a key part of the S-O-R-C model in the research field of Organizational Culture & Leadership (Laato et al., 2020). In the S-O-R-C framework, social influence is often integrated as a stimulus, because it further on increases the effects of the cognitive and affective states on the behavioral response. Especially in a working team

construct it could be challenging for a leader, since humans are likely to change their behavior and accept influence from their perceived social in-group (Kelman's, 1958, Bastian et al., 2012; Neal & Chartrand, 2011 cited in Laato et al., 2020).

Within the research field of Organizational Culture & Leadership the S-O-R-C model deals with the relationships between stimuli, organisms and responses that lead to certain consequences. The impact of organizational culture on employee engagement and employee performance and the influence of Leadership within these sequences are one main investigated discipline within social and behavioral sciences. The use of the S-O-R(-C) model can be examined by the following process and relation: the stimulus (S = Organizational Culture) affects the organism (O = Employee Engagement). The response (R = Employee Performance) is the effect of the organism which might lead to long-lasting positive or negative consequences for the company (C = Consequences) (Hasan et al., 2021).

Figure 4: S-O-R-C framework in Organizational Culture

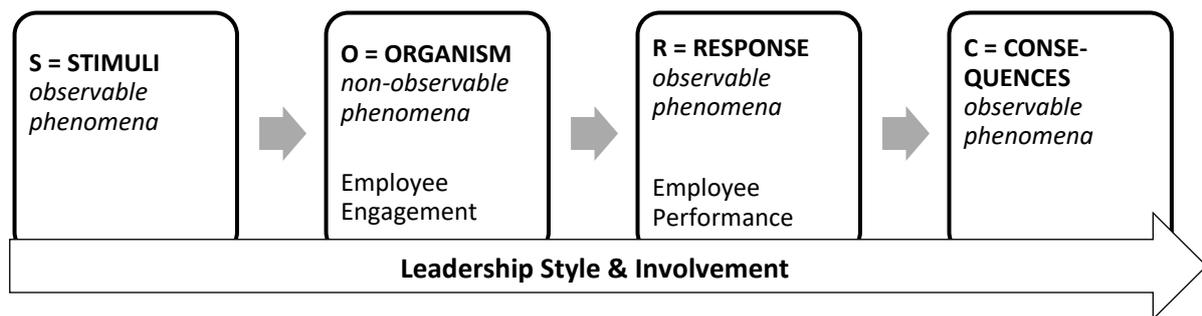


Source: Authors illustration, based on Hasan et al. (2021, p. 239); Laato et al. (2020)

Kazimoto (2016) stated, that organizational culture is related to employee engagement. When the organizational culture matches the expectations of employees, employee engagement will be high and vice versa. This relation might lead to positive reactions and performances (Hasan et al., 2021, p. 243; Robbins & Judge, 2017). Employee comfort and a positive social identity towards the organization are crucial for employee engagement and can be supported via open organizational culture, encouraging work environments and well-developed communication between employees and leaders as well as within the team (Kazimoto, 2016; Niermeyer, 2016). Moreover, it has been investigated that organizational culture can be compared to a brand image in consumer behavior theory including a clear vision and clear values, which guide the employees in their daily activities at work. This culture / brand can or cannot be supported by employees which leads to an either positive or negative performance and consequences (Hasan et al., 2021). Nevertheless, there are many other important stimuli influencing the employee engagement besides the organizational culture and thus lead to reactions of the organism, such as the employee's reasons for personal careers including aspects of image, prestige, self-actualization, getting recognition and other considerations. One of the most important influencing stimuli is nevertheless the

leadership style and leadership involvement, since leaders can use organizational culture and the whole employee empowerment process as tools to affect performance, increase teamwork capabilities, and motivate organizational members to perform well for organizational goals. Moreover, leaders can mobilize organizational members throughout the whole process and leadership. The influence of leadership style and leadership involvement should therefore be added as moderating variables in this field of S-O-R(-C) theory and should be seen as an opportunity to be investigated in future research (Hasan et al., 2021, p. 244 & Syafii et al. 2015).

Figure 5: Neo-Behaviorist S-O-R-C model incl. Leadership as moderating variable



Source: Authors illustration, adapted f. Hasan et al. (2021); Syafii et al. (2015)

As leadership styles were identified as the most important influencing factors in terms of usage of the S-O-R model in the research field of Organizational Culture & Leadership, the next chapter takes a deeper look into the various forms and history of it.

2.3. Organizational Culture and Leadership Styles

One of the first scientists who studied different leadership styles was the psychologist, Kurt Lewin. During the years 1936-1940, he studied how different leadership behavior affects the productivity and creativity of employees. Based on his experiments, he differentiated three classic leadership styles: democratic, autocratic and laissez-faire (Franken, 2019, p. 315). Based on the work of Kurt Lewin, Bass (1985) and Dyer (1986) investigated today's most popular leadership styles. The result is an amount of seven identified leadership styles, which are autocratic, expert, laissez-faire, participative, referent, transactional and transformational.

The term autocratic leadership style is derived from the ancient Greek word "autocratia", which can be translated as "autocracy". According to this, the autocratic leadership style means that the sole rule and decision-making power in a company lies with the manager. Important corporate decisions are made and implemented without involving employees. The subordinates must obediently follow the manager's instructions and carry them out in a disciplined manner. There is a strict hierarchical order in the company itself, whereby the employees are also regularly checked by the managers. In the event of violations of the rules and guidelines established by the manager, employees expect appropriate sanctions.

In firms where the expert leadership style is practiced, the authority of decision-making is especially transferred to those, who have the most adequate knowledge, skill set, or judgement capabilities for each given subject. In fact, these individuals or teams do not have to be the formal managers of the company. This leadership style is described as an inclusive leadership style that supports entrepreneurial behavior and employee autonomy (Sorenson, 2000; Franken, 2019; Weibler, 2016). The expert leadership style is also closely related to the referent leadership style. Both styles attribute the leader special personal characteristics that allow to manage the company through the power assigned by the employees (Dyer, 1986). The leader or owning-manager is perceived as a role model due to personal skills and achievements. This can create a special motivation of the employees, which is especially likely to occur in founder-managed family firms (Sorenson, 2000).

With the laissez-faire leadership style, the manager gives their employees the freedom to work completely independently. Goals and guidelines are defined, but the work process is controlled by the employees themselves. Team members receive the information they need to complete the task at hand but have the power and authority to make decisions. Nevertheless, the supervisor always retains responsibility for the actions of his team. This leadership style only proves beneficial when the team members are highly skilled, highly motivated, and capable enough to accomplish the task assigned to them. The laissez-faire leadership style is best suited to situations where employees have more knowledge than the leader or have expertise in a particular area that can be used to find a solution to the task (Sorenson, 2000; Stock-Homburg, 2013).

In the participative leadership style, the manager lets his employees develop suggestions themselves. Based on the suggestions made and the solutions discussed together, the supervisor can at least tip the scales, his opinion carries considerable weight. However, the employee can bring his interests and knowledge into the decision-making process and exert influence (Vroom & Yetton, 1973). The participative leadership style requires the manager to be cautious and the employees to be willing to take on responsibility. They must act in a goal- and cost-conscious manner and contribute to the success of the company through personal performance. The individual is much more integrated into the company. The hierarchical gap is not that big and formalization as is often the case for family firms that show a high "community" level (Miller & Le Broton-Miller, 2005).

Transactional leadership is a style of leadership that is characterized by clear rules, structures, and goals. The employee does what the supervisor expects of him. The implemented work is based on the idea of exchange. In his role, the employee acts as a rational decision-maker who follows the path to the goal. Transactionally managed people are remunerated extrinsically. That means especially through money and opportunities for advancement in the hierarchy (Züger, 2007).

In transformational leadership, the focus is on the vision of working together. This means that employees who are led in this way not only pursue their own interests (input-output relationship) through their actions, but also higher goals. Transformational leadership tries to achieve an additional increase in performance by changing the values and goals of the person being led. Kurt Lewin would most likely speak of the cooperative leadership style. Some scholars describe the component of individual support and encouragement as supportive

leadership or as vision- and mission-oriented, as well as individual and development-oriented (Lang & Rybnikova, 2014).

3. METHODOLOGICAL REMARKS

This study aims to determine the factors and variables that differentiate the use of the S-O-R models in two different fields of social and behavioral sciences, namely the field of “Consumer Behavior” on the one hand and “Organizational Culture & Leadership” on the other hand. The first step of this paper was the collection of literature and theory regarding the S-O-R model / paradigm in the context of the two defined research fields Consumer Behavior and Organizational Culture and Leadership. Therefore, the historical development of the usage of the models and the development of the S-O-R theories throughout the years have been investigated via a systematic literature review. The method of a literature review was used for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars, and practitioners. As a last step the authors chose from an array of strategies and procedures for identifying and understanding information pertinent to the topic of interest.

4. KEY FINDINGS

By comparing the two fields of research, it could be mentioned, that the S-O-R paradigm shows various similarities in both research fields. According to the literature review and the various models used by different researchers, the most correlations exist within the non-observable field of the model, the so-called black-box and organism stage. The cognitive components, such as an individual’s perception towards a product, company etc., as well as activating components, such as emotions values and attitudes combined with prior knowledge concerning the brand, product or organization are the most influential ones to understand in both fields of research.

In total, three differences, namely 1. focus and aim of usages, 2. the process and relation of the stimuli-organism-reaction stages itself, 3. the moderating variables and influencing factors throughout the process were identified and illustrated in figure 6.

Figure 6: Comparison of S-O-R model in research fields

Variable	S-O-R in Consumer Behavior & Purchasing Behavior		(-C) in Organizational Culture and Leadership	
	Indicator & Characteristics	Reference	Indicator & Characteristics	Reference
1. Focus and aim of usage	<ul style="list-style-type: none"> Insights about Consumer involvement Understanding of decision-making and purchasing behavior (with focus on purchasing intention) 	Houston & Rothschild (1977); Kroeber-Riel & Weinberg (2003); Trommsdorff & Teichert (2011)	<ul style="list-style-type: none"> Social motivation & behavioral responses enhancement of organizational & employee performance 	Gable (2006); Kazimoto (2016)
2. Stages, Process & relation of S-O-R	<ul style="list-style-type: none"> Process-orientation towards a goal: activation of a certain response Modeled in clear stages of decision making. one step follows another – linear process. Post-decision phase integrated but only for scenario planning 	Houston & Rothschild (1977); Parkinson & Turner Schenk (1980); Bieger (2006)	<ul style="list-style-type: none"> Relationship orientation: Relation between single effects to enhance a greater performance dependencies between individuals. Theory of learning: additional phase of “C” = Consequences 	Skinner (1966 & 1969); Kazimoto (2016)
3. Moderating Variables and influencing factors	<ul style="list-style-type: none"> Existing Brand knowledge (brand awareness and image) Marketing and communication activations Social influences and environment (family, friends, influencer etc.) 	Keller (1993); Kroeber-Riel & Weinberg (2003); Trommsdorff & Teichert (2011)	<ul style="list-style-type: none"> Leadership style leadership involvement Social influences (social in-group, team, colleagues) 	Hasan et al. (2021); Syafii et al. (2015); Laato et al. (2020)

Source: Authors illustration.

Whereas the S-O-R paradigm in consumer and purchasing behavior follows a clear process of single steps (e.g., four stages of decision making from Parkinson & Turner Schenk, 1980), the S-O-R(-C) theory in Organizational Culture and Leadership is built on the theory of learning and thus focuses on the relation between the single effects of the S-O-R(-C) theory. One main field of difference are the influencing and moderating variables, as already stated in Figure 3 including the effect of “Marketing and Communications” and Figure 5 including the impact of “Leadership Styles and Involvement”.

5. CONCLUSION AND FUTURE RESEARCH

The S-O-R paradigm is a guiding principle in various global management theories and is therefore a model mostly developed and used in various research fields (Parkinson & Turner Schenk, 1980). This paper presents a literature review and analysis of prior research dimensions of the S-O-R model in consumer behavior and branding theory in comparison to the usage of the model in organizational behavior and leadership theory. Although the models

show high similarities in both research fields within the topic of “Organism” including the non-observable black-box phenomena and non-observable dimensions with cognitive and activating components of employees and consumers, the comparison of the two research fields also showed some differences regarding the usage of the model. Therefore, three differences have been defined and the indicators and characteristics have been correlated according to the results of the literature review within both fields of usage.

Regarding the established leadership styles, seven leadership styles were identified. The shown leadership styles were originally based on the findings of Lewin. Later they were elaborated by Bass (1985) and Dyer (1986) and became part of the general leadership literature. The main goal is to contribute the research on environmental psychology by placing these leadership styles in the context of consumer behavior.

Limitations of this literature review arise regarding the number of articles that were considered. Even though the goal was to focus on the most relevant literature and most cited scholars, there are possibly further articles which were not considered adequately. This is, among other things, based on the different given definitions and the respective lack of consensus. Additionally, the lack of a common basis may result in questionable comparisons or generalizations.

Further research should continue the investigation of the correlation of the two models and include hypothesis creations and testing as well as empirical examinations within one of the two research fields to gain more actual data and support certain insights. Therefore, additional moderating variables, such as values and perceptions, the moderating variable of willingness to do/decide/pay more, as well as social influences including impacts of e.g., followership could be integrated in any further research. Moreover, influencing variables such as cultural aspects or generational differences and their influence on the S-O-R decision making could moreover be integrated in this field of research. Through further research on the existing gaps, a more profound understanding will be reached and could contribute in the long-term to the general research of environmental psychology.

References

1. Bass, B. M. (1985). *Leadership and performance beyond expectations*. New York, NY: The Free Press.
2. Bieger, T. (2006). *Tourismuslehre – ein Grundriss*. Bern: Haupt Verlag.
3. Decrop, A. (2006). *Vacation Decision Making*. Cambridge, MA: CABI Publishing.
4. Dyer, W. G. (1986). *Cultural change in family firms*. San Francisco, CA: Jossey-Bass.
5. Foscht, T., & Swoboda, B. (2009). *Käuferverhalten. Grundlagen, Perspektiven, Anwendungen*. Wiesbaden: Gabler.
6. Franken, S. (2019). *Verhaltensorientierte Führung. Handeln, Lernen und Diversity im Unternehmen*. Wiesbaden: Gabler Verlag.
7. Freyer, W. (2011). *Tourismus - Einführung in die Fremdenverkehrsökonomik*. München: Oldenbourg Wissenschaftsverlag GmbH.
8. Gable, S. L. (2006). Approach and avoidance social motives and goals. *Journal of Personality*, 71, 175-222.

9. Gable, S. L., & Impett, E. A. (2012). Approach and Avoidance Motives and Close Relationships. *Social and Personality Psychology Compass*, 6(1), 95-108.
10. Hasan, H., Astuti, E., Afrianty, T., & Iqbal, M. (2021). Impact of Organizational Culture on Employee Engagement and Employee Performance: A Stimuli-Organism-Response Approach. *Wacana Journal of Social and Humanity Studies*, 23(4). 235-247.
11. Houston, M. J., & Rothschild M. L. (1977). *A Paradigm for research on Consumer Involvement*. Madison, WI: University of Wisconsin.
12. Kazimoto, P. (2016). Engagement and Organizational Performance of Retails Enterprises. *American Journal of Industrial and Business Management*, No. 06. P. 516-525
13. Kroeber-Riel, W., & Weinberg, P. (2003). *Konsumentenverhalten (8., aktualisierte und erg. Aufl.)*. *Vahlens Handbücher der Wirtschafts- und Sozialwissenschaften*. München: Vahlen.
14. Keller, K. L. (1993). Conceptualizing, measuring and Managing Customer-Based Brand Equity. *Journal of Marketing*, 57(1), 1-22
15. Laato, S., Najmul Islam, A. K. M., Farooq, A., & Dhir, A. (2020). Unusual purchasing behavior during the early stages of the COVID-19 pandemic: The stimulus-organism-response approach. *Journal of Retailing and Consumer Services*, 57, 102224.
16. Lang, R., & Rybnikova, I. (2014). *Aktuelle Führungstheorien und Konzepte*. Wiesbaden: Springer.
17. Meffert, H., Baumann, C., & Kirchgeorg, M. (2008). *Marketing. Grundlagen marktorientierter Unternehmensführung. Konzepte – Instrumente – Praxisbeispiele*. Wiesbaden: Gabler.
18. Mehrabian, A., & Russell, J. A. (1974). *An Approach to Environmental Psychology*. Cambridge, MA: MIT Press.
19. Mehrabian, A., & Russell, J. A. (1977). Evidence for a Three Factor theory of Emotions. *Journal of Research in Personality*, 11(3), 273-294.
20. Miller, D., & Le Breton-Miller, I. (2005). *Managing for the long run: Lessons in competitive advantage from great family businesses*. Boston, MA: Harvard Business Press.
21. Parkinson, T. L., & Turner Schenk C. (1980). An Empirical Investigation of the S-OR Paradigm of Consumer Involvement. *Advances in Consumer Research*. 696.699.
22. Robbins, S., & Judge, T. (2017). *Organizational Behavior*. Harlow: Pearson.
23. Sorenson, R. L. (2000). The contribution of leadership style and practices to family and business success. *Family Business Review*, 13, 183-200.
24. Stock-Homburg, R. (2013). *Personalmanagement. Theorien, Konzepte, Instrumente*. Wiesbaden: Gabler.
25. Syafii, L. I., Thoyib, A., Nimran, U., & Djumahir. (2015). The Role of Corporate Culture and Employee Motivation as a Mediating Variable of Leadership Style Related with the Employee Performance (Studies in Perum Perhutani). *Procedia - Social and Behavioral Sciences*, No. 211, p. 1142-1147
26. Trommsdorff, V., & Teichert, T. (2011). *Konsumentenverhalten*. Stuttgart: Kohlhammer.
27. Vroom, V. H., & Yetton, P. W. (1973). *Leadership and decision-making*. Pittsburgh, PA: University of Pittsburgh Press.
28. Weibler, J. (2016). *Personalführung*. München: Vahlen.
29. Winkler, I. (2010). *Social Learning Theory of Leadership*. In: *Contemporary Leadership Theories. Contributions to Management Science* (book series). Physica-Verlag HD.
30. Züger, R. (2007). *Teamführung. Leadership-Basiskompetenz*. Zürich: Compendio.

Organizational Learning to Push Forward the Digital Transformation: The Case of Digital Innovation Labs

Friedrich Holotiuk

Frankfurt School of Finance & Management
Adickesallee 32-34, 60322 Frankfurt a.M., Germany
e-mail: f.holotiuk@fs.de

Jürgen Moormann

Frankfurt School of Finance & Management
Adickesallee 32-34, 60322 Frankfurt a.M., Germany
e-mail: j.moormann@fs.de

Abstract

Will IoT revolutionize the manufacturing process? Will blockchain turn the processing of trade finance upside down? Are 3D printers going to transform the sales business? Answers to those questions are researched and tested in Digital Innovation Labs (DILs). Those labs became an instrument for companies to handle disruption and innovation – however, without being a guarantee for success. Some DILs failed to reach their goals whereas others provided the pathway toward digital transformation. Therefore, this study examines how organizational learning advances innovation by means of DILs. In a unique study design, this paper uses the case study approach to look at two developmental stages of one particular DIL. We have conducted a series of interviews at an interval of three years. Over time, the DIL has changed fundamentally and established a funnel approach where the lab structure supports the entire innovation process of the company. Based on our study, we derive ten recommendations to enable organizational learning in the context of digital transformation in the financial services industry. Organizational learning has been essential in all parameters investigated (organization, strategy, team, people, and process) and plays a major role in the further development of DILs.

Keywords

Digital innovation labs, organizational learning, comparative analysis

Sustainable Production of e-Fuels and Its Social and Economic Impact

Mária Kmety Barteková

University of Economics in Bratislava
Bratislava, Slovakia
e-mail: maria.bartekova@euba.sk

Daniela Rybárová

University of Economics in Bratislava
Bratislava, Slovakia
e-mail: daniela.rybarova@euba.sk

Abstract

Renewable energy production is more labor intensive than conventional energy production, in delivering the same amount of energy output. It also uses less imported goods and services, particularly during operation, since renewable energy sources are by their nature indigenous, local energy sources. Opportunities for employment are provided in a range of sectors, including manufacturing, project development, construction and installation, operation and maintenance. This research paper aims to evaluate the economic and social impact of sustainable production of e-fuels in European countries, especially in Germany and Slovakia. To be able to make a statement concerning this issue, this thesis answers the following question: What is the social impact of sustainable production of e-fuels in selected European countries?

Keywords

Green jobs, Renewable energy employment, Energy efficiency employment, Central European Countries

1. INTRODUCTION

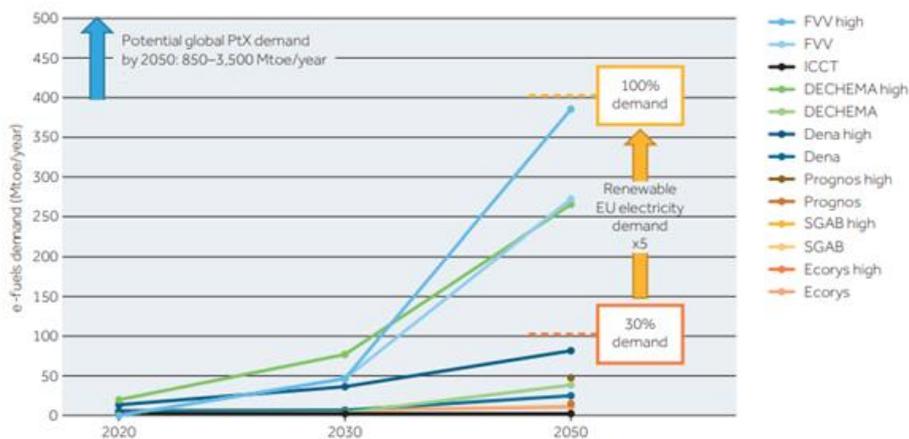
E-fuels are synthetic fuels, resulting from the combination of 'green or e-hydrogen' produced by electrolysis of water with renewable electricity and CO₂ captured either from a concentrated source (e.g. flue gases from an industrial site) or from the air (via direct air capture, DAC). E-fuels are also described in the literature as electrofuels, power-to-X (PtX), power-to-liquids (PtL), power-to-gas (PtG) and synthetic fuels (Grand, Le Brun, Vidil & Wagner, 2016). Materials produced from electricity (PtX) are often hailed as the universal solution as we move towards an emissions-free future, with claims that they facilitate carbon-neutral applications wherever climate change mitigation efforts are still faltering – in mobility, in buildings, in energy-intensive industry (Kler, Tyurina, Mednikov & Stepanov, 2010; Ridjan, Mathiesen, Connolly & Duić, 2013). Look more closely at electricity-based fuels and it quickly becomes apparent that not all PtX materials are sustainable – quite the contrary (Samavati, Martin, Santarelli & Nemanova, 2018; Barragán-Gutiérrez, López-Díaz & Krumm, 2017). If they are currently produced without any regulation of their sustainability, their emissions are in fact much higher than emissions from natural gas or diesel. For PtX materials to contribute to climate change mitigation, clear sustainability criteria are required.

PtX production is a complex process. First, water is converted into hydrogen using electricity in a process known as electrolysis. The hydrogen can be used directly in various applications. Before being stored or distributed, however, it must be compressed or liquefied, which requires additional energy inputs. As the next step, the hydrogen can be processed into gaseous or liquid fuels (e.g. methane) or e-fuels (e.g. synthetic kerosene and diesel), in which case carbon dioxide (CO₂) is also required.

In the past businesses were mainly responsible to stockholders for increasing profit, but with changing times corporations today have to take responsibility for many social, political and environmental aspects as well. Examples are working conditions, product protection or influence on local population (Edmunds, 1977). Business practices, even far away from the home market like most developing countries, can still be a topic for customers, governments, suppliers or shareholders (Knox & Maklan, 2004). The Study from Knox and Maklan (2004) shows a strong relation between the corporate social behavior and the strength of the corporate reputation, through addressing stakeholder concerns. Additionally, the social pressure about the transparency and accountability of actions rose, demanding a demonstration of results in addressing complex social problems such as poverty and inequality (Ebrahim & Rangan, 2014). This demonstration requires a full measurement of social performance and impact.

Figure 1 shows that e-fuels are not expected to play a significant role in the transport sector in the short-term (2030), and a high degree of variability is foreseen in the long term (2050). By 2050, most of the literature sources claim that the e-fuel contribution to the transport sector could range from 0 to 50–100 Mtoe/year (i.e. from 0 to 30% of the expected transport fuel demand in the EU by 2050), and will mainly be focused on the aviation, maritime and long-haul road transport segments (Jovan & Dolanc, 2020).

Figure 1: Global demand for e-fuels



Source: IRENA (2022)

2. LITERATURE REVIEW

The term ‘impact’ has not been consistently defined. According to Varga and Rosca (2019) the different definitions can be categorized in three lines of thinking. “Some consider it as the broad, far-reaching results of social intervention, others define it as the occurred social change, which is proven to be attributed to the intervention, while others ... explain impact as the effects of social intervention which are sustained changes on people, organizations, environment and systems” (Varga & Rosca, 2019).

Furthermore, many differentiations can be drawn in the type of impact, looking at indirect or direct and intentional or unintentional. Social impacts cover several categories including changes in way of life, culture expressed through people’s shared beliefs, customs and values, community, political system, environment, health, personal and property rights or fear and aspirations (Larsen, Hansen & Nielsen, 2018; Ebrahim & Rangan, 2014). An overall model used by several impact assessment analyses is the impact value chain (Varga & Rosca, 2019). It demonstrates the chronological sequence of cause and effects of events and happenings. The impact value chain analyses the steps happening before, which caused the impact, tracing it back to the starting activity.

The potential for green hydrogen production at costs lower than USD 2/kgH₂ is almost 10 000 EJ/year by 2050 (over 24 times the global final energy demand in 2020) (IRENA, 2022). However, several factors could constrain this very large potential. First, the potential is not equally distributed across countries, and some (e.g. Germany, Japan, Republic of Korea) have much lower potential than the expected future needs. Second, the low-cost supply locations can be in remote places with limited infrastructure (e.g. roads, grid, pipelines), which would increase the costs due to the facilities and additional transport infrastructure needed. Third, the additional transport cost to the importing markets may reduce attractiveness by increasing overall cost significantly.

Based on estimates for global PtX demand and market potential, an input-output analysis can be used to determine the impact that ramping up PtX production will have on the European

economy. It is possible to outline the direct value-added effects and employment impact on European machine construction and plant engineering, on suppliers indirectly, and that induced by the additional income and consumption effect triggered as a result. This analysis allows for the quantification of potential for the economic location of Europe and for a breakdown by country in the EU-28.

Major investments around the world in power plants for solar electricity and wind energy as well as in the plants for PtX production are needed for the production and conversion of renewable energy in liquid and gaseous PtX energy carriers. A study by authors Fuchs, Meyer and Poehls (2022). has determined that the increase in demand for PtX conversion equipment and plants for Germany alone has the potential to create around 470,000 jobs and EUR 36.4 billion in value added if German machine construction and plant engineering can retain its current market shares in the production of these capital goods.

3. RESEARCH DESIGN

The aim of the paper is to assess the economic and social impact of sustainable production of e-fuels in European countries. We have selected the two European countries, Germany and Slovakia as the European leaders in automotive industry. The conceived research questions were following:

- Research question no. 1 – What is the economic impact of sustainable production of e-fuels in selected European countries?
- Research question no. 2 – What is the social impact of the sustainable production of e-fuels in selected European countries?

In the research paper, the descriptive statistics for all the variables were examined to make sure they fell within acceptable range and skewness is one such statistic that was carefully looked at. We have chosen a linear regression analysis to assess the social impact of sustainable production of e-fuels in Germany and Slovakia. Variables are the poverty rate and the growth rate of e-fuels demand. The data source is the Eurostat database, the OECD database and IRENA's data & statistics.

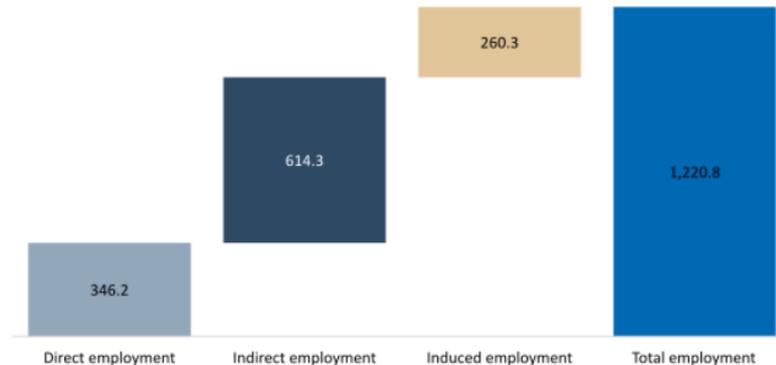
4. RESULTS AND DISCUSSION

The diversity of causes of poverty also gives many options for tackling it. Broad economic stability, competitive markets and public investments in infrastructure are recognized as important requirements for a reduction in poverty (World Bank, 2018). One factor is the correlation between poverty and economic growth. Low economic growth comes with high poverty rates. In the past countries with faster economic growth managed to significantly reduce monetary poverty. But on the opposite simply fostering the national growth of economy does not necessarily lead to a decrease of poverty depending on the distribution of income. Inequalities, for example in education contribute to a persistence of poverty, leading to intergenerational effects. This iterative process starting from not having access to basic services as education, followed by a low income, ends with also leaving the descendants without opportunities to get access to education (Walk, Greenspan, Crossley & Handy, 2015).

This persistence also has a negative effect on economic growth, which again fosters high poverty rates. Solutions have to be found to get out of this circle (Andrade Rosas & Jiménez-Bandala, 2018).

One theory is focusing on the poverty reduction through inclusive development efforts. These efforts can be drawn from political economy for financial inclusion, the use of technology, especially the introduction of telecommunications, and market-based strategies. Market-based approaches focus on the increase of productivity and income through for ex-ample new business opportunities with new creation of jobs and opening up new markets. Studies and social projects have shown that using an inclusive development approach can help to reduce poverty nationally and globally (Chibba, 2008). Focusing on inclusive development means necessarily including the effects of business activity – negative and positive – in the considerations. The creation of new jobs through business activity can lead to a higher household income and from this to a higher consumption. Negative aspects can also include the neglect of rural areas and agriculture, which leads to an even bigger gap between rich and poor and with it the decrease of food production. These inequalities are not necessarily visible on the basis of national measurements, since the national income rate still rises (Singer, 2006). These negative effects can be prevented through measuring on a subnational level, taken the urban and rural differences in poverty into account. With this information specific measures can be taken to address the local situation (Steinert et al., 2018).

Figure 2: Employment effect of e-fuels sustainable production

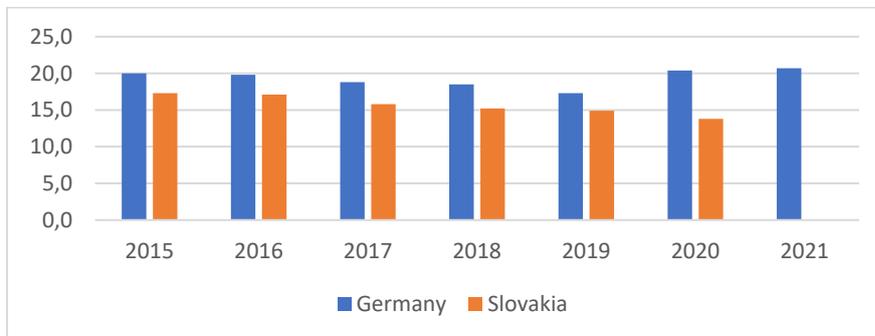


Source: IRENA (2022)

The export of PtX equipment and plants at the orders of magnitude mentioned above would generate considerable employment effects. Almost 350,000 additional people would be employed directly in the production of electrolysers and other PtX equipment and plants. A further 600,000 employees would be needed for the production of the intermediate consumption and the supplier network connected with it. The total effect, including the employment effects triggered by the additional consumer demand, amounts to 1.2 million additional employees in Europe (Figure 2). This corresponds to the number of employees in the entire chemical industry in Europe (Becker, Pfeifer & Schweikert, 2021; Fuchs, Meyer & Poehls, 2022).

Poverty rate in Slovakia is lower than in Germany. This effect could be caused by the immigration policy of Germany. Germany is the target country for most of immigrants entering Europe.

Figure 3: Poverty rate in Germany and Slovakia (2015 - 2021)



Source: processed by authors according to Eurostat (2022)

Table 1 and Table 2 show the results of the linear regression analysis. We can state that there is no relationship between the poverty rate as the indicator of social impact of the sustainable e-fuel production and the development of e-fuels demand in selected European countries.

Table 1: Results of regression analysis – Slovakia

Model Fit Measures

Model	R	R ²
1	0.698	0.488

Model Coefficients - Poverty rate

Predictor	Estimate	SE	t	p
Intercept	20.547	2.532	8.12	0.001
Demand_PtX	-0.354	0.181	-1.95	0.123

Source: author's calculations

Table 2: Results of regression analysis -Germany

Model Fit Measures

Model	R	R ²
1	0.00586	3.43e-5

Model Coefficients - Poverty rate

Predictor	Estimate	SE	t	p
Intercept	19.19820	5.563	3.4512	0.026
Demand PtX	-0.00395	0.337	-0.0117	0.991

Source: author's calculations

The value-added effects can be allocated to the economic contribution of each European country. In addition, the total effect can be broken down into its components of direct, indirect and induced value added. Figure 4 shows the annual value-added effects for the individual economies of the EU-28 in absolute figures.

Figure 4: Value-added effects in Europe



Source: IRENA (2022)

At around EUR 29.2 billion, Germany accounts for around one-third of the value-added effects. Italy also achieves double-digit annual growth of around EUR 14.8 billion. This means that the contribution in Italy alone is as high as the Italian automotive industry's value added today. The two countries show clearly both the direct effects on PtX equipment and plant manufacturers and the indirect effects on suppliers. Other countries, such as France and Spain, enjoy – measured against their overall economic importance in Europe – relatively minor direct effects from the export of PtX equipment and plants. However, due to the strong networks in European economies, they profit to a significant extent from the manufacturers of PtX equipment and plants in the neighbouring European countries. At around 12.7 percent of all intermediate consumption, some 57 percent of intermediate consumption imports in Europe come from other EU countries. In other regions, such as North America or Asia, only around 10 percent of intermediate consumption imports come from the region's neighbouring countries (Fritsch & Matthes, 2020). Therefore, overall, the benefits are seen not only in the countries of Europe that have a strong export economy in the area of PtX equipment and plants, but also in the countries with suppliers (indirect effect) and manufacturers of consumer goods and services for private households (induced effect). In total, the value-added effects in Europe correspond to the entire current gross domestic product of the Baltic states Estonia, Latvia and Lithuania.

The German job market is also expected to benefit. The German economy may profit from up to 470,800 new jobs in total, if the current employment intensities are taken as a benchmark with simplification in mind. This would correspond to about half the current workforce in the

automotive industry in Germany (Schnuelle, Wassermann & Stuehrmann, 2022). Accordingly, this may elicit potentially significant benefits for economic growth and employment in Germany.

Given the large volume of investment, the additional demand would therefore trigger considerable growth and employment effects. Significant demand for imports from China, for example, is of a similar magnitude; triggering comparable effects for the German manufacturing industry. If the Chinese economy had grown at only half the pace over a period of five years, the production (or production value) of the German economy would have been 1.3 percentage points lower.

5. CONCLUSION

According to the results of the regression analyses used in the research paper, we can state that there is no relationship between the poverty rate and growth rate of e-fuels demand in Germany, nor Slovakia. P – value in both linear regression models was higher than 0.05, in case of Slovakia 0.123 and in case of Germany 0.991. Overall, if there is EUR 215 billion in annual investment demand for PtX equipment and plants, this will result in potential of EUR 80 billion in value added and 1.2 million jobs in Europe. The EU has the opportunity to position itself as a leading supplier of sustainable technologies (Rosa, 2017, Wilson & Styring, 2017).

Acknowledgement

This research was supported by the VEGA Project no. 1/0708/20 Socio-economic Determinants of Sustainable Consumption and Production in Terms of Impact on Business Performance and Competitiveness 2020.

References

1. Andrade Rosas, L. A., & Jiménez-Bandala, C. A. (2018). Unemployment and the Probability of Falling into Poverty Traps: Considerations for Developing Countries. *Revista Española De Investigaciones Sociológicas*. Advance online publication. <https://doi.org/10.5477/cis/reis.164.3>
2. Barragán-Gutiérrez, I. E., López-Díaz, A., & Krumm, W. (2017). Synthetic fuel production from shredded scrap waste. *Revista Facultad de Ingeniería*, 26(44), 135-145.
3. Becker, M., Pfeifer, G., & Schweikert, K. (2021). Price Effects of the Austrian Fuel Price Fixing Act: A Synthetic Control Study. *Energy Economics*, 97, 105207.
4. Chibba, M. (2008). Poverty Reduction in Developing Countries. *World Economics*, 9(1), 197-200.
5. Ebrahim, A., & Rangan, V. K. (2014). What Impact? A Framework for Measuring the Scale and Scope of Social Performance. *California Management Review*, 56(3), 118-141.
6. Edmunds, S. W. (1977). Unifying Concepts in Social Responsibility. *Academy of Management Review*, 2(1), 38-45.
7. Eurostat (2022). People at risk of poverty or social exclusion. https://ec.europa.eu/eurostat/databrowser/view/sdg_01_10/default/table?lang=en
8. Fritsch, M., & Matthes, J. (2020). On the Relevance of Global Value Chains and The Intra-European Division of Labour. *National Institute Economic Review*, 252, 4-18.

9. Fuchs, C., Meyer, D., & Poehls, A. (2022). Production and Economic Assessment of Synthetic Fuels in Agriculture - A Case Study from Northern Germany. *Energies*, 15(3), 1156.
10. Grand, D., Le Brun, C., Vidil, R., & Wagner, F. (2016). Electricity production by intermittent renewable sources: A synthesis of French and German studies. *The European Physical Journal Plus*, 131(9), 329.
11. IRENA (2022). *Data & Statistics*. Abu Dhabi: IRENA. Retrieved from <https://www.irena.org/Statistics>
12. Jovan, D. J., & Dolanc, G. (2020). Can Green Hydrogen Production Be Economically Viable under Current Market Conditions. *Energies*, 13(24), 6599.
13. Kler, A. M., Tyurina, E. A., Mednikov, A. S., & Stepanov, V. V. (2010). The combined technology for production of synthetic fuels and electricity with reduced CO₂ emissions. *International Journal of Low-Carbon Technologies*, 5(4), 264-272.
14. Knox, S., & Maklan, S. (2004). Corporate Social Responsibility: *European Management Journal*, 22(5), 508-516.
15. Larsen, S. V., Hansen, A. M., & Nielsen, H. N. (2018). The role of EIA and weak assessments of social impacts in conflicts over implementation of renewable energy policies. *Energy Policy*, 115, 43-53.
16. Ridjan, I., Mathiesen, B. V., Connolly, D., & Duić, N. (2013). The feasibility of synthetic fuels in renewable energy systems. *Energy*, 57, 76-84.
17. Rosa, R. (2017). The Role of Synthetic Fuels for a Carbon Neutral Economy. 3(4), 11.
18. Samavati, M., Martin, A., Santarelli, M., & Nemanova, V. (2018). Synthetic Diesel Production as a Form of Renewable Energy Storage. *Energies*, 11(5), 1223.
19. Schnuelle, C., Wassermann, T., & Stuehrmann, T. (2022). Mind the Gap—A Socio-Economic Analysis on Price Developments of Green Hydrogen, Synthetic Fuels, and Conventional Energy Carriers in Germany. *Energies*, 15(10), 3541.
20. Singer, A. E. (2006). Business Strategy and Poverty Alleviation. *Journal of Business Ethics*, 66(2/3), 225-231.
21. Steinert, J. I., Cluver, L. D., Melendez-Torres, G. J., & Vollmer, S. (2018). One Size Fits All? The Validity of a Composite Poverty Index Across Urban and Rural Households in South Africa. *Social Indicators Research*, 136(1), 51-72.
22. Varga, V., & Rosca, E. (2019). Driving impact through base of the pyramid distribution models: The role of intermediary organizations. *International Journal of Physical Distribution & Logistics Management*, 49(5), 492-513.
23. Walk, M., Greenspan, I., Crossley, H., & Handy, F. (2015). Social Return on Investment Analysis: A Case Study of a Job and Skills Training Program Offered by a Social Enterprise. *Nonprofit Management and Leadership*, 26(2), 129-144.
24. Wilson, I. A., G., & Styring, P. (2017). Why Synthetic Fuels Are Necessary in Future Energy Systems. *Frontiers in Energy Research*, 5, 19.
25. World Bank (2018). *Piecing Together the Poverty Puzzle*. Washington, DC: World Bank.

Effectiveness of eco-innovations in selected countries

Iveta Kufelová

University of Economics in Bratislava
Bratislava, Slovakia
e-mail: iveta.kufelova@euba.sk

Nora Grisáková

University of Economics in Bratislava
Bratislava, Slovakia
e-mail: nora.grisakova@euba.sk

Peter Štetka

University of Economics in Bratislava
Bratislava, Slovakia
e-mail: peter.stetka@euba.sk

Abstract

The impact of climate change on society and the economy represents one of the most fundamental challenges of today. Ecology, protection of the environment and sustainable development have been the dominant issue in recent years in both, the ordinary and the business environment. Many companies and their business managers set voluntary and ambitious goals in this regard. They are actively engaged in finding solutions for the gradual transition to an environmentally sustainable model of production and consumption. A clean environment is an important prerequisite for maintaining a high quality of life in any country.

Keywords

Eco-innovations, eco-innovation index indicators, circular economy

1. INTRODUCTION

Part of business are constant societal changes resulting in new market requirements, customers and market regulations in the field of sustainable development, including environmental protection (Bobáková, 2015). In the last decade, questions and challenges related to socially responsible business, which is based on the long-term sustainability of production with regard to the efficient use of resources, with minimal impact on climate change, and also life (material and social) has been part of the business environment in the areas of production and services, employee satisfaction and the environment in which the company operates (Dubcová, 2013). These challenges affect the very way of doing business and lead to certain changes in business. However, due to the usual way of doing business, many companies cannot respond flexibly to ongoing changes, such as rising costs of energy and raw materials, compliance with stricter legislative standards or environmental requirements of customers. Companies that don't take any steps in this direction will expose themselves to an increased risk of failure in the market. Therefore, it is essential to find alternative approaches that could help solve these problems related to the sustainable development of enterprises, while simultaneously finding opportunities for growth, cost reduction and competitive advantage (Slovak Business Agency, 2018).

2. RESEARCH OBJECT AND METHODOLOGY

In the presented article, we will focus on eco-innovations, which are part of global society and in recent years have been an active issue for representatives of the UN, OECD, EU and political leaders of states and their economies. By means of the eco innovation index, we are comparing the development in selected countries. Part of the issue is also the circular economy and examples from practice in selected enterprises in Slovakia. In the preparation of the article, we've used literature research, which was the main tool for searching and completing comprehensive knowledge related to the solved problem, as well as a method of scientific abstraction. We processed the obtained data on the basis of analysis and synthesis. Analysis as a method was also used for the characteristics of the research object - eco-innovations, indicators of the eco-innovation index and examples from practice.

When we have been processing the results of the work and discussion, we summarized the obtained information using the method of deduction and synthesis, we used pictures and graphs, which we subsequently evaluate.

3. RESULTS AND DISCUSSION: ECO-INNOVATIONS AS PART OF THE EUROPEAN GREEN AGREEMENT

Slovakia with other 13 countries joined the initiative to support the European Green Deal (European Commission, 2019). The initiative says that part of the economic renewal should be the transition to a carbon-neutral and circular economy ¹. It is necessary to maintain the set

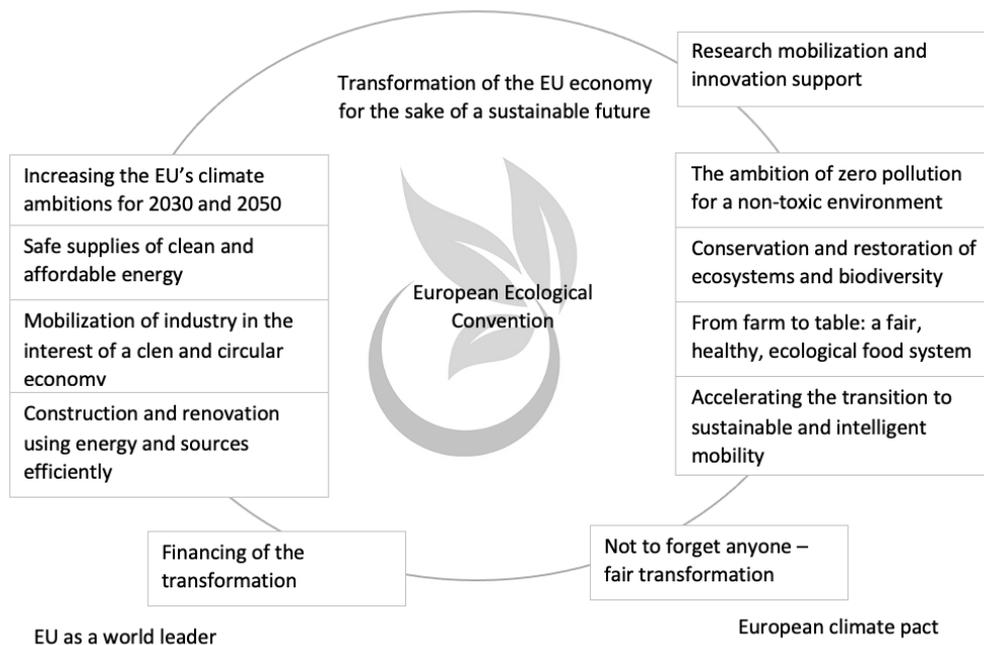
¹ The circular economy is a system, when during creating the design of a product, we have in mind its entire "life" cycle so that it is as waste-free as possible, as long as possible and closed. This means that in the production of products we consume less primary resources, less energy and use sustainable and renewable resources and

ambitions in the fight against climate change, which include: "achieving climate neutrality by 2050 as well as the goal for 2030, which is to reduce greenhouse gas emissions by 50-55%" (United Nation, 2015). The Green Deal, supported by investments in green technologies, sustainable solutions and new businesses, will continue to be the EU's strategy. The plan of the European Green Deal contains activities that have to:

- to support the efficient use of resources through the transition to a clean circular economy,
- to restore biodiversity and reduce pollution.

It also describes the necessary investments, available financial instruments and explains how to ensure a fair and inclusive transition. The following picture shows the individual elements of the ecological convention.

Picture 1: The elements of the ecological convention



Source: Ministry of the Environment of the Slovak Republic (2019)

Despite the weakening of the economic growth of the EU countries due to the COVID 19 pandemic, the countries will try to support the basic objective "in 2050 the EU will be climate neutral". Achieving this goal will require measures across all sectors of the economy, such as:

- invest in environmentally friendly technologies,
- to support innovations in industry,
- introduce more ecological, cheaper and healthier forms of private and public transport,
- decarbonize the energy sector,
- ensure higher energy efficiency of buildings,

materials. We create the individual components of the product in such a way that they are reusable, repairable, modifiable, recyclable or biodegradable if necessary.

- cooperate with international partners in order to improve global environmental quality standards.

The basic framework for the eco-innovation policy in Slovakia was set in the document Envirostrategy 2030 entitled Greener Slovakia – Environmental Policy Strategy of the Slovak Republic until 2030 (2019). Specifically, the strategy focuses on the development of the circular economy, ecologically less harmful energy production, respectively the introduction of economic measures to stimulate ecological development of technologies and innovations. A particularly important part of this document is the effort to support green public procurement (Ministry of the Environment of the Slovak Republic, 2019)

Support for the development of eco-innovations in Slovakia is divided into several measures. The focus on reducing environmental risk and pollution as well as better use of resources through innovative products, processes, management and business models and services is found in environmental protection measures as well as in science and research development (R&D) measures.

3.1. Eco-Innovation Index - Comparison of Selected Countries

In the EU, the eco-innovation performance of member countries has been monitored since 2010, when the Eco-innovation Score board was quantified as part of The Eco-innovation Observatory project, which evaluates and compares the performance of national economies in the area of eco-innovations. The eco-innovation index is based on 16 indicators and covers five areas that are contained in following table.

Table 1: Indikátors of eko-innovation index

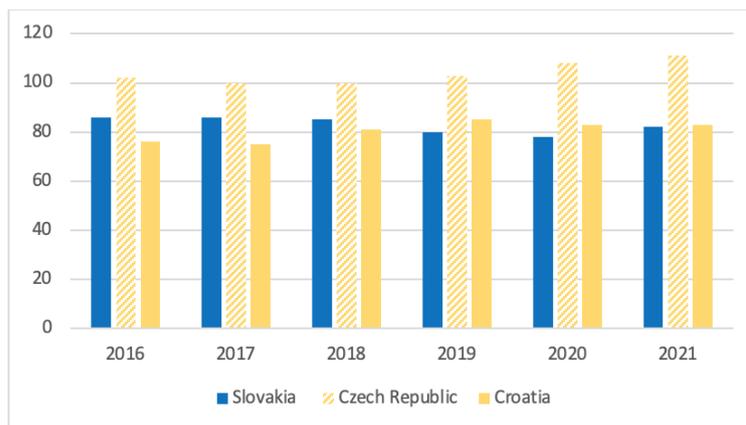
Eco-innovation inputs	Eco-innovation activities	Eco-innovation outputs	Environmental results	Socio-economic results
Government spending on science and research in the field of environment and energy,	Companies that have introduced innovative activities aimed at reducing material inputs per unit of production	Patents with eco-innovations	Material productivity	Export of goods from eco-innovative industries
			Water productivity	
Persons employed in the field of science and research	Companies that have introduced innovative activities aimed at reducing energy consumption per unit of production	Academic publications with eco-innovations	Energy productivity	Employment in eco-innovative industries
Amount of green investments in the initial phase	Companies that have implemented an environmental management system (ISO 14001)	Eco innovations in the field of mass media	Intensity of greenhouse gas emissions	Sales in eco-innovation industries

Source: European Commission (2021)

The value of the Eco-innovation Index is calculated as an unweighted average of these 16 sub-indicators. It points out how successfully actions in the area of eco-innovation are implemented in individual member states compared to the EU average (EU Index=100). The goal is to increase funding for research that contributes to expanding the knowledge base in the field of the environment.

The average level of the EU was set at 121 for 2021. Slovakia was ranked among the countries with the lowest level of eco-innovation, in 21st place with a value of 82. For the comparison of the V4 countries, the results are more positive than results of Poland and Hungary. The Czech Republic ranked above Slovakia and reached 13th place within the EU with a value of 111. Croatia with a value of 86 just above SK. The leaders of the eco-innovation index for 2021 include Luxembourg (171), Finland (157), Austria (150), Denmark (150), (Sweden (142), Germany (133).

Graph 1: Development of the Eco-innovation Index Slovakia, Czech Republic, Croatia 2016 – 2021



Source: European Commission (2021)

Graf 2: Eco-innovation Index 2012-2021 Croatia and Slovakia



Source: European Commission (2021)

Graph 3: Eco-innovation Index 2012-2021 Czech Republic (Czechia) and Slovakia



Source: European Commission (2021)

Compliance with the measures of the ecological convention also means higher investments in the case of some industries. Many of companies in Slovakia state that they do not reflect the additional costs associated with this, or do not reflect them in the final prices. It is also decisive in which industry the company operates and which type of measure it has decided on. On average, 7 out of 100 entrepreneurs include these costs in the value of the product or service, and about 25% of companies partially reflect the costs of ecological innovations in the prices of products and services.

Finances and necessary investments are also often reasons that entrepreneurs consider when operating more ecologically. A third of companies are reluctant to be ecological because of the financial complexity of investments in environmental protection. Among other barriers, entrepreneurs include legislation, a lack of experts, other entrepreneurs lack demand from customers, and some companies do business in a field that does not allow ecological measures (Forbs Slovakia, 2020).

3.2. Circular Economy as Part of Eco-Innovations in Selected Companies in Slovakia

The current part of the eco-innovation approach and the green economy is the circular economy. Its basic principle is environmental friendliness and acceptable use of natural resources. The aim of the circular economy is to preserve the value of products and materials for as long as possible in order to minimize waste and use new resources. The circular economy helps to solve the risks related to the supply of raw materials, especially critical ones (Ministry of the Environment of the Slovak Republic, 2019). The monitoring framework for the circular economy, introduced by the European Commission, consists of 10 indicators, some of which are divided into sub-indicators.

The following areas are monitored for production and consumption:

- supply of critical raw materials,

- green public procurement,
- waste generation
- food waste

In the business environment, the circular economy can be understood as a prerequisite for the competitiveness of companies. However, it is obvious that smaller firms implement circular economy activities more slowly and their willingness to finance these activities is lower compared to larger enterprises. It can also be assumed, that if smaller companies carry out circular economy activities, these are mostly cost-free or low-cost activities. As the size of the company grows, so does the level of involvement of the company in the circular economy. Green thinking starts already with product design – the product should be the most energy efficient and the easiest to recycle. The production of such products should also have a minimal negative impact on the environment.

As an example, the company **Beko Slovakia**, which has been operating in Slovakia since 2005. On the Slovak market, it offers customers a wide range of free-standing domestic and built-in appliances. Currently, this company is perceived as a synonym for functionality, energy efficiency and world-class technologies at an affordable price. All Beko appliances are created with respect to the environment, in accordance with the ISO 9001 and ISO 14001 standards. This is also why Beko is the second best-selling brand in Europe. Today's consumers demand comprehensive value for their money. Product reliability, after-sales service and product warranty extension play an important role in the choice. BEKO provides extended warranties for selected appliances for a total duration of 5 years. Another step towards extending the life of the products is also the provision of a 10-year engine warranty for selected types of washing machines, by which Beko contributes to the increased durability and repairability of its products and to the reduction of the impact of its products and production processes on the environment. Similarly, e.g., Gorenje provides a 15-year warranty on the refrigerator compressor.

The level of environmental pollution is constantly affected by the production of waste. The concept of zero waste is focused on the fact that all resources should be reused. One of the ways to contribute to this, is to minimize the waste produced. It starts with the purchase - without packaging.

Without Garbage (zero waste) online store can be a good solution for people without a store in their area. The e-shop sends the purchased goods in a reusable packaging or compostable bag, and even offers the option to send and have the goods packed in your own packaging (used packaging from other stores, resealable plastic bags or fabric packaging is used). The packing room also serves as a pick-up point where people can come and pick up their order in person. The company **Actinidia** has expanded the sale of bulk foods without packaging in its e-shop by cooperating with a zero-waste bakery and shop in Bratislava. It is a gluten-free artisan bakery called: U Dobrožrúta, which, in addition to offering alternative sourdough breads, pastries and cakes for celiac and vegans, is also special for its environmental dimension – it is the first in Slovakia to produce almost no waste and thus promotes the concept of zero waste. Company **Dobrožrúti** thanks to cooperation with Bezodpadu.sk (Actinidia, s. r. o.) and other suppliers, offers various gluten-free crops, dried fruits, nuts, etc. by weight in own packaging. Except to a food, you can also find designer eco-goods made

from recycled materials, such as textile makeup remover pads, brushes for washing dishes, toothbrushes, coffee cups or soy candles and natural cosmetics from local producers.

Similarly, a network of eco-pharmaceutical and cosmetic stores - **Ecoterra of Asante**, with headquarter in Trnava, sells shower gels, shampoos, washing gels, fabric softeners and various household cleaning products, which it pours from large-volume packaging into your own bottles or to containers purchased directly in the store for repeated use. In the Ecoterra of Asante, the process of returnable packaging is used, and in production these large-volume packaging is refilled, as the company's main goal is to reduce plastic waste and support the idea of reusing consumer packaging (Ministry of the Environment of the Slovak Republic, 2019).

4. CONCLUSION

Eco-innovations represent an attractive opportunity for many companies. The European Commission does not place so much emphasis on the innovation and uniqueness of these solutions within the framework of setting policy priorities and support schemes, but the key criterion is the environmental aspect of eco-innovation. In practice, it can therefore be a matter of shortening the implementation of proven restrictions with the aim of reducing energy consumption or the use of recycled materials in production. The introduction of eco-innovations thus combines the transition to an environmentally sustainable business with direct and tangible economic benefits for the innovating company. It is an opportunity for gaining new customers and entering new markets, attracting new investments and increasing productivity and technological capacities. At the same time, it can reduce production costs, increase profitability and attract new investments. No less important is that by introducing eco-innovations, companies stay ahead of ever-tightening regulatory standards.

The innovative behavior of companies brings benefits that are a certain added value of eco-innovation. Other facts on which eco-innovations have an impact include (Grisáková, Kufelová & Štetka, 2020):

- increasing the profitability of the company within the value chain itself,
- increase in productivity and technical capacity of the company,
- access to attractive investments and more.

If the green policy has to be really effective and receive the appropriate support, companies must know that environmentally sustainable business is not only responsible, but also an economically advantageous approach. It is the eco-innovation that combines both of these key aspects.

Acknowledgement

The article is an (partial) output of research project VEGA MŠ: Diffusion and consequences of green innovations in imperfect competition markets, VEGA 1/0646/20, doc. Ing. Nora Grisáková, PhD.

References

1. Bobáková, V. (2015). Nevyhnutnosť podpory inovácií v malých a stredných podnikoch. *The scientific paper from International Scientific Correspondence Conference EAEP*, (pp. 16- 25). Prešov.
2. Dubcová, G. (2013). *Nové trendy spoločenského podnikania na Slovensku*. Bratislava: Ekonóm.
3. European Commision. (2019). The European Green Deal. *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions*. Retrieved from <https://ec.europa.eu/info/sites/info/files/european-green-deal-communicationen.pdf>
4. European Commision. (2021). The Eco-Innovation Scoreboard and the Eco-Innovation index. Retrieved from https://ec.europa.eu/environment/ecoap/indicators/index_en
5. Forbs Slovakia. (2020). Tretina slovenských firiem zaviedla ekoinovácie. Odrazí sa to na zvýšení cien za služby i tovar. Retrieved 0from <https://www.forbes.sk/tretina-slovenskych-firiem-zaviedla-ekoinovacie-odrazi-sa-to-na-zvyseni-cien-za-sluzby-i-tovar/>
6. Grisáková, N., Kufelová, I., & Štetka, P. (2020). *Hodnotový rozmer ekoinovačnej stratégie podniku*. České Budějovice: Vysoká škola evropských a regionálných študií.
7. Ministry of the Environment of the Slovak Republic. (2019, february). Circular Economy - Future of the Deveopment of Slovakia. 105. (T. K. Gušťaříková, Ed.) Lexman, s.r.o. Retrieved from <https://www.enviroportal.sk/uploads/report/9202.pdf>
8. Ministry of the Environment of the Slovak Republic. (2019). *Strategy of the Slovak Republic's environmental policy until 2030*. Bratislava: Ministry of the Environment of the Slovak Republic. Retrieved from [www.minzp.sk: www.minzp.sk/files/iep/03_vlastny_material_envirostrategia2030_povlade.pdf](http://www.minzp.sk/files/iep/03_vlastny_material_envirostrategia2030_povlade.pdf)
9. Slovak Business Agency. (2018). *Analýza využívania eko-inovácií a obehovej ekonomiky v prostredí MSP*. Slovak Business Agency (SBA). Retrieved from [www.sbagency.sk: http://www.sbagency.sk/sites/default/files/7_analyza_vyuzivania_eko-inovacii_a_prvkov_obehovej_ekonomiky_v_prostredi_msp.pdf](http://www.sbagency.sk/sites/default/files/7_analyza_vyuzivania_eko-inovacii_a_prvkov_obehovej_ekonomiky_v_prostredi_msp.pdf)
10. United Nation. (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*. United Nations. Retrieved from https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

Taxable Agglomeration Rents Across the Spanish Local Labor Markets

Jesus Lopez-Rodriguez

Jean Monnet Group on Competition and Development (GCD), Universidade da Coruña, 15071 A Coruña, Spain
and
ECOBAS, Spain
e-mail: jesus.lopez.rodriguez@udc.es

Brais Pociña-Sanchez

Jean Monnet Group on Competition and Development (GCD), Universidade da Coruña, 15071 A Coruña, Spain

Laura Varela-Candamio

Jean Monnet Group on Competition and Development (GCD), Universidade da Coruña, 15071 A Coruña, Spain

Abstract

Testing the existence of taxable agglomeration rents has become a fruitful research avenue in the empirical front of foot-loose capital geographical economics models. However, three aspects are not satisfactorily solved empirically: First the fulfilment in the empirical counterparts of the labor immobility assumption implied by these models. Second, the validity of market potential as a proxy of agglomeration economies at a small geographical scope. Third, the (lack of) treatment of the endogeneity issue in the tax-setting-market potential estimations. This paper overcomes the first two issues by using as the unit of analysis, in the estimation of taxable agglomeration rents for Spain, local labor markets (LLMs). In relation to the third issue, we exploit data on the on number of Covid-19 cases for each LLM as an instrument for market potential ensuring that the exogeneity assumption is not violated. The results of the estimations confirm the existence of a taxable agglomeration rent across the Spanish LLMs.

Keywords

Geographical economics, tax competition, market potential, taxable agglomeration rent, local labor markets

Formal and Informal Tools for the Protection of Intellectual Property Rights in Creative Industries in Central European Countries

Helena Majdúchová

University of Economics in Bratislava
Bratislava, Slovakia
e-mail: helena.majduchova@euba.sk

Mária Kmetý Barteková

University of Economics in Bratislava
Bratislava, Slovakia
e-mail: maria.bartekova@euba.sk

Abstract

The aim of the research paper is to point out the importance of informal tools of protection of intellectual property rights, especially trade secrets, in creative industry entities. The use of trade secrets and copyrights is clearly higher than the use of patents in every country surveyed (V4 countries, Germany, Slovenia, Austria and Croatia) and in all creative industries. The final determinant we have identified is the financial cost of acquiring and maintaining formal and informal intellectual property rights. However, there are no relevant statistics at the level of Eurostat in this area. It is only possible to rely on the fees required by each country to register formal IP rights. As far as informal rights are concerned, it is extremely difficult to quantify the cost of protecting them. Creative industry enterprises use informal protection of their innovation process more than other businesses. The IPR framework thus takes on a very broad dimension, which on the one hand gives countries considerable flexibility in terms of designing the actual legislation governing IPR, especially in the current digital age.

Keywords

Creative industries, intellectual property rights, central European countries, innovation

1. INTRODUCTION

Europe has an immensely rich cultural heritage and its countries share a common history in many respects. European Union documents stress the importance of the creative industries as a dynamic force contributing to sustainable development (Florida, 2002). The European Union Community has already adopted a number of documents, declarations and also legislative provisions designed to promote the development of the creative economy. It creates new jobs, plays a crucial role in global value chains and promotes innovation processes, adds value as an indicator of social cohesion and serves as a tool for preventing or eliminating recessions in economic development. The creative industries are seen as a combination of entrepreneurial activities in the arts and other creative activities. Its importance is identified in relation to other economic sectors, to which it brings innovative elements ensuring their competitiveness, especially in relation to information and communication technologies. The creative industries are thus increasingly important in business-to-business markets such as advertising, design and architecture, as well as in business-to-consumer markets such as books, clothing and music. The experience and working methods of creative entrepreneurs in many fields are also influential and relevant in other parts of the economy. The significance of the creative industries thus goes beyond their play and is a means to smart growth for the industry and its surroundings. It can be expected that industries in the 21st century will increasingly depend on the generation of knowledge through creativity and innovation (Landry & Bianchini, 1995; Vilabla, 2009).

Intellectual property rights play an important role in the development of the creative economy. They protect creativity and control the commercial exploitation of the products of scientific, technological and cultural creation. The protection of IP rights in CI entities is a very complex issue and poses a challenge for the stakeholders involved, and this is because in the current era of digitization and the advent of artificial intelligence, copying and imitation is very easy. In the current internet era, where most works of art can be digitized and exchanged and shared almost for free on the web, IP rights are of paramount importance in ensuring that creators who have participated in the creative process and who have invested money, time, energy and their own know-how are rewarded. Protecting IP rights is a matter of survival for these actors, otherwise the incentive for their creators to both operate in their respective industries and to produce relevant innovations is lost. IPR protection regimes were originally developed for the analogue age. Their basic aim was to strike a fair balance between the interests of creators on the one hand and users on the other hand. However, in the digital environment this is much more difficult.

2. LITERATURE REVIEW

The World Intellectual Property Organization (WIPO) refers to intellectual property as *"creations of the mind, everything from works of art to inventions, computer programs to trademarks and other brand names."* Intellectual property encompasses a wide range of activities and plays an important role in both cultural and economic life, which is recognized by the various laws protecting intellectual property rights (WIPO, 2020). According to Decree of the Minister of Foreign Affairs No. 69/1975 Coll. on the Convention Establishing the World

Intellectual Property Organization, signed in Stockholm on 14 July 1967, intellectual property is understood as "rights":

- to literary, artistic and scientific works,
- to performances by performers, sound recordings and radio broadcasts,
- to inventions from all fields of human activity,
- to scientific discoveries,
- to industrial designs and models,
- to manufactural marks, trademarks and service marks, as well as to trade names and business names,
- to protect against unfair competition,
- and all other rights relating to intellectual activity in the industrial, scientific, literary and artistic fields."

In general, intellectual property rights are divided into copyright and industrial property rights. An overview of these is given in the following table.

Table 1: Intellectual property law system

COPYRIGHT AND RIGHTS RELATED TO COPYRIGHT	INDUSTRIAL PROPERTY RIGHTS
<ul style="list-style-type: none"> ○ Copyright ○ Performers'right ○ Right of sound and audiovisual recordings ○ Right of broadcasters ○ Right to databases 	<ul style="list-style-type: none"> ○ Industrial rights to the results of creative activity: <ul style="list-style-type: none"> ● Patent law, utility model law, topographies of semiconductor products, new plant varieties. ○ Industrial Designation Rights: <ul style="list-style-type: none"> ● Trademarks, trade names, Designation of origin and geographical indications. ○ Rights analogous to industrial rights: <ul style="list-style-type: none"> ● Improvement proposals, methods of prevention, diagnosis of diseases and treatment of humans and animals, protection of plants against pests, right of logos, domain names.
<p>Intellectual property law: trade secret law, unfair competition law, media law</p>	

Source: compiled by authors; see also Skorkova (2019)

Industrial property rights can be described as formal rights, i.e. institutionalized and registered. For other intellectual property objects, including those protected under copyright law (copyright work, artistic performance, sound recording, sound-visual recording, broadcast, database) or under commercial legislation (e.g. in the Czech Republic and Slovakia it is the Commercial Code) (trade secrets, know-how, confidential information, logo), the principle of informal protection applies without the need for administrative registration or examination. For a better understanding of the differences between formal and informal rights, we will use the example of patent vs. trade secret.

According to the definition of the Industrial Property Office of the Slovak Republic as well as WIPO (World Intellectual Property Organization), it is a protective document by which the state gives the exclusive right to its owner to use the invention for a certain period of time. By publishing the patent, the owner gives valuable technical information to the public, thus creating one of the largest sources of technical information in the world. Patents are granted for inventions that are new, involve inventive activity and are capable of industrial application. Not only new products, devices and technologies can be patented, but also

chemically produced substances, pharmaceuticals, industrially produced micro-organisms, as well as biotechnological processes and the products obtained using them.

Trade secrets may be technical in nature, for example drawings and designs, prototypes, manufacturing processes, unpatentable or unpatented inventions, know-how, formulae or recipes, genetic materials and scents. Trade secrets may consist of lists of customers and suppliers, business methods and strategies, and costs and prices price information.

On 8 June 2016, the European Parliament and the Council adopted the European Commission's proposal for a Directive on the protection of undisclosed know-how and commercial information (business secrets) against their unlawful acquisition, use and disclosure.

Table 2: Comparison of the differences between a patent and a trade secret

Criterion	Patent	Trade secrets
Explicit knowledge	Yes	No
Tacit knowledge	No	No
Reverse engineering allowed	No	Yes
Method of protection	in accordance with the legislation in force in the country in question	within internal company guidelines
Temporal definition of protection	20 years since its invention	indefinitely, length depends on the claimant
Disclosure of protection	wide public awareness	limited awareness within business processes
Object of protection	mainly products (invention that has industrial applicability, as well as substances, microorganisms, biotechnological processes)	Trade secrets can cover a range of information and know-how that cannot be protected or cannot be adequately protected by patents, such as: <ul style="list-style-type: none"> ○ inventions in the nascent stage, ○ manufacturing processes, ○ lists of suppliers and clients.
Cost of protection	patent attorney costs, administrative fees, patent maintenance fees	Ongoing costs of checking compliance with corporate protection
European harmonization	Yes	After implementation of the Directive

Source: compiled by authors; see also Linton (2016) and Kulti, Takalo & Toikka (2007)

In real practice, trade secrets have several advantages over other types of intellectual property rights:

- is broad in scope, covering virtually any type of valuable business information that a business wishes to protect,
- there is no need to refer the registration to an institutionalized process,
- trade secret protection is flexible, e.g. when new valuable information arises, businesses do not have to wait for the state approval process, but simply incorporate it into their existing protection,
- from a company-wide perspective, trade secrets can be considered innovation-friendly because they can be shared with internal and external stakeholders to the extent they choose.

Naturally, there are also some disadvantages to the advantages:

- is not comprehensively protected from reverse engineering, even in some countries the state allows reverse engineering and other practices that are critical to innovation;
- trade secret violations are enforceable in the commercial courts, with the award of appropriate damages depending on the judge's competence to assess whether the information meets the requirement for legal protection, and the judge must be able to identify the trade secret, ensure that it is not disclosed to third parties, order appropriate compensation and ensure that it is enforceable;
- trials sometimes take so long that the information has lost its value;

In patent protection, on the other hand, the inventor enjoys the protection of the Patent Act. The one who filed the first application has the right to exclude others from making, using, selling or importing during the term of the patent (Linton, 2016). The traditional view of intellectual property rights tells us that patents are the holy grail of protection, especially in manufacturing. However, research over the past two decades has challenged this assumption (Cohen et al., 2000; Arundel, 2001, Anton & Yao, 2004; Crass et al, 2016 and others). In light of these studies, informal rights and trade secrets in particular are taking on a larger and more important role in corporate practice.

Published studies and surveys (e.g., ITC, 2014; USITC, 2016; BRDIS³, 2012) point to the fact that a significant proportion of businesses identify trade secrets as "*very important*" to their operations. Out of a sample of 7,000 businesses, as many as 56% considered trade secrets to be very important, compared to 48% for trademarks and 31% for copyrights. For example, in sectors such as chemicals, information and communication technology, businesses considered trade secrets more important than patents.

3. RESEARCH DESIGN

The aim of the paper is to point out the importance of informal tools of protection of intellectual property rights, especially trade secrets, in creative industry entities. The importance of these informal instruments is increasing and is increasingly published in various scientific and professional studies. Evidence is also provided by the newly emerging legislation in the European but also in the American space on this area, such as the Transpacific Partnership Agreement (TPP), the World Trade Organization Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). Despite these policy initiatives, the actual empirical documentation on the nature, implementation and use of trade secrets is rather carried out in developed countries and there are relatively few surveys dealing with the relationship between formal and informal rights, e.g. in former socialist bloc countries. Not to mention that there is a virtual absence of research examining the relationship between the impact of the type of IP protection and the innovation process. In order to at least partially contribute to filling this gap, we present an analysis that focuses on the space of Central European countries (the Czech Republic, Hungary, Germany, Poland, Austria, Slovakia and Slovenia). The data source is the Eurostat database. However, this database, apart from valuable data, has its limitations which also limit the conclusions of this paper. For the purpose of the analysis, descriptive statistics were chosen. We provide descriptive statistics on the use of trade secrets and patents among innovators and these are presented by country, by

economic sector of the creative industries, by type of innovation and by cooperation practices. Some of the results have also been analyzed by firm size.

In order to ensure comparability of the results obtained, the Eurostat methodology was used for all parameters examined. The following industries were selected as creative industries according to the Eurostat NACE_R2 methodology:

- 58-60 Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities,
- 62-63 Computer programming, consultancy, and information service activities,
- 71-73 Architectural and engineering activities; technical testing and analysis; scientific research and development; advertising and market research.

The size of the enterprise was also determined according to the Eurostat methodology:

- Small enterprises (S) from 10 to 48 employees,
- Medium enterprises (M) from 50 to 249 employees,
- Large enterprises (L) - 250 employees or more.

4. RESULTS AND DISCUSSION

The object of the research presented in this paper is to examine the relationship between formal and informal tools for the protection of intellectual property rights in creative industry enterprises through the determinants that influence the enterprise's decision on which tools to choose. The approach chosen was inspired by the European Observatory on Infringements of Intellectual property Rights study published by the authors in June 2017, which included data for the years 2010-2012 (Wajzman & Garcia-Valero, 2017). By reviewing the available literature for example (Hall et al., 2014; Rammer, 2007; Arora, Athreye & Huan, 2015) we formulated the following determinants:

1. Degree of competition in innovation. We expect that in a country with a high share of innovative enterprises, protection of invention through patent will be preferred. Conversely, in a country with a lower share of innovative firms, these enterprises will prefer informal instruments to protect intellectual property rights. Creative industry enterprises are the vehicle for innovation and examining their ability to exploit IPRs will be a determinant that deserves attention.
2. Type of innovation. We expect product innovations to be more protected by formal instruments and process innovations by informal IPR protection instruments. This assumption is based on the practice of reverse engineering, which is used more in product innovation (Hall & Harhoff, 2012; Hurmelinna & Puumalainen, 2007). Due to their activities, creative industry enterprises are mainly carriers of process innovation.
3. Collaboration and open innovation. We assume that creative industry businesses, due to the nature of their business, will primarily collaborate with other businesses and clients (Chesbrough & Bogers, 2014). In terms of formal and informal IPR protection tools, enterprises that collaborate with other enterprises prefer patenting to protect their knowledge and to control the transfer of the positive impacts of innovations to external partners. In this case, secrecy in the form of trade secrets is difficult.
4. Financial constraints. We assume that applying for patents is financially costly and therefore creative industry companies will prefer informal IPR protection tools.

The above determinants will be investigated in the Central Europe, which is made up of the V4 countries (Czech Republic, Hungary, Poland and Slovakia), Slovenia, Croatia, Austria and Germany. A comparison of the countries of the former socialist bloc and with countries that did not go through the transition process may provide further insights. The source of the research is Eurostat databases for the years 2016-2018.

We do not consider the above determinants to be exhaustive; rather, we consider them to be a list of academic hypotheses that could be tested, analysed, and then expanded to include new determinants. The following table (Table 3) gives an overview of the companies that have declared an innovation (process or product) by sector and by the size of the company.

Table 3: Enterprises that introduced an innovation by type of innovation, developer, NACE Rev.2 activity and size class (%)

NACE_R2												
Country	58-60			62-63			71-73					
	total			total			total					
	PI	PCI		PI	PCI		PI	PCI				
Czechia	41,0	45,7		54,1	59,9		22,8	34,1				
Croatia	44,5	50,2		66,0	67,7		40,4	46,9				
Hungary	28,2	32,5		43,3	37,3		26,5	27,5				
Poland	19,7	28,8		31,9	37,0		13,1	22,6				
Slovenia	42,3	48,7		68,3	59,4		48,0	43,1				
Slovakia	13,4	11,0		25,7	26,3		9,7	24,5				
Germany	35,3	46,2		72,6	68,1		44,2	62,0				
Austria	56,0	63,9		67,3	76,2		35,4	55,5				
EU 27 country							34,6	46,3				
EU 19 country							37,3	50,7				
Size enterprises												
Country	58-60			62-63			71-73					
	small	medium	large	small	medium	large	small		medium		large	
							PI	PCI	PI	PCI	PI	PCI
Czechia	x	x	x	x	x	x	19,2	31,9	36,9	42,9	68,2	60,7
Croatia	x	x	x	x	x	x	40,8	47,8	38,2	36,6	x	67,3
Hungary	x	x	x	x	x	x	25,3	26,4	38,3	34,2	25,0	62,5
Poland		x	x	x	x	x	11,0	20,6	21,9	31,0	37,3	51,0
Slovenia	x	x	x	x	x	x	46,0	x	64,9	x	x	x
Slovakia	x	x	x	x	x	x	8,7	24,5	16,1	24,7	25,0	25,0
Germany							41,9	59,9	54,7	71,5	70,8	87,0
Austria							33,7	53,9	49,7	70,9	43,8	43,8

PI – Product innovation; PCI – Process innovation

In all the countries analyzed, process innovations prevailed over product innovations in all the sectors, with minor exceptions (Slovakia in sectors 58-60, Slovenia and Germany in sectors 32-63). This confirms the assumption that process over product innovation prevails in the creative industries. At the same time, based on the literature search on reverse engineering,

we confirm the assumption that creative industry firms will use more informal than formal IPR protection instruments. It was not possible to assess the impact of size on the type of innovation chosen in industries 58-60 and 62-63 (Eurostat does not report these data), only data for sectors 71-73 were available. Again, the assumption that the size of the enterprise does not have a major impact on the choice of the type of innovation chosen is confirmed. In all countries analyzed, process innovation was predominant in this sector and in all size categories.

In the following table, we will focus on tracking which IPRs are prevalent in creative industry businesses.

Table 4: Enterprises that applied for a patent, registered an industrial, design, trademark or used trade secrets, by NACE Rev. 2 activity and size class

Innovation enterprises															
NACE_R2	58-60					62-63					71-73				
GEO/IPR_T RN	P	T	ID	TS	C	P	T	ID	TS	C	P	T	ID	TS	C
Czechia	7,0	43,1	2,7	9,9	49,6	8,1	18,9	1,7	22,9	22,6	18,2	12,8	6,1	17,7	13,0
Croatia	1,7	16,6	:	25,1	22,8	2,7	19,6	0,4	50,5	8,2	3,1	3,0	0,7	30,4	5,1
Hungary	8,0	21,1	1,9	24,8	45,0	6,2	8,1	0,0	17,2	11,9	7,5	7,6	1,6	17,6	10,5
Poland	3,1	14,3	0,0	:	:	4,5	9,4	0,1	:	:	11,8	7,8	2,1	:	:
Slovenia	0,0	51,1	:	0,0	19,6	:	18,7	0,0	:	13,0	14,1	:	:	:	:
Slovakia	0,0	43,4	0,0	17,4	82,6	0,0	18,7	0,0	15,7	36,4	6,7	3,4	1,8	15,3	15,7
Germany	3,4	28,7	4,0	45,0	42,9	6,7	24,6	1,1	65,4	15,5	11,1	13,2	4,5	47,7	10,7
Austria	5,0	36,2	0,0	46,6	22,6	6,7	21,9	2,1	58,6	13,6	10,7	14,2	1,8	48,6	7,0
	10 to 49 employees					50 to 249 employees					250 employees or more				
NACE_R2	71-73														
GEO/IPR_T RN	P	T	ID	TS	C	P	T	ID	TS	C	P	T	ID	TS	C
Czechia	13,7	10,2	4,6	14,4	12,7	31,4	20,0	8,4	28,1	14,8	37,2	25,6	26,2	25,7	6,7
Croatia	1,2	3,0	0,4	30,2	4,8	21,6	3,6	3,6	34,2	8,7	48,5	:	:	:	:
Hungary	7,4	6,3	1,4	16,8	10,1	8,5	16,5	3,9	24,6	14,2	0,0	20,0	0,0	0,0	0,0
Poland	12,2	7,6	2,4	:	:	13,4	8,5	1,4	:	:	0,0	7,7	0,0	:	:
Slovenia	13,1	10,1	:	26,1	:	20,5	:	0,0	:	:	:	:	:	:	:
Slovakia	2,7	0,6	0,0	13,8	17,6	34,6	23,1	14,0	26,0	3,8	0,0	0,0	0,0	0,0	0,0
Germany	9,1	10,7	3,6	45,7	9,0	19,0	23,7	9,7	56,3	18,1	20,1	19,8	0,0	52,9	14,8
Austria	7,3	14,1	1,8	47,7	5,5	30,5	12,8	2,4	53,0	15,9	62,5	50,0	0,0	87,5	37,5

P – patent; T – trademark; ID- industrial design; TS – trade secret; C- copyright

The use of trade secrets and copyrights is clearly higher than the use of patents in every country surveyed and in all creative industries. The largest differences are in Croatia, where informal rights outweighed formal rights by a factor of 71-73 to 5. In the case of Slovenia and Poland, it is not possible to comprehensively assess this ratio due to missing data. Germany shows the highest share of informal rights in the 58-60 and 62-63 sectors. In contrast, in the 71-73 sector, copyright, together with the Czech Republic, showed the lowest share.

It was not possible to comprehensively assess the monitoring of this ratio by enterprise size in the analyzed sectors due to missing data. In the Czech Republic, across all size categories of innovative enterprises, formal IP protection instruments were predominant in sectors 71-73. In Slovakia and Hungary, this tendency appeared in medium-sized enterprises. In the other countries, the available data showed that the size of the enterprise did not play a significant role in the proportion of formal and informal instruments in IPR protection.

Table 5: Enterprises that co-operated on R&D and other innovation activities with other enterprises or organizations, by kind and location of co-operation partner, NACE Rev. 2 activity

Country	Enterprises within the enterprise group	Private business enterprise outside the enterprise group	Consultants or commercial labs	Suppliers of equipment, materials, components or software	Clients or customers from the private and public sectors	Competitors or other enterprises of the same sector	Universities or other HE institutions, research institutes and non-profit organizations
58-60							
Czechia	4,0	11,3	1,8	8,9	3,1	0,0	3,7
Germany	2,0	10,7	2,8	4,7	1,9	3,0	10,3
Croatia	6,4	15,1	6,9	9,2	5,3	1,5	6,7
Hungary	4,9	22,9	4,4	9,9	11,4	3,3	7,3
Austria	x	x	x	x	x	x	x
Poland	4,4	5,6	3,0	3,4	2,8	0,9	5,0
Slovenia	x	33,4	x	16,7	x	0,0	x
Slovakia	0,0	1,6	1,6	1,6	1,6	1,6	0,0
61-63							
Czechia	10,2	23,0	2,2	13,7	10,0	3,5	11,5
Germany	9,6	32,2	7,8	11,7	17,7	11,3	38,6
Croatia	14,5	45,5	15,6	23,2	30,4	6,3	18,9
Hungary	5,0	38,8	9,6	15,9	19,4	5,3	13,4
Austria	x	x	x	x	x	x	x
Poland	7,0	13,5	4,4	5,5	5,8	1,6	8,2
Slovenia	16,6	64,0	x	29,3	x	x	x
Slovakia	7,9	20,3	7,4	12,5	13,1	3,3	14,1
71-73							
Czechia	5,7	16,5	5,7	8,0	7,7	2,2	12,8
Germany	7,8	21,3	5,5	5,8	13,5	8,3	31,0
Croatia	4,5	10,6	3,6	6,3	5,9	1,2	6,4
Hungary	5,4	28,9	11,7	14,2	15,5	4,6	14,9
Austria	x	x	x	x	x	x	x
Poland	4,5	11,2	4,5	5,0	6,5	2,2	10,1
Slovenia	12,3	46,1	20,4	23,1	27,3	6,3	x
Slovakia	2,9	11,8	5,2	9,0	0,0	3,5	12,8

As Table 5 clearly shows, in all the countries and creative industries analyzed, collaboration with out-group companies prevails in the generation of innovation activities. It can be assumed that this cooperation both enables enterprises to seek inspiration for innovation outside their internal environment and creates peer links and networks, which may take the

form of clusters, cluster initiatives or cooperating enterprises. In the 58-60 sector, the impulses that enterprises received from suppliers played an important role in the creation of initiatives. This tendency was also confirmed in sectors 61-63. Sectors 71-73 had a very high share of cooperation with universities, research centers and non-profit organizations. This cooperation would merit further analysis. From the data provided by the Eurostat database, it is not possible to establish the link between cooperation and the IP protection tools.

The final determinant we have identified is the financial cost of acquiring and maintaining formal and informal intellectual property rights. However, there are no relevant statistics at the level of Eurostat in this area. It is only possible to rely on the fees required by each country to register formal IP rights. As far as informal rights are concerned, it is extremely difficult to quantify the cost of protecting them. Quantifying, for example, the benefits and costs of trade secrets from an economic point of view is also difficult because, given that these are secret and intangible rights, businesses are reluctant to disclose information about these facts. With increasing digitization, the costs of preventing cybercrime are clearly rising, as trade secrets in particular are a popular target for cybercrime. The direct costs of protecting trade secrets include, in particular, ensuring their protection (confidentiality agreements and cyber security). The indirect costs of protecting trade secrets consist of knowledge flows within the enterprise (James, Leiblein & Lu, 2013; King, 2007). Too strong protection in the form of secrecy can hamper a firm's efforts to innovate. It is not proven that protecting informal rights is cheaper than formal rights (Searle, 2012). Protecting and enforcing an injured party's right in litigation can be extremely costly, with litigation leading to further loss of secrecy and unclear remedies and uncertain damages.

5. CONCLUSION

Creative industry enterprises use informal protection of their innovation process more than other businesses. The IPR framework thus takes on a very broad dimension, which on the one hand gives countries considerable flexibility in terms of designing the actual legislation governing IPR, especially in the current digital age. There is considerable scope in business, but also in scientific and academic settings, for a broad exploration of the links between formal, informal IPRs and the creation of innovations. Much of the research focuses on formal rights because they are traditional, visible, formalized and measurable through registered applications. However, this does not mean that a company cannot choose a combination of these IP rights. For example, a trade secret can be chosen by a creative industry undertaking to protect know-how which it will then use in the implementation of a patented invention. For example, different parts of a software programme may initially be protected by a trade secret, subsequently by a patent or copyright, and later trademarks or designations may be added when commercialization takes place. Trade secrets become particularly important in industries where it is difficult to obtain a patent (e.g. software inventions, architectural work, production of films, video games, recipes, etc.). Research in this area should also focus on examining the protection of these rights at the level of the product and its different life cycle stages (currently only aggregated data at company level are available). We also note the need to investigate whether legal institutions are currently acting in line with the digital environment in which creative industry players find themselves.

Acknowledgement

This research was supported by the VEGA Project 1/0582/22 Dimensions of cross-sectoral entrepreneurship of cultural and creative industry entities in the context of sustainable development.

References

1. Anton, J. J., & Yao, D. A. (2004). Little Patents and Big Secrets: Managing Intellectual Property. *The RAND Journal of Economics*, 35(1), 1.
2. Arora, A., Athreye, S., & Huang, C. (2013). *Innovation, Patenting and Licensing in the UK: Evidence from the SPU survey*. Intellectual Property Office.
3. Arundel, A. (2001). The relative effectiveness of patents and secrecy for appropriation. *Research Policy*, 30(4), 611-624.
4. Chesbrough, H., Vanhaverbeke, W., & West, J. (Eds.). (2014). *New Frontiers in Open Innovation*. Oxford: Oxford University Press.
5. Cohen, W., Nelson, R., & Walsh, J. (2000). *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)*. National Bureau Of Economic Research.
6. Crass, D., Garcia Valero, F., Pitton, F., & Rammer, C. (2019). Protecting Innovation Through Patents and Trade Secrets: Evidence for Firms with a Single Innovation. *International Journal of the Economics of Business*, 26(1), 117-156.
7. *Decree of the Minister of Foreign Affairs of 13 January 1975 on the Convention establishing the World Intellectual Property Organisation, signed in Stockholm on 14 July 1967, 69/1975 Coll.* <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/1975/69/>
8. Florida, R. L. (2003). *The rise of the creative class: And how it's transforming work, leisure, community and everyday life*. Pluto Press.
9. Hall, B. H., & Harhoff, D. (2012). Recent Research on the Economics of Patents. *Annual Review of Economics*, 4(1), 541-565.
10. Hall, B., Helmers, C., Rogers, M., & Sena, V. (2014). The Choice between Formal and Informal Intellectual Property: A Review. *Journal of Economic Literature*, 52(2), 375-423.
11. Hesmondhalgh, D. (2013). *The cultural industries*. Boston, MA: Sage.
12. Hurmelinna, P., & Puumalainen, K. (2007). 'Nature and Dynamics of Appropriability: Strategies for Appropriating Returns on Innovation. *R&D Management*, 37(2).
13. James, S. D., Leiblein, M. J., & Lu, S. (2013). How Firms Capture Value from Their Innovations. *Journal of Management*, 39(5), 1123-1155.
14. King, A. W. (2007). Disentangling Interfirm and Intrafirm Causal Ambiguity: A Conceptual Model of Causal Ambiguity and Sustainable Competitive Advantage. *Academy of Management Review*, 32(1), 156-178.
15. Kultti, K., Takalo, T., & Toikka, J. (2007). Secrecy versus patenting. *The RAND Journal of Economics*, 38(1), 22-42.
16. Landry, C., & Bianchini, F. (1995). *The creative city*. Demos.
17. Linton, K. (2016). The Importance of Trade Secrets: New Directions in International Trade Policy Making and Empirical Research. *Journal of International Commerce and Economics*, 1, 1-17.
18. Majdúchová, H., & Kmety Barteková, M. (2020). Innovations in the Creative Industry Entities. *SHS Web of Conferences*, 74, 02009.
19. Rammer, C. (2009). *Innovationsverhalten der Unternehmen in Deutschland 2007: Aktuelle*

- Entwicklungen und die Rolle der Finanzierung.* Zentrum für Europäische Wirtschaftsforschung.
20. Searle, N. (2012). The Criminalization of the Theft of Trade Secrets: An Analysis of the Economic Espionage Act. *IP Theory*, 2(2), 33-51.
 21. Skorková, V. (2019). *Repetitóriium práva duševného vlastníctva* (Druhé, prepracované a doplnené vydanie). IURIS LIBRI.
 22. Wajsman, N., & García-Valero, F. (2017). *Protecting Innovation through Trade Secrets and Patents: Determinants for European Union Firms*. European Observatory on Infringements of Intellectual Property Rights. https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/observatory/documents/reports/Trade%20Secrets%20Report_en.pdf
 23. WIPO (2020). *What is intellectual property?* Retrieved from <https://www.wipo.int/publications/en/details.jsp?id=4528>

Strategies for Communication With Stakeholders in Mergers and Acquisitions

Sergey Myasoedov

The Russian Academy of national economy and public administration
82 Prospect Vernadskogo, Moscow 119571, Russian Federation
e-mail: vicerektor@rane.ru

Emil Martirosyan

The Russian Academy of National Economy and Public Administration
82 Prospect Vernadskogo, Moscow 119571, Russian Federation
e-mail: marem81@mail.ru

Teimuraz Vashakmadze

The Russian Academy of national economy and public administration
82 Prospect Vernadskogo, Moscow 119571, Russian Federation
e-mail: teimuraz.vashakmadze@gmail.com

Anastasia Sergeeva

The Russian Academy of national economy and public administration
82 Prospect Vernadskogo, Moscow 119571, Russian Federation
e-mail: nastasia.sergeeva@gmail.com

Abstract

This article discusses the Stakeholder efficient communication strategies and analysis the possible ways of stakeholder-based management system improvements that led the M&A deals in consolidation and integration targets achieve.

Keywords

M&A deals, stakeholders, consolidation and integration, stakeholders' communication

INTRODUCTION

In the storm of events that usually surrounds M&A transactions, communication plays a critical role, but its role is underestimated or even forgotten. Strategic use of communications is imperative for the success of any transaction. Communications play a significant role during the transaction announcement, in the first 100 days that follow, and in the longer term, when the combined company seeks to complete integration tasks.

M&A deals are more likely to cause losses – the normal rhythm of business is interrupted, employees are distracted, and productivity decreases. Therefore, it is not surprising that these factors can be the reasons for potentially negative economic results in the transaction:

- Productivity. Anxious and distracted employees, confused about today's priorities and tomorrow's directions, spend an excessive amount of time thinking.
- Key talents. Employees quickly lose confidence in their superiors, who fail to communicate the new course quickly and clearly. Often, the best employees leave first because they least want to stop moving up the career ladder because of the feuds of new managers among themselves.
- Market share. Competitors have an excellent opportunity to grow their customer base and attract employees from the reorganized company by exploiting their internal fears, problems, and lack of concern for the critical asset of any business – people.

Very often, companies are not able to establish communication with staff during a difficult transition period. The lack of communication at such moments is also a kind of communication that sends a signal of uncertainty. We live in a time when information and communication opportunities are available instantly - through social media, the Internet, television, and more traditional channels. When communications are not up to standard, the success of the transaction is at risk.

Communication helps to mitigate risks by preventing the appearance of fears and concerns among the staff of both organizations involved in the transaction. This can be achieved by sending consistent and consistent messages to all stakeholders, in particular those who are most involved in the transaction.

Companies that implement an effective communication plan along with the announcement of an M&A deal can significantly improve the customer orientation and the firm's customer focus, employee commitment, productivity, speed of decision-making, and give people confidence in the new business direction of the reorganized company.

Problems faced by customers and actions to resolve them

In order for the integration process to be effective, it is very important to implement the fundamentals of integration as soon as possible in order to minimize disruptions and achieve synergy. Running the plans shown in the diagram is critical to achieving success.

The acquisition, like other large-scale corporate changes, is a great opportunity to set a new course. This requires setting clear goals, establishing leadership, and clarifying roles during the transition period. This will facilitate effective communication between members of the integration team and the adoption of decisive actions.

No two transactions are the same, so you can never say with certainty that there are "right" and "wrong" communication options during periods of great change and transformation. However, some approaches work better than others. These very specific actions, as part of your communication plan, will play a big role in reducing the level of anxiety, apprehension, and confusion among stakeholders.

The possible recommendations:

- Organize a communication group. Gather representatives of the external and internal communications departments to work under common leadership. Together, the team can develop a protocol for planning, developing information messages, distributing them, and evaluating results.
- Determine who exactly your stakeholders are and divide them into groups. Evaluate the problems and concerns of each group of stakeholders and, based on this, evaluate the unique information needs of each participant.
- Prepare a deal announcement. Create a plan to communicate your intentions about the transaction. Develop informational messages and determine the timing, sequence, and method of their distribution. Think through the sequence with which you will issue informational messages
- Announce the deal. Announce your intention to conduct the transaction to the public. Each message should address issues and issues identified in the course of the stakeholders ' analysis. Pay special attention to those stakeholders who are more directly affected by the transaction. Communication with these people can never be superfluous.

The integration team must quickly set priorities in its work, including: replacing employees ' negative emotions about the transaction with the ability to focus on what employees can do best: buy, sell, produce, invest, and pursue the organization's goals. Close and honest communication in this case will facilitate smooth completion of the transaction and lay the foundations for long-term value creation as a result of the transaction.

Effective communication during integration: defining success, achieving results

Setting a course requires a plan that defines practical steps and success criteria. Do criteria should correspond to the given integration strategy, the organization's vision and mission, as well as the values of employees and their behavior.

Table 1: Effective communications during integration

Success Criteria	What to do
<ul style="list-style-type: none"> • The main stakeholders are identified and participate in the transition stage • Success criteria are related to behavioral change and tangible results • The approaches used in communications are consistent with the employer's brand - staff behavior, corporate culture, and values are taken into account • Two-way communication channels are installed 	<ul style="list-style-type: none"> • Identify and analyze internal stakeholders • Develop and coordinate key information messages to support the transaction • Anticipate and answer employee questions • Prepare a communication strategy and plan • Establish the main processes, channels, frequency and timing of communication, and separate roles and responsibilities • Establish quality assurance and risk management procedures

<ul style="list-style-type: none"> • Communications are stable and touch on the substance of issues, regardless of the role and level of employees • Employees understand and support the reasons for making the transaction • Actions to prevent crises and emergencies do not stop 	<ul style="list-style-type: none"> • Prepare and distribute communication materials • Identify change agents (employees who initiate innovation) and create a feedback network through them • Review and coordinate topics available for discussion with the external public
---	---

Planning and conducting Day 1

Even if the best decisions were made at the course Setting stage, many things can go wrong without proper planning and execution. While Day # 1 (the day of the deal announcement) is an important occasion to celebrate, it is also a time to move important transactions smoothly. (for a smooth transition of essential operations). Effective communications during this important transition period will serve as stabilizers.

When planning Day # 1, participants have a choice: they can talk honestly and openly to root out the deal rumors, or they can ignore the rumors and watch for them to turn into fear and confusion. Stakeholder analysis is the first step to taking control of rumors and other false information.

Even the most experienced and competent acquiring companies face the challenge of anticipating the volume and variety of questions coming from stakeholders. Stakeholder analysis is a tool for understanding the unique problems of each group of stakeholders. The task of the communicator is to find answers to questions that arise, thereby reducing the degree of concern of the staff. Below are key steps that will help you understand your stakeholders and their concerns:

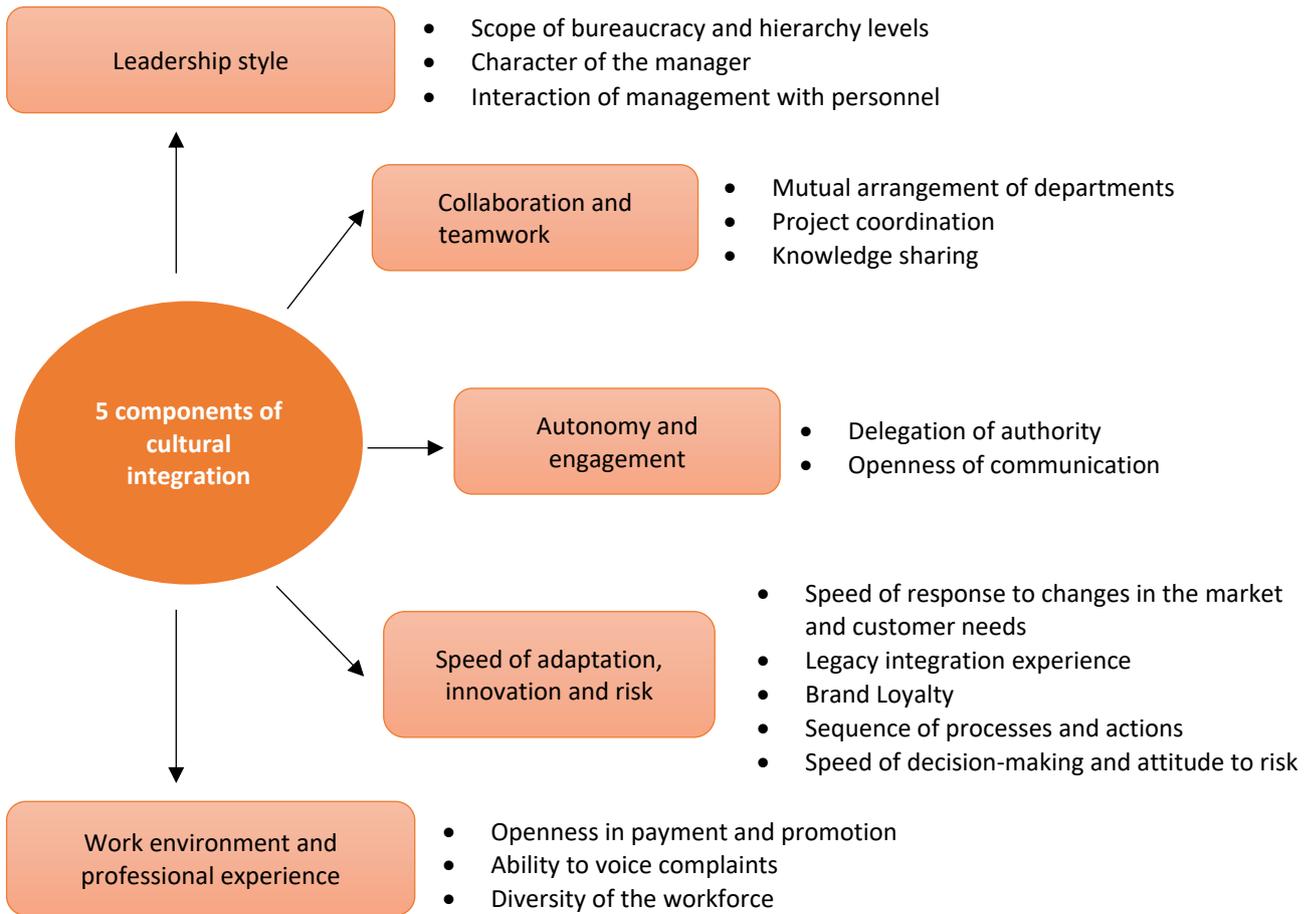
- Listen to your stakeholders. Anticipate their information needs. Conduct interviews and focus groups with key stakeholders and analyze the results.
- Report back on your results and plan your response. Prepare a summary of your stakeholders 'analysis and share the relevant part of the report with individual stakeholders' representatives. This will allow you to confirm or refute the results of the analysis and demonstrate the company's awareness and concern about the issues raised by stakeholders. Feedback reports to stakeholders are a way to quickly establish trust relationships.
- Respond to the information needs of your stakeholders regularly at short intervals. Develop a rhythm for communication that will allow you to provide stakeholders with key information in a timely manner. When you receive a question that you can't answer, admit it and provide a time frame in which the answer to the question will be known.
- Prepare a communication plan for Day # 1 and for the post-trade period. Use the results of the stakeholder analysis to develop a communication strategy and a detailed action plan. Make sure that people are clear about their roles, responsibilities, and expectations from Day 1 onwards.

Change management skills are critical to effectively transforming two organizations into a single viable organization with long-term potential. Transformation will require a disciplined approach to organizational design, where an integration strategy will be useful. The right

people should be assigned to well-defined roles and their behavior should be customized to transform the organization.

Key steps for managing changes in integration include:

- Learn and manage cultural change. You need to quickly understand the two different organizational cultures and the differences between them. Figure 25 shows the five components of cultural integration and the criteria used to analyze each component.
- Culture is evaluated and measured based on the work styles and behaviors of the people most affected by integration. The five components of cultural integration are measured using these criteria to determine which attributes best characterize each of the integrated cultures.
- Design your future organization as soon as possible. Align your organizational design with your integration strategy. Build staff integration and HR integration in accordance with the organizational design.
- Appoint senior management without delay. Appoint executive managers, heads of global functional and operational departments, and managers in key regions. Early appointments to senior management positions will allow for rapid implementation of changes. The change management program will be supported by executive management and implemented from the top down.
- Appoint senior management without delay. Appoint executive managers, heads of global functional and operational departments, and managers in key regions. Early appointments to senior management positions will allow for rapid implementation of changes. The change management program will be supported by executive management and implemented from the top down.
- Actively manage your integration team. It is very important to manage all members of the integration team to achieve timely completion of work, attention to detail, and quick resolution of problematic issues.
- Use incentives to accelerate behavioral changes. Establish appropriate material incentives for senior management, the transition team, and key employees to retain staff and encourage them to engage in desirable behaviors.
- Stick to your current communication plan. Keep stakeholders informed about new processes, decisions made, and current progress.
- Track your progress and results. Ask stakeholders to comment on the progress they see. Change your strategy and actions depending on the feedback from stakeholders.



KEY FINDINGS

It is extremely important to have a strategic approach to communication throughout the entire transaction and integration period—from the announcement of the transaction to the closing of the transaction, during the first 100 days after closing, and beyond - until a significant part of the integration of both companies is achieved. Simply announcing key aspects of the transaction to employees is not enough. Communications should anticipate the problems and questions of key stakeholders and directly address these problems before, during, and after the transaction is closed.

The main challenge for communication managers in M&A transactions is to build and maintain trust between the main stakeholders of both organizations in an ever-changing, sometimes chaotic integration process.

Communication plays an important and powerful role in strengthening the success of a transaction. Being aware of questions, concerns, and concerns that employees may have, and answering them honestly will help build trust.

References

1. United Nations (2005). Stakeholder engagement: a practical guide to the organization of interaction with stakeholders. Issue 2. The United Nations Environment and Stakeholder Research Associates.
2. FTSE4Good ESG Ratings (2001). Thematic Criteria and Scoring Framework. FTSE International Limited (FTSE) and Ethical Investment Research Services Limited (EIRIS).
3. Ground rules for the measurement of the FTSE4Good ESG ratings (2011). FTSE International Limited (FTSE) and Ethical Investment Research Services Limited (EIRIS). Version 1.0.
4. Damodaran, A. (2005). The Value of Synergy. Available at SSRN: <http://ssrn.com/abstract=841486> or <http://dx.doi.org/10.2139/ssrn.841486>.^[1]^[2]^[3]^[4]^[5]^[6]^[7]
5. Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review*, 20, 65-91
6. Freeman, R.E. (1984). *Strategic Management: A stakeholder approach*. Boston, MA: Pitman.
7. Jawahar, I. M., & McLaughlin, G. L. (2001). Toward a descriptive stakeholder theory: An organizational life cycle approach. *Academy of Management Review*, 26, 397- 414.
8. Houston, J., James, C., & Ryngaert, M., (2001). Where Do Merger Gains Come From? Bank Mergers from the Perspective of Insiders and Outsiders. *Journal of Financial Economics*, 60(2/3), 285-331.
9. Martirosyan, E., & Vashakmadze, T. (2013). Introducing Stakeholder Based Frameworks for Post-Merger Integration Success. *Global Business Conference Proceedings*. 169-175.
10. Savage, G. T., Nix, T. W., Whitehead, C. J., & Blair, J. D. (1991). Strategies for assessing and managing stakeholders. *Academy of Management Executive*, 5, 61-75.

Identifying Successful Leaders' Opportunities and Limitations

Emad Nasserian

University of Salzburg
Salzburg, Austria
e-mail: emad.nasserian@stud.sbg.ac.at

Tatjana Seibt

University of Salzburg
Salzburg, Austria
e-mail: tatjana.seibt@fham.de

Abstract

Leadership has an important role in an organization and nowadays all academics research tries to find successful leadership for companies or organizations. Each successful organization works to identify and unify leadership characteristics and requirements to create a healthy working environment that can push employees to be more innovative and creative. Two perspectives have been constructed on developing discourse and systems for educational leadership. Stacey statement introduce theory as 'institutionalized techniques of discipline' and in this paper we explain about this theory and relationship between this theory and successful leadership. In this paper the opportunities for successful leadership will be identified as same as patent analysis and generative topographic mapping can be introduced as good opportunities for managers to guide their organization to successful points and the limitation that a manager in an organization can be suffered will be introduced. Regarding to this point that even experienced, well-known, and reputable leaders undertake irrational behaviors because they are experiencing several limitations that prevent executives from choosing optimal and normal solutions.

Keywords

Successful leadership, opportunities, limitation, and challenge

1. INTRODUCTION

Leadership is a key element in an organization. The soul of leadership should be owned by each leader who has the main task of managing activities in the organization so according to this importance, how to be successful in leadership studies also is mentioned as a key point for the expanding army of people studying or at least claiming to study leadership in one sense or another (Alvesson, 2020; Ministry of Public Works, and Housing, 2018). The most researchers have good motivation to improve the world through the development of knowledge getting published as part of becoming employable, being promoted, and obtaining a job at a highly prestigious university is probably high on the agenda of many academics (Alvesson, 2020).

The role of each leadership is not only on the performance of an organization but also have a major impact on people and culture. All programs that need organizational changes begin from the premises of initial understanding the fact. It affects the people that hold the authority is vital for the company's success (Pănuță & Brezuleanu, 2020). Leader who challenges in the right way invariably elicit complex and conflicting information. That's why the best ones are also able to interpret. They will need to recognize patterns, push through ambiguity, and seek new insights (Schemaker, Krupp & Howland, 2013).

The successful leader work-life narrative is constructed in the complexity of available discourses illustrating that 'truth' is an elusive concept and that it must be found a space in discourse where can be a successful leader. At the level of an organization, leadership development can be started by first making an evaluation plan on all its levels (Pănuță & Brezuleanu, 2020; Coombs, 2016)

Projecting leadership ability in a company has effect on the entire organization, from an individual person to a group and finally to the entire organization. The assessment in much research want to understand how internal personal changes influence on the whole system, make it sensitive to external changes and able to quickly adapt (Pănuță & Brezuleanu, 2020). It requires to be aware of the structural, political, and cultural context for analyses and discussions of educational leadership and it can be introduced as a part of them. Two history backgrounds have been considered on developing discourse and systems for educational leadership (Alfirevic, Pavicic, Koren & Najev Cacija, 2020).

It should be considered that an approach to leadership development based only on the teaching of skills and models reflects the same perspective. Underpinning this approach is an implicit assumption that we can distil all the different issues that a leader is likely to face into a limited number of standard scenarios. The leaders can learn standard approaches to deal with everyday situations. Without doubting that the most researchers have good motivation and a high level of commitment including a genuine concern to improve the world through the development of knowledge getting published as part of becoming employable or being promoted and obtaining a job at a highly reputable university is probably high on the agenda of many academics (Pănuță & Brezuleanu, 2020).

For leadership study, we need to consider the overall cultural context, the spirit of the time, and the market forces behind the demand for a particular type of leadership knowledge in

particular, concepts and recipes that promise good news and simple guidelines for "success" (Pănuță & Brezuleanu, 2020).

In this study is defined three main theories that they are the path goal theory, the contingency theory, the transformational theory, and transactional theory. Bass (1960) has initially research about family factors that have important role for the development of leadership in children. He recommended that leadership potential is the most important effect among the youngest siblings of the family, for children in families of four or five children, and for those children who are in the family that parents provide for them opportunities for decision-making, encouragement, and acceptance. Instead, if indeed leadership behaviors can be relatively stable (Krosnick & Alwin, 1989), so the transformational leadership behaviors that exist during adolescence may have critical implications for later leadership (Karagianni & Montgomery, 2017).

2. STACEY STATEMENT AND SUCCESSFUL LEADERSHIP

There is a suggestion from Stacey (2012) leadership programs teach 'institutionalized techniques of discipline'. In his suggestion is observed that it would be argued that today's leaders are the agents of discipline in society and the process of training large numbers of managers as success leaders is a key activity sustaining the disciplinary society. Leadership and leadership development programs are far more about order and discipline than they are about change and creativity (Lawrence, 2014).

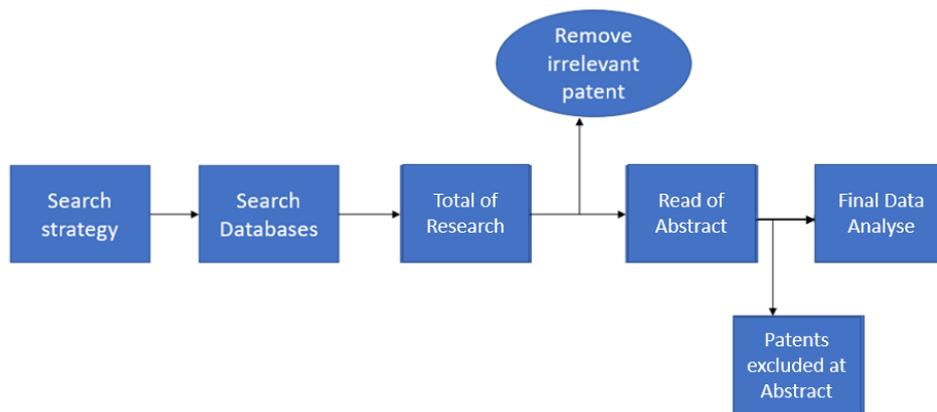
As Stacey statement, there is nothing wrong with regarding leaders as the representative of order and discipline, so these are good paths for a manager that his organization gets in goal and become successful therefore Organizations require order and discipline, and leaders are the obvious candidates to manage and control both. The leaders may be asked for concepts, order, and discipline that they lead to change. It should be considered that the different ways in which middle management are engaged are in change. Sometimes, it appears, their role is restricted to implementing what they have been told to implement without being engaged in the creative process. On the other occasions they have a role to play in the creative process, a step that would appear to greatly enhance the likelihood that the rest of the organization will engage in the kind of dialogue needed to generate coordinated change (Lawrence, 2014).

Two conceptions for success leadership are important, the first one is to administer, maintain and coordinate, and the second one is to create. According to complex change, the skills of administration, maintenance and coordination are unlikely to suffice. We cannot find books or courses that can alone provide the leader with a prescribed set of solutions for each situation that they will be suffer with them. The world is too complex, so it needs to define standard solutions to general problems, and if we do seek to rely upon the judgement of 'experts' we are likely to discover quite frequently that those judgements are wrong. Because models and tools cannot be relied upon the success leader must exercise and, in this case, Stacey define it as 'practical judgement', i.e., judgement acquired through experience and reflection upon that experience (Lawrence, 2014).

3. IDENTIFYING SUCCESSFUL LEADERS' OPPORTUNITIES

Identification of business opportunities is important for technology-based manufacturers and in this case the IRI (Industrial Research Institute) Research group Leadership Skills and Styles sought to explore the questions and identify the important business opportunities that make successful leader. According to recent research, there exists an insufficiency of identifying business opportunities compared to previous studies which have focused mainly on technology opportunities and service opportunities for success of managers (Ministry of Public Works, and Housing, 2018; Feng, Liu & Feng, 2021).

Figure 1: Diagram for technology opportunity



The patent analysis and generative topographic mapping can be introduced as good opportunities for managers to guide their organization to successful points. According to these two parameters can help managers of companies to be stronger, more effective leaders also it should be considered that from application of the proposed approach of these two parameters, an in depth understanding of identifying technology-driven business opportunities for the manufacturing, where we find and how to transform the patent data into business opportunities was documented, as well as its contribution to sustainable business model development (Ministry of Public Works, and Housing, 2018; Feng, Liu & Feng, 2021).

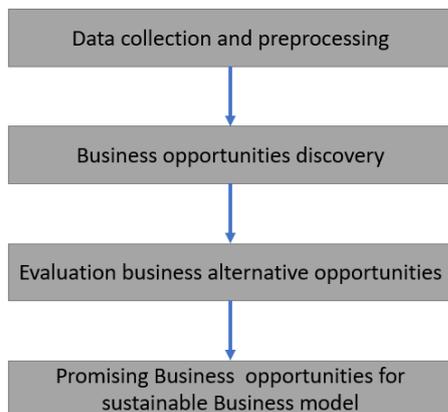
One of the most comprehensive research projects about organizations and their opportunities for successful management was conducted by Pelz and Andrews (1966). In their assessment they analyzed more than 1,300 organization, they identified several features of productive parameters for organization which are included allowance for personal freedom, opportunities for workers to see the results of their work applied, accommodation for diverse work styles and strategies, and venues for vigorous interaction with colleagues (Kay Fountain, 2004; Carpenter, 2021).

Their studying was so interesting, and they can observe that the most effective scientists and engineers worked under conditions that include some creative tensions. Although work modes and tools have changed dramatically in the 50 years since this study was performed, the work provides early identification of the importance of conditions in overall organizational success (Kay Fountain, 2004; Ministry of Public Works, and Housing, 2018; Carpenter, 2021).

These conditions can be considered as a direct function of leadership, suggesting that the policies, practices, and everyday behaviors of leaders should be aimed at establishing an environment in which researchers can be most productive. Additionally, based on Pelz and Andrews', the characterization of the attributes of a favorable working environment allows for the creation of metrics that can measure success for leaders (Carpenter, 2021).

After Pelz and Andrews, Farris (1988) reviewed the state of knowledge regarding leadership, according to his observation, there are three important conceptions for successful leadership opportunities: 1) the traits and behaviors of technical leaders 2) the balance of informal and formal leadership in the organization. He also introduced 3) new organizational climate indirectly, although he does not discuss climate, his argument clearly implies that an organization's climate largely emanates from its leadership (Kay Fountain, 2004; Carpenter, 2021).

Figure 2: process of opportunities for success leadership in an organization



The relationship of these three concepts within the organizational structure is defined by this studying. Defining leadership in terms of its role in enabling and assisting others, Farris discussed that, although leadership can occur at many levels, those in formal management positions have the greatest influence. Farris also concluded that technical skills are very important for leaders. he argued, the technical skill level of the supervisor, is related to the level of freedom afforded a group; supervisors with lower levels of technical skill must recommend more freedom than those with higher skill levels (Carpenter, 2021).

After Farris assessment, next question should be answered about importance of skills at successful leadership, so Cordero, Farris and Di Thomaso (2004) evaluated the balance of technical, people, and administrative skills in managers based on a survey of 2,172 technical professionals. Focusing on first line supervisors, they concluded that all three sets of skills should be deployed effectively, based on the strengths and weaknesses of the group, to create a stimulating and productive work environment. they found, Successful leaders act as captains to provide help and as catalysts by creating conditions in which employees are faced to meaningful objectives, not simply given tasks, and empowered to work with peers to achieve or exceed their goals. These kind of conditions leads to improved performance and expanded skill development in group members. Cordero and colleagues focus the importance

of not assuming a causal relationship the leader's lower skill level does not create the productive and stimulating conditions; rather, they discuss, the right condition makes the leader's technical skills less important (Carpenter, 2021).

On the other hand, Elkins and Keller (2003) presents that a leader's capacity for enforcing structure assigning tasks and defining subordinates' roles is the stronger predictor of team performance in development projects. Looked at the literature broadly, analyzing the effectiveness of various leadership modes, including transformational leadership (Bass 1985; Bass & Bass 2008), leader - member exchange (LMX) theory (Graen & Uhl-Bien 1995), and path-goal theory (House 1996). In general, Elkins and Keller find transformational models in which leaders fill multiple roles within and outside their core work groups to be most effective in management settings. This fits with Keller's (2006) findings from a long-term study of leadership, which demonstrated that a leader's capacity for transformational leadership defined by Keller as "the impression that he or she has high competence and a vision to achieve success," an impression that evokes commitment and dedication from others (p. 202) positively predicts team performance for research project teams (Ministry of Public Works, and Housing, 2018; Carpenter, 2021).

Like Elkins and Keller research, Hage and colleagues (2008) note that research on leadership styles in R&D remains rare, with only a handful of studies providing useful guidance to identify important aspects of effective leadership. As an example of such a study, they cited the work of Hollingsworth (2004), who identifies three essential abilities for successful leaders: 1) long term scientific vision, 2) cognitive mentoring of researchers (valuing and encouraging ideas), 3) emotional mentoring of researchers (valuing and encouraging the person) (Carpenter, 2021).

According to successful leadership, identification of business opportunities is considerable for companies seeking to develop new sustainable business models (SBMs) for future competitive advantages. However, there is not enough identifying business opportunities compared to previous studies so there is a gap and for filling the gap for this study, it proposes a new systematic approach to identify business opportunities for new SBMs based on information relating to the manufacturers' technologies and patents. To illustrate, an example in the mining machinery industry was examined as a case study. Next research is for Dirichlet, and this research was used to generate 26 business topics, which were categorized into the 9 structures blocks of the Business Model Canvas (BMC). At the end, dynamic business modelling was presented which integrated sustainable BMCs and system dynamics to assess and rank these business opportunities. According to this approach consensus building can be promoted between the technology and business planning departments on developing technology driven SBMs in both public and private sectors (Feng, Liu & Feng, 2021).

4. IDENTIFYING SUCCESSFUL LEADERS' LIMITATIONS

Many experts have confirmed that organizations and societies are currently experiencing a lack of effective leadership, which is one reason for the economic, political, and social crises appearing all over the world. Ironically, leaders today have much better access to information

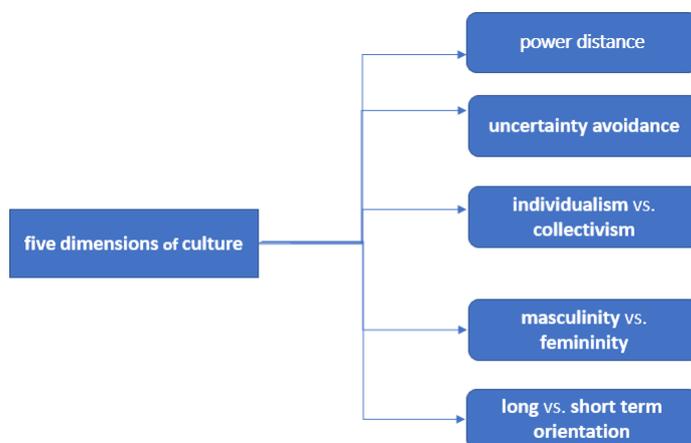
and knowledge than their predecessors did. However, today's executives are also facing the speed of transformation, scale, and complexity in the world around them. They need to lead people of different cultures, regions, ranks and generations in both virtual and real-world environments. Thus, the task of providing leadership is far more unpredictable, complicated, and challenging than ever before. Because of the leadership deficit, many managers, entrepreneurs, politicians, and social activists are willing to lead. As several business schools and training centers offer educational leadership programs, executives often try to develop their leadership skills through these resources. However, the most of them still find many ambiguous answers to their questions about effective leadership. That is why new and more sophisticated education methods are introduced like leadership group coaching (Korzynski, 2014; Pfeffer, 2010).

Political limitations are related not only to a political environment; leaders experience corporate politics and power plays in companies all over the world. Executives need to adjust the power exercised with their internal competitors, which involves negotiating resources and creating coalitions. This usually constrains the room for leadership action (Pfeffer, 2010).

It happens often that a political leader or a CEO of a large corporation needs to promote an employee who is not the best candidate for the position. Even if he coached, mentored, or supported another candidate in the past, the leader is forced to empower a candidate favored by a coalition. This could negatively affect employee motivation, but this is the price of power plays and politics in the organization. Boundary spanning leadership behaviors are useful to overcome political limitations for leadership effectiveness (Korzynski, 2014).

The culture is the most difficult issue to change in an organization. Leaders have a great role in creating the organizational culture. However, when they in still some cultural norms among their subordinates, it is very likely that these norms will be related to leadership limitations in the future. Hofstede (2010) stated that there are national cultural characteristics that influence the behavior of organizations and identified five dimensions of culture.

Figure 3: Five dimensions of culture



For example, if a leader works in an organization that favors individualism and competition, he or she needs to apply his or her goals and desires and thus value independence and self-reliance. Transformational leadership behaviors are useful in overcoming cultural limitations in leadership (Korzynski, 2014; Hofstede, 2010).

Several studies confirmed Simon's hypothesis about human cognitive limits (Galbraith, 1974). Thus, the rationality of human behavior is bounded by information processing capabilities (March 1978). When one takes leaders into consideration, the information collection process also has some constraints, especially in the professional environment of today. A few decades ago, some successful leaders collected information about the organization and their employees while walking the hallways (Mintzberg, 1973; Kotter, 1990; Eccles & Nohria, 1991). Hallways have been replaced by a variety of sophisticated communication methods, such as online networking platforms or mobile systems. It can be concluded that leaders who want to be effective in the communication process must adapt to the new working environment. Moreover, they need to adjust their leadership styles otherwise they will experience huge limitations in access to information (Korzynski, 2013).

The scientific process is defined as iterative in nature and advances in any scientific domain are conditional upon the continuous refinement of theories and the methodology used to check them. For scientific communities, there are clear benefits to achieve some perspective on how research can be conducted in specific domains and to test how scientific knowledge unfolds. Such epistemological pursuits also can be referred to as „state of science“, are progressively common in organizational sciences (Coombs, 2016; Brutus & Duniewicz, 2008). Sandura and Williams (2000) have researched in the human resource management area, and they concluded that this body of knowledge is rich on realism but also lacks in experimental control and, consequently, in internal validity (Brutus & Duniewicz, 2008).

According to above research it can be achieved that current business environment is complex and dynamic, and these features will develop new sizes so the companies because of this developing should be adapted to the new requirements and according to these requirements are necessary to support organizational change. The world in future has changes in technology field and it will be so fast, it is increasing of the computerization degree of all processes and by fusion between companies. Change management can be identified as important limitation for a leadership that they should be considered in their organization, as it is understood as organization wide phenomenon, implies in opinion of some authors, a systematic sequence of many processes, with clearly defined stages. Paul Marinescu proposes in his paper "management of public institutions", the following basic steps to implement change in organizations: One of the biggest challenges for leader in one organization will be training employees and the trainings have good capacity to respond to these changes. The accepting risks and changes will become the most important activity for companies. The adaption to the new requirements will become obviously and clearly a condition of survival in a business environment with multiple variables (Militaru & Zanfir, 2016).

Paul Marinescu proposes in his paper "management of public institutions", the following basic steps to implement change in organizations:

- defining the factors for change

- recognizing the need for change, both at management level and at the level of executive
- making a diagnosis analysis on issues that involving changing
- identifying the methods or how to make change and determining how to implement it
- defeating the resistance to change
- effective implementation of change
- evaluating the results obtained from the process of implementing an organizational change.

Creating a strong connection between these stages is essential for improved communication from the top-down organizational level. Each step shown above is necessary for the desired success after taking decisions that generate major changes in organization, but these steps must be reported to the reality that we find in each organization, at its own culture. When it comes to organizational change and its effects, we should refer to the crucial role of human resources. In this view, an effective change management should be approached through all organizational processes but must be centered on employees. According to this assumption, it can be indicated some coordinates that it is considered important for the managers practice within business organizations: raising staff knowledge about the issue of implementation of organizational change. First, the employees must understand why is required achieve change, regardless of its nature. Top management or the managers from medium level can achieve workshops, sittings for work meetings where will make an analysis of the possible effects that will emerge after making a change. It is very important at this stage to answer any questions of employees (Militaru & Zanfir, 2016).

In organizations with long-term vision, change management should be exactly conducted and reported directly to the company's specific objectives and to the real and concrete situations for company, situations which may influence its activity. According to the dynamism of the business environment, organizational change can be seen as an absolute necessity. The main responsibility of top management is to correctly identify the current internal situation within the organization and determine what changes are needed to ensure long-term success. The coordinates that we have highlighted in this work can have a contribution for the assurance of high performances even in less favorable situations for the organization. An intelligent change management involves determining employees to support change, not because it wants the company management, but because they consider necessary (Militaru & Zanfir, 2016).

5. CONCLUSION AND RESULTS

Each leadership has important role is not only on the performance of an organization but also have a major impact on people and culture. Research in the field of leadership, following parameters should be considered in it. First, the cultural context, second one is the spirit of the time, and third one is the market forces behind the demand for a particular type of leadership knowledge and the last one can be mentioned as concepts and recipes that promise simple guidelines for "success" in an organization. In this paper we analyze the theory Stacey and according to this statement leadership is about being in between to extemporize

and create platforms where possible actions can be discussed and where it is possible to create legitimacy for the need for changes. Models and tools cannot be relied upon the success leader must exercise and, in this case, Stacey define it as “practical judgement”. These two parameters, patent analysis and generative topographic mapping be introduced as good opportunities for managers to guide their organization to successful point.

Nowadays the lack of the effective leadership can be observed also task of providing leadership is far more unpredictable and complicated subject so there are many limitations for success leadership. We introduced political and cultural issues as important limitation for managers.

Unmodernized system is another limitation for business manager. The current business environment is complex and dynamic, and these features will develop new sizes so the companies because of this developing should be adapted to the new requirements and according to these requirements are necessary to support organizational change and these changes due to limitation for managers that they will be suffered with them.

References

1. Alfirevic, N., Pavicic, J., Koren, A., & Najev Cacija, Lj. (2020). Educational Leadership, Improvement and Change Discourse and Systems in Europe.
2. Alvesson, M. (2020). Upbeat leadership: A recipe for or against “successful” leadership studies.
3. Brutus, S., & Duniewicz, K. (2008). The many heels of Achilles: An analysis of self-reported limitations in leadership research.
4. Carpenter, D. (2021). Success Factors in R&D Leadership
5. Coombs, M. (2016). The discursive construction of a successful leader.
6. Feng, J., Liu, Z., & Feng, L. (2021). Identifying opportunities for sustainable business models in manufacturing: Application of patent analysis and generative topographic mapping.
7. Hofstede, G. (2010). Cultures and Organizations: Software for The Mind.
8. Karagianni, D., & Montgomery, A. J. (2017). Developing leadership skills among adolescents and young adults: a review of leadership programmes.
9. Kay Fountain, A. (2004). An investment into successful leadership transitions in the Old Testament.
10. Korzynski, P. (2013). Employee Motivation in New Working Environment. *International Journal of Academic Research*, 5, 184-188.
11. Korzynski, P. (2014). Overcoming Leadership Limitations: A Theoretical Study of Leadership Behaviours and Methods, Management and Business Administration. *Central Europe*, 22(4), 26-38.
12. Lawrence, P. (2014). Leading Change: How Successful Leaders Approach Change Management
13. Militar, C., & Zanfir, A. (2016). Implementation of change in organization of change in organization challenge for the manager of future.
14. Ministry of Public Works, and Housing (2018). Analysis of Leadership Style on Performance (Case Study Employee of Directorate of Infrastructure Investment Development).

15. Pănuță, S., & Brezuleanu, S. (2020). Research on leadership abilities projection Adelina Iacobache (Lungu).
16. Pfeffer, J. (2010). Power play. *Harvard Business Review*, (July/August), 84-90.
17. Schemaker, P. J. H., Krupp, S., & Howland, S. (2013). Strategic Leadership: The Essential Skills. *Harvard Business Review*.

Lending to Women and Lending Risk in Micro-Banks: The Moderating Effects of Patriarchy and Female Leadership

Samuel Anokye Nyarko

University of Montpellier
2300, Avenue des Moulins, 34185 Montpellier Cedex 4, France
e-mail: s.nyarko@montpellier-bs.com

Leif Atle Beisland

University of Agder
Universitetsveien 19. 4604 Kristiansand S, Norway
e-mail: leif.a.beisland@uia.no

Roy Mersland

University of Agder
Universitetsveien 19. 4604 Kristiansand S, Norway
e-mail: roy.mersland@uia.no

Abstract

Good repayment rates are a prerequisite for the prosperity of both microfinance institutions and their clients. The success of microfinance in empowering poor female populations has been facilitated by high repayment rates among women. However, this study shows that microfinance lending risk to female clients is highly context dependent. Higher levels of patriarchy are associated with poorer repayment rates. Nonetheless, the positive association between patriarchy and female lending risk disappears when the CEO or chair of microfinance institutions is a woman.

We believe that the reduced repayment gender advantage of females under increasing levels of patriarchy can be explained by females becoming instruments of men in patriarchal societies; it does not really matter whether the name on a borrowing contract is a male or a female – the male is the *de facto* decision maker in any case. However, female top managers are aware of the challenges female clients face and are able to design microfinance operations in ways that mitigate the negative influence of patriarchy on females' repayment.

The considerable focus on females in microfinance in general can be attributed to women being poorer and more vulnerable than men in many developing countries. Obviously, patriarchy is a severe hindrance for microfinance institutions in their struggle to empower women in many societies. Our findings on female leadership give a direct policy implication; appointment of female leaders is an efficient means to empower females, at least as microfinance clients but probably also in their lives in general.

Keywords

Microfinance, lending risk, patriarchy, female empowerment, management

The Response of High-Growth Enterprises to the Crises Caused by the Covid-19 Pandemic

Iwona Otola

Czestochowa University of Technology
ul. Armii Krajowej 19b, 42-200 Częstochowa, Poland
e-mail: iwona.otola@pcz.pl

Marlena Grabowska

Czestochowa University of Technology
ul. Armii Krajowej 19b, 42-200 Częstochowa, Poland
e-mail: marlena.grabowska@pcz.pl

Abstract

The contingency theory assumes that the effectiveness of the applied methods in management is determined by a specific situation caused by unforeseen events. Enterprises are sensitive to environmental contexts and the effectiveness of their actions results from their resilience or adaptability. This seems to be particularly important in the case of environmental turbulence caused by the COVID-19 pandemic, which was characterized by a high degree of unpredictability and uncertainty in the social, economic and legal spheres. The undertaken topic of research on situational conditions relates to high-growth enterprises (HGEs) that belong to the group of innovative enterprises, in addition, they quickly react to changes on the market and adapt to its requirements.

The main scientific objective of this paper is an assessment of the response of high-growth enterprises to the circumstances caused by the COVID-19 pandemic. Empirical research in relation to HGEs was conducted twice, the first at the beginning of 2019, and the second after the third wave of the pandemic in October 2021. Empirical analyzes were carried out with the use of Generalized Estimating Equations (GEE) on the same research sample of 150 Polish HGEs. Considering the general features of HGEs, it should be stated that there was a decrease in sales revenues and an increase in operating costs, but at the same time there was no reduction of employees. In addition, research shows that:

- the vast majority of the surveyed entities did not change the number of the offered assortment of products and services,
- more than half of the enterprises experienced a reduction in the availability of material resources,
- the possibility of obtaining external financial resources has not changed, but a significant part of HGEs has reduced the possibility of collecting its own funds,
- the relevance of factors in relations with a key supplier has changed.

Keywords

Contingency theory, high-growth companies, Covid-19 pandemic, generalized estimating equations

Determining Factors That Influence Brazilian Consumer Using *Fintechs*

Cristina Helena Pinto de Mello

ESPM

Rua Doutor Alvaro Alvim 123, 04018-010 São Paulo, Brazil

e-mail: chmello@espm.br

Kaue Augusto Fernandes

ESPM

Rua Vinte e oito de setembro 1121, Brazil

e-mail: kaueafd@yahoo.com.br

Abstract

Fintechs emerged and increased the offer of financial products and services to consumers, competing with financial institutions. However, there are still few studies that address the reasons why Brazilian consumers have used financial startups. The objective of this study is to understand what are the determining factors that have influenced consumers to use *fintechs* in Brazil. Based on this premise, the constructs of the UTAUT3 model were used, incorporating variables used in studies carried out in Germany, China and South Korea, namely: Brand Image, Trust, Data Security and Government. A questionnaire was developed and disseminated through ads on *Google* and *Facebook* to users who searched for the term *fintech*. There were 506 valid responses. Data were analyzed with the partial least squares structural equation model (PLS-SEM) to test the hypotheses. The results showed that, of the twelve variables of the UTAUT3 model, six of them were supported. Among the studies carried out outside the country, only the Brand Image and Data Security variables were supported. In this way, this study contributes to the literature on the factors that influence Brazilian consumers to use *fintechs*, providing a more comprehensive and current view of users' interests and also with the market that will be able to understand how to win and/or keep customers.

Keywords

Consumer behavior, *fintech*, use influence, UTAUT3

1. INTRODUCTION

With the increasing use of *smartphones*, companies, in general, have created mobile applications (*apps*) for customers, digitizing them, that is, processes that previously needed people and physical spaces to be carried out, can be made by the consumer himself in the mobile *app*. In the case of financial institutions, this evolution in platforms is no different.

Customer digitization has been advantageous in the financial services industry. One of the main reasons for this is that financial products are almost exclusively based on customer information (Puschmann, 2017). For example, in order to take out a personal loan, the financial institution needs to have access to the data of the interested party, no physical component is needed and the credit will be transferred to the consumer's account.

Information Technology and its components, such as Big Data, cloud sharing, have allowed financial services companies to automate existing processes and create new products, services, processes and business models (Puschmann, 2017). *Fintechs* have taken advantage of this business opportunity, as they use technology as one of the main factors for creating differentiated products and services for customers. Differentiation in products and services occurs, as large banks are able to offer various financial products, consequently compromising the operational agility of processes. Meanwhile, *fintechs* make a smaller number of products available to consumers, sometimes just one, offering attributes that large institutions may not be able to offer. At the same time, several *fintech* sectors are not regulated like the big banks, which can generate consumer distrust in contracting new products and services. In addition, their services may not have arrived or are not available in all regions of Brazil, making the consumer not even aware of the existence of these companies.

According to the *Banco Central do Brasil (BCB)*, one of the main financial regulatory bodies in the country, *fintechs* are companies that introduce innovations in financial markets through the intensive use of technology, with the potential to create new business models. They operate through online platforms and offer innovative digital services related to the sector.

In 2016, the *BCB* published the Financial Stability Report demonstrating interest in financial market innovations and emphasizing that such innovations would be beneficial to the national development of the banking system (Barros et al., 2019). Despite this, in the report that the *BCB* issued in 2020 showed that the five largest banking conglomerates in the country (*Itaú, Bradesco, Banco do Brasil, Caixa Econômica Federal* and *Santander*) ended the year with 81,8% of the credit market and with 79,1% of total deposits.

Despite the high concentration of large financial institutions, there is a portion of the Brazilian population that has used *fintechs*, thus, to assist in the construction of this research, the model developed by Farooq et al. (2017), *Extending the Extended Unified Theory of Acceptance and Use of Technology (UTAUT3)*, associated with four constructs that emerged in research carried out in Germany (Stewart & Jürjens, 2018), China (Hu et al., 2019) and South Korea (Ryu, 2018), they are: Brand Image, Trust, Data Security and Government.

During the bibliographic research, the Brand Identity construct emerged, this construct was added to the study as a possible research gap to test whether this was a factor that influenced Brazilian consumers to use *fintechs*.

This research is organized into six sections, according to the proposed logical structure. Section one presents the introduction to the topic. Section two presents the literature review with the main concepts. Section three describes the methodologies used. Section four addresses the results found. Section five contains the research findings, including study limitations. Section six consists of the applied recommendations.

2. LITERATURE REVIEW

2.1. Fintechs

According to Puschmann (2017), the term *fintech* is a combination of the English words “Financial Technology”. Fintechs seek to obtain innovative financial solutions made possible by information technology. According to Leong and Sung (2018) is any innovative idea that improves the processes of financial services, proposing technology solutions according to different business situations, that is, the combination of financial processes, technology management and innovation management. To Nuyens (2019), is the convergence of technology and financial services as a means of providing more ways to interact with customers. The term is often used by *startups* that provide these solutions, although it also includes service providers such as banks and insurance companies (Puschmann, 2017).

In this study, the definition of the *Banco Central do Brasil (BCB)* will be adopted, which names *fintechs* as companies that introduce innovations in financial markets through the intense use of technology, with the potential to create new business models. They operate through online platforms and offer innovative digital services related to the sector.

In the survey carried out in May 2021 by the *consultoria Distrito*¹, it was mapped that Brazil has 1.158 companies in total. The selection criteria consider the removal of startups that are not from Brazil, that have no signs of activity, website, or that have not passed the initial stage of ideation – startups that have one of these characteristics often represent the majority of companies in other countries. databases. One of the ways found to bring more accuracy to the analysis was to launch a special register for startups that wanted to be included in their studies.

Despite the subjectivity of the research criteria, recognized by the company itself, it was not find a more reliable data source that could inform the number of *fintechs* in Brazil. Therefore, it was decided to use the research carried out by the *consultoria Distrito* due to its methodology, which considered that for a company to be considered a *fintech* it should have the following characteristics:

- Have innovation at the heart of the business, whether in the technological base, in the business model or in the value proposition;

¹ Consultoria Distrito is an innovation platform for startups, corporations and investors

- Being active at the time of the study, as measured by *website* status and *social media* activity;
- Perform activities directly related to the financial market;
- Have Brazilian nationality and operate in Brazil at the time of the study.

From the explanation of the term fintech and the contextualization of the Brazilian scenario, models and theories about technology acceptance will be presented.

2.2. Technology Acceptance

In the last decades there has been a constant evolution of technology, understanding the process of adopting new technologies is essential to understand what are the factors that influence consumer behavior and, in this work, understand the behavior of *fintech* consumers.

Among the technology acceptance models, the most cited is the *Technology Acceptance Model* (TAM), developed by Davis (1989). The model focuses on two constructs, *perceived usefulness* (PU) and *perceived ease of use* (PE) and whether these two factors change behavior and influence a person's intention to use new technologies.

Davis (1989) defines perceived usefulness as the degree to which a person believes that using a specific technology would facilitate their job performance. According to the author, people tend to use a technology or not if they believe it will increase the efficiency of their work. Recent studies (Carlin, Olafsson & Pagel, 2017; Chang, Wong, Lee & Jeong, 2016) on technology adoption in the last decade have shown that perceived usefulness can have a positive impact on users' intentions for technology adoption.

Perceived ease of use, on the other hand, refers to the degree to which a person believes that the use of a specific technology would relieve the effort of their work (Davis, 1989). The use of a specific technology can be influenced by the intention to use, and the intention to use that technology is determined by the perceived usefulness and the perceived ease of use (Stewart & Jürjens, 2018).

According to Davis (1989), Riquelme and Rios (2010), and Taylor and Todd (1995), even if potential users believe that a technology is useful, they may, at the same time, believe that the systems are too difficult to use and that the performance benefits of using it are outweighed by the effort of using the application. The author argues that perceived ease of use refers to the degree to which a person believes that using a specific system would be effortless. A technology deemed easier to use than another is more likely to be accepted by users.

The TAM model has had some adaptations over the years, becoming more robust and making it possible to explain more variables. TAM2 (*Theoretical Extension of the Technology Acceptance Model*) emerged, proposed by Venkatesh and Davis (2000), the UTAUT (Unified Theory of Acceptance and Use of Technology) proposed by Venkatesh et al. (2003), the TAM3 developed by Venkatesh and Bala (2008), the UTAUT2 proposed by

Venkatesh; Thong; Xu (2012) and the most recent UTAUT3 developed by Farooq et al.

The UTAUT3 theory was developed by Farooq et al. (2017) to explore and contribute to research gaps in the UTAUT2 proposed by Venkatesh, Thong and Xu (2012). This new theory introduces a variable that had not been considered in UTAUT2: personal innovation focused on information technology (IT).

Farooq et al. (2017) argue that this model is people's perceived predisposition, which reflects their tendency to independently experiment with new advances in technology. In other words, it is the willingness to adopt the latest technological devices or the propensity to take risks, which can be associated with trying new features and advancements in the IT domain.

2.3. Brand Image (IM)

The brand image guarantees users the definition of the company's segment, helps the company and the user to build a solid relationship, consequently, improves consumer satisfaction and their trust with the company (Hu et al., 2019).

A *fintech* needs to involve *design* techniques to deliver an attractive financial product to the consumer's needs and desires. Cheng, Wu & Leiner (2019) warn that if a company wants to reach a broad audience, it must make its platforms (*websites/mobile applications*) increasingly attractive to its consumers (Leong et al., 2017).

2.4. Trust (T)

To Kim, Mirusmonov and Lee (2010), trust is an important factor that influences consumer behavior in uncertain environments, such as *fintechs*, as they are new companies with little regulation. Elie-Dit-Cosaque and Straub (2008) believe that a fundamental element of trust is that based on the institution, that is, the individual's belief that the platform on which they trade is safe.

Due to the inherent factors of *fintech*, its adoption has certain risks. Hu et al. (2019) report that trust is closely related to brand image and perceived risks. To Zhang, Lee and Huang (2003), trust is related to security, data usability and information integration. Ryu (2018) argues that consumers in the financial sector are more distrustful of adopting *fintechs*, as they trust structuring aspects of large banks. Lee and Shin (2018) adds that *fintechs* need to keep the security and privacy of their customers protected, because if their information is compromised, they can easily file complaints with regulatory agencies and stop using the platforms.

2.5. Data Security (DS)

Consumers are increasingly concerned about the misuse of their personal information when using fintech and the consequences that misuse of their data can cause (Bansal et al., 2010). Schierz, Schilke and Wirtz (2010) argue that the use of fintech is associated with a relatively high potential for loss, highlighting items such as: privacy, personal data and transactions.

Privacy is a concern of many Internet users, making online security measures necessary (Contreras Pinochet et al., 2019). People are concerned about how their personal data is used, because, if used on an untrustworthy platform, their personal information can be used by hackers, resulting in financial loss or even fraud (Lee, 2009).

2.6. Government (G)

According to Videira (2020), government agencies have supported the emergence of new *fintechs*, which have conquered the national financial market with their low-cost and practical proposals.

Brazilian credit fintechs began to act with regulation after the creation of the Lei 12.865 of October 9, 2013, which required the *Banco Central do Brasil (BCB)*, through the *Conselho Monetário Nacional (CMN)* to regulate the sector. Thus, companies that wish to operate with credit must request authorization from the *BCB*, these *fintechs* have been regulated since April 26, 2018, through Resolutions 4.656 and 4.657. Until the time of the research, this was the only regulated sector.

2.7. Brand Identity (ID)

According to Maffezzoli, Prado (2013), the brand identity is the congruence between the personal image and the brand image, that is, the consumed brand becomes a significant symbol in the consumer's life, therefore, the consumer's image ends up confused with the brand image. Thus, consumers [re]construct their identity (*self*), based on consumer experiences with brands and vice versa (Benício De Mello et al., 2008).

Table 1: Methodological mooring matrix

References	Variable	Hypothesis number	Hypothesis
Farooq et al. (2017)	Performance Expectation (PE)	H1	The performance expectation positively affects the intention to use <i>fintechs</i> .
	Effort Expectancy (EE)	H2	Effort expectancy positively affects intention to use <i>fintechs</i> .
	Social Influence (SI)	H3	Social influence positively affects the intention to use <i>fintechs</i> .
	Facilitating conditions (FC)	H4a H4b	Enabling conditions positively affect the intention to use <i>fintechs</i> . Enabling conditions positively affect the use of <i>fintechs</i> .
	Hedonic Motivation (HM)	H5	Hedonic motivation positively affects the intention to use <i>fintechs</i> .
	Price (P)	H6	Price positively affects intent to use <i>fintechs</i> .
	Habit (H)	H7a H7b	Habit positively affects intention to use <i>fintechs</i> . The habit positively affects the use of <i>fintechs</i> .
	Personal Innovation (PI)	H8a H8b	Personal innovation positively affects the intention to use <i>fintechs</i> . Personal innovation positively affects the use of <i>fintechs</i> .
	Intent of Use (IU)	H9	Intent to use positively affects the use of <i>fintechs</i> .
Stewart & Jürjens (2018); Hu et al. (2019)	Brand Image (IM)	H10	Brand image positively affects intention to use <i>fintechs</i> .
Ryu (2018); Stewart & Jürjens (2018); Contreras Pinochet et al. (2019); Hu et al. (2019)	Trust (T)	H11	Trust positively affects intention to use <i>fintechs</i> .
	Data Security (DS)	H12	Data security positively affects the intention to use <i>fintechs</i> .
Ryu (2018); Hu et al. (2019)	Government (G)	H13	The government positively affects the intention to use <i>fintechs</i> .
Mello & Fonsêca (2008), Maffezzolli & Prado (2013)	Brand Identity (ID)	H14	Brand identity positively affects the intention to use <i>fintechs</i> .

Source: Own elaboration

3. METODOLOGY

The research methodology used was a survey that questioned 506 consumers of services offered by *fintechs*. It was asked whether the respondent knew the meaning of the term fintech, regardless of the user's positive or negative response, the definition of the *Banco Central do Brasil (BCB)* was given, plus Brazilian *fintech* logos. The examples used were *Nubank*, *PicPay*, *GuiaBolso*, *Geru*, *Neon*, *Contabilizei*, *Toro Investimentos*, *Trigg* and *Creditas*.

The first part was to carry out an investigation and survey of bibliographic references that allowed the construction of a model and a questionnaire to be applied with *fintech* consumers. The second part was to carry out a survey and apply questionnaires with consumers who are *fintech* customers.

The construction of the questionnaire and its scales are based on the studies that served as the basis for this work. They are: The construction of the questionnaire and its scales are based on the studies that served as the basis for this work. Are they:

- UTAUT3;
- Brand Image;
- Trust;
- Data Security;
- Government;
- Brand Identity.

The motivation for using the UTAUT3 theory was due to its ability to clarify the changes between intentional behavior and real behavior (King & He, 2006), consequently, to evaluate the determining factors that influence the consumer to use *fintechs*.

As the researches that served as a base are in a foreign language, the articles are all in English, the scale translated by the author of this research was not located. So, the hypotheses and the scale had to be translated and adapted so that the essence of the question was not lost. A pre-test was carried out to examine the reliability and validity of the instruments with 43 people, to measure whether what was being questioned made sense to the Brazilian consumer. After the pre-test, the questions were readapted, and a new pre-test was carried out with 182 people. This questionnaire was again adapted for the completion of the final questionnaire.

The scale was composed of thirteen latent variables, including the eight variables of the UTAUT3 model, as factors of external influence, and each variable was composed of three to nine observable variables. In total, 55 questions were asked.

The Confidence hypothesis (C) underwent some adjustments, initially, only the scale of Hu et al. (2019), as it had the best results compared to other studies (Contreras Pinochet et al., 2019; Ryu, 2018; Stewart & Jürjens, 2018), which also analyzed the variable Confidence, however, the scale contained only two questions. Thus, the scale of Contreras Pinochet et al. (2019), as it was the study that presented the best results compared to those of Ryu (2018); Stewart and Jürjens (2018), joining the scales of the two studies.

The item for each measurement variable was expressed on a seven-point Likert scale. The options were “strongly disagree”, “disagree”, “neither agree nor disagree”, “agree”, “strongly agree”.

The pre-test served to filter the respondent's eligibility, with the question “Do you use any *fintech*?”. The answer options for this question were: “Never used it”, “I use it sometimes”, “I use it almost daily”, “I use it daily”. Two pre-tests were performed. The first survey was

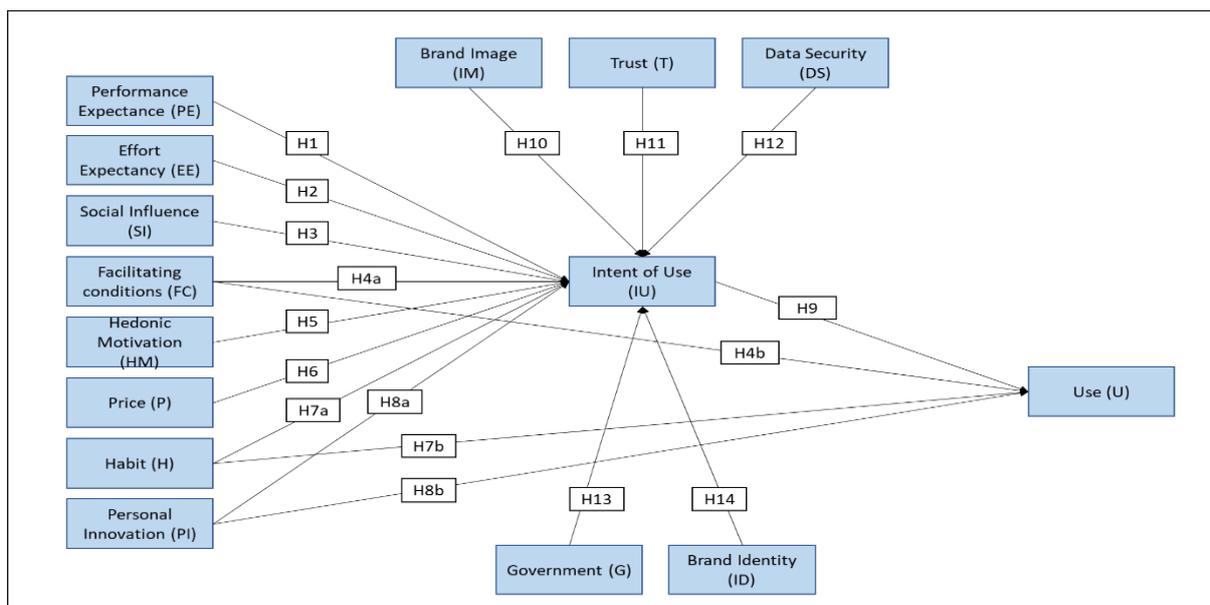
disregarded for the purpose of this work, as people responded to the entire survey, even without having ever used a *fintech*. Four people gave feedback that they had never used *fintech* services or products, but the structure of the interview required answering the full survey, even without knowing how this financial *startup* worked. This step was considered ineffective, as it evaluated the opinion of consumers and non-consumers of *fintechs*. Thus, for the second pre-test, the respondent who selected the option “Never used” was forwarded to the socioeconomic questions and, consequently, was not able to respond to the survey. The question that filtered the respondent's eligibility was kept in the final questionnaire.

After the second pre-test, a question was incorporated to identify which services or products were used by consumers. In some response options, examples were given to facilitate what the term meant for the interviewee. The questionnaire was distributed between August 12 and 23, 2021 through ads on *Google* and *Facebook*. It obtained 1710 responses, however, about 70% of respondents had never used *fintech* services and products, making them ineligible to respond to the survey. The study obtained 506 valid responses.

The analysis of statistical data was performed using the *partial least squares structural equation modeling* (PLS-SEM) approach due to its suitability for exploratory research (Hu et al., 2019; Ryu, 2018). The *software* used in this research was SmartPLS version 3.0, using the *bootstrapping* feature.

Figure 1 represents the model used to predict the determining factors that could influence the use of *fintechs* in Brazil, based on the UTAUT3 model and the constructs in the articles by Hu et al. (2019), Ryu (2018), Stewart; Jürjens (2018), in addition to the Brand Identity (ID) construct.

Figure 1: Proposed research model



4. ANALYSIS OF RESULTS

The distribution of the answer, in terms of gender, the female sex had a vast majority, with more than 70% of the respondents, no interviewee selected the gender “Other”. In terms of age and income distribution, the sample had a significantly higher proportion of users in the 18-25 age group (53.4%). Overall, 74,5% of respondents had an income of up to R\$2.200,00. About 66,2% of respondents did not know the term *fintech*, but after explaining the term with the logos of Brazilian *fintechs*, they realized that they were users of these *startups*. The frequency of use of consumers who responded that they use *fintechs* “Sometimes” is 44,9%, who use “Almost daily”, 27,3% and “Daily”, 27,9%. There was almost a tie in the “Almost daily” and “Daily” options (138 and 141 respondents, respectively). Responses were obtained from at least one representative from each Brazilian state, with the exception of *Amapá (AP)*, which had no respondents in the survey. The predominance of respondents is from *São Paulo (SP)* and *Minas Gerais (MG)* with 20,4% and 15,4%, respectively.

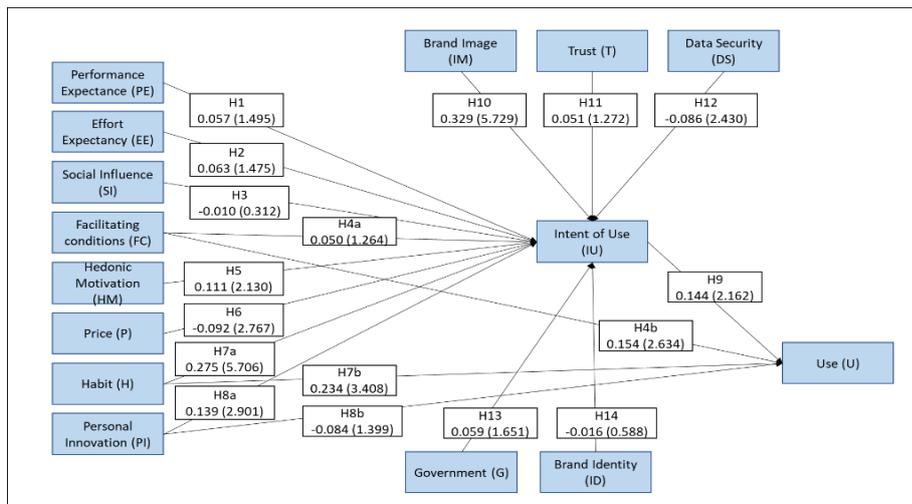
Table 1: Measures of reliability and validity

Variable	α	CC	AVE
Performance Expectation (PE)	0,82	0,89	0,73
Effort Expectation (EE)	0,87	0,91	0,73
Social Influence (SI)	0,84	0,91	0,76
Facilitating Conditions (FC)	0,79	0,86	0,61
Hedonic Motivation (HM)	0,81	0,89	0,72
Price (P)	0,84	0,90	0,76
Habit (H)	0,84	0,90	0,76
Personal Innovation (PI)	0,78	0,87	0,69
Intent of Use (IU)	0,91	0,94	0,84
Brand Image (IM)	0,73	0,84	0,64
Trust (T)	0,94	0,95	0,69
Data Security (DS)	0,91	0,94	0,85
Government (G)	0,90	0,92	0,75
Brand Identity (ID)	0,92	0,94	0,68
Usage	1,00	1,00	1,00

α : Cronbach's alpha; CC: Composite reliability; AVE: Average variance extracted
Source: Prepared by the author.

After the validity and reliability analysis, an empirical study was carried out with the variables, in order to verify if they were factors that influenced the Brazilian consumer to use *fintechs*. Based on the data analysis, the sample data and the structural equation model were used to test the hypothesis. The standardized path coefficient (β) and the t-value were obtained by *SmartPLS 3.0*, using the *SEM* model to test the proposed hypotheses. According to Hair et al. (2019), in general, if $t > 1,96$, the coefficient test is significant at the confidence level $p < 0,05$. If $t > 2,58$, the coefficient test is significant at the confidence level $p < 0,01$. If $t > 3,1$, the coefficient test is significant at the confidence level $p < 0,001$. The results of the hypothesis test are shown in Figure 2.

Figure 2: Results of the proposed model



Thus, the UTAUT3 model supported the constructs *MH*, *P*, *H* and *IP* with the *IU* hypotheses. In the Usage hypotheses, *CF*, *H* and *IU* variables were supported. From the other studies, the variables *IM* and *SD* were supported. The *ID* variable did not affect the intention to use *fintechs* by Brazilian consumers.

It was decided to test the model with the nine hypotheses that were supported to test the feasibility of the model. All variables had a t-value greater than 1,96 (Hair et al. 2019), with the exception of the *IU* construct ($\beta = 0,109$; $t = 1,671$; $p = 0,095$), which was rejected.

With the *UI* variable being rejected, another test was performed, removing this construct, considering, once again, the constructs that were supported. The results are described in Table 2.

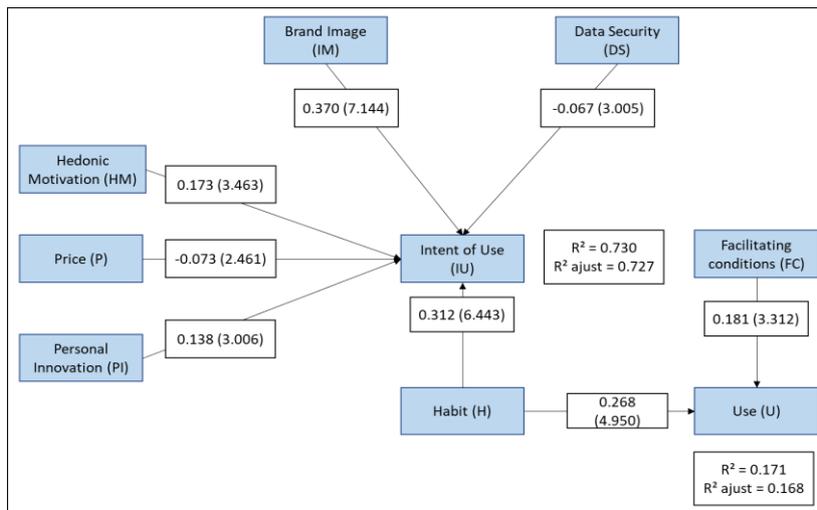
Table 2: New model feasibility analysis

Variable	β	Value-t	Value-p	Analysis
Facilitating Conditions (FC)	0,181	3,312	0,001	Supported
Motivação Hedônica (MH)	0,173	3,463	0,001	Supported
Price (P)	-0,073	2,461	0,014	Supported
Habit (H)	0,312	6,443	0,000	Supported
	0,268	4,950	0,000	Supported
Personal Innovation (PI)	0,138	3,006	0,003	Supported
Brand Image (IM)	0,370	7,144	0,000	Supported
Data Security (SD)	-0,067	3,005	0,003	Supported

Source: Prepared by the author

The R^2 and the adjusted R^2 of the Intention to Use (UI) hypothesis were 0,730 and 0,727, respectively, suggesting that the variables are able to explain 72,7% of UI. The R^2 and the adjusted R^2 of the Use hypothesis were 0,171 and 0,168, respectively, proposing that the variables have an explanatory power of 16,8% of the model.

Figure 3: New model proposal



The Facilitating Conditions (FC) variable, in UTAUT theory, was described as the degree to which the individual believes that there is an organizational and technical infrastructure to support the use of new technologies (Venkatesh et al. 2003). From the UTAUT2 model, the variable started to simultaneously evaluate the hypotheses Intention to Use and Use. In the first hypothesis, the variable was not supported in the model, not having representation in the sample in relation to the intention to use *fintechs*, but it proved to be a factor that influences the behavior of consumer use.

The Hedonic Motivation (HM) construct was defined by Venkatesh, Thong and Xu (2012) as the fun or pleasure derived from the use of a technology. This variable showed relevance to the researched public, which allows us to infer that Brazilian financial *startups* have pleased their audience and using them has become pleasant for them.

The results showed that Price is a relevant factor for the public interviewed and that the costs and price charged by *fintechs* influence the intention to use these companies, as they are seeing benefits in what is being offered. As mentioned by Venkatesh; Thong; Xu (2012), this factor can impact the use of new technologies by consumers when the benefits of use are perceived as greater than the monetary cost.

The Habit construct (H) was already following the Intention of Use and Use paths. In this research, this factor proved to be important for the consumer in both hypotheses, and it can be inferred that the use of *fintechs* has become a habit for the sample surveyed, that is, it already uses these financial *startups* automatically, and there may not be more need for triggers that drive use.

The Personal Innovation (PI) variable, in the Intention to Use hypothesis, had a significant influence and proved to be a determining factor for the research consumer, however, in the Use hypothesis, it was not fundamental. It can be inferred that people are willing to take new risks with the products and services offered by *fintechs*, but even so, they are cautious with the new technological resources offered, and may not be the first consumers to use the resources available.

The Brand Image (IM) variable is a way of guaranteeing users the definition of the company's segment, that is, how the company is positioned (HU et al. 2019). In view of the results presented, the study sample is satisfied with the positioning and reputation of the *fintechs* used and the way they offer their products and services.

Although there is a relationship between Data Security and Trust, the latter did not have significant impacts on respondents. Inferring reasons why Data Security has been decisive is that consumers trust *fintechs*' data systems, not believing that personal data or money will be stolen. According to Contreras Pinochet et al. (2019), as consumers perceive that the security of their data is maintained, there is a decrease in the sense of barriers to engagement in general.

5. RESEARCH CONCLUSIONS AND LIMITATIONS

From the quantitative research carried out with fintech consumers, it was possible to understand which are the specific factors that influence and that do not influence consumer decision-making for using *fintechs*.

Based on the evaluated constructs, it is assumed that consumers are increasingly thirsty for platforms that offer greater convenience and better rates, when they purchase new products. The results of this study showed that the use of these companies has already become a habit for the consumer. Therefore, if a company does not offer a good service combined with a good product, the consumer will probably change the financial *startup* used, as they have the necessary tools and knowledge to do so.

In addition, consumers showed a propensity to try out new features that companies may offer, generating an alert to all players, that is, large financial institutions and existing *fintechs*. If they do not reinvent themselves and adapt to the factors that consumers are valuing, they may lose market share, compromising their long-term survival (Contreras Pinochet et al. 2019). Thus, all *players* must pay attention and value the factors that consumers claim as determinants and offer products and services according to demand.

Some hypotheses of the Facilitating Conditions and Personal Innovation constructs were refuted, however, as one of the hypotheses ended up being accepted, it was considered, for the purposes of the conclusion of the study, that they are factors that influence consumer behavior when using *fintechs*. On the other hand, other constructs of the UTAUT3 model were refuted, namely, Performance Expectation (PE), Effort Expectation (EE), Social Influence (SI), Intention to Use (IU). Of the other studies, Trust (T) and Government (G). The construct that would be the research gap was also rejected, Brand Identity (ID).

Despite the Brazilian consumer being used to and even enjoying using the platforms offered by financial *startups*, the resources offered by them have not yet generated the feeling of financial facilitation. This feeling may arise, if there are changes in the public studied, a public with a higher income or an older age, given that the public of this research had a

high concentration of people who receive up to two minimum wages and aged between 18 and 25 years.

Consumers also stopped valuing the Intention to Use when the proposed model uses only the supported constructs, demonstrating that consumer behavior changes when all the previous variables are not considered, that is, even if they were refuted, they supported the IU, but, after withdrawals, the IU is no longer relevant.

The variables Trust and Government were also not decisive for the Brazilian consumer, indicating that government regulations have not hindered the use of these companies, indicating that, on the contrary, the programs that the Central Bank of Brazil has promoted are leveraging the creation of new financial companies, making them reliable for the population.

Despite research indicating that Brand Identity (ID) would be a determining factor for the consumer to use a *fintech*, it ended up not having significant effects, that is, this characteristic has not yet overcome the barrier between what is the consumer's image and what is the brand image. Again, it is possible that this was due to the public studied, which may not identify with brands that represent their financial life.

In addition to the aforementioned public limitations, future studies could be carried out with a statistically significant public, thus highlighting the determining factors that make the Brazilian public use *fintechs*. Due to limitations of time and financial resources, it was not possible to carry out this research in this work. Given the relevance of the subject, there is an opening of analysis with this public and even with the entire Latin American public. As there are several *fintechs* emerging in the region, studying their consumer in the academic sphere becomes necessary.

References

1. Banco Central Do Brasil, Fintech ecosystem. Available at: https://www.bcb.gov.br/en/financialstability/fintechs_en. Accessed on: July 15, 2020.
2. Bansal, S. K., Bansal, A., & Blake, M. B. (2010, December). Trust-based dynamic web service composition using social network analysis. In *2010 IEEE International Workshop on: Business Applications of Social Network Analysis (BASNA)* (pp. 1-8). IEEE.
3. Barros, G., Coelho, I., & Palomares, V. (2019). O impacto das fintechs no setor bancário nacional. *Iniciação-Revista de Iniciação Científica, Tecnológica e Artística., São Paulo, 7(3)*, 82-111.
4. BRASIL. *Lei nº 12.865, de 09 de outubro de 2013*. Provides for payment arrangements and payment institutions that are part of the Brazilian Payment System (SPB). Available at: http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2013/Lei/L12865.htm. Accessed on July 16, 2020.
5. Carlin, B., Olafsson, A., & Pagel, M. (2017). *Fintech adoption across generations: Financial fitness in the information age* (No. w23798). National Bureau of Economic Research.
6. Chang, Y., Wong, S. F., Lee, H., & Jeong, S. P. (2016, August). What motivates Chinese consumers to adopt FinTech services: A regulatory focus theory. In *Proceedings of the 18th*

- annual international conference on electronic commerce: e-commerce in smart connected world* (pp. 1-3).
7. Cheng, F. F., Wu, C. S., & Leiner, B. (2019). The influence of user interface design on consumer perceptions: A cross-cultural comparison. *Computers in Human Behavior, 101*, 394-401.
 8. Contreras Pinochet, L. H., Diogo, G. T., Lopes, E. L., Herrero, E., & Bueno, R. L. P. (2019). Propensity of contracting loans services from FinTech's in Brazil. *International Journal of Bank Marketing*.
 9. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
 10. Farooq, M. S., Salam, M., Jaafar, N., Fayolle, A., Ayupp, K., Radovic-Markovic, M., & Sajid, A. (2017). Acceptance and use of lecture capture system (LCS) in executive business studies: Extending UTAUT2. *Interactive Technology and Smart Education*.
 11. Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review, 31(1)*, 2-24.
 12. Hu, Z., Ding, S., Li, S., Chen, L., & Yang, S. (2019). Adoption intention of fintech services for bank users: An empirical examination with an extended technology acceptance model. *Symmetry, 11(3)*, 340.
 13. Kim, C., Mirusmonov, M., & Lee, I. (2010). An empirical examination of factors influencing the intention to use mobile payment. *Computers in human behavior, 26(3)*, 310-322.
 14. King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & management, 43(6)*, 740-755.
 15. Lee, I., & Shin, Y. J. (2018). Fintech: Ecosystem, business models, investment decisions, and challenges. *Business horizons, 61(1)*, 35-46.
 16. Lee, M. C. (2009). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic commerce research and applications, 8(3)*, 130-141.
 17. Leong, C., Tan, B., Xiao, X., Tan, F. T. C., & Sun, Y. (2017). Nurturing a FinTech ecosystem: The case of a youth microloan startup in China. *International Journal of Information Management, 37(2)*, 92-97.
 18. Leong, K., & Sung, A. (2018). FinTech (Financial Technology): what is it and how to use technologies to create business value in fintech way?. *International Journal of Innovation, Management and Technology, 9(2)*, 74-78.
 19. Maffezzolli, E. C. F., & Prado, P. H. M. (2013). Identificação com a marca: Proposição de um instrumento de medida. *REAd. Revista Eletrônica de Administração (Porto Alegre), 19*, 588-619.
 20. Mello, S. C., & Fonsêca, F. R. B. (2008). Revisitando a identidade do relacionamento marca-consumidor: repensando as estruturas nessas relações comerciais. *Cadernos EBAPE. BR, 6*, 01-19.
 21. Nuyens, H. (2019). How disruptive are FinTech and digital for banks and regulators?. *Journal of risk management in financial institutions, 12(3)*, 217-222.
 22. Puschmann, T. (2017). Fintech. *Business & Information Systems Engineering, 59(1)*, 69-76.
 23. Riquelme, H. E., & Rios, R. E. (2010). The moderating effect of gender in the adoption of mobile banking. *International Journal of bank marketing, 28(5)*, 328-341.
 24. Ryu, H. S. (2018). What makes users willing or hesitant to use Fintech?: the moderating effect of user type. *Industrial Management & Data Systems*.
 25. Schierz, P. G., Schilke, O., & Wirtz, B. W. (2010). Understanding consumer acceptance of

- mobile payment services: An empirical analysis. *Electronic commerce research and applications*, 9(3), 209-216.
26. Stewart, H., & Jürjens, J. (2018). Data security and consumer trust in FinTech innovation in Germany. *Information & Computer Security*.
 27. Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information systems research*, 6(2), 144-176.
 28. Vance, A., Elie-Dit-Cosaque, C., & Straub, D. W. (2008). Examining trust in information technology artifacts: the effects of system quality and culture. *Journal of management information systems*, 24(4), 73-100.
 29. Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science*, 46(2), 186-204.
 30. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.
 31. Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision sciences*, 39(2), 273-315.
 32. Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, 157-178.
 33. Videira, S. L. (2020). Fintechs: Novos Atores Das Finanças Contemporâneas - Um Olhar Geográfico. *Revista Entre-Lugar*, 11(21), 261-284.
 34. Zhang, Y., Lee, W., & Huang, Y. A. (2003). Intrusion detection techniques for mobile wireless networks. *Wireless Networks*, 9(5), 545-556.

Digital Vs. Traditional: Selected Views on Creating an Optimal Marketing Communication Mix

František Pollák

University of Economics in Bratislava
Dolnozemska cesta 1, 852 35 Bratislava, Slovakia
e-mail: frank.pollak@acuityeng.com

Peter Markovič

University of Economics in Bratislava
Dolnozemska cesta 1, 852 35 Bratislava, Slovakia
e-mail: peter.markovic@euba.sk

Róbert Világi

University of Economics in Bratislava
Dolnozemska cesta 1, 852 35 Bratislava, Slovakia
e-mail: robert.vilagi@euba.sk

Abstract

The search for efficiency in a turbulently changing market environment is one of the main challenges of business. However, the issue of efficiency has several dimensions. In our study, we focus on investigating the dimension of effectiveness from the point of view of spending resources on promotion. The aim of the study is to examine the elementary starting points of the issue of marketing communication from the point of view of the transition from traditional to digital media.

Based on reference studies that indicate that already in 2023, average customers will spend approximately twice as much time in the digital environment as they spend in the environment of traditional media, we come to the question of effective creation of the communication mix. As part of the analysis, we rely on our own empirical research, in which we identified the media preferences of Central Europeans on a sample of more than 5,000 respondents. The results indicate that different age groups approach traditional and digital media differently.

The optimal approach to choosing an effective communication mix should be based on perfect knowledge of the target market. While clusters of customers grouped on the basis of age create one of the elementary segmentation parameters. It is on the basis of this segmentation criterion that we found that customers aged 55+ are more inclined towards traditional media, but this does not mean that age-based targeting cannot effectively reach them in the online environment. On the other hand, based on the research results, it can be concluded that targeting customers younger than 34 through television is on the edge of its effectiveness. The combination of communication channels is therefore more than appropriate. By identifying relatively interesting clusters, the study creates a prerequisite for a better understanding of the media market from the point of view of the target customer.

Overall, it can be stated that the media market is undergoing a digital transformation, therefore it is necessary to thoroughly examine this transformation. From the point of view of the authors, the presented study is a starting point for the following complex research on the issue.

Keywords

Marketing communication, communication mix, internet, media, customer

Acknowledgement

This research was funded by the Slovak Republic scientific grant agency VEGA, grant number 1/0140/21.

The Impact of the Fourth Industrial Revolution on Planning and Control Processes in Industrial Enterprises in Slovakia

Diana Puhovichova

University of Economics in Bratislava
Dolnozemska cesta 1, 852 35 Bratislava, Slovakia
e-mail: diana.puhovichova@euba.sk

Nadežda Jankelova

University of Economics in Bratislava
Dolnozemska cesta 1, 852 35 Bratislava, Slovakia
e-mail: nadezda.jankelova@euba.sk

Abstract

The introduction of the fourth industrial revolution, known as Industry 4.0, is manifested by a digital transformation based on technological advances. The introduction of the revolutionary concept will achieve the interconnection of machines, systems, processes within the value chain, realized beyond the scope of a single enterprise. Interconnected systems (also called cyber-physical systems) can communicate with each other using standard Internet networks and analyze data in order to configure and adapt to changes. Industry 4.0 enables data to be collected and analyzed across machines, enabling faster, more flexible, and efficient processes to produce higher quality goods at reduced cost. This will in turn increase manufacturing productivity, shift the economy, boost industrial growth, and adjust the profile of the workforce, ultimately transforming the competitiveness of businesses and regions. The aim of the present article is to examine the impact of Industry 4.0 within the planning and control processes in industrial enterprises operating in the Slovak Republic, and also to provide an overview of opportunities and threats, as well as the degree of implementation of key technologies forming the concept of Industry 4.0, which cause changes and emerging trends in the areas under study. Through the research questions we will uncover the current situation in the Slovak industry and confirm the significant impact coming from the Industry 4.0 era from a managerial perspective.

Keywords

Fourth industrial revolution, planning, controlling, industrial enterprises

1. INTRODUCTION

The Fourth Industrial Revolution is an actual topic that is attracting attention not only from industry but also from researchers in academia. While academic research oriented towards Industry 4.0 is growing exponentially, there is still a lack of evidence of the need to apply the researched revolution in practice. Even the emerging challenges faced by the industry in the application of the aforementioned Industry 4.0 concept seem to be neglected (Bajic et al., 2021).

Industry 4.0 includes highly customized products and other value-added services (Schumacher, Erol & Sihn, 2016). Hence, the strategic actions of businesses require innovation to be part of their processes. However, dynamic business environments require appropriate management practices that are important in their development (Shamim et al., 2016). It is Industry 4.0 that has significant potential to create the need for a paradigm shift in management based on technological and innovation changes leading to digital transformation (Maskuriy et al., 2019).

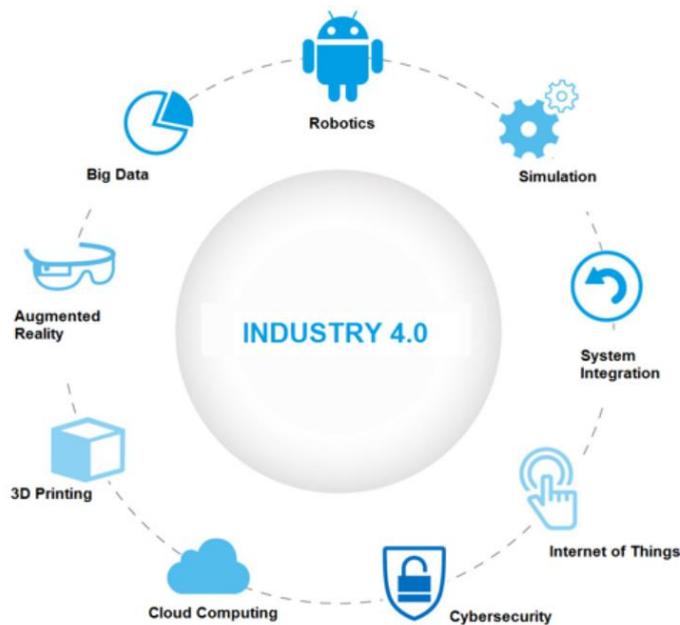
We consider it important to examine the pressure of Industry 4.0 on the management processes of enterprises. Considering the scope of the present study, we will focus our attention more significantly on the impact of Industry 4.0 on business processes in the conditions of Slovak industry in order to fill the research gap exploring the impact of the current era on the field of planning and control processes from a managerial perspective. In the theoretical part of the paper, we offer a literature review forming the basis of the theoretical knowledge by applying an inductive systematic review of relevant studies that inform about the researched issue. In the next section, we will offer information about the methodology and present the research questions that form the methodological framework of the study. In the research results, we will offer answers to the research questions and evaluate the situation of the Slovak industry in the context of Industry 4.0.

2. THEORETICAL BACKGROUND

2.1. Industry 4.0

Industry 4.0 is related to developments in cyber-physical systems (CPS) that build on the three previous revolutions that were characterized by mechanization, electrification, and information technology (Kerin & Pham, 2019). The ongoing fourth wave of technological progress was born in the form of the German Strategic High-Tech Initiative, which was discussed at the Hannover Fair in 2011 with the aim of changing the perception of the world through the introduction of cutting-edge technologies. Boston Consulting Group (2015) introduced the concept of Industry 4.0, which is made up of nine core pillars that will ensure the value chain is connected beyond the boundaries of a single enterprise. It will also enable the flow, collection, and analysis of information across machines, ensuring more dynamic, flexible, and efficient processes to produce higher quality goods at lower costs. According to the Boston Consulting Group, this is achieved by implementing modern technologies, which are shown in the following figure.

Figure 1: Pillars of Industry 4.0



Source: Lima, F. et al. (2019). Digital Manufacturing Tools in the Simulation of Collaborative Robots: Towards Industry 4.0. *Brazilian Journal of Operations and Production Management*, 16 (2), 261-280.

Industry 4.0 is thus considered to be a significant phenomenon of our time by virtue of its orientation towards emerging changes that affect business processes. On the one hand, we are talking about processes of digitization of the functioning of the entire enterprise, on the other hand, we are talking about processes of robotization. It is therefore an important penetration of modern technologies and new parameters that affect not only enterprises but also society as a whole. We are also talking about important advances in the knowledge of key sciences, such as the field of nanotechnology, biology, material sciences, medical sciences, genetics, and other areas (Staněk & Ivanová, 2016).

This period is characterized by automation, digitalization and robotization, where production technologies, intelligent machines are connected to the network and ensure fast data exchange. It is about creating and building smart factories that are fully automated, operating in a continuously optimized production environment. The intention of Industry 4.0 is symptomatic in the better interaction between intelligent machines as well as between human capital and machines. The concept brings not only new opportunities but also challenges that undoubtedly affect management or business models, but also creates a new demand for modern management concepts, including those related to learning (Rozkwitalska, Slavik, 2017).

Today, industrial enterprises are at different levels of digitalization and are differently open to adopting new digital trends. Some of them are more innovative than others, which depends on the complexity of their structure and flexibility in adopting new trends (Maskuriy et al. 2019), which also represents the key to changing the perception of the concept of Industry 4.0 and promoting the productivity of production, changing the profile of the workforce, increasing economic growth and the competitiveness of individual industries, regions, or even entire countries.

Based on the above, we agree with the study of Shamim et al. (2016) that in order to successfully implement the Industry 4.0 phenomenon, it is essential to apply a set of appropriate management practices that are conducive to learning, improving capability, opening up to innovation, embracing the challenges of smart manufacturing and business operations that are compatible with Industry 4.0 conditions.

2.2. Planning and Controlling

2.2.1. Planning

Planning is the initial function of management, and its proper role is to set out the goals that the organization will pursue and to outline the ways and means to achieve these goals (Majtán, 2016). Henri Fayol adds that this is the most difficult function to achieve, so it is important that the different departments, and team plans are linked and aligned with the organizational goal, and at the same time, in order for the enterprise to be able to effectively plan activities, it is necessary to have sufficient knowledge, knowledge of the objectives and the vision of the enterprise, or flexibility (Belyh, 2019). It is through properly functioning planning that an enterprise can increase the possibility of success with the aim of higher profits in a competitive market, for this reason it is necessary to realize the importance of the aforementioned function of management. In the context of Industry 4.0, it is important to pay attention to system complex planning, cloud-based process planning through CAD, CAM, CAPP software, provision of quality software support for planning processes, advanced planning systems such as APS and also modification of business models capable of responding to the ever-changing business environment. We share the views of individual researchers, and while we are aware that we have not fully identified all the changes in the researched issue, we have included the most relevant one's thorough literature search. We have summarized these areas in the following table, which further characterizes planning from an Industry 4.0 perspective.

Table 1: Managerial function planning in conditions of Industry 4.0

Planning and Industry 4.0	
System comprehensive planning	Smart Manufacturing systems enable the active use of information across the entire vertical chain - from sensors on production equipment, to diverse manufacturing information systems, to ERP systems at the business level, which can be combined with data from partners along the horizontal value chain - such as changes in customer requirements. Integrated production planning leads to improvements in the overall efficiency of production facilities and increases production throughput. The aforementioned PWC research shows that real-time, systemic, end-to-end business planning, including collaboration with partners at a horizontal level, is now feasible using cloud-based platforms. Enterprises that are able to apply and leverage system complexity planning to increase integration between suppliers and key customers across the horizontal value chain significantly improve efficiency and optimize inventory levels. Also, with the help of product tracking systems, there is an increase in warehouse efficiency and a reduction in logistics costs (PWC, 2016).
Cloud-based process planning	Cloud-based process planning defines a framework that enables integration and coordination in the development of "smart products" and the exchange of information between entities that are part of services and applications. Collaborative connections are

	<p>a priority, and along with the development of new products, it is necessary to establish a collaborative process with both customers and suppliers within a common communication infrastructure (Brettel et al., 2014). Cloud-based process planning is supported by CAD, CAM and CAPP software functions (Milošević, 2017a; Milošević 2017b; Milošević, 2019).</p>
<p>Software support for process planning - CAD, CAM, CAPP</p>	<p>CAD (computer-aided design) software is used to manipulate the technical characteristics of products and also provides easy access to product design information. It increases the productivity of both the designer and the process planner and improves communication in this part of the value chain (Denkena, 2007). CAM (computer-aided manufacturing) software enables process simulation, machine control and operation assistance during planning, production, management, transportation, and storage (Miao et al., 2002). The CAPP system is a computer application to assist process planners in the planning function. It is considered as a key technology for the integration of CAD and CAM (Yusof, Kamran, 2014). The CAPP system, which enables the automatic definition of the process plan, is complex, and the implementation, as with most of the pillars of the Industry 4.0 concept, requires a very high investment and a higher level of IT knowledge among users and developers, compared to previous industry requirements. Industry 4.0 requires the implementation of an advanced version of the CAPP system with improved real-time data collection, storage, and processing from different parts of the value chain in order to create an optimal process plan (Trstenjak et al., 2020).</p>
<p>Advanced Planning Systems APS</p>	<p>APS represent any computer program that uses advanced mathematical algorithms or logic to perform optimization or simulation planning and scheduling. At the same time, they consider a range of constraints and business rules to provide real-time planning and scheduling and decision support (Lin et al., 2006). APS is transdisciplinary in nature, incorporating and integrating knowledge from areas such as mathematical modelling, information technology and manufacturing systems (Vieira, Deschamps & Valle, 2021). As stated by Siemens (2021), this is a key part of the digital transformation of the enterprise in digitalizing the entire production process to create the smart enterprise of the future.</p>
<p>Creating new business models</p>	<p>Scientific literature expects Industry 4.0 business models to be based on new value propositions, characterized primarily by highly individualized products, integrated and well-synchronized combinations of products and services, and innovative digital service solutions (Iansiti & Lakhani, 2014). Deciding whether and to what extent the business model needs to be adapted is itself a challenge. Unfortunately, some authors prematurely assume that existing business models themselves are no longer suitable (Dijkman et al., 2015). Indeed, some enterprises believe that Industry 4.0 requires new business models; however, others interpret Industry 4.0 as more of a disruptor (Burmeister et al., 2016). Laudien and Daxbröck (2016) specifically highlight the heterogeneity of enterprises and discuss the influencing factors determining business model innovation decisions, such as competitive pressures, available resources and competencies, and a strong culture.</p>

Source: own processing

2.2.2. Controlling

The concept of modern controlling in Industry 4.0 is described by Kamps (2013), who explained the aforementioned term as the main process of achieving corporate goals and can be considered as an ideal tool for the innovation potential of corporate development. Kamps also mentioned that a modern management control system identifies, plans, and focuses on achieving goals. The focus of the new future of controlling, achieving, and planning goals is also visible in the study of Svensson and Edström, who perceived modern controlling as a new approach aimed at adaptation in a hyper-competitive environment, to promote a healthy business that is ready for new challenges. These conclusions have been extended by Písař and Havlíček (2019), who see controlling as an opportunity for the stable development of

enterprises and, on this basis, as a tool for cohesion and competitiveness. They also mentioned the importance of implementing new technologies and an advanced information system for SMEs (small and medium-sized enterprises) as an essential support for controlling management and its performance. Controlling should meet the conditions created by the Industry 4.0 environment and direct the enterprise towards building a flexible organizational structure. On this topic, Safar et al. (2018) stated that the process of globalization and Industry 4.0 are forcing researchers to look for new flexible business-organizational structures. According to Jo et al. (2017), it is not enough to have a flexible organizational structure and technology, it is also essential to have business overview and the ability to predict future trends as accurately as possible. According to Cao et al. (2017), the importance of forecasting and controlling is essential for successful business growth. Modern controlling supported by the power of technology in Industry 4.0 can not only act as a tool for business management but can also be instrumental in evaluating business information and managing costs and risks more efficiently. Based on a review of the available academic literature, we outline the key areas of change in the control function in the context of the impact of Industry 4.0. We will focus on the impact of Industry 4.0 on the controlling process, Controllor 4.0, modern control methods and the expression of their relationship with the controlling function, controlling capabilities of industrial processes. We have summarized the above areas in the following table, which further characterizes controlling from an Industry 4.0 perspective.

Table 2: Managerial function controlling in conditions of Industry 4.0

Controlling and Industry 4.0	
Controllor 4.0	A study by Deloitte (2020) describes some idea of the scale of change we can expect to see in the role of the controllor in the digital age: from being a behind-the-scenes advisor to management, the role of controllors will change to that of active agents of change, generating relevant insights to support critical decision-making. The role of professional controllors will be to exploit the potential of the huge datasets generated in the digitization process. New business models of the future, which are a tool for emerging businesses, controllors can develop specialized mechanisms for planning, reporting, analysis, and interventions tailored to the specific needs of innovative business models. Controllors 4.0 will be the developers and drivers of analytics. For control, they will introduce approaches from predictive forecasting to scenario planning - which are particularly important in times of uncertainty, such as the current economic situation during the COVID-19 crisis. Also, as a driver of business transformation, auditors will provide valuable support in the implementation and management of transformation projects in enterprises. The controllors of the future will also be equipped with new in-depth knowledge. Unless they are knowledgeable about innovative markets and products, as well as specific drivers for the business, they will not be able to be an effective "sparring" partner to management.
Modern methods and tools in controlling	In the research of Čambalíková and Szabo (2017), the use of modern methods within the control function is pointed out. The author states that the use of modern methods in controlling is absent compared to other managerial functions. Based on the results of the study, among the most used methods in the control framework are: Balanced Scorecard, benchmarking, and time management. Parprskárová (2020) adds business process management, internal audit, project management, cause, effect and variance analysis, ISO: 9000 to the above methods and tools based on the research carried out. Based on the study of Bienkowska and Zgrzywa-Ziemak (2014), we can add business process reengineering, competency-based management, customer relationship management (CRM), enterprise resource planning (ERP), lean management, outsourcing, Six Sigma, and quality management to the above-mentioned control methods.

Industrial process control capabilities	<p>Porter and Heppelmann (2014) reveal how smart technologies can transform the current process control system. Achieving the goals requires specific investments and the use of expertise, resulting in new control capabilities aligned with the company's strategy. Moeuf et al. (2017) adapted Porter and Heppelmann's work, where they developed four distinct control capabilities within an analytical framework in line with the Industry 4.0 concept. These are: monitoring, control, optimization, and autonomy. Through monitoring, the systems issue warnings if the situation changes or if there are inconsistencies in performance. The monitoring function can also take the form of historical analysis used to clarify decision making (Segura Velandia et al., 2016). By control against historical data, standard system behavior and defined performance thresholds, algorithms can be used to detect situations requiring a decision (Aruväli et al., 2014). Therefore, control requires human-system interaction (Cao et al., 2011). Through monitoring data, simulation models, it is possible to optimize production systems and resources in real time (De Ugarte et al., 2011). Synchronization of all involved in the value chain leads to better performance across the network of partners (Horbach et al., 2011; Mauricio-Moreno et al., 2015). It is also important to mention the monitoring capabilities, real-time management, and optimization of current systems to ensure new levels of autonomy are achieved (Khalid et al., 2016). What is needed is the development of systems that are able to autonomously learn from their own behavior and adapt depending on the results obtained (Bagheri et al., 2015).</p>
--	---

Source: own processing

Based on the above, it is clear that the impact of Industry 4.0 transfers into significant changes in the planning and control processes of the enterprise, which should also be the agenda of business managers, as we consider them to be the carriers and leaders of the digital transformation of enterprises.

3. RESEARCH DESIGN

The aim of the present research article is to address, through literature and scientific articles, the fourth wave of technological advances, Industry 4.0, in which integration between manufacturing operations systems and information and communication technologies is occurring, and its impact on planning and control processes in enterprises. We applied the theoretical knowledge to business practice through an electronic questionnaire survey, which was sent to managers of industrial enterprises operating in Slovakia.

We focused in particular on the changes caused in the management functions of planning and controlling. We used accessible domestic and foreign sources to analyze the topic. Through the information gained, we have developed a significant theoretical knowledge base that is essential for understanding the changes in planning and control processes resulting from the Industry 4.0 initiative. To develop the results of the present study, we conducted a questionnaire survey reflecting the theoretical findings. The research sample consisted of 115 managers who provided us with an up-to-date overview of the impact of Industry 4.0 on business processes, the rate of implementation of modern technologies as well as the impact of the ongoing phenomenon on the area of planning and controlling. In the practical part we used basic descriptive statistics.

Industry 4.0 is spreading rapidly around the world. It is a revolution in the form of a flexible platform where modern technology and the internet are ubiquitous enablers of business and production. Tremendous efforts have been made to design future trends and shifts in

technologies, systems, and tools (Flores et al., 2019). However, there seems to be a lack of insight into the impact of Industry 4.0 in the area of planning and control. In other words, there is a need for an explanation of the impact of Industry 4.0 on the aforementioned management functions. For a better understanding and explanation of the Industry 4.0 concept in the conditions of the Slovak industry, we will indicate at which stage of implementation of the Industry 4.0 concept enterprises are, where they see significant opportunities and threats, as well as the extent of implementation of modern technologies that are the creators of changes in business processes. To address the above need, we propose the following research questions:

RQ1: *In which phase of Industry 4.0 are the industrial enterprises operating in the territory of Slovakia?*

RQ2: *In which areas of business processes do industrial enterprises see the greatest opportunities but also threats?*

RQ3: *What is the level of implementation of modern technologies forming the Industry 4.0 concept?*

RQ4: *What is the level of implementation of changes within the planning function?*

RQ5: *What is the level of implementation of changes within the controlling function?*

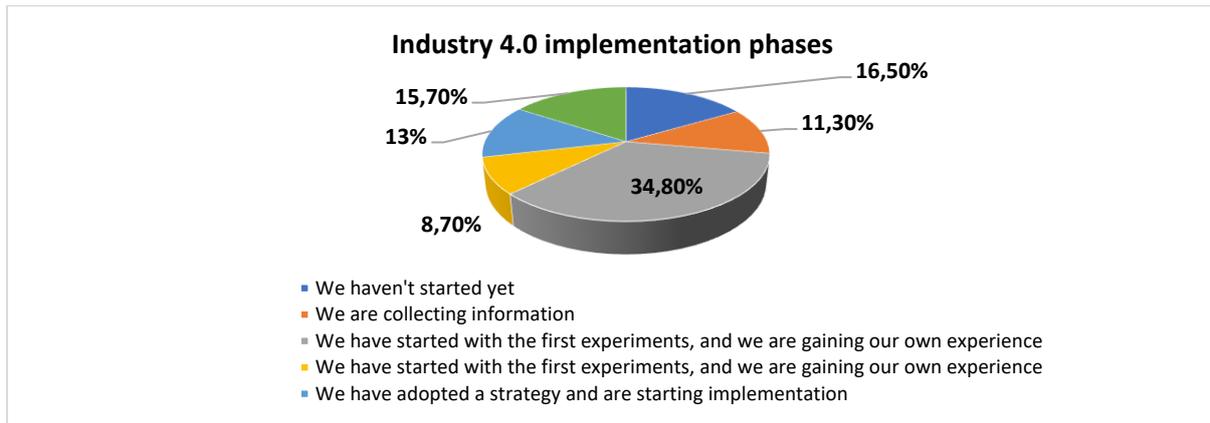
The research in the present article attempts to answer the individual research questions through the implementation of a questionnaire survey, which brought us closer to the current situation in the Slovak industry in the conditions of Industry 4.0 in the researched areas.

4. RESULTS AND DISCUSSION

Industry 4.0 represents a new industrial paradigm, or smart industry, which is at the core of current debates, and which reconfigures the relationship between people and businesses, technology and production systems, production, and consumption, and proposes a new relationship between business and industry in the process of digitalization (Cherns, 1976; Mazali, 2018; Mumford, 2003). The above-mentioned facts also have a significant impact on the managerial functions of planning and controlling. Therefore, in the following part of the presented research we answer individual research questions, in which we will approach the issue of the impact of Industry 4.0 on planning and control processes of industrial enterprises operating in the Slovak Republic:

RQ1: *In which phase of Industry 4.0 are the industrial enterprises operating in the territory of Slovakia?*

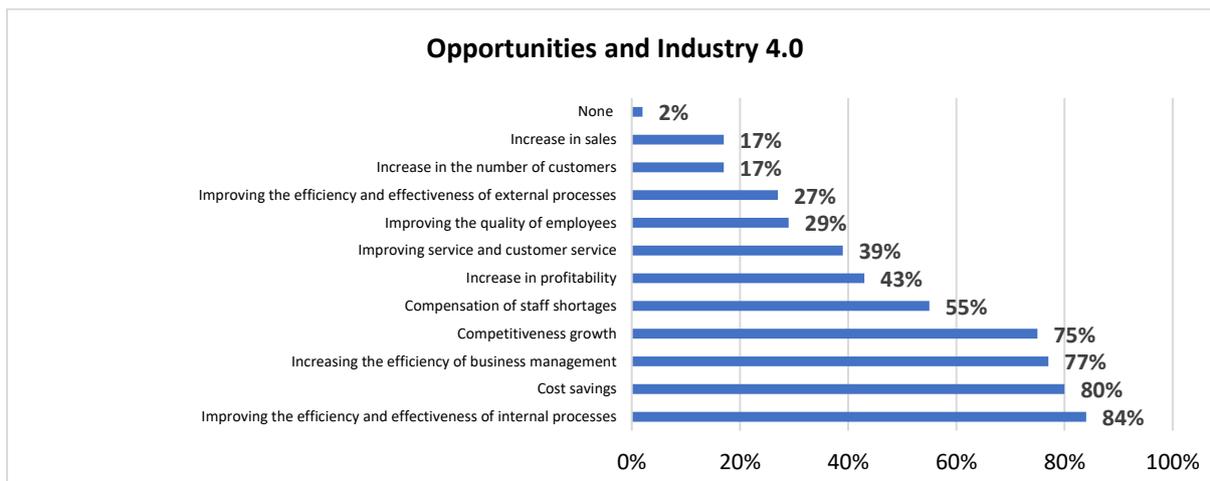
Graph 1: Industry 4.0 implementation phases



Of the data collected, the "we have started with the first attempts, and we are gaining our own experience" phase dominates (34.8%, 40 enterprises). It is debatable whether in such an advanced era of digitalization, robotization and automation, the above-mentioned phase of experiments and gaining own experience is sufficient. In the preparatory phase of creating their own strategy is 8.7% (10 enterprises), with the adopted strategy and the beginning of implementation is a group of enterprises representing 13% (15 enterprises). The first alarming result is that only 15.7% of industrial enterprises (18 enterprises) have fully implemented the Industry 4.0 concept. The second striking result is that as many as 27.8% of enterprises have not even started their first attempts, of which 16.5% (19 enterprises) have not started at all and 11.3% (13 enterprises) are only gathering information for the time being.

RQ2: In which areas of business processes do industrial enterprises see the greatest opportunities but also threats?

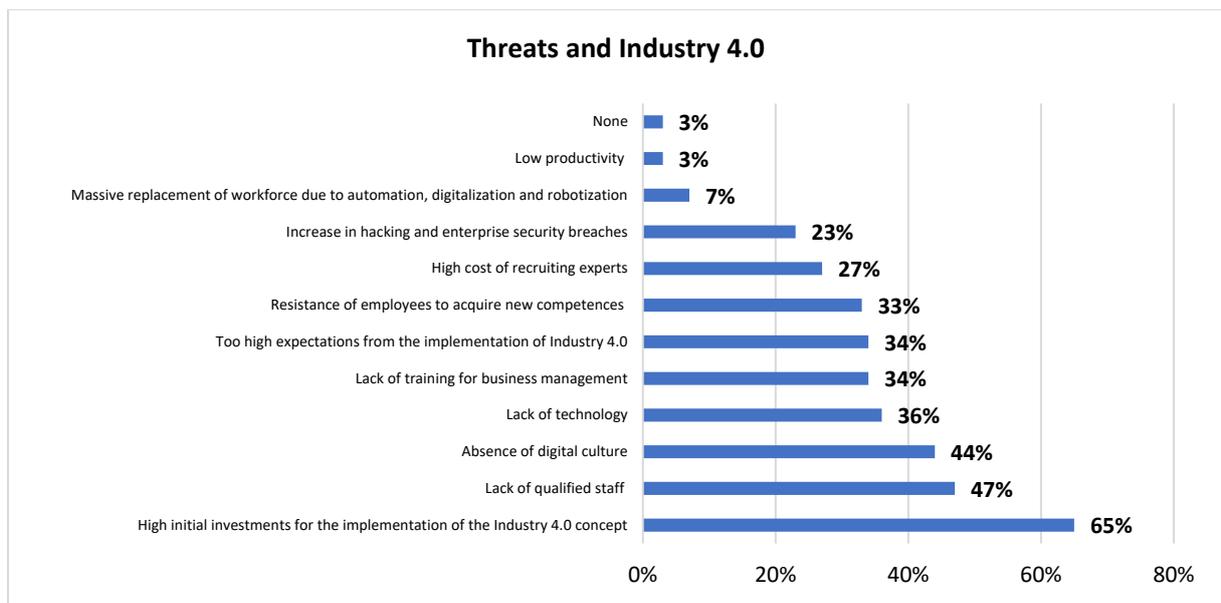
Graph 2: Opportunities and Industry 4.0



Based on the results reflected in the graph, it is evident that the most significant opportunities brought about by Industry 4.0 are considered by managers to increase the efficiency and effectiveness of internal processes (84%, 97 respondents), cost savings (80%, 92 respondents) and increase the efficiency of the management of the entire enterprise (77%, 88

respondents). The results of the research confirmed that increasing the efficiency of the management of the whole enterprise or the efficiency of management is among the top 3 opportunities that Industry 4.0 brings. On the other hand, the least important opportunities are considered by managers to be increasing the efficiency and effectiveness of external processes (27% and 31 respondents, respectively), increasing sales (17% and 19 respondents, respectively), and increasing the number of customers (17% and 19 respondents, respectively). Finally, 2% of respondents (2 respondents) indicated that they did not see any of the above as opportunities in the context of Industry 4.0.

Graph 3: Threats and Industry 4.0



It is clear that managers rank high initial investments for the implementation of the Industry 4.0 concept (65% or 75 respondents), lack of qualified staff (47% or 54 respondents) and the absence of a digital culture (44% or 51 respondents) among the biggest threats. On the other hand, managers consider increased hacking and enterprise security breaches (23% and 26 respondents, respectively), massive workforce replacement due to automation, robotization and digitalization (7% and 8 respondents, respectively), and low productivity (3% and 3 respondents, respectively) to be among the less serious threats. The results of the research confirm the claims of the studies that even according to the expressed views of managers there will not be a massive replacement of jobs by modern technology, i.e., there will not be so-called "technological unemployment". Finally, 3% of respondents (3 respondents) do not even see threats at all in the context of Industry 4.0.

RQ3: *What is the level of implementation of modern technologies forming the Industry 4.0 concept?*

Managers scored each of the 9 Industry 4.0 technologies, according to the Boston Consulting Group, using a Likert scale of 1 (strongly disagree) to 6 (strongly agree). Within the research results, we will use codes for the individual technologies that form the pillars of Industry 4.0, for the sake of better orientation in statistical investigations. The technologies (variables) are described in the following table.

Table 2: Industry 4.0 variable codes

Industry 4.0 Technologies	Variable codes
Additive manufacturing	I4.0_1
Augmented reality	I4.0_2
Autonomous robots	I4.0_3
Big data and analytics	I4.0_4
Cloud computing	I4.0_5
Cyber security	I4.0_6
Horizontal and vertical integration	I4.0_7
Internet of Things	I4.0_8
Simulations	I4.0_9

In the following table we provide an overview of descriptive statistics from the results of the implementation of Industry 4.0 technologies. We have used descriptive statistics namely arithmetic mean, median, mode, standard deviation, variance, skewness, skewness, skewness, range of variation, minimum and maximum.

Table 3: Descriptive statistics of Industry 4.0 technologies

Industry 4.0 Technologies									
	I4.0_1	I4.0_2	I4.0_3	I4.0_4	I4.0_5	I4.0_6	I4.0_7	I4.0_8	I4.0_9
Sample	115	115	115	115	115	115	115	115	115
Mean	2,69	2,38	2,88	3,21	3,23	4,18	3,22	3,20	3,30
Median	3,00	2,00	2,00	3,00	3,00	4,00	3,00	3,00	3,00
Mode	1	1	1	1	4	5	4	4	1
Std. Deviation	1,43	1,39	1,76	1,67	1,65	1,40	1,48	1,54	1,71
Variance	2,04	1,94	3,11	2,80	2,71	1,96	2,19	2,37	2,92
Skewness	0,51	0,71	0,47	0,04	0,08	-0,53	-0,003	0,07	0,02
Kurtosis	-0,65	-0,49	-1,18	-1,22	-1,15	-0,33	-0,99	-1,08	-1,29
Range	5	5	5	5	5	5	5	5	5
Minimum	1	1	1	1	1	1	1	1	1
Maximum	6	6	6	6	6	6	6	6	6

Based on the results above, it can be seen that the highest value of the arithmetic mean is cyber protection (I4.0_6) with a value of $\mu=4.18$, within which the highest frequency (modus) is 5 - "agree". Cyber protection is the most implemented element of the Industry 4.0 concept in industrial enterprises in Slovakia. On the other hand, augmented reality (I4.0_2) has the lowest value of arithmetic mean with the value $\mu=2.38$, within which the greatest frequency is 1 - "strongly disagree". Augmented reality is the least implemented element of the Industry 4.0 concept in industrial enterprises in Slovakia.

RQ4: What is the level of implementation of changes within the planning function?

Again, managers expressed their opinion on statements falling under the planning processes using a Likert scale from 1 to 6. For ease of reference in the statistical investigations, we coded the individual items that identify changes within the managerial planning function with the abbreviations PL_1 to PL_11. The individual statements (changes) are described in the table below.

Table 4: Codes of identified changes to the managerial function planning

Identified planning changes	Variable codes
System comprehensive planning	PL_1
Cloud-based planning system	PL_2
CAD software for easier product visualization	PL_3
CAM software for process simulation and machine control	PL_4
CAPP software for automatic generation of process plans	PL_5
Big Data in the databases needed for enterprise planning processes	PL_6
Machine learning and predictive analytics methods	PL_7
Quality hardware and software support	PL_8
Educating the younger generation on new planning trends	PL_9
Advanced planning systems using mathematical algorithms and logic to optimize and simulate planning	PL_10
Flexible business models	PL_11

The following table provides an overview of the descriptive statistics from the survey results that indicate the extent to which each of the identified changes have been implemented within the managerial function planning.

Table 5: Descriptive statistics of the managerial function planning

Planning											
	PL_1	PL_2	PL_3	PL_4	PL_5	PL_6	PL_7	PL_8	PL_9	PL_10	PL_11
Sample	115	115	115	115	115	115	115	115	115	115	115
Mean	4,05	3,10	3,98	3,24	2,54	2,98	2,62	3,99	3,34	2,97	3,10
Median	4,00	3,00	5,00	3,00	2,00	3,00	2,00	4,00	4,00	3,00	3,00
Mode	5	2	5	1	1	1	2	5	4	1	4
Std. Deviation	1,39	1,54	1,83	1,76	1,57	1,65	1,41	1,47	1,53	1,58	1,55
Variance	1,93	2,36	3,33	3,08	2,48	2,72	1,98	2,17	2,33	2,51	2,41
Skewness	-0,56	0,12	-0,52	0,03	0,66	0,32	0,60	-0,52	-0,16	0,30	0,12
Kurtosis	-0,39	-1,22	-1,19	-1,41	-0,74	-1,06	-0,61	-0,57	-1,04	-1,12	-1,12
Range	5	5	5	5	5	5	5	5	5	5	5
Minimum	1	1	1	1	1	1	1	1	1	1	1
Maximum	6	6	6	6	6	6	6	6	6	6	6

According to the results of arithmetic averages, managers of industrial enterprises implement system complex planning (PL_1) the most, with the value of $\mu=4.05$, with a mode of 5 - "agree". On the other hand, CAPP software (PL_5), which is a combination of CAD and CAM software, was ranked the lowest in arithmetic mean with a value of $\mu=2.54$, at mode 1 - "strongly disagree", indicating that it is the least implemented planning change.

RQ5: What is the level of implementation of changes within the controlling function?

As with the previous managerial function, we coded the identified changes (variables).

Table 6: Codes of identified changes to the managerial function controlling

Identified controlling changes	Variable codes
Strengthening the position of the controller	CL_1
Monitoring systems to detect changes and inconsistencies in performance	CL_2
Supporting human-system interaction in control activities	CL_3
Using predictive diagnostics	CL_4
Use of autonomous systems in real time	CL_5

Applying basic descriptive statistics, we arrived at the following results.

Graph 4: Modern management trends supporting control processes

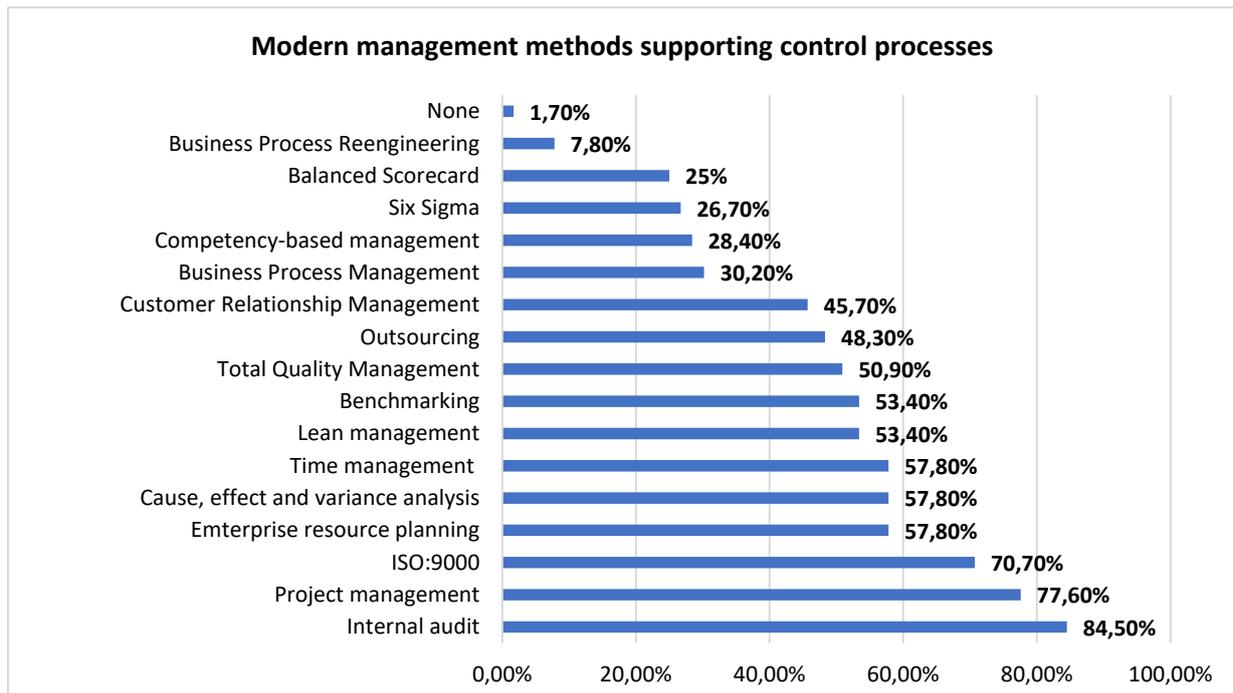


Table 7: Descriptive statistics of the managerial function controlling

	Controlling				
	CL_1	CL_2	CL_3	CL_4	CL_5
Sample	115	115	115	115	115
Mean	3,62	3,70	3,67	3,22	2,96
Median	4,00	4,00	4,00	3,00	3,00
Mode	4	4	4	4	4
Std. Deviation	1,38	1,41	1,35	1,41	1,48
Variance	1,91	1,98	1,82	1,98	2,20
Skewness	-0,36	-0,42	-0,42	-0,11	0,13
Kurtosis	-0,73	-0,68	-0,60	-0,83	-1,01
Range	5	5	5	5	5
Minimum	1	1	1	1	1
Maximum	6	6	6	6	6

The table above shows that the most implemented change in the context of controlling is the monitoring of systems to detect changes and inconsistencies in performance (CL_2) with an arithmetic mean of $\mu=3.70$, with a mode of 4 - "moderate agree". On the contrary, the lowest value of the arithmetic mean, i.e., $\mu=2.96$, is registered in the use of autonomous systems in real time (CL_5), at the same modus.

As part of the research, we also investigated the extent to which the methods below are applied in industrial enterprises. Managers could select several options.

Through the questionnaire survey, we found that managers mostly implement the following methods within the control processes: internal audit (84.5%, 98 respondents), project management (77.6%, 90 respondents), ISO:9000 (70.7%, 83 respondents). On the other hand, the less implemented modern methods in industrial enterprises are Six Sigma (26.7%, 31 respondents), Balanced Scorecard (25%, 29 respondents) and Business Process Reengineering (BPR) (7.8%, 9 respondents). Even 1.7% of the respondents (2 respondents) stated that they do not implement any of the above methods in their control processes.

5. CONCLUSION

The results of the present research point to the need to implement changes within the managerial functions of planning and controlling in the context of the impact of Industry 4.0. Through the literature and professional scientific articles, we have established a significant knowledge base of the addressed issues from a theoretical perspective. Subsequently, we mapped the impact of Industry 4.0 in Slovak industry through a questionnaire survey. On the basis of the research questions, we elaborated on the issue and provided the opinions of the managers of the surveyed enterprises.

The most significant findings from the presented research are that only 15.7% of industrial enterprises (18 enterprises) have fully implemented the Industry 4.0 concept, which is a striking fact as we are already in the period of digital transformation. It is up to the industry's business leaders to consider whether this situation is sufficient for their growth needs as well as to remain competitive. Another finding is that managers perceive the greatest opportunity in the implementation of the Industry 4.0 concept in increasing the efficiency and effectiveness of internal processes (84%, 97 enterprises), while the greatest threat they see in the need for high initial investment for the implementation of the Industry 4.0 concept (65%, 75 enterprises). The result is again negative, and it is up to the state representatives to consider whether it is not necessary to introduce subsidies to accelerate the transformation to the conditions of Industry 4.0 as well as the introduction of innovations, as the enterprises cannot afford it under the current conditions.

The results highlight the importance of implementing Industry 4.0 technologies that transfer into changes in individual management functions. The most prominent representation is cyber protection. The claim is borne out by the fact that Industry 4.0 is transferring business processes to the digital environment, which naturally attracts hackers to obtain sensitive corporate data. Industrial enterprises in Slovakia are no exception, and on this basis, they protect themselves by implementing cyber protection. The least implemented technology is

augmented reality, which can be attributed to the fact that managers do not see its diverse uses.

The most dominant change in the planning context is the introduction of Smart Manufacturing initiatives, in other words, system-wide comprehensive planning. Through their responses, managers highlighted the importance of proactively using data across the vertical and horizontal chain of businesses to increase their efficiency, performance, and strengthen integration between stakeholders to reduce costs. Finally, in the managerial function controlling, managers see the importance in monitoring systems to detect changes in inconsistencies in performance, thus they can prevent unnecessary problem. And among the most used methods managers use internal audit (84.5%, 98 enterprises).

Industry 4.0 has the potential to transform traditional industry into a smart industry with advanced modern technologies. In order for enterprises to cope with the rapid pace of development of Industry 4.0, a focus on introducing innovation into business processes is needed. An adequate set of management practices can make a major contribution to the development of long-term innovation capabilities of enterprises and facilitate the implementation of the Industry 4.0 concept. The intention of the present research was to highlight the importance of Industry 4.0, which transfer into noticeable changes in the field of planning and controlling. Among other things, the research also highlights the under-researched managerial practices that are inherent to fostering an innovation climate in the context of Industry 4.0.

Acknowledgement

This paper is a partial output of the VEGA ME SR project No.1/0017/20 Changes in the application of managerial functions in the context of the fourth industrial revolution and adaptation processes of enterprises in Slovakia.

References

1. Aruväli, T., Maass, W., & Otto, T. (2014). Digital Object Memory Based Monitoring Solutions in Manufacturing Processes. *Procedia Engineering*, 69, 449-458.
2. Bagheri, B. et al. (2015). Cyber-physical Systems Architecture for Self-Aware Machines in Industry 4.0 Environment. *IFAC-PapersOnLine*, 48(3), 1622-1627.
3. Bajic, B. et al. (2021). Industry 4.0 Implementation Challenges and Opportunities: A Managerial Perspective. *IEEE Systems Journal*, 15(1), 546-559.
4. Belyh, A. (2019). *Functions of management – planning, organizing, staffing and more*.
5. Bieńkowska, A., & Zgrzywa-Ziemak, A. (2014). Coexistence of controlling and other management methods. *Operations Research and Decisions*, 24(2), 5-33.
6. Boston Consulting Group. (2015). Industry 4.0: The Future of Productivity and Growth in Manufacturing Industries.
7. Brettel, M. et al. (2014). How Virtualization, Decentralization and Network Building Change the Manufacturing Landscape: An Industry 4.0 Perspective. *International journal of mechanical, aerospace, industrial and mechatronics engineering*, 8(1) 37-44.
8. Burmeister, C., Lüttgens, D., & Piller, F. (2016). Business model innovation for Industrie 4.0: why the “Industrial Internet” mandates a new perspective on innovation. *Die Unternehmung*, 70(2), 124-152.

9. Cao, H. et al. (2011). Knowledge-Enriched Shop Floor Control in End-of-Life Business. *Production Planning & Control*, 22(4), 174-193.
10. Cao, Y. et al. (2017). Management forecasts and the cost of equity capital: international evidence. *Review of Accounting Studies*, 22(2), 791-838.
11. Cherns, A. (1976). The principles of sociotechnical design. *SAGE journals*, 8, 783-792.
12. Deloitte (2020). *The future of controlling*.
13. Denkena, B. et al. (2007). Knowledge management in process planning. *CIRP Annals*, 56, 175-180.
14. Dijkman, R. et al. (2015). Business models for the Internet of Things. *International Journal of Information Management*, 35(6), 672-678.
15. Flores, E., Xu, X., & Lu, Y. (2019). Human Capital 4.0: a workforce competence typology for Industry 4.0. *Journal of Manufacturing Technology Management*, 31, 687-703.
16. Horbach, S. et al. (2011). Building Blocks for Adaptable Factory Systems. *Robotics and Computer-Integrated Manufacturing*, 27, 735-740.
17. Iansiti, M. & Iakhani, R. K. (2014) Digital ubiquity: how connections, sensors, and data are revolutionizing business. *Harvard Business Review*, 92(11), 90-99.
18. Jo, W. S. et al. (2017). The fit of industry 4.0 applications in manufacturing logistics: a multiple case study. In *Advances in Manufacturing*, 5(4), 344-358.
19. Kamps, T. (2013). *Systematic chasing for economic success: an innovation management approach*.
20. Kerin, M., & Pham, D. T. (2019). A review of emerging industry 4.0 technologies in remanufacturing. *Journal of Cleaner Production*, 237, 117805.
21. Khalid, A. et al. (2016). A Methodology to Develop Collaborative Robotic Cyber Physical Systems for Production Environments. *Logistics Research*, 9(23).
22. Laudien, M. S., & Daxbröck, B. (2016). The influence of the Industrial Internet of Things on business model design: a qualitative-empirical analysis. *International Journal of Innovation Management*, 20(8).
23. Lima, F. et al. (2019). Digital Manufacturing Tools in the Simulation of Collaborative Robots: Towards Industry 4.0. *Brazilian Journal of Operations and Production Management*, 16(2), 261-280.
24. Lin et al. (2006). The mythical advanced planning systems in complex manufacturing environment. *IFAC Proceedings Volumes (IFAC-PapersOnline)*.
25. Majtán, M. (2016). *Manažment*. Bratislava: Sprint.
26. Maskuriy, R. et al. (2019). Industry 4.0 for the Construction Industry: Review of Management Perspective. *Economies*, 7(3), 68.
27. Mauricio-Moreno, H. et al (2015). Design S3-RF (Sustainable x Smart x Sensing - Reference Framework) for the Future Manufacturing Enterprise. *IFAC-PapersOnLine*, 48(3), 58-63.
28. Mazali, T. (2018). From industry 4.0 to society 4.0, there and back. *AI and society*, 33, 405-411.
29. Miao, K. H., Sridharan, N., & Shah, J. J. (2002) CAD-CAM integration using machining features. *International Journal of Computer Integratrion Manufacturing*, 15, 296-318.
30. Milošević, M. et al. (2017a). A model of collaborative process planning system (E-CAPP). *Tehnicki Vjesnik*, 24, 97-103.
31. Milošević, M. et al. (2017b). e-CAPP: A distributed collaborative system for internet-based process planning. *Journal of Manufacturing Systems*, 42, 210-223.

32. Milošević, M. et al. (2019). A cloud-based process planning system in industry 4.0 framework. *International Conference on the Industry 4.0 Model for Advanced Manufacturing*, 202-211.
33. Moeuf, A. et al. (2020). The industrial management of SMEs in the era of Industry 4.0. *International Journal of Production Research*, 56(3), 1118-1136.
34. Mumford, E. (2003). *Redesigning human systems*. Idea Group, Hershey. London: IRM Press.
35. Paprskárová, P. (2020). *Trendy interného kontrolovania v podnikateľských subjektoch*.
36. Písař, P., & Havlíček, K. (2019). *Advanced controlling and information systems methods as a tool for cohesion and competitiveness of the European union*.
37. Porter, M., & Heppelmann, J. (2014). How Smart, Connected Products are Transforming Competition. *Harvard Business Review*, 92, 64-88.
38. PWC. (2016). Industry 4.0: Budovanie digitálneho podniku.
39. Rozkwitalska, M., & J. Slavik. (2017). Around learning and Industry 4.0 in management theory. *International Journal of Contemporary Management*, 16(4), 185-206.
40. Safar, L. et al. (2018). Concept of SME business model for industry 4.0 environment. *TEM Journal*, 7(3), 626-637.
41. Schumacher, A., Erol, S., & Sihn, W. (2016). A Maturity Model for Assessing Industry 4.0 Readiness and Maturity of Manufacturing Enterprises. *Procedia CIRP*, 52, 161-166.
42. Segura Velandia, D. M. et al. (2016). Towards Industrial Internet of Things: Crankshaft Monitoring, Traceability and Tracking Using RFID. *Robotics and Computer-Integrated Manufacturing*, 41, 66-77.
43. Shamim, S. et al. (2016). Management Approaches for Industry 4.0. *Evolutionary Computation (CEC), 2016 IEEE Congress*, 5309-5316.
44. Siemens. (2021). *Production Planning and Scheduling*.
45. Staněk, P., & Ivanová, P. (2016). *Štvrtá priemyselná revolúcia a piaty civilizačný zlom*. Bratislava: Vydavateľský dom ELITA.
46. Szabo, L., & Čambalíková, A. (2017). *Moderné trendy v manažmente a ich uplatňovanie v podnikoch na Slovensku*. Brno: Tribun EU.
47. Trstenjak, M. et al. (2020). Process Planning in Industry 4.0 - Current State, Potential and Management of Transformation. *Sustainability*, 12(15), 5878.
48. Vieira, J., Deschamps, F., & Valle, P. D. (2021). *Advanced Planning and Scheduling (APS) Systems: A Systematic Literature Review*.
49. Yusof, Y., & Kamran, L. (2014) Survey on computer-aided process planning. *The International Journal of Advanced Manufacturing Technology*, 75(1/2), 77-89.

Student User-Generated Content as a Communicative Success Factor for Universities – Final Results

Peter Schneckenleitner

University of Applied Sciences Kufstein Tyrol

Kufstein, Austria

e-mail: peter.schneckenleitner@fh-kufstein.ac.at

Abstract

A research project for digital networking among students was launched at the University of Applied Sciences Kufstein, Tyrol at the beginning of 2021. After a needs assessment, the clarification of technical requirements and the establishment of this platform (Schneckenleitner, 2021), this paper analyzes the development of network participation, the perception and the success factors for such a platform. For this purpose, two methods were chosen. A focus group interview designed to shed light on how students perceive the usability and usefulness of Microsoft's Yammer networking interface after an initial testing phase. The results were used to optimize the platform. After another testing phase, a Delphi survey was used to create a prediction model for the future development of the network. The findings from both methods were related to the literature review, which includes Metcalfe's law of network effects, VIE motivation theory according to Vroom, and success factors for social networks from empirical research. The study discusses the reasons why the student network barely gained momentum and provides conclusions about crucial internal and external factors that stood in the way of positive development.

Keywords

Online-communities, community building, student platform, MS yammer, participation

1. INTRODUCTION

After students of the FH Kufstein repeatedly expressed the wish for a faculty-internal digital exchange platform, a corresponding project was launched in 2021. By means of empirical research among the students of the University of Applied Sciences Kufstein (UASK), the actual need for a digital networking platform could be confirmed from 106 completely filled out questionnaires. Furthermore, the expected functions and contents of such a platform were determined, representing the conditions under which students would accept this medium and build a communication network on it. In coordination with the departments of IT and Marketing, the software Microsoft-Yammer was selected for the establishment of a digital student platform. All UASK students have free access to the Microsoft Office 365 software package and their personal FH credentials thus also serve as access authorization for the Yammer software.

From the literature research for this initial scientific work, conclusions could also be drawn about the necessary strategy for the implementation of Yammer. According to the Fogg Behavior Model, in order to analyze the interaction of platform users, action triggers, so-called prompts, are needed in addition to the motivation and ability to use the platform (Fogg, 2009). To this end, students should be used in a hands-on project to pioneer and stimulate social exchange on the platform. An interim report was presented at the 5th International Conference on Research in Humanities & Social Sciences in Berlin, Germany. (Schneckenleitner, 2021)

Yammer was implemented in 2021 and placed in the hands of a student project team. They were entrusted with the task of using the results of the market research to create a basic structure on Yammer with communities for the content desired by the students. Further tasks were the promotion of the network among the students, the creation of initial content and the administration of the platform.

2. OBJECTIVE AND RESEARCH QUESTIONS

The project of a network platform for the students of the UASK is scheduled until the end of 2022 and phase one was the design and implementation of such a platform. This paper deals with the second phase of the project, which is divided into two test periods with respective scientific observations and analyses.

After the first test period, the students' perception regarding the Yammer platform will be explored. For this purpose, the focus group survey method was chosen. After the implementation of these findings and the optimization of the network platform, a second test period will follow. In this phase, the added value for the students will be assessed and the further development of the platform will be predicted. For such an assessment of a complex and difficult to predict issue, the forecasting model of the Delphi survey will be used. The research questions are:

RQ1: "What is the added value for the students of the FH Kufstein through networking on Yammer and how easy and expedient is its use?"

RQ2: "According to which criteria and best practices can a student platform best be implemented?"

3. THEORETICAL BACKGROUND

Network effects describe that the value of a network for the individual participants increases when the number of network users increases. The added benefit can lead to the encouragement of more new users to join the network, making growth in user numbers self-perpetuating. However, if a critical mass of participants is not reached, the demand for the network collapses (Erk & Müller, 2021).

According to the literature, the size of this critical mass for a positive network effect depends on many combined factors, such as price, competing networks and, among others on a meta-level, network effects themselves (Grajek & Kretschmer, 2010). The stronger the network effect, the smaller the critical mass (Baraldi, 2011). A network user is only a relevant part of the critical mass when he actively interacts on the platform (Evans & Schmalensee, 2010).

Nguyen et al. (2020) identified reasons for disengagement on social networks. The main cause was found to be trust in the credibility of the network platform, both from their literature review and the survey results. Vohra & Bhardwaj (2019) also establish the strong relationship between trust and engagement in online communities. The second point mentioned by Nguyen et al. was the lack of participation of other users, which has a direct impact on credibility as a negative network effect and hinders the growth of the network. Furthermore, the common social norms of the participants and the perceived anonymity in the network were elaborated as points. According to the study, anonymity can increase users' proactive interaction, as the fear of sharing information and opinions online has become a determining factor. On the other hand, Kasakowsij et al. (2018) concluded in their study comparing anonymous and non-anonymous networks that both systems can be popular and successful.

According to Marbach et al. (2019), in order to produce such added value for network users, altruistic individuals should be brought in to answer questions for the community and help it with solutions to problems. Erk & Müller (2021) also see the identification of participants who develop and offer content with high added value as one of the major challenges in enterprise ecosystems. From this research, the most important factors for the success of a social network are:

- Perceived Credibility
- Social Media Engagement
- Social Norms
- Perceived Anonymity
- Added Value
- Influencer/Community Manager

The inventor of Ethernet network technology, Robert Metcalfe, established a formula in 1980 that states that the value of a network increases exponentially with its size. The potential benefit U is equal to the number of network participants n squared. $U = n^2$

After criticizing this theory, Metcalfe himself proved it in 2013 using Facebook as an example. Zhang et al. (2015) applied the law to the Tencent communications platform, which has significant differences from Facebook in terms of revenue, costs, business model, and technology. Nevertheless, they were able to prove its validity for this network as well, in contrast to competing models like Sarnoff's law, Odlyzko's law, or Reed's law. Van Hove (2016) criticized that neither Metcalfe nor Zhang et al. included the impact of increasing content variety and quality on subscriber growth. Following up on the Zhan et al. study, he reviewed this influence on the Tencent platform. Unlike the other laws of network theory, Metcalfe's law stood up to the test and was the only one that still showed validity as content quality changed. Relevant to this paper is the core statement of Metcalfe's law that each additional user increases the value of the network not linearly but even exponentially.

4. METHOD

Throughout the project, three different methods were used for the research. In phase one of the project (Schneckenleitner, 2021), a quantitative survey was used to determine the need and requirements for a student platform.

4.1. Focus Group Discussion

Phase 2 of this research focuses on the platform users. The appropriate method for this is the focus group interview. The focus group is a variation of the group discussion, an interview form that is conducted in a group (Snoy, 2010) with optimally 6 to 10 participants (Kühn & Koschel, 2018). The simulation of an everyday situation is intended to ensure a deeper engagement with the topic (Snoy, 2010) and provide insight into the attitudes, views, and knowledge of the target group. It is a personal interview and therefore a qualitative research method (Zerfaß & Volk, 2019). With the help of a focus group, one wants to survey the subjective perception of certain groups regarding a topic or the company's appearance. This method is often used as a concept test to investigate the acceptance of a new idea or a new technology.

The focus group interview was conducted due to the Covid-19-pandemia online via MS Teams on 2021 with six selected students of the FH Kufstein and was recorded with audio and video. Participation was voluntary and was not compensated. The interview was conducted under the moderation and observation of two interviewers, also students at the FH Kufstein, using a structured interview guideline. The recorded focus group interview was transcribed verbatim according to Dresing and Pehl (2015), translating dialect as accurately as possible into High German. For the analysis of the document, the form of summary content analysis according to Mayring (2015) was chosen in order to reduce the statements of the subjects to the essentials. The MAXQDA program was used for the analysis. After the results of the focus group interview were implemented, the platform continued to operate normally. The number of users remained very low, so in phase 3 we started to investigate the cause of the problem with the Delphi method.

4.2. Delphi Method

Analyses using the Delphi method are used to create a forecast model for issues that are difficult to assess and predict. For this purpose, the opinions of individually interviewed and mutually anonymous experts are obtained on a topic by means of a questionnaire (Gunzburg, 2015). The evaluated results of this survey are fed back to the same experts in a second round of questions as feedback, which is to be evaluated in terms of consensus or weighted in terms of relevance (Steurer, 2011). The anonymous questioning is intended to lower the inhibition threshold to revise an original opinion in a next wave of questioning (Häder, 2021) and to avoid the influence of dominant persons within the expert group, the follow-the-leader syndrome (Sobaih, Ritchie, & Jones, 2012).

Regarding the number of feedback rounds, Delbecq et al. (1976) suggest two or three survey waves as sufficient. Häder (2014) describes 4 types of Delphi surveys, whose questionnaire design can be qualitative, quantitative or mixed, depending on the type. Type 1 is idea aggregation through qualitative questioning. Mixed questionnaire designs are used in type 2, determination of an issue, and type 3, determination of expert opinions. And consensus building in Type 4 is done through quantitative research.

Type 3 was selected for this survey to ascertain expert opinions, as the aim of the survey is to obtain the most possible input from the experts, on which the existing consensus is then to be ascertained. Two waves of interviews were deemed sufficient for this purpose, the first predominantly in qualitative design and the second mainly quantitative. Five students were chosen as experts, each of whom had been involved in setting up and moderating the MS Yammer platform at UASK. The survey was conducted in two waves, each using an online questionnaire created on MS Forms and sent electronically. In the first survey round, the strengths, weaknesses, opportunities and threats of the Yammer network were queried in the sense of a classic SWOT analysis (Meffert et al., 2019). Furthermore, mainly open questions were asked about opinions and forecasts on the success factors for social networks. In round two, the same five experts were fed back feedback on topics with insufficient consensus from round one to re-evaluate these topics.

The analysis of the first wave of Delphi surveys, like that of the focus group interviews, followed Mayring (2015). Results with at least 80% agreement between the interviewees, i.e. four out of five experts, were assumed to be valid prophecies of the Delphi Oracle. In categories with less agreement, conflicting expert opinions or even only individual mentions, these contents were converted into new questions. In the second survey wave, the experts were then asked to rate these topics in order to reassess the consensus of the expert group.

5. RESULTS

5.1. Results of the Focus Group Discussion

The handling of Yammer was rated as simple. Switching between the desktop version and the mobile app on the smartphone was mentioned as a low barrier to entry, but purely technically there was no overall obstacle to using the platform. Desired content was mentioned as: Tips and tricks for lectures, about professors, and about student life; information about student

discounts, meeting places, recreational opportunities, and local recommendations in Kufstein; and a swap and sale exchange. According to the focus group, the potential added value of Yammer comes from the accumulation and exchange of knowledge and experience on the platform. This should make it easier to network more quickly and achieve study-related goals. Currently, there is no tool for such campus-wide networking, only internal Facebook and WhatsApp groups. Since Yammer offers the possibility to create restricted internal communities, the basic idea behind the platform was evaluated very positively. Despite this benefit, none of the participants had used the Yammer network before. And even in everyday conversations between students, only one of the six respondents could confirm ever having talked about it with colleagues. Yammer was also unknown from companies where the respondents had worked.

However, the main reason given for not using it was the impression that the platform was controlled and managed by the UASK. The students feel that they are being supervised and that they hesitate from using it for fear of not being given the freedom to express their opinions. This impression was reinforced by the initial dissemination of information via Yammer by the study management of the UASK as well as by lecturers in courses and a practical project group. The postings by the project team were perceived as too professional and created uncertainty as to how loosely and informally one was allowed to share content. It was also mentioned that students on average were more passive users of social networks and tended to consume content rather than share it.

Another hurdle was the introduction of the platform in times of the Covid 19 pandemic (2021/22). Due to the restrictions and the resulting distance learning over the first semesters that Yammer was available to students, students were not on site at the university campus. Exchanges about events and other forms of collaborative issues were obsolete, and information about what was happening in Kufstein was not of interest. It was also noted that students wanted to distance themselves from this in their free time due to the amount of time spent online in front of electronic devices for studying. Thus, the added value of meeting and networking digitally in times of social distancing was not perceived as such. Due to all these factors, there was no use and interaction on the platform at any time. According to the focus group, the students had already sought other sources of information and ways of networking. The lack of interaction and relevant content on the platform also meant that there were no incentives for new users to use Yammer. In order to reach the target group in the best possible way and in time, it was recommended to inform starting students about Yammer right at the beginning of their studies. Lectures at the UASK, promotion by the students themselves, as well as posters, flyers, stickers with QR codes and information booths on campus were mentioned as possibilities to make the network known.

Communication would also need to be improved via the existence of a mobile app. Since the use of social media is shifting more and more to the smartphone (Statista, 2022), it is essential to inform the target group about this offer. It was suggested to adapt the logo of the app in order to make the reference to the UAS recognizable. In order to enrich the platform with qualitative content, cooperation with Austrian National Union of Students federal body of Representatives and its departments were proposed. As a measure to increase user activity, the announcement of sponsored competitions was mentioned, such as photo contests or "the best recipe for the lunch break".

5.2. Results of the Delphi Method

The first, predominantly qualitative, survey wave using the Delphi method already produced results with significant consensus among the experts in some categories. For example, a high demand among UASK students for an exchange platform was confirmed by 80% of the respondents. The five experts were in 100% agreement about the functionality of Yammer. Thus, it was unanimously evaluated as a modern social network that has all the necessary features. Likewise, it was confirmed as the right format for this purpose, compared to an online forum, which was mentioned as the second possible option for a student platform in the introductory study to the Yammer project (Schneckenleitner, 2021).

A category that also showed great consensus already in round one of the survey was the topic of Yammer's low credibility. 80% of the experts rated students' perception of Yammer as being controlled by the UASK and thus not a credible network by students for students. The same experts therefore advised restricting access to students only. Lecturers should be blocked from the platform.

The main reasons given for not using the network in this first wave of interviews were that the lack of participation and interaction on Yammer was a deterrent to new users and that no relevant content could be found that created added value for students. These findings are consistent with those from the focus group discussion: few users, little content. There was also unanimity on the point that the platform needs support even after the end of the project in order to become known. According to the experts, the project would be doomed to failure before momentum was created in the dissemination and growth of the network.

An 80% agreement was found in the second wave on the greatest added value that a student platform can potentially generate for the target group. Study-related content, such as information on lectures and lecturers, the exchange of scripts and old exams, and other tips and tricks that make studying easier and promote success.

Another question was intended to provide information about the exact target group, since isolated expert opinions in the first survey questioned the usefulness for different segments of it. Thus, in the second round, the potential usefulness was assessed separately by the experts for the bachelor's degree, master's degree, part-time, full-time and per academic year segments. The result showed complete agreement on the top segment of the target group. According to this, an exchange platform brings the most added value for full-time bachelor students in their first year of study.

Internal study program groups formed by students on social networks such as WhatsApp or Facebook are seen as strong competitors for MS Yammer. Especially if such channels for joint exchange and networking have already been established, 80% of the experts consider getting used to an additional communication platform such as Yammer to be an inhibiting factor for students.

Regarding the influence of the Covid 19 pandemic on the development of Yammer, the focus group discussion had still confirmed it. In the Delphi survey, the question about influence was

asked at a time when the pandemic restrictions had largely been lifted. No consensus was found about a boost for Yammer from this loosening and opening after two years of restrictive measures.

6. CRITICAL REFLEXION

The results of the focus group discussion and the Delphi survey show that a critical mass of participants was not reached at any point in the project. This prevented the use of the network from gaining momentum on its own and a positive network effect from being achieved according to Metcalfe's law. Planned trigger activities for beginning students could not be carried out due to the renewed lockdown in the context of the Covid 19 pandemic in Winter 2021/22. The students were almost entirely at home in distance-learning, which meant that they could not be specifically made aware of Yammer in person (and also have no reason for using it).

Another serious factor was the platform's lack of credibility. In summary, this was explained by the initial information about the study management, in courses and about the supervisors of a UASK-initiated project, as well as by the fact that lecturers of the UASK have access to the network. According to recommendations, credibility could only be increased by peer-to-peer promotion, by information about the origin and functions of the platform, as well as by the possibility to post anonymously if desired. Nevertheless, it should be noted that, both among the interviewed focus group and among the experts in the Delphi survey, the desire of the students of the FH Kufstein for a digital exchange platform was confirmed.

As an answer to research question F1: "What added value is created for the students of the FH Kufstein through networking on Yammer and how easy and expedient is its use?" it can be drawn from the Delphi study that the students primarily derive their benefit from study-related content. The exchange of scripts and old exams, as well as tips and tricks on courses and lecturers. However, this relevant content is not shared and collected on Yammer, neither by the students nor by the platform maintainers, who are not least students themselves. The low perceived credibility of the network is the main reason for this.

If the results are thus applied to the drivers for participation on social networks as pointed out in the theoretical background, neither Perceived Credibility nor Social Media Engagement represent favorable factors. Perceived Anonymity is also rated as insufficient. The desired added value is not achieved, as described above. Due to the pandemic, community managers were very limited in their work. The benefit of the matching social norms of the target group as the only positive driver can thus no longer cause a swing in the direction of a positive network effect.

7. PRACTICAL IMPLICATIONS

To answer research question 2 "According to which criteria and best practices can a platform best be implemented?" following guideline presents our finding:

Check Responsibility

Our study shows the desire of students for complete independence in the development of an internal network. This is accompanied by the question of responsibility for this platform. From the point of view of a university, however, it makes no sense to host an interactive platform and ultimately be responsible for it without knowing the content.

Check Access

Our results show that access to a student platform should be exclusive. This means that only UASK students should have access to the platform. Other observers such as professors, lecturers, university staff etc. should be excluded.

Check Target Group

Our degree programs are tailored for different student groups. Be it part-time or full-time students, be it master's or bachelor's students. The benefits of a platform are not the same for all students. The results show that full-time bachelor students in their first year would benefit the most from such a platform.

Check Timing

The results show that the greatest effectiveness of an announcement for students is at the start of their studies. The later the student encounters the platform, the lower the benefit. The promotion must come from the students themselves, and the dissemination of information must be peer to peer.

Check Content

The content of a student platform must derive from the users themselves. User-generated content is in demand. A professional input of content is considered to be untrustworthy. A moderation of the platform is advisable, but this should not actively import content.

Acknowledgement

This scientific paper was supported by funds from the state of Tyrol. Lukas Hammerl, Corina Matt, Sarah Kufner, Lara Anna Hohenwarter, Alexandra Öttl, Roman Elias Witlaczil, Miriam Eppacher und Sarah Preiss supported this project with valuable scientific contributions and support.

References

1. Baraldi, L. (2011). The Size of the Critical Mass as a Function of the Strength of Network Externalities: A Mobile Telephone Estimation.
2. Briedenhann, J., & Butts, S. (2008). Application of the Delphi Technique to Rural Tourism Project Evaluation. *Current Issues in Tourism*, 9(2), 171-190.
3. Delbecq, A., Van de Ven, A. H., & Gustafson, D. (1976). Group Techniques for Program Planning; a guide to nominal group and Delphi processes. *The Journal of Applied Behavioral Science*, 12(4), 581-581.
4. Dessart, L., Veloutsou, C., & Morgan-Thomas, A. (2015). Consumer engagement in online brand communities: a social media perspective. *Journal of Product & Brand Management*, 24(1), 28-42.

5. Dresing, T., & Pehl, T. (2015). *Praxisbuch Interview & Transkription & Analyse: Anleitungen und Regelsysteme für qualitativ Forschende* (6. Auflage Ausg.). Eigenverlag.
6. Elnasr, E., Sobaih, A., Ritchie, C., & Jones, E. (17. 08 2012). Consulting the oracle? Applications of modified Delphi technique to qualitative research in the hospitality industry. *International Journal of Contemporary Hospitality Management*, 24(6), 886-906.
7. Erk, C., & Müller, C. (2021). *Unternehmens-Ökosysteme*. Wiesbaden: Springer.
8. Evans, D. S., & Schmalensee, R. (2010). Failure to Launch: Critical Mass in Platform Businesses. *Review of Network Economics*, 9(4), 1.
9. FH Kufstein. (2022). [www.fh-kufstein.ac.at](https://www.fh-kufstein.ac.at/Studieren/Bachelor/Marketing-Kommunikationsmanagement-VZ/Curriculum/soziale-kompetenzen/teambuilding). Retrieved from <https://www.fh-kufstein.ac.at/Studieren/Bachelor/Marketing-Kommunikationsmanagement-VZ/Curriculum/soziale-kompetenzen/teambuilding> abgerufen
10. Fogg, B. J. (2009). A behavior model for persuasive design. In *Persuasive '09* (S. April 26-29). California, USA: Claremont. Retrieved from <https://dl.acm.org/doi/pdf/10.1145/1541948.1541999> abgerufen
11. Grajek, M., & Kretschmer, T. (2010). *Estimating Critical Mass in the Global Cellular Telephony Market*. Berlin: Springer.
12. Gunzburg, R. (2015). Delphi method: oracle or sound judgment?. *European Spine Journal*, 24, 1115.
13. Häder, M. (2014). *Delphi-Befragungen - Ein Arbeitsbuch*. Wiesbaden: Springer.
14. Häder, M. (2021). Delphi-Analyse. In C. Zerres (ed.) *Handbuch Marketing-Controlling* (pp. 205-222). Berlin: Springer.
15. Hagi, A., & Yoffie, D. (2016). Network Effects. In M. Augier, & D. Teece (eds.), *The Palgrave Encyclopedia of Strategic Management*. London: Palgrave Macmillan.
16. Kasakowsij, R., Fietkiewicz, K. J., Friedrich, N., & Stock, W. G. (2018). Anonymous and Non-anonymous User Behaviour on Social Media: A Case Study of Jodel and Instagram. *Journal of Information Science Theory and Practice*, 3, 25-36.
17. Köck-Hódi, S., & Mayer, H. (2013). Die Delphi-Methode. *ProCare*, 18, 16-20.
18. Kühn, T., & Koschel, K-V. (2018). *Einführung in die Moderation von Gruppendiskussionen*. Wiesbaden: Springer.
19. Marbach, J., Lages, C., Nunan, D., & Ekinci, Y. (2019). Consumer engagement in online brand communities: the moderating role of personal values. *European Journal of Marketing*, 53(9), 1671-1700.
20. Mayring, P. (2015). *Qualitative Inhaltsanalyse: Grundlagen und Techniken*. Weinheim: Beltz.
21. Meffert, H., Burmann, C., Kichgeorg, M., & Eisenbeiß, M. (2019). *Marketing - Grundlagen marktorientierter Unternehmensführung*. Wiesbaden: Springer Gabler.
22. Nguyen, L., Nayak, R., Watkins, J., & Nguyen, P. (2020). Drivers of social media disengagement: a study of young consumers in Vietnam. *Young Consumers*, 21(2), 155-170.
23. Ray, S., Kim, S. S., & Morris, J. G. (2014). The Central Role of Engagement in Online Communities. *Information Systems Research*, 25(3), 528-546.
24. Schneckenleitner, P. (2021). Student User-Generated Content as a Communicative Success Factor for Universities - First Interim Results. *5th International Conference on Research in Humanities and Social Sciences* (pp. 104-117). Vilnius: Diamond Scientific Publishing.
25. Snoy, R. (2010). Werkzeugkiste: 23. Fokusgruppen. In *OrganisationsEntwicklung* (pp. 94-98).

26. Statista. (2022). [www.statista.at.](https://de.statista.com/statistik/daten/studie/691596/umfrage/nutzung-von-social-media-ueber-mobile-endgeraete-in-deutschland/) Retrieved from <https://de.statista.com/statistik/daten/studie/691596/umfrage/nutzung-von-social-media-ueber-mobile-endgeraete-in-deutschland/> abgerufen
27. Steurer, J. (2011). The Delphi method: an efficient procedure to generate knowledge. *Skeletal Radiol*, 40, 959-961.
28. Van Hove, L. (2016). Metcalfe's Law and Network Quality: An Extension of Zhang et al. *Journal of Computer Science and Technology*, 31(1), 117-123.
29. Vohra, A., & Bhardwaj, N. (2019). From active participation to engagement in online communities: Analysing the mediating role of trust and commitment. *Journal of Marketing Communications*, 25(1), 89-114.
30. Zerfaß, A., & Volk, S. (2019). *Toolbox Kommunikationsmanagement - Denkwerkzeuge und Methoden für die Steuerung der Unternehmenskommunikation*. Wiesbaden: Springer.
31. Zhang, X-Z., Liu, J-J., & Xu, Z-W. (2015). Tencent and Facebook Data Validate Metcalfe's Law. *Journal of Computer Science and Technology*, 30(2), 246-251.

Communication Strategies for Mitigating the Pandemic in Tourism. The Integrated Marketing Communications Approach

Maja Šerić

University of Valencia
Avenida de los Naranjos s/n, 46022 Valencia, Spain
e-mail: maja.seric@uv.es

Maria Vernuccio

Sapienza University of Rome
Via del Castro Laurenziano 9, 00161 Rome, Italy
e-mail: maria.vernuccio@uniroma1.it

Abstract

The Integrated Marketing Communications (IMC) approach has been confirmed as a strategic marketing process in tourism and hospitality businesses. The concept advocates for the delivery of clear and consistent messages to final consumers by coordinating different marketing communication tools and channels. The integration of marketing messages now assumes particular relevance, considering uncertainties that have been brought by the COVID-19 pandemic to the tourism sector. Thereby, successful management of marketing communications has become an imperative for tourism and hospitality practitioners facing difficulties during these challenging times. This paper aims at examining to what extent and how have marketers employed basic principles of IMC in a tourism destination while struggling with the pandemic. The empirical study took place in Croatia in the final quarter of 2021. Eight tourism and hospitality managers operating in the entire country participated in a qualitative research. Seven basic principles of IMC were examined, namely: 1) IMC as a tactical and strategic process; 2) coordination and synergy of different communication tools and channels; 3) message clarity and consistency; 4) communication centered on new technologies and database management; 5) customer-centric communication 6) IMC as a component of relationship approach, and 7) IMC as a component of brand equity strategy. All the respondents understood the need of implementing their marketing communications in an integrated way, although they experienced certain difficulties in pursuing some principles. Implications for the tourism and hospitality industry are discussed.

Keywords

Integrated marketing communications, COVID-19 pandemic, tourism and hospitality, Croatia

Acknowledgments

This work has been developed under the R+D+I Project GV/2021/176, funded by *Generalitat Valenciana*, Ministry of Innovation, Universities, Science and Digital Society.

What Factors Influence the Profitability of Tourism Firms? An Analysis for Austrian Hotels and Restaurants

Mario Situm

University of Applied Sciences Kufstein
Andreas Hofer-Straße 7, 6330 Kufstein, Austria
e-mail: mario.situm@fh-kufstein.ac.at

Alexandra Brunner-Sperdin

University of Applied Sciences Kufstein
Andreas Hofer-Straße 7, 6330 Kufstein, Austria
e-mail: alexandra.sperdin@fh-kufstein.ac.at

Abstract

The performance of companies in the tourism industry not only depends on the ability to use internal resources efficiently (Alberca & Parte, 2018), but also on external factors outside the company (Duncan, Ginter & Swayne, 1998; Enright & Newton, 2004; Porter, 1999). It is therefore the combination of various factors of the internal and external environment that influence the profitability of hotels and restaurants. However, studies commonly show that the success of a company depends more on strategic decisions at the firm-specific level than on industry conditions, which supports the theoretical assumptions of the resource-based view (RBV). Nevertheless, it can be stated that the use of the RBV solely is not sufficient from a theoretical perspective to completely describe corporate behavior, so the RBV should be combined with other theoretical perspectives (Lockett, Thompson & Morgenstern, 2009) to develop a comprehensive explanatory model.

The aim of the study was therefore to test the influence of different factors (independent variables) based on several theoretical paradigms, such as RBV, network-based view (NBV) and demand-based view (DBV) on the profitability of hotels and restaurants. Within the framework of this study, annual financial statement data of 466 Austrian hotel firms and 310 restaurant firms were collected over a period from 2005 up to and including 2015. These data were supplemented with data describing the location of the firms, the frequency of tourist movement and the tourism demand and supply. The profitability of the companies (defined as EBIT/total assets) was defined as the dependent variable. In order to measure the influence of those internal and external factors on the firm profitability, several models have been calculated using quantile regression.

Independent variables describing the firm-specific level (e.g., company size, level of debt and type of diversification) show the greatest significant influence on firm profitability. The influence of the destination (based on the urban-rural-classification) is only significant for restaurant firms. However, the average length of stay has a positive significant influence on the profitability of hotel firms. For both types of firms, bed occupancy as well as the interaction between firm size and GDP-change from the previous year (positive coefficients in both cases) are significant explanatory variables. Managers of both types of companies

should therefore build up resources, keep their debt at an acceptable level and consider a strategy of diversification in order to increase profitability. From a regional policy perspective, decision-makers should improve the offer in tourist destinations so that the average length of stay of tourists and the utilization of bed capacities can be increased.

Keywords

Hotels, network-based-view, profitability, resource-based-view, restaurants

References:

1. Alberca, P., & Parte, L. (2018). Operational efficiency evaluation of restaurant firms. *International Journal of Contemporary Hospitality Management*, 30(3), 1959-1977.
2. Duncan, J. W., Ginter, P. M., & Swayne, L. E. (1998). Competitive advantage and internal organizational assessment. *The Academy of Management Executive*, 12(3), 6-16.
3. Enright, M. J., & Newton, J. (2004). Tourism destination competitiveness: A quantitative approach. *Tourism Management*, 25(6), 777-788.
4. Lockett, A., Thompson, S., & Morgenstern, U. (2009). The development of the resource-based view of the firm: A critical appraisal. *International Journal of Management Reviews*, 11(1), 9-28.
5. Porter, M. E. (1999). Michal Porter on competition. *The Antitrust Bulletin*, 44(4), 841-880.

European Market's Cultural Zones of Homogeneity: Hierarchical Clustering Analysis

Peter Štetka

University of Economics in Bratislava
Dolnozemska st. 1, 852 35 Bratislava, Slovakia
e-mail: peter.stetka@euba.sk

Nora Grisáková

University of Economics in Bratislava
Dolnozemska st. 1, 852 35 Bratislava, Slovakia
e-mail: nora.grisakova@euba.sk

Iveta Kufelová

University of Economics in Bratislava
Dolnozemska st. 1, 852 35 Bratislava, Slovakia
e-mail: iveta.kufelova@euba.sk

Abstract

The aim of this paper is to identify specific cultural segments i.e., clusters within the European market, which could be defined from marketers' perspective as a zone of cultural homogeneity. It allows marketers to design and apply uniformed marketing strategies, tactics, and programs for each segment separately, using the strengths of localization, while maintaining a reasonable level of global approach i.e., optimized glocalization. The segmentation presented in this paper was conducted using the Hierarchical clustering analysis. As a segmentation variable (bases), the Hofstede's cultural dimensions were applied i.e., power distance, individualism, uncertainty avoidance, masculinity, long-term orientation, and indulgence. Using statistical measures of the loss of information, three segments were created and described. For the description purposes, the bases were applied as the descriptors, creating the universal bases for future research, and allowing future precisions of these findings.

Keywords

Segmentation, hierarchical clustering analysis, culture, Hofstede's cultural model, European market

1. INTRODUCTION

Intercultural marketing is about both localization and globalization: it aims to customize products and marketing strategies to the needs of customers, within the framework of a global strategy. Intercultural marketing seeks to balance intercultural differences between nations, requiring local adaptation of the marketing program, and intercultural equivalences, contributing to the creation of a scope and learning effect. To carry out such a marketing optimization, it is necessary to identify segments of the global market, consisting of countries, in which it is possible to apply a single marketing program. Yet, intercultural marketing does not only focus on geographical and national segmentation criteria, but also considers consumer values, attitudes, preferences, and lifestyles, which it also associates with age, social class, ethnicity, employment, etc. (Usinier, 2009).

There are currently several studies that have used these segmentation criteria to identify segments of the global market, including demographic (Anderson et al., 1999), psychological and value-oriented studies (Boote, 1983), quality of life studies (Peterson et al., 2000), attitudes (Verhage et al., 1989), behavior (Askegaard et al., 1998), customer loyalty (Yavas et al., 1992) and purchasing situation (Gehrt et al., 2003).

Geographical zones of cultural homogeneity correspond to a large extent with national cultures (Usinier, 2009). One of the studies confirming this statement is that of De Mooij and Keegan (1991), who conducted a comparative analysis of lifestyles in Europe and Asia, which resulted in the definition of multinational target groups. Each of these target groups represents a separate segment, consisting of consumers in several countries.

As part of monitoring and comparing the lifestyle of consumers, there are currently several centers conducting research on these aspects of consumer behavior across cultures. Examples include the Survey Research Group (2022), which monitors cross-border lifestyle changes in Hong Kong, Malaysia, the Philippines, Singapore, Thailand, and Taiwan. In parallel, similar consumer lifestyle research in Europe is being carried out, in the form of an extensive survey, under the auspices of ACE (Anticipating Change in Europe) and the CCA (Center de Communication Avancée, 2022).

Conclusions on global lifestyle convergence have also been supported by gender-based global market segmentation (Tai et al., 1997), which identified changes in consumer lifestyles in Hong Kong, Taiwan, and China e.g., based on women's perceptions and roles, family life, health, and the environment. The research led to the finding that women in China tend to be influenced by Western values and are radically approaching Hong Kong and Taiwanese consumers. Another study demonstrated the usefulness of global gender-based segmentation for Turkish travel agencies (Koc, 2002).

There is no uniformity in intercultural marketing in the methodology of global market segmentation based on socio-cultural factors. Research methods and procedures are often derived from intercultural psychology (Matsumoto et al., 2011). Certain alternative approaches have been provided by other authors (Kale, 1987; Kreutzer, 1988; Souiden, 2002; Hofstede, 1999; Usinier, 2009), which deal directly with the field of intercultural or global marketing. Usinier (2009) also presented a specific methodology in the form of operative

mapping of zones of cultural homogeneity, based on cultural as well as marketing criteria associated with the product category. The result of such a matrix should be the identification of the countries within which the product will be marketed, and which fall into one segment as the equivalent of a zone of cultural homogeneity.

This paper presents a hierarchical clustering analysis (segmentation) based on Hofstede's cultural model (Hofstede, 2001), who has carried out extensive research on this issue over several decades. A key concept of his research is national culture, which he understands as the collective programming of the mind that an individual acquires when growing up in a particular country (Hofstede, 1997).

He was inspired by Inkeles and Levinson (1997) - a study of national culture, in which they distinguished three dimensions of values that have incremental implications for the functioning of society and individuals within societies. These are: the relationship to authority; the self-perception of the individual in terms of the relationship between the individual and society, as well as in terms of the individual understanding of masculinity and femininity; and finally, ways of managing conflicts, including managing aggression and expressing emotions.

Hofstede (2001) conducted his pilot research in IBM, on the sample of 116,000 employees of 66 nationalities in 50 countries, who answered 63 questions reflecting their system of values. Based on their answers, Hofstede derived four dimensions of national culture, for which he subsequently quantified the respective values for each country. These dimensions are: (1) Power Distance (PDI), which deals with the fact that all individuals in societies are not equal – it expresses the attitude of the culture towards these inequalities amongst us. Power Distance is defined as the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally. (2) Uncertainty Avoidance (UAI) has to do with the way that a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? This ambiguity brings with it anxiety and different cultures have learnt to deal with this anxiety in different ways. The extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these is reflected in the score on Uncertainty Avoidance. (3) Individualism (IDV) - the fundamental issue addressed by this dimension is the degree of interdependence a society maintains among its members. It has to do with whether people's self-image is defined in terms of "I" or "We". In Individualist societies people are supposed to look after themselves and their direct family only. In Collectivist societies people belong to 'in groups' that take care of them in exchange for loyalty. (4) Masculinity (MAS) - a high score (Masculine) on this dimension indicates that the society will be driven by competition, achievement, and success, with success being defined by the winner / best in field – a value system that starts in school and continues throughout organizational life. A low score (Feminine) on the dimension means that the dominant values in society are caring for others and quality of life. A Feminine society is one where quality of life is the sign of success and standing out from the crowd is not admirable. The fundamental issue here is what motivates people, wanting to be the best (Masculine) or liking what you do (Feminine). (5) Long Term Orientation (LTO) - this dimension describes how every society must maintain some links with its own past while dealing with the challenges of the present and future, and societies prioritize these two existential goals

differently. Normative societies, which score low on this dimension, for example, prefer to maintain time-honored traditions and norms while viewing societal change with suspicion. Those with a culture which scores high, on the other hand, take a more pragmatic approach: they encourage thrift and efforts in modern education to prepare for the future. (6) Indulgence (IND) - one challenge that confronts humanity, now and in the past, is the degree to which small children are socialized. Without socialization we do not become "human". This dimension is defined as the extent to which people try to control their desires and impulses, based on the way they were raised. Relatively weak control is called "Indulgence" and relatively strong control is called "Restraint". Cultures can, therefore, be described as Indulgent or Restrained.

An extensive replica of Hofstede's research, entitled *Culture in the Cockpit*, was conducted by Merrit (2000), who set the following question: Does Hofstede's theory, which is based on research conducted in only one enterprise in the 1970s, currently have a universal validity? Merrit conducted similar research as Hofstede on the sample of 9,417 pilots from 26 airlines in 19 countries. He used the FMAQ questionnaire, which measures 82 items using a five-point Likert scale of pilots' attitudes and values, related to their work and environment. The result of this research was the validation of Hofstede's findings.

In research following Hofstede's theory, an internal differentiation of the individualism-collectivism dimension was achieved. It turned out that individualism is not the same in all the countries, esp. in terms of performance-related values. E.g., a study of three individualistic countries with the same language (USA, Canada, Australia) found that US residents place much higher pressure on performance compared to the other two countries (Feather, 1994). However, the differences between individualistic countries are even more pronounced when looking at the Scandinavian countries, which, as individualistic countries, share certain features with the US, but collectivistic elements are also included here. Because of this finding, researchers started to distinguish between the vertical and horizontal dimensions of individualism - collectivism, based on the individual's view of their own position in relation to others. While in horizontally oriented societies individuals tend to perceive the position of people equally, individuals are perceived as different from other members of society based on the social hierarchy, thus accepting social inequalities (Triandis, 1995).

Hofstede's approach to identifying and comparing cultural values has been widely criticized (McSweeney, 2002; Gerhart et al., 2005; Nakata, 2009), but it can still be considered relevant and evidenced by its relevance in subsequent research and studies (Steenkamp et al., 2002; Hofstede, 1999; Wedel et al., 2000).

2. METHOD

Broadly stated, there are two approaches to segmentation (Wedel & Kamakura, 2000), namely, a priori methods and post-hoc methods. In a priori methods, an analyst uses domain knowledge to segment the population into different groups. We will not be focusing on these types of approaches. In post-hoc methods, the analyst relies on data analysis to identify groupings. There are two broad categories of post-hoc methods: (1) Traditional methods, which are based on using a distance or a similarity metric to determine how far or near a

customer is from other customers in the market, and (2) Newer probability-based, such as latent cluster analysis, which can help identify groupings in the population from which a sample of respondents has been selected for the segmentation analysis.

Traditional cluster analysis refers to a range of techniques that are available to identify structure (groupings) within complex and multidimensional data, as are typically available in segmentation studies. There are two basic classes of methods: (1) Hierarchical methods, in which we build up or break down the data row by row, and (2) Partitioning methods, in which we break the data into a prespecified number of groups and then reallocate or swap data to improve some measure of effectiveness. The software that was used to conduct the analysis (enginius) includes one method of each type i.e., Ward's (1963) (hierarchical) and K-means (partitioning), which are among the most popular segmentation methods used in practice.

Hierarchical methods produce "trees," formally called dendrograms. In Ward's method, we form clusters based on the change in the error sum of squares associated with joining any pair of clusters. Using Ward's (1963) procedure, we form clusters based on minimizing the loss of information associated with grouping individuals into clusters. We measure loss of information by summing the squared deviations of every observation from the mean of the cluster to which it is assigned. Using Ward's method, we assign clusters in an order that minimizes the error sum of squares (ESS) from among all possible assignments, where ESS is defined as

$$ESS = \sum_{j=1}^k \left(\sum_{i=1}^{n_j} X_{ij}^2 - \frac{1}{n_j} \left(\sum_{i=1}^{n_j} X_{ij} \right)^2 \right),$$

where X_{ij} is the intent to purchase score for the i th individual in the j th cluster; k is the number of clusters at each stage; and n_j is the number of individuals in the j th cluster.

The number of clusters (K) to use is usually based on managerial judgment, but certain indices can also help us to determine an appropriate number of clusters. In hierarchical clustering, we use the distances at which clusters are combined as a criterion and select the solution (number of clusters) for which distances between clusters are reasonably large. As we increase the number of clusters, we should be looking for a big improvement in our criterion followed by a smaller improvement, as an indication that there is little benefit to producing finer clusters.

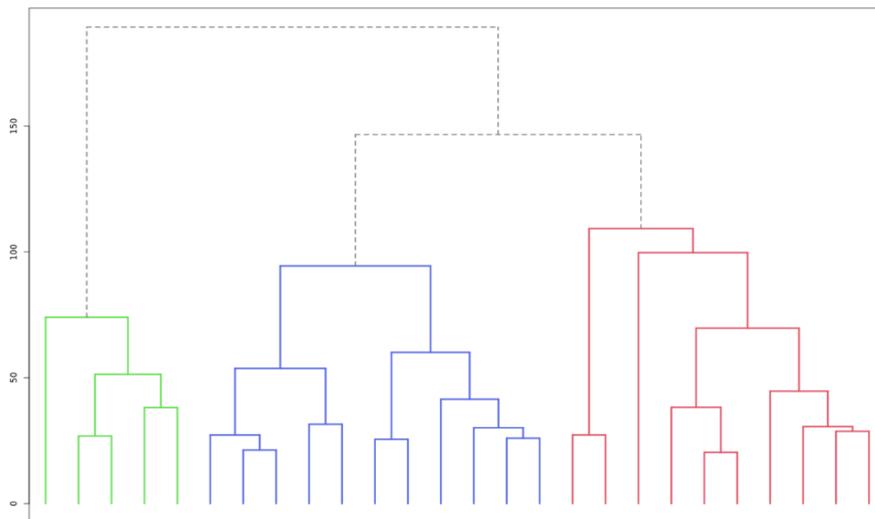
Once we've identified the appropriate number of segments and countries which belong to each segment, we begin the process of profiling the members of those segments. In cluster profiling, we attempt to create a picture of the members of the clusters using all the variables of interest. In this paper, we are not presenting the outcomes of discriminant analysis using descriptors i.e., for the profiling purposes we are using the clustering variables (bases).

3. RESULTS

The ideal number of segments is a function of statistical fit (what the data say), managerial relevance (what makes the most sense from a managerial point of view), and targetability (can the segments be easily targeted). When the three criteria do not perfectly converge, selecting the right number of segments becomes a judgment call. Using statistical criteria exclusively (see scree plot analysis below), we have retained three segments. The segmentation method relies on the hierarchical clustering approach. This approach generates a dendrogram that we display next.

The dendrogram represents the grouping process of observations into clusters. It is a tree diagram to illustrate the arrangement of clusters produced by hierarchical clustering, and how the observations are incrementally clustered together. The chart reads from bottom (all initial observations are separated) to top (all observations are clustered into one unique segment). The height represents the distance between the two groups of observations being merged at each step. If two very distant groups are being merged, this will create a 'jump' in the dendrogram, indicating that it might be wise to stop the clustering process before.

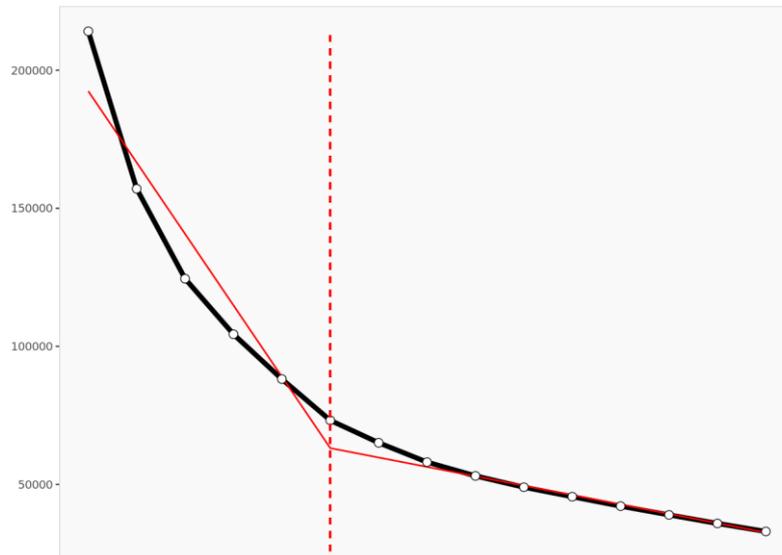
Figure 1: Dendrogram



The scree plot compares the sum of squared error (SSE) for each cluster solution. A good cluster solution might be when the SSE slows dramatically, creating an 'elbow'. Such elbow does not always exist. From a statistical point of view, the SSE reported in the screeplot is computed as the sum of squared error between each observation and its cluster centroid (or center), summed over all the observations.

The screeplot displays, for each cluster solution, a measure of within-cluster heterogeneity. If clusters group observations that are widely different (which will happen if the number of clusters is too small to capture the variability in the data), the value will be high. A good cluster solution might be where the screeplot displays an 'elbow', that is, where increasing the number of clusters beyond a certain point does not dramatically decrease within-cluster heterogeneity. The measure displayed in the screeplot is related, but not equivalent, to the distance reported in the dendrogram.

Figure 2: Screeplot



The following table presents the size of the population (the number of countries being included in the analysis) and its structure i.e., the size of each segment being created using hierarchical clustering approach.

Table 1: Segment size

Segment size	Population	Segment 1	Segment 2	Segment 3
Size	26	10	11	5
Relative size	100%	38%	42%	19%

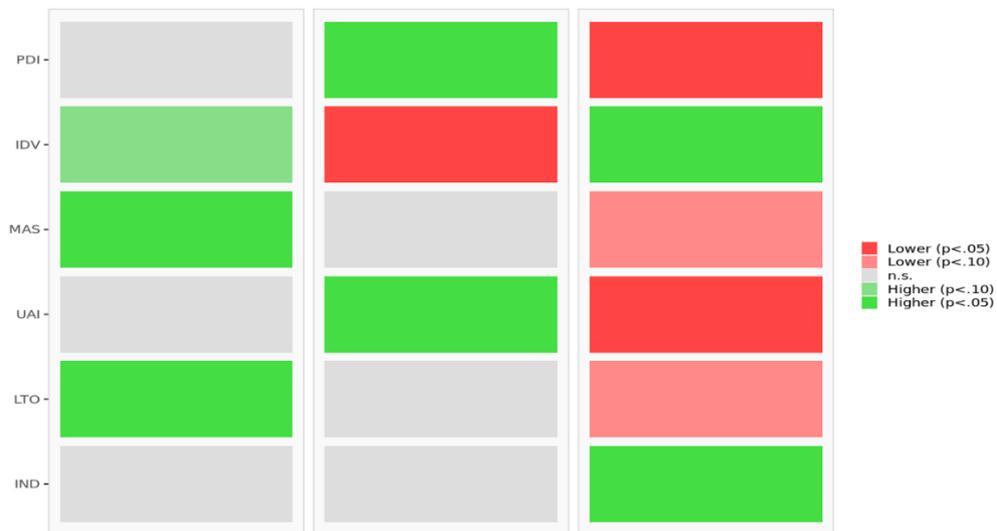
The following table presents the description of the population as an average value per the whole group of countries being included in the analysis, and the description of each segment being created using the hierarchical clustering approach. These average values are calculated as averages of each segmentation variable, overall for each segment (centroid). Segmentation variables that are statistically different from the rest of the population are highlighted in red (lower) or green (higher).

Table 2: Segment description

Segment description	Population	Segment 1	Segment 2	Segment 3
PDI	51,8	45,7	67,4	29,6
IDV	57,8	64,6	45,3	71,6
MAS	47,2	61,9	43,5	25,8
UAI	71,7	66,8	90,6	39,8
LTO	57,5	69,8	52,6	43,4
IND	44,4	37,2	40,4	67,6

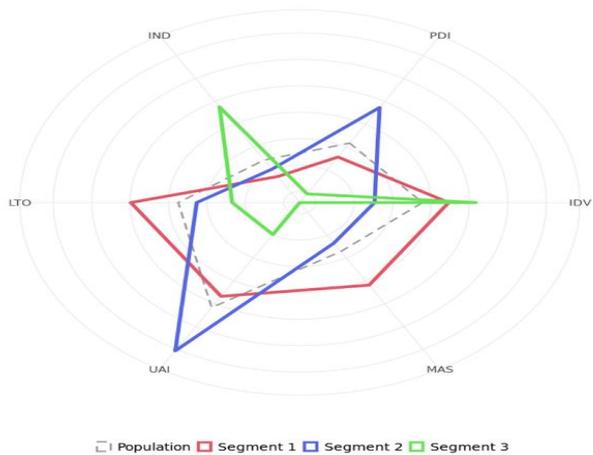
Segment differences per segment were further assessed. Cell colors indicate to what extent a segment is statistically different from the rest of the population on each segmentation variable.

Figure 3: Statistical differences in segment profiles



The following chart is comparing the averages of the segmentation variables across all segments.

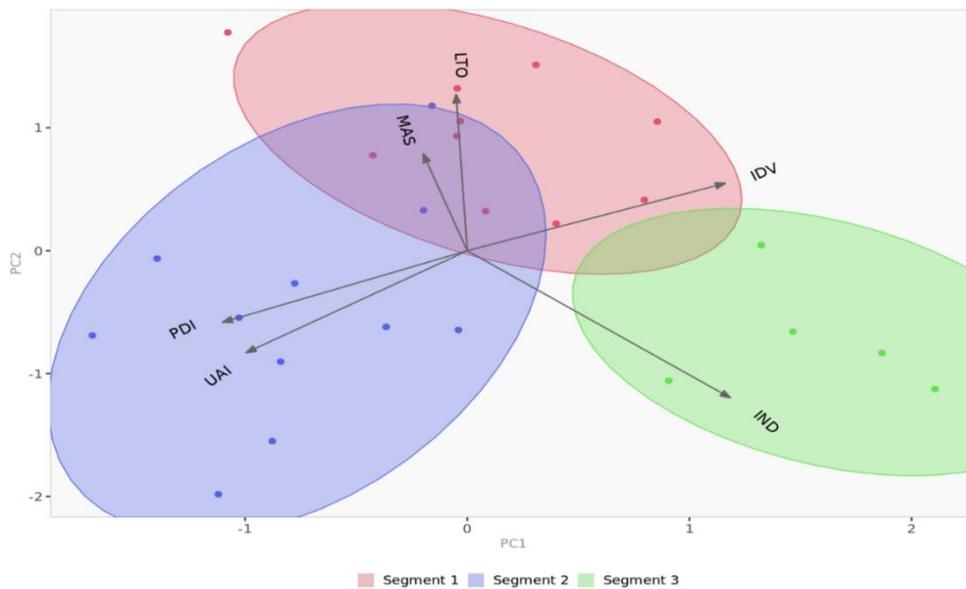
Figure 4: Spider chart



The chart below is a graphical representation of the various segments, segment members, and segmentation variables. It is obtained by plotting the first two dimensions of a principal component analysis performed on the (standardized) segmentation data, on top of which segment information has been overlaid. Because only the first two dimensions of the PCA are displayed, and these two dimensions capture only 65,3% of the variance in the data, some differences between segments might not appear here. Note that segmentation variables with no variance, if any, have been excluded. Two clusters who appear to overlap in the first two dimensions might be distinct on other dimensions. Consequently, this chart is a useful guide,

especially to see which segmentation variables are correlated, but may be misleading if used to select the optimal number of segments.

Figure 4: Spatial representation of segments and segmentation variables using principal component analysis



The following table presents the segment to which each country (member of the population) belongs to.

Table 3: Segment membership

Segment membership	Segment
SK	1
CZ	1
PL	2
HU	1
AT	1
DE	1
FR	2
IT	1
SP	2
CH	1
HR	2
BE	2
BG	2
DK	3
EE	1
IE	3
EL	2
LV	1

LU	1
MT	2
NL	3
PT	2
RO	2
SI	2
FI	3
SE	3

4. DISCUSSION

Intercultural marketing and socio-cultural segmentation are a long-term subject of research by the authors of this paper (Štetka, 2013). Several relevant reasons have so far been identified to justify the implementation of Hofstede's research findings in markets (Štetka, 2012). The authors also dealt with the definition of value-based factors influencing consumers' decision making, considering Hofstede's cultural dimensions as the base (Kintler & Štetka, 2013). Subsequent research on profiling the individual segments was conducted, e.g., individualistic versus collectivist segment (Štetka, 2014a), or a segment characterized by a high and low power distance index (Štetka, 2014b). A special field of the authors' previous research was the impact of Hofstede's cultural dimensions on the diffusion of product innovations (Štetka, 2015; Štetka et al., 2016), which resulted in the identification of European innovation-diffusion segments (Štetka et al., 2015). These research results followed the identification of diffusion factors of product innovations (Štetka et al., 2019), identified consumer reference framework across cultures (Štetka & Majtán, 2014), and the subsequent definition of the information mechanism (Štetka, et al., 2015a; Štetka & Rybárová, 2014; Štetka & Braunová, 2014) and normative mechanism (Štetka et al., 2015b) and its impact on the diffusion of innovations.

However, in these studies authors worked with separate dimensions of Hofstede's cultural model, which were specially profiled. In selected cases, these dimensions were combined on a logical basis, but without further statistical analysis. The research results presented in this paper therefore represent a significant shift for the future profiling of the segments identified here, using descriptors as discriminatory variables. The partial research results presented in this paper therefore represent the basis for the future research in the field of socio-cultural segmentation and deep understanding of the European market.

5. CONCLUSION

The aim of this paper was to identify specific cultural segments i.e., clusters within the European market, which could be defined from marketers' perspective as a zone of cultural homogeneity. It allows marketers to create and apply uniformed marketing strategies, tactics, and programs for each segment - cluster of countries but not for each country separately, using the strengths of localization, while maintaining a reasonable level of global approach i.e., optimized glocalization. The segmentation presented in this paper was conducted using the Hierarchical clustering analysis and further attributed methods precisizing obtained results.

As a segmentation variable (bases), the Hofstede's cultural dimensions were applied i.e., power distance, individualism, uncertainty avoidance, masculinity, long-term orientation, and indulgence. Using statistical measures of the loss of information, three segments were created and described. For the description purposes, the bases were applied as the descriptors were left out of this research, creating the universal bases for future research, and allowing future precisions of these findings.

Intercultural marketing and socio-cultural segmentation of the global and European market is a long-term subject of the research conducted by authors of this paper. However, in their previous research, authors worked with separate dimensions of Hofstede's cultural model, which were specially profiled. In selected studies, these dimensions were combined on a logical basis, but without further statistical analysis. The research results presented in this paper therefore represent a significant shift for the future profiling of the segments identified here, using descriptors as discriminatory variables. The partial research results presented in this paper represent the basis for the future research in the field of socio-cultural segmentation and its further market applications.

Acknowledgement

This paper is a result of the solution of VEGA project no. 1/0646/20 (Diffusion and the consequences of green innovation in imperfect competition markets), 100% share.

References

1. Anderson, P. M. et al. (1999). Culture and Fast Food Marketing Mix in the Peoples Republic of China and the USA: Implications for Research and Marketing. *Journal of International Consumer Marketing*, 11, 77-95.
2. Askegaard, S. et al. (1998). The Local and the Global: Exploring Traits of Homogeneity and Heterogeneity in European Food Cultures. *International Business Review*, 7, 549-568.
3. Boote, A. S. (1983). Psychographic Segmentation in Europe. *Journal of Advertising Research*, 22, 19-25.
4. Centre de Communication Avancée (2022). Available at: www.lecca.com
5. De Mooij, M. K., & Keegan, M. (1991). *Advertising Worldwide*. Hemel Hempstead: Prentice Hall.
6. Feather, N. T. (1994). *Psychology and Culture*. Boston, MA: Allyn and Bacon.
7. Gehrt, K. C. et al. (2003). Situational Segmentation in the International Market Place: The Japanese Snack Market. *International Marketing Review*, 20, 180-194.
8. Gerhart, B. et al. (2005). National Culture and Human Resource Management: Assumptions and Evidence. *International Journal of Human Resource Management*, 16(6), 971-986.
9. Hofstede, G. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*. London: Sage Publications.
10. Hofstede, G. (1997). *Cultures and Organizations: Software of the Mind*. New York, NY: McGraw-Hill, 1997.
11. Hofstede, T. (1999). International Market Segmentation Based on Consumer-Product Relations. *Journal of Marketing Research*, 36, 80-92.

12. Inkeles, A., & Levinson, A. (1997). *National Character: A Psycho-social Perspective*. New Brunswick: Transaction Publishers.
13. Kale, S. H. (1987). A Strategic Approach to International Segmentation. *International Marketing Review*, 4, 60-70.
14. Kintler, J., & Štetka, P. (2013). Vymedzenie faktorov ovplyvňujúcich hodnotové rozhodovanie spotrebiteľa. In *Dominantný subjekt na trhoch sieťových odvetví a jeho cenová politika: zborník vedeckých prác*. Bratislava: Vydavateľstvo EKONÓM, 42-48.
15. Koc, E. (2002). The Impact of Gender in Marketing Communications: The Role of Cognitive and Affective Cues. *Journal of Marketing Communications*, 8, 257-275.
16. Kreutzer, R. T. (1988). Marketing Mix Standardization: An Integrated Approach in Global Marketing. *European Journal of Marketing*, 22, 19-30.
17. Matsumoto, D. et al. (2011). *Cross-Cultural Research Methods in Psychology*. Cambridge, MA: Cambridge University Press.
18. McSweeney, B. (2002). Hofstede's Identification of National Cultural Differences - A Triumph of Faith a Failure of Analysis, Human Relations. *Human Relations*, 55(1), 89-118.
19. Nakata, C. (2009). *Beyond Hofstede: Culture Frameworks for Global Marketing and Management*. Basingstoke: Palgrave Macmillan.
20. Peterson, M. et al. (2000). Country Segmentation Based on Objective Quality-of-Life Measures. *International Marketing Review*, 17, 56-73.
21. Souiden, N. (2002). Segmenting the Arab Markets on the Basis of Marketing Stimuli. *International Marketing Review*, 19, 611-636.
22. Steenkamp, E. M. et al. (2002). International Market Segmentation: Issues and Perspectives. *International Journal of Research in Marketing*, 19, 185-213.
23. Štetka, P., & Braunová, M. (2014) Informačný vplyv referenčných skupín na spotrebiteľské preferencie naprieč kultúrami. In: Trendy v podnikaní 2014. Mezinárodní vědecká konference. *Trendy v podnikání 2014: recenzovaný sborník příspěvků mezinárodní vědecké conference, Plzeň, 13-14.10.2014.*, 1-6.
24. Štetka, P., Grisáková, N., Kintler, J., & Hrušovská, D. (2019). *Faktory difúzie produktovej inovácie*. Praha: Wolters Kluwer.
25. Štetka, P., & Majtán, Š. (2014). *Referenčný rámec spotrebiteľa naprieč kultúrami*. 1. vyd. Bratislava: Vydavateľstvo EKONÓM.
26. Štetka, P., & Rybárová, D. (2014). Vnímané riziko a nákupná konformita. In: Trendy v podnikaní 2014. Mezinárodní vědecká konference. *Trendy v podnikání 2014: recenzovaný sborník příspěvků mezinárodní vědecké conference, Plzeň, 13-14.10.2014.*, 1-7
27. Štetka, P., Šlosár, R., & Majtán, Š. (2016). The Role of cultural diversity in new product sales forecasting. In *Studia Ekonomiczne: Zeszyty naukowe Uniwersytetu ekonomicznego w Katowicach*. Katowice: Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach. 199-211.
28. Štetka, P., Šlosár, R., & Vrtíková, K. (2015). Informačný mechanizmus difúzie produktových inovácií naprieč európskymi tržmi. In *Aktuálne problémy podnikovej sféry 2015*. Bratislava: Vydavateľstvo EKONÓM, 671-678.
29. Štetka, P., Vrtíková, K., & Šlosár, R. (2015). Európske inovačno-difúzne trhové segmenty. In *Aktuálne problémy podnikovej sféry 2015*. Bratislava: Vydavateľstvo EKONÓM, 663-670
30. Štetka, P., Vrtíková, K., & Šlosár, R. (2015). Normatívny mechanizmus difúzie produktových inovácií naprieč európskymi tržmi. In *Aktuálne problémy podnikovej sféry 2015*. Bratislava: Vydavateľstvo EKONÓM, 679-686.

31. Štetka, P. (2015). Cultural Impact on Innovations Diffusion Across the European Markets. In *Globalization and its socio-economic consequences - 15th International scientific conference, 7th-8th October 2015, Rajecké Teplice, Slovak Republic*. 779-791.
32. Štetka, P. (2013). Interkultúrny marketing a socio-kultúrna segmentácia globálneho trhu. In *Ekonomika, financie a manažment podniku: zborník vedeckých statí pri príležitosti 60*. Bratislava: Vydavateľstvo EKONÓM.
33. Štetka, P. (2012). Opodstatnenie implementácie záverov Hofstedeho výskumu na stredoeurópskych trhoch. In *Aktuálne problémy podnikovej sféry*. Bratislava: Vydavateľstvo EKONÓM, 563-567.
34. Štetka, P. (2014a). Profilovanie individualistického a kolektivistického socio-kultúrneho trhového segmentu. In *Aktuálne problémy podnikovej sféry 2014*. Bratislava: Vydavateľstvo EKONÓM, 478-483.
35. Štetka, P. (2014b). Profilovanie socio-kultúrneho trhového segmentu charakterizovaného vysokým a nízkym indexom vzdialenosti mocenských pozícií. In *Aktuálne problémy podnikovej sféry 2014*. Bratislava: Vydavateľstvo EKONÓM, 484-489.
36. Survey Research Group (2022). Available online: www.surveymethods.com
37. Tai, S. H. C. et al. (1997). A Lifestyle Analysis of Female Consumers in Greater China. *Psychology and Marketing*, 14, 287-307.
38. Triandis, H. C. (1995). *Individualism and Collectivism*. New York, NY: Westview Press.
39. Usinier, J. C. (2009). *Marketing Across Cultures*. Harlow: Pearson Education.
40. Verhage, B. J. et al. (1989). Will a Global Strategy Work? An Energy Conservation Perspective. *Journal of the Academy of Marketing Science*, 17, 129-136.
41. Ward, J. (1963). Hierarchical grouping to optimize an objective function. *Journal of the American Statistical Association*, 58, 236-244.
42. Wedel, M., & Kamakura, W. A. (2000). *Market Segmentation: Conceptual and Methodological Foundations*, second edition. Boston, MA: Kluwer Academic Press.
43. Yavas, U. et al. (1992). Global Consumer Segmentation Versus Local Market Orientation: Empirical Findings. *Management International Review*, 32, 265-273.

The Assessment of Data Analytics Skills and Business Knowledge for Finance Professionals in Context of Business Analytics

Andreas Stoller

SMBS - University of Salzburg Business School
Feldpark 23; 6300 Zug, Switzerland
e-mail: andreas.stoller@stud.sbg.ac.at

Abstract

Digital technologies are impacting the finance profession in different ways, leading to changes in required skills for finance professionals. The most recent literature discussing emerging technologies in finance profession stated, that improved skills in data analytics and higher business orientation is the superior path for finance professionals. This paper seeks to explore skills assessments from practical view as well as test procedures described in research literature for data analytics skills and business knowledge. This paper concludes that test procedures for data analytics skills cover a broad range of skills, and test procedures for business knowledge are not covered broadly in literature.

Keywords

Business analytics, data analytics skills, business knowledge

1. INTRODUCTION

The finance function is impacted by digitalization through the automation and robotization of routine processes, the introduction of business intelligence and the application of data analytics, leading to changes in the role of finance professionals (Möller et al., 2020). In some companies technologies like data analytics and automated forecasting, time series techniques, machine learning and simulation are already in use (Möller et al., 2020). Möller et al. (2020) pointed out that to find the right combination of artificial intelligence and human input is a key challenge of the finance department under increasing digitalization. Especially, in times of increasing volatility and structural breaks a combination of human judgement and business acumen with the extensive use of data and technology are key and complete automation may only be effective in clearly defined processes (Möller et al., 2020). Abad-Segura and González-Zamar (2020) used the term “relationship between science and technology” which needs to be established and that allows to support the decision-making process.

Research articles are discussing the new capabilities needed for finance employees to cope with the opportunities and challenges resulting from digital technologies. The most recent literature discussing emerging technologies in finance profession stated, that improved skills in data analytics and higher business orientation is the superior path for finance professionals to stay a valuable partner to the business under increasing digitalization (Stoller, 2021). Especially the large volume of information should be used with greater speed and in a more transparent way for the decision-making process. Generally, financial processes were always dealing with changes and had to adjust to continuous development, or in a more proactive way, finance departments had to shape the processes in changing environments. For example, new competencies were required to manage data with the introduction of business intelligence (Davenport, 2013). However, the digitalization requires more extensive changes in the abilities of finance employees and is shaping the learning processes. Furthermore, the digitalization may impact financial processes from a different direction: “Digital disruption comes with less cost, more pace and from non-traditional competitors” (Marrone & Hazelton, 2019).

The strong focus on IT skills, data analytics skills and business orientation in finance research literature could further be derived from the upcoming business innovation processes. Bassellier and Benbasat (2004) stated that to stay competitive “business innovation relies even more strongly on partnerships between IT and business people” as the focus of innovation needs to be driven by business. To become the “shapers of innovation”, departments combining the required skills are discussed to have a superior standing. Similarly, IT related research literature is discussing the increase of business knowledge skills for IT employees (Stoller, 2021).

Furthermore, research articles with focus on information system capabilities and the impact of those on firm performance indicated the importance of human resource skills in comparison to infrastructure capabilities (Aydiner, Tatoglu, Bayraktar & Zaim, 2019). The IT infrastructure is discussed not to show a robust impact on decision making quality or a competitive advantage as it is an imitable resource which is easy to access on the market (Aydiner et al. , 2019). Technology investment itself does not create a competitive advantage.

In contrary to this statement, Wamba et al. (2017) discussed infrastructure and human resource skills to be relatively more important than management capability. Furthermore, Gupta and George (2016) stated that data-specific technical skills may get dispersed among individuals and thereby making this resource ordinary across organizations over time.

The remainder of this paper is structured as follows. Section 2 introduces the main terminology for the digital technology business analytics as a main driver for data analytics skills and business knowledge requirements. Section 3 discusses the results and the implications of test procedures on data analytics skills and business knowledge. Section 4 concludes the paper.

2. THEORETICAL BACKGROUND

2.1. Characteristics of Business Analytics

Business analytics is defined as “the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decision and actions” (Davenport & Harris, 2007). Business analytics is classified in descriptive analytics, predictive analytics and prescriptive analytics (Appelbaum et al., 2017; Davenport, 2013). Spraakman et al. (2021) used a similar definition for data analytics which they defined as “the use of information technology tools to perform data analyses”. Similarly, data analytics is described as combination of processes and tools for gaining insights and improve decision making (Ghasemaghaei et al., 2018). Processes and tools include predictive analytics, statistics, data mining, artificial intelligence and natural language processing (Ghasemaghaei et al., 2018). Data mining combines “statistics, machine learning and artificial intelligence to discover patterns in large data sets” (Gotthardt et al., 2020) and is described as a basis for business analytics (Oesterreich & Teuteberg, 2019). Moreover, the use of external information increased in business analytics as described in studies (Andreassen, 2020).

Davenport (2013) discussed a chronological three-steps “analytics approach” with the era of business intelligence as “Analytics 1.0”, the era of big data as “Analytics 2.0” and the era of data-enriched offerings as “Analytics 3.0”. Analytics 3.0 is summarized as application of powerful data-gathering and analysis methods to a company’s operations and offerings, i.e. embedded data smartness into the products and services of the company (Davenport, 2013). However, requirements listed under “Analytics 3.0”, like internal and external sources in structured and unstructured format, show overlap with the definition of big data. We define “Analytics 3.0” mainly as an extent of available data sources with no major impact on business analytics itself. Other authors did not distinguish between business intelligence and big data as chronological steps and discussed business intelligence as an overall concept of business analytics (Ni et al., 2019; Spraakman et al., 2021). Further below, business intelligence and big data are discussed as presented in literature.

Business intelligence is defined as a “system comprised in both technical and organizational elements that presents its user with historical information for analysis to enable effective decision making and management support, with the overall purpose of increasing organizational performance” (Işık et al., 2013). The era of business intelligence, which was born in the mid-1950s, was “giving managers the fact-based comprehension to go beyond

intuition when making decisions” based on processes of recording, aggregating and analysing data (Davenport, 2013). The majority of business intelligence activity was based on historical information without predictions (Davenport, 2013). The main role of business intelligence is to improve the quality of decision-making (Ni et al., 2019). The underlying assumption is, that consolidating and analyzing large amount of data as well as reporting on this data will result in more effective decision-making (Ni et al., 2019). Ni et al. (2019) stated that the impact of business intelligence on decision-making quality is not addressed in research. However, business intelligence is the largest IT expenditure in organizations (Ni et al., 2019). Furthermore, Excel is described to be the most used business intelligence tool (Spraaakman et al., 2021). The ability to manage data, utilizing enterprise data warehouses which were used to capture information, is discussed as new competency of this era (Davenport, 2013).

The era of big data is described to begin in the mid-2000s (Davenport, 2013). Big data describes the increased volume of generated and accessible data with increased velocity and variety. Velocity describes the speed of data creation, and variety refers to structural heterogeneity covering structured and unstructured data (Andreassen, 2020; Appelbaum et al., 2017; Bhimani, 2020; Janvrin & Weidenmier Watson, 2017; Moll & Yigitbasioglu, 2019; Oesterreich & Teuteberg, 2019; Richins et al., 2017). This data is described to be internal and external with increasing volume of social media data (Cockcroft & Russell, 2018; Marrone & Hazelton, 2019). Big data is described to have greater potential to derive valuable information like patterns and anomalies than “small data” (Cockcroft & Russell, 2018). Big data analytics is considered as a game changer enabling improved business efficiency and effectiveness (Wamba et al., 2017). However, Ghasemaghahi et al. (2018) stated that big data does not increase the speed of decision making process which may be driven by complex processes in collecting, managing and analyzing big data.

2.2. Data Analytics Skills and Business Knowledge

After having discussed the definition of business analytics, the definition of business orientation and data science skills is introduced as discussed in literature which is focusing on emerging technologies in finance profession. The definition of these two skills is summarized in Table 1 in Appendix 1. The table uses the skills profile as presented by Oesterreich et al. (2019) and is adjusted to distinguish between professional finance skills and the skills related to business orientation, as business orientation is discussed to be of high importance as a separate skill (Stoller, 2021). Moreover, the table also describes the overall finance view without limiting to management accountants only and is extended by the most current research view on the skills profile of finance employees. Oesterreich et al. (2019) defined data analytics skills as a sub-skill of data science skills.

Especially the role changes for management accountants as part of the finance profession are in focus of research literature. Objective of management accounting activities is to provide greater clarity to managerial decision and to decrease the level of uncertainty of actions taken (Bhimani, 2020). Management accountants’ role changes induced by increasing digitization of business environments have steadily increased in literature publications over the last few years (Oesterreich et al., 2019). Increasing digitization, automation of business processes, introduction of new products and appearance of new business models will heavily impact the

management accountants' role (Oesterreich et al., 2019). Becoming an active business partner, business analyst and data scientists will be the requirements for the management accountants' role, where the analyst function is partially assigned to those of a data scientists (Oesterreich et al., 2019). In contrary, organizational changes driven by digitalization, especially the introduction of data officers, may change the data creation routines which will lead to more decentralized, self-service based reporting and decision making environment (Möller et al., 2020). Moreover, data scientists are reported not to be organized within the finance departments (Möller et al., 2020).

The business partner role, business manager or change agent acting as internal consultant and service provider to the management are mentioned to be the new focus for management accountants (Oesterreich et al., 2019). Although, the business partner role has already evolved over the last decades, it is now enriched with acting as change agent and taking the lead within the digital transformation process (Oesterreich et al., 2019). The future role model of management accountants is described as "a more analytical, emotionally-intelligent business partner role with mathematical, statistical and programming skills" (Oesterreich et al., 2019). Richins et al. (2017) stated that the responsibility of management accounting may increase over the next years as this function is best suitable to fulfil the role as strategic partner to business, performing problem driven data analysis on structured and unstructured data, interpreting and communicating the results under the main target to improve financial objectives. On the contrary, in the era of business intelligence, analysts spent a big portion of time in preparing data for analysis and a relatively small portion on the analysis itself (Davenport, 2013). As business intelligence data analysis was slow and required relatively high amount of resources (Davenport, 2013), ex ante theory-driven hypotheses for testing may have been of higher importance. This may result in the view, that business orientation and business partnering of finance employees may become of lower importance in the future.

Based on the discussion above, we further focus to review test procedures for data analytics skills, and comprehensive business knowledge as measurement for business orientation.

3. TEST PROCEDURES FOR DATA ANALYTICS SKILLS AND BUSINESS KNOWLEDGE

3.1. Test Procedures for Data Analytics Skills

3.1.1. Practitioners' view on test procedures for data analytics skills

As previously discussed, data analytics skills and comprehensive business knowledge are the main required skills for finance professionals to shape the future of the profession under increasing impact of digital technologies. The test procedures on these skills are discussed in this section.

To provide a comprehensive view on the test procedures of data analytics skills, practitioners' view is discussed in this chapter. Data analytics skills show several assessment tests available in the context of hiring process for data analytics experts or to generally assess the skills level of corresponding employees. As the skills of a potential employee are unknown to the hiring organization, it can be assumed that the assessment test will cover the must-to-have skills for a specific profession, which are data analytics skills in this specific case. The search for

practitioners' test was done online on the 26th May 2022. Hence, the following discussion is focused on practitioners' tests which are available online.

The result of the analysis regarding available online tests to assess data analytics skills is summarized in Table 2 in Appendix 1. The tests include different competencies which are assessed. The test from "Vervoe" includes a portion in assessing skills which may benefit the business including communication skills. In contrary, the test from "Mettl" comprises the assessment of technical skills and competencies in programming and statistics. However, the detailed description of "Mettl" test mentions that the abilities to extract information by analyzing data and suggesting possible outcome are assessed in the test as well. Furthermore, critical thinking, data visualization and presentation skills are described as the must-to-have skills for data analysts in "additional information" part for the "Mettl" test. Other must-to-have skills are SQL, machine learning, Microsoft Excel and R or Python-Statistical Programming. Similarly, the "DevSkiller" test focusses on the technical aspects like practical coding skills and data structures but mentions that critical thinking is an important skill of data analysts in order to find the most efficient solution to problems.

A more comprehensive test is presented by "Adaface" and is titled "data science test". However, the test is designed to test data science skills for a broad number of roles like data scientist, data science engineer, data analyst, machine learning engineer and statistician. Data science is defined by "Adaface" as "a blend of various fields such as statistics, machine learning, and predictive analysis to extract knowledge or insights from data". Critical thinking and communication skills do not mention to be tested or to be of relevance. Similarly, test offered by "Xobin" provide a broad assessment but include suggestions of conclusions and support for decision-making as assessed skills.

In summary, the practical data analytics skills tests which are available online, provide a broad range of skills tested including programming skills which show an enhancement to data analytics requirements described previously. Some tests purely focus on coding and data structure competencies while other tests also include assessing of ability to derive the conclusions for decision making support.

3.1.2. Research view on test procedures for data analytics skills

After having reviewed the practitioners' view on the assessment of data analytics skills, in this chapter we discuss the research view on data analytics skills test procedures. Several publications are discussed in detail in this chapter to show the general set up of research for this type of research stream. Moreover, the dimensions and items used for assessment of data analytics skills and related skills for managing digital technologies from the analytical point of view are summarized in Table 3 in Appendix 1.

Ghasemaghaei et al. (2018) discussed a comprehensive framework to measure data analytics competency in the context of decision quality and efficiency. Data analytics competency describes the ability to effectively deploy data analytics-based resources for decision making (Ghasemaghaei et al., 2018). Decision quality is defined as accuracy, precision, and reliability of the decision outcomes and decision efficiency concerns with arriving at decisions quickly

(Ghasemaghaei et al., 2018). Similarly, data analytics is defined as the capacity to manage, process and analyze data (Ferraris et al., 2019). Data analytics competency comprises five dimensions: data quality and bigness of data (IT-enabled intangibles), analytical skills and domain knowledge (human IT resources), and tools sophistication (IT infrastructure). Ghasemaghaei et al. (2018) noticed positive relationship between data analytics competency and decision making performance. Furthermore, Ghasemaghaei et al. (2018) stated that all dimensions of data analytics competency significantly improve decision quality, and that the decision efficiency is increased by all dimensions, except bigness of data. The employee domain knowledge and analytical skills comprise the combination of knowledge and skills in order to effectively perform data analytics and represent the skills portion of the framework. Ghasemaghaei et al. (2018) summarized that skills of employees as part of data analytics competency of an organization have not received sufficient attention in literature.

The domain knowledge includes deep understanding of the procedures, facts and processes involved in the specific organization in order to identify key attributes for effective solution of business problems (Ghasemaghaei et al., 2018). However, the analytical skills are not discussed broadly in the comprehensive framework. The analytical skills are skills required to analyze and interpret data for generating business insights (Ghasemaghaei et al., 2018). Furthermore, Ghasemaghaei et al. (2018) stated that the depth of data analysis heavily depends on the combination of all dimensions of the comprehensive framework (Ghasemaghaei et al., 2018).

Similarly, Yasmin et al. (2020) discussed that big data analytics capabilities depend on the three dimensions “infrastructure capability”, “human resource capability” and “management capability” as description of the interconnection of technology, people and management. The description of “human resource capability” dimension is adapted from Aydiner, Tatoglu, Bayraktar, Zaim, and Delen (2019) and Aydiner, Tatoglu, Bayraktar, and Zaim (2019). Furthermore, Yasmin et al. (2020) stated that these three dimensions are the most used dimensions in existing literature discussing the impact of data analytics capabilities on competitive advantage of organizations. Other descriptions used for the three dimensions are tangible, human, and intangible (Gupta & George, 2016). As mentioned, Table 3 summarizes the items used in the researched literature to measure data analytics skills as part of the “human resource capability”.

Similarly, Rialti et al. (2019) and Wamba et al. (2017) discussed the three data analytics capabilities in context of big data. Infrastructure capability is the combination of information systems capable of collecting, storing, processing and analyzing big data which should also include adaption to different types of data (Rialti et al., 2019). Management capability comprises skills regarding selecting and implementing the right infrastructure and identifying the right information to be extracted from datasets (Rialti et al., 2019). Human resource capability deals with skills to identify the right data for analysis and to draw appropriate conclusions from the analysis (Rialti et al., 2019). More general definition is used by Wamba et al. (2017), where human resource capability refers to professional ability to undertake assigned tasks. However, Wamba et al. (2017) used four sub-dimensions with 21 items to assess the personnel expertise including technical knowledge, technological management knowledge, business knowledge and relational knowledge.

A “more operational” model is discussed by Aydiner, Tatoglu, Bayraktar, Zaim, and Delen (2019) using “data acquisition and processing”, “prescriptive analytics”, “predictive analytics” and “descriptive analytics” as items to assess business analytics capabilities. However, the model is focused on software and systems in use rather than on required skills. Furthermore, the IT infrastructure is discussed not to show a robust impact on decision making quality or competitive advantage as it is an imitable resource which is easy to access in the market (Aydiner, Tatoglu, Bayraktar, & Zaim, 2019). Technology investment itself does not create a competitive advantage. Similar assessment is discussed by Duan et al. (2020).

Mikalef and Gupta (2021) discussed the technical skills required for artificial technologies capability build up. As their questionnaire is focused on data science skills, we discuss the items used for assessment below. The tasks to be performed by these data science skills are implementation and realization of artificial intelligence algorithms, managing the infrastructure to support initiatives, introduction of initiatives, and ensuring artificial intelligence applications adhere to goals (Mikalef & Gupta, 2021). Individuals performing these tasks require strong background in statistics, probability, predictions, calculus, algebra, Bayesian algorithms, and logic as well as programming, data structures and language processing (Mikalef & Gupta, 2021). Similarly, Gupta and George (2016) discussed competencies in machine learning, data extraction, data cleaning, statistical analysis and understanding of programming paradigms as required skills.

Mikalef and Gupta (2021) discussed the future roles to emerge due to introduction of digital technologies. The roles are trainers, explainers, and sustainers. These roles are generalized to digital technologies in the context of our research. Trainers are concerned with setting up digital technologies for effective use. Sustainers ensure digital technologies are operating as expected. Explainers bridge the gap between the technologists and the business managers by providing clarity regarding functionalities of digital technologies. As previously discussed, practitioners-oriented assessments as well as comprehensive frameworks to measure data analytics capabilities also stated the importance of business and management knowledge. The business knowledge is discussed in the next chapter.

Furthermore, the practitioners’ view, which is frequently discussed via professional social media channels, defines data analytics as the ability to spot patterns in data and to transform raw data into actionable insights. Like the discussion above, the technology is discussed as a basic which however seems to have no impact on the core data analytics skills. This type of definition characterizes data analytics skills as mostly hard skills driven by analytical capabilities which are partially enlarged by business knowledge and broader business experience in order to derive actionable insights from data. Similarly, practice-oriented publications define data analytics skills as “identify, analyze, and interpret key data” (Brands & Holtzblatt, 2015).

3.2. Test Procedures for Business Knowledge

Assessment of business knowledge and business skills does not allow the same methodology as discussed above regarding data analytics skills as business knowledge can be classified as company specific. The number of publications discussing this topic is limited. The literature

reviewed is summarized in Table 5 in Appendix 1. The literature is focused on the “internal view” of business knowledge which comprises the assessment of internal processes and intraorganizational topics. The external view of business knowledge focusses on customers, suppliers and competitors.

Generally, literature uses broad definitions for business knowledge and business skills. Lin et al. (2013) defined business skills as knowledge that refers to businesses directly and indirectly. Business knowledge and skills include knowledge of industries and functional areas, management and organizational skills, interpersonal/communication skills as well as specific skills for management of personnel resources and financial resources (Lin et al., 2013). Bassellier and Benbasat (2004) defined two categories of business competence of information technology professionals as “organization-specific knowledge” as well as the “interpersonal and management knowledge” in order to develop and strengthen the relationship with the clients of IT professionals as a valuable partner to the business. The main target is to create linkages of IT departments with other organizational units (Bassellier & Benbasat, 2004). This mainly “internally oriented” framework may be seen as a minimum requirement setting regarding comprehensive business knowledge. The category “interpersonal and management knowledge” is related to interpersonal and leadership skills and should be omitted for the purpose of the discussion in this chapter. The dimensions of category “organization-specific knowledge” are summarized in Table 4 in Appendix 1.

Similarly, Mikalef and Gupta (2021) described business skills in the context of the role explainers for digital technologies. However, the focus is on the connection between digital technologies and business. The main tasks possessing the business skills are discussed as realizing business value for investments in digital technologies, understanding the potential application areas of digital technologies, and explaining digital technologies to non-experts (Mikalef & Gupta, 2021). Wamba et al. (2017) discussed business knowledge in their dimension “personnel expertise” and added the business environment view to the organizational internal business view. However, this description does not correspond to the desired higher business orientation for finance professionals being able to talk the “language of business”. To get a comprehensive view on the business knowledge, the business knowledge requirements for “interface roles”, like the “explainers”, were discussed above. Further below, we follow the discussion from publications analyzing finance employees’ skills to provide a broader view on comprehensive business knowledge requirements.

Oesterreich et al. (2019) discussed “market and business understanding” as one skill of their skill category “professional skills”. The “market and business understanding” comprises the internal view defined as enhanced knowledge and understanding of company’s interdisciplinary business and process. The external view is defined as enhanced knowledge and understanding of company’s market, customers and competitors.

Generally, the business orientation of finance employees and especially the business orientation of management accountants is discussed under the keyword “business partnering” which covers the individual experience as well as the personality of management accountants (Goretzki & Weber, 2012). Business partnering covers strategic topics and close collaboration in core organizational activities. The basis for this activity and especially the basis for intraorganizational acceptance of management accountants is described as the

enhanced knowledge of operational processes (Goretzki & Weber, 2012). Hence, the business partner role covers the internal and external view. Similarly, Egle and Keimer (2016) stated that enhanced understanding of internal processes as well as market knowledge are of high importance to fulfil the business partner role. Trends and potential market changes need to be identified and analyzed. Moreover, the organization's business model and the value added processes needed to be thoroughly understood (Egle & Keimer, 2016). An internal view of business partnering in context of identifying potential use of information is shared by Seufert and Oehler (2016) arguing that enhanced understanding of the single business departments is required. However, the importance of management accountants' understanding of the market and the shaping of product portfolio is discussed to increase in the future (Goretzki & Weber, 2012). Similarly, Payne (2014) noted that market knowledge is of high importance for the finance function.

A more general definition for business partnering is "understanding the business" (Payne, 2014) or applying "language of business" (Richins et al., 2017). In this context, Payne (2014) argued that performing data analytics should provide opportunities to better understand a business and its customers. This point of view creates a specific type of iterative loop between business knowledge and data analytics skills.

4. CONCLUSION

The most recent literature discussing emerging technologies in finance profession stated, that improved skills in data analytics and higher business orientation is the superior path for finance professionals in order to stay a valuable partner to the business under increasing digitalization. This paper analyses test procedures for data analytics skills and comprehensive business knowledge to provide a more detailed understanding of these skills. The paper summarizes the view of practitioners and researchers. Data analytics skills are broadly discussed in practice-oriented publications and research literature. Data analytics skills cover a broad range of skills and are mostly requesting business understanding for data analysts to derive valuable insights and to support decision making. The technical portion of data analysts' skills covers skills in programming, data structures, data analysis and partially machine learning. The data analytics skills discussed in practice-oriented publications and research literature do not focus on technical aspects purely but treat business orientation as important factor. This may be seen as enhancement of the technically-oriented data analyst role and the finance profession may face competition from this role in the future assuming the data analyst role will not be organized within the finance department. Comprehensive business knowledge assessment tests are not discussed broadly in research literature which may be driven by organization-specific context of this skill. However, enhanced understanding of organization-internal processes and enhanced market knowledge are described as important sub-skills of this skill. Furthermore, data analytics and business knowledge are discussed to be part of an iterative improvement loop where both skills can be improved by each other.

As limitations it should be mentioned that the implementation of digital technologies in finance departments is described to be at an early stage and the implication for future skills requirements may be discussed in more detail in the upcoming years. The assessment tests

for data analytics in research literature are mainly discussed in the context of effectiveness and efficiency increase of IT-departments. Moreover, this paper does not analyze the historical aspects of the data analyst role and functions especially in the context of big data.

Future research needs to analyze the development of the data analyst role and functions in historical context to get an understanding how this role changed and to derive implications for the finance profession and required skills development. Moreover, an organizational expert view based on expert interviews or questionnaires may provide further clarification on the data analytics skills requirements of finance professionals at the current stage in comparison to past requirements. This may provide an indication of the development of the skills requirements in the future. However, the disrupting part of digital technologies needs to be taken into consideration. The interdependencies between data analytics skills and business knowledge may be an interesting research topic as well, as this may define in which organizational department the impactful part of data analytics may be performed in the future. Furthermore, the discussed changes or adjustments of the skills for finance employees may have an impact on the effectiveness of the processes or may even change the structure of processes finance departments are currently performing.

References

1. Abad-Segura, E., & González-Zamar, M-D. (2020). Research Analysis on Emerging Technologies in Corporate Accounting. *Mathematics*, 8(9), 1589.
2. Andreassen, R-I. (2020). Digital technology and changing roles: a management accountant's dream or nightmare?. *Journal of Management Control*, 31(3), 209-238.
3. Appelbaum, D., Kogan, A., Vasarhelyi, M., & Yan, Z. (2017). Impact of business analytics and enterprise systems on managerial accounting. *International Journal of Accounting Information Systems*, 25, 29-44.
4. Ashrafi, A., Zare Ravasan, A., Trkman, P., & Afshari, S. (2019). The role of business analytics capabilities in bolstering firms' agility and performance. *International Journal of Information Management*, 47, 1-15.
5. Aydiner, A. S., Tatoglu, E., Bayraktar, E., & Zaim, S. (2019). Information system capabilities and firm performance: Opening the black box through decision-making performance and business-process performance. *International Journal of Information Management*, 47, 168-182.
6. Aydiner, A. S., Tatoglu, E., Bayraktar, E., Zaim, S., & Delen, D. (2019). Business analytics and firm performance: The mediating role of business process performance. *Journal of Business Research*, 96, 228-237.
7. Bassellier, & Benbasat (2004). Business Competence of Information Technology Professionals: Conceptual Development and Influence on IT-Business Partnerships. *MIS Quarterly*, 28(4), 673.
8. Bhimani, A. (2020). Digital data and management accounting: why we need to rethink research methods. *Journal of Management Control*, 31(1/2), 9-23.
9. Brands, K., & Holtzblatt, M. (2015). Business Analytics: Transforming the Role of Management Accountants. *Management Accounting Quarterly*, 16(3), 1-12.
10. Cockcroft, S., & Russell, M. (2018). Big Data Opportunities for Accounting and Finance Practice and Research. *Australian Accounting Review*, 28(3), 323-333.

11. Côte-Real, N., Ruivo, P., Oliveira, T., & Popovič, A. (2019). Unlocking the drivers of big data analytics value in firms. *Journal of Business Research*, 97, 160-173.
12. Davenport, T. H. (2013). Analytics 3.0. *Harvard Business Review*, 91(12), 64-72.
13. Davenport, T. H., & Harris, J. G. (2007). *Competing on analytics: The new science of winning*. Boston, MA: Harvard Business School Press.
14. Duan, Y., Cao, G., & Edwards, J. S. (2020). Understanding the impact of business analytics on innovation. *European Journal of Operational Research*, 281(3), 673-686.
15. Egle, U., & Keimer, I. (Eds.). (2016). *Digitaler Wandel im Controlling (No. 37): Schriften aus dem Institut für Finanzdienstleistungen Zug IFZ*.
16. Ferraris, A., Mazzoleni, A., Devalle, A., & Couturier, J. (2019). Big data analytics capabilities and knowledge management: impact on firm performance. *Management Decision*, 57(8), 1923-1936.
17. Ghasemaghahi, M. (2019). Does data analytics use improve firm decision making quality?. The role of knowledge sharing and data analytics competency. *Decision Support Systems*, 120, 14-24.
18. Ghasemaghahi, M., Ebrahimi, S., & Hassanein, K. (2018). Data analytics competency for improving firm decision making performance. *The Journal of Strategic Information Systems*, 27(1), 101-113.
19. Goretzki, L., & Weber, J. (2012). Die Zukunft des Business Partners - Ergebnisse einer empirischen Studie zur Zukunft des Controllings. *Controlling & Management*, 56, 22-29.
20. Gotthardt, M., Koivulaakso, D., Paksoy, O., Saramo, C., Martikainen, M., & Lehner, O. (2020). Current State and Challenges in the Implementation of Smart Robotic Process Automation in Accounting and Auditing. *ACRN Journal of Finance and Risk Perspectives*, 9(1), 90-102.
21. Gupta, M., & George, J. F. (2016). Toward the development of a big data analytics capability. *Information & Management*, 53(8), 1049-1064.
22. Hayajneh, J. A., Elayan, M. B. H., Abdellatif, M. A. M., & Abubakar, A. M. (2022). Impact of business analytics and π -shaped skills on innovative performance: Findings from PLS-SEM and fsQCA. *Technology in Society*, 68, 101914.
23. Işık, Ö., Jones, M. C., & Sidorova, A. (2013). Business intelligence success: The roles of BI capabilities and decision environments. *Information & Management*, 50(1), 13-23.
24. Janvrin, D. J., & Weidenmier Watson, M. (2017). "Big Data": A new twist to accounting. *Journal of Accounting Education*, 38, 3-8.
25. LaValle, S., Hopkins, M. S., Lesser, E., Shockley, R., & Kruschwitz, N. (2010). Analytics: The new path to value. *MIT Sloan Management Review*, 52(1), 1-25.
26. Lin, T-C., Wang, Y-S., & Wang, Y-Y. (2013). Exploring the determinants of IS developers' behavioural intention to learn business skills. *Behaviour & Information Technology*, 32(11), 1125-1138.
27. Marrone, M., & Hazelton, J. (2019). The disruptive and transformative potential of new technologies for accounting, accountants and accountability. *Meditari Accountancy Research*, 27(5), 677-694.
28. Mikalef, P., & Gupta, M. (2021). Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance. *Information & Management*, 58(3), 103434.
29. Moll, J., & Yigitbasioglu, O. (2019). The role of internet-related technologies in shaping the work of accountants: New directions for accounting research. *The British Accounting Review*, 51(6), 100833.

30. Möller, K., Schäffer, U., & Verbeeten, F. (2020). Digitalization in management accounting and control: an editorial. *Journal of Management Control*, 31(1/2), 1-8.
31. Ni, F., Arnott, D., & Gao, S. (2019). The anchoring effect in business intelligence supported decision-making. *Journal of Decision Systems*, 28(2), 67-81.
32. Oesterreich, T. D., & Teuteberg, F. (2019). The role of business analytics in the controllers and management accountants' competence profiles. *Journal of Accounting & Organizational Change*, 15(2), 330-356.
33. Oesterreich, T. D., Teuteberg, F., Bensberg, F., & Buscher, G. (2019). The controlling profession in the digital age: Understanding the impact of digitisation on the controller's job roles, skills and competences. *International Journal of Accounting Information Systems*, 35, 100432.
34. Payne, R. (2014). Discussion of 'Digitisation, 'Big Data' and the transformation of accounting information' by Alnoor Bhimani and Leslie Willcocks (2014). *Accounting and Business Research*, 44(4), 491-495.
35. Petkov, R. (2020). Artificial Intelligence (AI) and the Accounting Function - A Revisit and a New Perspective for Developing Framework. *Journal of Emerging Technologies in Accounting*, 17(1), 99-105.
36. Pilipczuk, O. (2020). Toward Cognitive Management Accounting. *Sustainability*, 12(12), 5108.
37. Rialti, R., Zollo, L., Ferraris, A., & Alon, I. (2019). Big data analytics capabilities and performance: Evidence from a moderated multi-mediation model. *Technological Forecasting and Social Change*, 149, 119781.
38. Richins, G., Stapleton, A., Stratopoulos, T. C., & Wong, C. (2017). Big Data Analytics: Opportunity or Threat for the Accounting Profession? *Journal of Information Systems*, 31(3), 63-79.
39. Seufert, A., & Oehler, K. (2016). Controlling und Big Data: Anforderungen an die Methodenkompetenz. *Controlling & Management Review Sonderheft*, 1, 74-81.
40. Spraakman, G., Sanchez-Rodriguez, C., & Tuck-Riggs, C. A. (2021). Data analytics by management accountants. *Qualitative Research in Accounting & Management*, 18(1), 127-147.
41. Stoller, A. (2021). Impact of Digital Technologies on Finance Profession. *Global Business Conference 2021 Proceedings*, 199-214.
42. Tippins, M. J., & Sohi, R. S. (2003). IT competency and firm performance: is organizational learning a missing link? *Strategic Management Journal*, 24(8), 745-761.
43. Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J., Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research*, 70, 356-365.
44. Yasmin, M., Tatoglu, E., Kilic, H. S., Zaim, S., & Delen, D. (2020). Big data analytics capabilities and firm performance: An integrated MCDM approach. *Journal of Business Research*, 114, 1-15.

Appendix 1: Tables

Table 1: Skills profile of finance employees (Oesterreich et al., 2019)

Category	Skills	Description	Additional references	
Professional skills	Professional qualification and experience	Basic qualification and professional experience that is needed for task fulfilment, evaluating economic events	Petkov (2020)	
	Traditional financial and management accounting skills	Specific skills from the controlling, finance and accounting discipline that are required for traditional finance tasks	Petkov (2020)	
Business orientation	Market and business understanding	Enhanced knowledge and understanding of the company's market, customers, competitors as well as the company's interdisciplinary business and processes	Andreassen (2020)	
		"Language of business"	Richins et al. (2017)	
Data science skills	Skills in data analytics	Enhanced understanding of the existence and availability of quantitative and statistical methods for data mining purposes		
		Skills required for the acquisition, preparation, integration, analysis and visualization of internal and external data; collection, extraction and analysis of information from diverse databases	Pilipczuk (2020); Janvrin & Weidenmier Watson (2017)	
		The ability to identify and extract patterns and interrelations between variables within a big volume of data		
		Skills in system and data architecture		
		Statistical skills	Advanced mathematical and statistical skills (e.g. in regression analysis) to engage with the possibilities of analytics	
			The ability to apply statistical methods in order to generate exploratory hypotheses from available data	
		Programming skills	Skills in programming and scripting language in order to generate added value from the analyzed data; supervision of automated processes (may be performed by bot managers)	Gotthardt et al. (2020)
		Modelling skills	Skills in data modelling (e.g. to generate forecasts); identification of useful models	Richins et al. (2017)

Table 2: “Practitioners’ view” on assessment of data analytics skills

Provider	Test Set Up	Assessed skills/competencies
Vervoe https://vervoe.com/assessment-library/data-analyst/	Data Analyst Skills Assessment Test: Assessment contains 10 questions that are designed to test the varying skills	Summary: Proficient in maths and demonstrate strong business sense Tested skills: <ul style="list-style-type: none"> ○ Critical thinking: Able to translate data analysis to business outcomes and explain outcomes and recommendations to stakeholders ○ Data models: Connection between data and definition of new data models ○ Data Classification: Skills in analyzing large data sets regarding understanding of required outcome of the data (e.g. sentimental analysis, logistical regression, classification models)
Mercer/Mettl https://mettl.com/test/data-analyst-assessment-test/	Data Analyst Test: Evaluates a candidate's proficiency in Database Query writing, SQL Server Basics, R-Programming and R-Libraries; measures the candidates’ abilities to extract information by analyzing data and suggesting possible outcomes and their proficiency in using R	Summary: Performing data analysis and statistical operations in the R language Tested skills: <ul style="list-style-type: none"> ○ Database Query Writing: Creating Database Query Questions in MS SQL language ○ Hands on Programming: Programmer's efficiency in creating codes in R programming language ○ SQL Server Basics: Skills in SQL Server - General on both intermediate and difficult level ○ R Programming: evaluates a candidate's applied skills in R-Functions ○ R Libraries: candidate's applied skills in R - DPLYR and R - GGLOT2 on both intermediate and difficult level
DevSkiller https://devskiller.com/coding-tests-skill/data-analysis/demo-requested	Data Analysis test: Analysis of knowledge of Data analysis and coding ability, problem-solving and time-management skills	Summary: Technically oriented test mainly on coding and data structure Tested skills: Data analysis, HSQLDB, MySQL, Pandas, Python, SQL, data science, Data Structures, Python, Python 3.x
Adaface https://www.adaface.com/assessment-test/data-science-test	Data Science test: Assesses proficiency in statistics, probability, linear and non-linear regression models and ability to analyze data and leverage Python/ R to extract insights from the data	Summary: Test performed on a library of 10,000+ questions Tested skills: <ul style="list-style-type: none"> ○ Expertise with R tools, Python, and machine learning techniques ○ Ability to clean and prepare data for analysis ○ Experience building robust machine learning models ○ Understanding of linear and non-linear regression models ○ Experience with exploratory data analysis and regression analysis ○ Expertise with data visualization tools
Xobin https://xobin.com/test-portfolio/data-analyst-test	Data Analyst test: Assesses ability to analyze data, extract information, suggest conclusions, and support decision-making	Summary: Multiple choice questions, case study or assignments Tested skills: <ul style="list-style-type: none"> ○ Quantitative ability ○ Reasoning ability ○ Logical thinking ○ SQL & Oracle Programming ○ Problem Solving

Table 3: Measurement of data analytics skills

Autor	Scale	Dimensions: items
Hayajneh et al. (2022); Ashrafi et al. (2019) - (both publications show same items adapted from LaValle et al. (2010))	5-point scale from "not at all" to "to a very great extent"	Business analytics capabilities: <ul style="list-style-type: none"> ○ The organization predicts and prepares for the future by proactively evaluating scenarios or potential trade-offs ○ Decision making is based on rigorous analytic approaches (e.g., quantitative modelling, simulation) ○ The organization manages data to enable the ability to share and aggregate data across departments or business units ○ Business information and analytics differentiate us within the industry ○ Improving our information and analytics capability is a top priority
Ghasemaghaei et al. (2018)	7-point Likert scales ranging from "strongly disagree" to "strongly agree" adapted from Tippins & Sohi (2003)	Analytical skills: <ul style="list-style-type: none"> ○ Our data analytics users are knowledgeable when it comes to utilizing such tools. ○ Our data analytics users possess a high degree of data analytics expertise. ○ Our data analytics users are skilled at using data analytics tools.
Yasmin et al. (2020)	Application of two multicriteria decision-making methodologies	Human resource capabilities: <ul style="list-style-type: none"> ○ Our IS staff has adequate knowledge of the computer-based system. ○ Our firm seeks a high degree of computer-based technical expertise of the IS department's employees. ○ Our IS staff can implement the right application at the right time. ○ Our IS staff can discover potential problems rapidly in the system. ○ Our IS staff is capable of quickly maintaining the system whenever a failure occurs.
Aydiner, Tatoglu, Bayraktar & Zaim (2019)	Five-point Likert from "strongly agree" to "strongly disagree"	Human resource capability: <ul style="list-style-type: none"> ○ Our IS staff has adequate knowledge of computer-based systems. ○ Our company seeks high degree of computer based technical expertise for IS department/unit's employees. ○ Our IS staff has ability to learn quickly and apply new technologies as they become available. ○ Our IS staff has the skills and knowledge to manage projects in our current business environment. ○ Our IS staff has the ability to work closely and efficiently with our employees and customers. ○ Our IS staff is capable of discovering potential problems rapidly in the systems. ○ Our IS staff is capable of quickly maintaining the system whenever a failure occurred.
Aydiner, Tatoglu, Bayraktar, Zaim & Delen (2019)	Five-point Likert from "never" to "always" regarding relative use of applications	Data acquisition and processing: <ul style="list-style-type: none"> ○ Information propagation; data warehousing; data capturing system; document management system ○ Prescriptive analytics: ○ Data analysis system; product development system; E-commerce ○ Predictive analytics:

		<ul style="list-style-type: none"> ○ Marketing intelligence system; investment intelligence system; data mining; decision support system ○ Descriptive analytics: ○ Visualization; dashboard; scorecard; OLAP analysis
Ghasemaghaei (2019)	Seven-point scale (not specified)	<p>Analytics capability:</p> <ul style="list-style-type: none"> ○ Our data analytics users possess a high degree of data analytics expertise. ○ Our data analytics users are knowledgeable when it comes to utilizing such tools. ○ Our data analytics users are skilled at using data analytics tools.
Côrte-Real et al. (2019)	Seven-point scale from “strongly disagree” to “strongly agree”	<p>Big data analytics use (to what extent is big data analytics used to support key business activities in each of the following business processes):</p> <ul style="list-style-type: none"> ○ Supplier relations: forge closer links with suppliers, monitor quality, monitor delivery times, gain leverage over suppliers, negotiate pricing. ○ Production and operations: improve throughput, boost labor productivity, improve flexibility and equipment utilization, streamline operations. ○ Product and service enhancement: embed IT in products, increase pace of development/R&D, monitor design cost, improve quality, support innovation. ○ Marketing and sales: spot market trends, anticipate customer needs, build market share, improve forecast accuracy, evaluate pricing options. ○ Customer relations: respond to customer needs, provide after-sales service and support, improve distribution, create customer loyalty
Ferraris et al. (2019)	Seven-point scale (not specified)	<p>Big data analytics management capabilities:</p> <ul style="list-style-type: none"> ○ We continuously examine the innovative opportunities for the strategic use of big data analytics. ○ We perform big data analytics planning processes in systematic and formalized ways ○ When we make big data analytics investment decisions, we think about and estimate the effect they will have on the productivity of the employees’ work ○ When we make big data analytics investment decisions, we consider and project about how much these options will help end-users make quicker decisions ○ In our organization, information is widely shared between business analysts and line peoples, or those who make decisions or perform jobs have access to all available know-how ○ In our organization, the responsibility for big data analytics development is clear.
Mikalef & Gupta (2021)	Not specified	<p>Technical skills (artificial intelligence/data science skills):</p> <ul style="list-style-type: none"> ○ The organization has access to internal and external talent with the right technical skills to support AI work ○ Our data scientists are very capable of using AI technologies (e.g. machine learning, natural language processing, deep learning) ○ Our data scientists have the right skills to accomplish their jobs successfully ○ Our data scientists are effective in data analysis, processing, and security

		<ul style="list-style-type: none"> ○ Our data scientists are provided with the required training to deal with AI applications ○ We hire data scientists that have the AI skills we are looking for ○ Our data scientists have suitable work experience to fulfil their jobs
Duan et al. (2020)	Seven-point scale from “none at all” to extensively (regarding extent of use)	<p>Business analytics:</p> <ul style="list-style-type: none"> ○ Descriptive (What has happened and what is happening?): e.g. uses business intelligence and data mining to provide the context of and trending information on past or current events. ○ Predictive analytics (What could happen?): e.g. uses statistical models and forecasts to provide an accurate projection of the future happenings and the reasoning as to why. ○ Prescriptive analytics (What should we do?): e.g. uses optimization and simulation to recommend one or more courses of action and show the likely outcome of each decision.
Wamba et al. (2017); Rialti et al. (2019)	Seven-point scale from “strongly disagree” to “strongly agree”	<p>Technical knowledge:</p> <ul style="list-style-type: none"> ○ Our analytics personnel are very capable in terms of programming skills (e.g., structured programming, web-based application, CASE tools, etc.). ○ Our analytics personnel are very capable in terms of managing project life cycles. ○ Our analytics personnel are very capable in the areas of data management and maintenance. ○ Our analytics personnel are very capable in the areas of distributed computing. ○ Our analytics personnel are very capable in decision support systems (e.g., expert systems, artificial intelligence, data warehousing, mining, marts, etc.). <p>Technological management knowledge:</p> <ul style="list-style-type: none"> ○ Our analytics personnel show superior understanding of technological trends. ○ Our analytics personnel show superior ability to learn new technologies. ○ Our analytics personnel are very knowledgeable about the critical factors for the success of our organization. ○ Our analytics personnel are very knowledgeable about the role of business analytics as a means, not an end.
Gupta & George (2016)	Not specified	<p>Technical skills:</p> <ul style="list-style-type: none"> ○ We provide big data analytics training to our own employees ○ We hire new employees that already have the big data analytics skills ○ Our big data analytics staff has the right skills to accomplish their jobs successfully ○ Our big data analytics staff has suitable education to fulfil their jobs ○ Our big data analytics staff holds suitable work experience to accomplish their jobs successfully

Table 4: Dimensions of category organization-specific knowledge (Bassellier & Benbasat, 2004)

Dimension	Description
Organization overview	<ul style="list-style-type: none"> ○ Business environment ○ Business context in which technologies are developed, deployed, and used ○ Organizational goals and objectives, core capabilities and critical success factors
Organizational units	<ul style="list-style-type: none"> ○ Functional areas of organization incl. objectives and problems
Organizational responsibility	<ul style="list-style-type: none"> ○ Overall business responsibility ○ Understanding of development of the business
Knowledge of IT-business integration	<ul style="list-style-type: none"> ○ Business problem solving and integration business development with IT capability ○ Building synergies with other departments ○ Business system thinkers (understanding of processes that technology can enable in the future)

Table 5: Measurement of business knowledge

Author	Dimensions: items
<p>Bassellier & Benbasat (2004)</p> <p>Scale: Five-point scale”</p>	<p>Organization-specific knowledge:</p> <p>Organization overview</p> <ul style="list-style-type: none"> ○ Rate your level of knowledge of the organization’s external environment (e.g., government, competitors, suppliers, and customers) ○ Rate your level of knowledge of the goals and objectives of the organization as a whole ○ Rate your level of knowledge of the core capabilities of the organization ○ Rate your level of knowledge of the key factors that must go right for the organization to succeed <p>Organizational units</p> <ul style="list-style-type: none"> ○ Rate your level of knowledge of the main challenges that different divisions in the organization face in achieving their objectives ○ Rate your level of knowledge of the language (e.g., key concepts, jargon, etc.) of the different divisions in the organization ○ How well do you understand the work processes of the different divisions in your organization? ○ Rate your level of knowledge of the connections and interdependencies between the various divisions in the organization <p>Organizational responsibility</p> <ul style="list-style-type: none"> ○ To what extent do you take actions to stay informed about business developments not directly related to IT? ○ How much do you participate in business activities that are not directly related to IT? ○ To what extent are you concerned by the overall performance of your business organization? ○ To what extent does your work have an impact on the performance of the organization? <p>Knowledge of IT-business integration</p> <ul style="list-style-type: none"> ○ How experienced are you at recognizing potential ways to exploit new business opportunities using IT?

	<ul style="list-style-type: none"> ○ How experienced are you at analyzing business problems in order to identify IT-based solutions (understand situations, getting the "big picture", identifying underlying root problems, etc.)? ○ How experienced are you at evaluating the organizational impacts of IT solutions? ○ Rate your level of knowledge of the alignment between business goals and information systems goals in the organization as a whole ○ Rate your level of knowledge of the way IT contributes to the value of the organization
<p>Mikalef & Gupta (2021)</p> <p>Scale: Not specified</p>	<p>Business skills (artificial intelligence/data science skills):</p> <ul style="list-style-type: none"> ○ Our managers are able to understand business problems and to direct AI initiatives to solve them ○ Our managers are able to work with data scientists, other employees and customers to determine opportunities that AI might bring to our organization ○ Our managers have a good sense of where to apply AI ○ The executive manager of our AI function has strong leadership skills ○ Our managers are able to anticipate future business needs of functional managers, suppliers and customers and proactively design AI solutions to support these needs ○ Our managers are capable of coordinating AI-related activities in ways that support the organization, suppliers and customers ○ We have strong leadership to support AI initiatives and managers demonstrate ownership of and commitment to AI projects
<p>Wamba et al. (2017)</p> <p>Scale: Seven-point scale from "strongly disagree" to "strongly agree"</p>	<p>Business knowledge:</p> <ul style="list-style-type: none"> ○ Our analytics personnel understand our organization's policies and plans at a very high level. ○ Our analytics personnel are very capable in interpreting business problems and developing appropriate solutions. ○ Our analytics personnel are very knowledgeable about business functions. ○ Our analytics personnel are very knowledgeable about the business environment.

ZalaZONE: is that a complex innovation ecosystem?

Csilla Tóth

University of Pannonia
Dr. Michelberger Pal u. 3., 8900 Zalaegerszeg, Hungary
e-mail: csilla.toth@zalazonepark.hu

András Hány

University of Pannonia
Dr. Michelberger Pal u. 3., 8900 Zalaegerszeg, Hungary
e-mail: andras.hany@apnb.hu

Beáta Fehérvölgyi

University of Pannonia
Dr. Michelberger Pal u. 3., 8900 Zalaegerszeg, Hungary

Abstract

A key topic of researches on innovation ecosystems is the interpretation of the given ecosystem and the identification of specific features of the system. Based on the related research of the authors, the aim of the current paper is to discuss methodological issues of innovation ecosystems, using theoretical approaches, then interpretation through the example of the ZalaZONE Science and Innovation Park program. In doing so, initiatives as part of the Hungarian innovation ecosystems, such as the national laboratories, the innovation platforms and other programs also will be presented. After that, the paper addresses the theme of cooperation between the actors of an ecosystem, and finally, in the context of operational sustainability, an exemplary interpretation of the developed business framework model follows. As a result of the discussion, the authors draw conclusions about the current state of the ZalaZONE Science and Innovation Park and the possibilities for further development, pointing out the complex nature of the innovation ecosystem which aspect is still subject of running researches.

Keywords

Science Park, innovation ecosystem, complex systems, ZalaZONE

1. INTRODUCTION

Innovation is considered to be a fundamental source of significant wealth creation within the economy. As high-tech industries have greater growth potential, the best way to stimulate job creation and economic growth is to help transfer innovation more effectively from the research economy to the commercial sector. An important feature of the innovation ecosystem is that the resources available to the research economy are linked to the resources produced by the commercial economy. Another characteristic is that units within an ecosystem are either geographically localized or strategically linked to focus on the development of a particular technology (Westhead & Batstone, 1998).

Over the past 15 years, the concept of innovation ecosystems has become popular among expanding range of related researches, with typically business and strategic origins and focus (Gomes, et al., 2018). The history of the concept of innovation ecosystem differs significantly from the conceptual history of the innovation system. The more intensive use of the term began after the publication of a Harvard Business Review article by Adner (2006), which also contains a definition of probably the most widely used definition of innovation ecosystems. It defines the innovation ecosystem as “cooperation agreements through which businesses combine their offerings into a coherent, customer-oriented solution”. The main roots of the concept lie in the related concept of business ecosystems used by Moore (1993) and others. Empirical descriptions of innovation ecosystems often identify the importance not only of cooperating but also of competing actors (e.g. Rohrbeck et al., 2009; Hannah & Eisenhardt, 2018) and products (e.g. Carayannis & Campbell, 2009; Nambisan & Baron, 2013) and the importance of competing technologies and standards (Arthur, 1989). It seems that the shift from the concept of business ecosystems to innovation ecosystems may have changed the emphasis too much from competition to collaboration.

Granstrand and Holgersson (2020) introduce a new definition of innovation ecosystems in their publication. According to their findings, the innovation ecosystem is sum of the actors, activities and product, as well as the institutions and relationships, including complementary and substitute relationships, that are important for the innovative performance of an actor. In this definition, the content include products and services, tangible and intangible resources, technological and non-technological resources, and other types of inputs and outputs of a system, with key focus on innovations. In other words, the innovation ecosystem may include a system of actors with cooperative (complementary) and competitive (substitute) relationships with or without a focus company, and a product system that includes complementary and substitute relationships. The innovative performance is used rather than innovations or innovativeness to incorporate related imitations into the system and to facilitate operationalization from an economic point of view, thus also avoiding loopholes.

A lot of suggestions for the conceptual definition of innovation ecosystems have been made by many authors but no final definition is still available. Although mentioned some of them above, highlighting the key message in connection to the subject of the current research are the followings. An innovation ecosystem like a Science Park is:

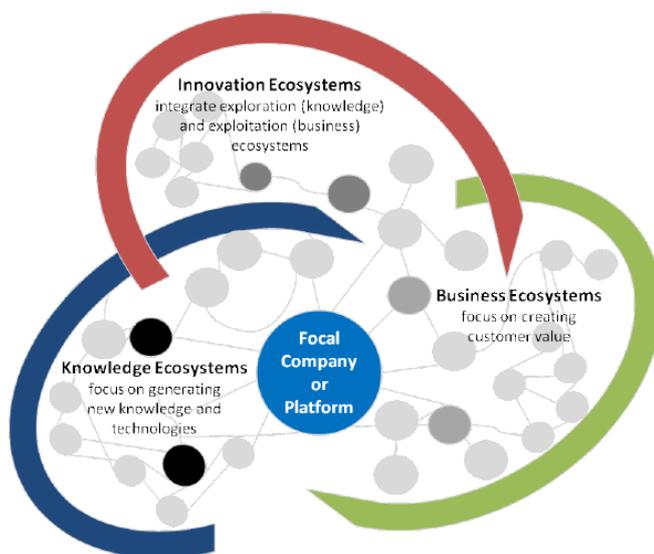
- balance of research and commercial economy,
- should have a sectoral focus,

- include several and different type of players, activities and products, but cooperation is one of the most important success factor.

The Triple Helix is one of the most frequently used model as an institution-oriented approach to innovation ecosystems. It also provides a conceptual foundation for science and innovation parks. The “Triple Helix” model developed by (Etzkowitz & Leydesdorff, 2000) emphasizes three “helices” that are related to the innovation system: academia/universities, industry, and state/government. Etzkowitz and Leydesdorff explains “university-industry-government relations” and networks, with particular emphasis on triangular and hybrid networks, where these helices overlap. As an extension of the Triple Helix model, some authors (e.g. Carayannis & Campbell, 2009) have proposed the “Quadruple Helix” model.

Katri (2015) provides a detailed overview of different approaches to business, innovation, and knowledge ecosystems (see Figure 1). This is useful to understand the positioning and content implementation of a Science Park which is usually not based on a pure model, but it can also carry different characteristics of different types of innovation ecosystems. The literature on business ecosystems as well as service or industrial ecosystems highlights economic outcomes and business relationships between actors. The discussion of innovation (eco) systems and regional clusters focuses on mechanisms and policies that facilitate the creation of innovative startups around regional centers or clusters. The main interest and outcome of knowledge ecosystems is the creation of new knowledge through joint research work, collaboration, or the development of the knowledge base.

Figure 1: Types of ecosystems



Source: Katri (2015)

However, this kind of perspective is limited to describe a truly functioning innovation system, because it does not take into account its complex social dynamics. Probably this has resulted in the quadruple and n-tuple models, and another triple-helix approaches, which have still limitations.

2. THE NEED FOR THE COMPLEXITY THEORY APPROACH

The main outcome of the knowledge ecosystem is new know-how, which can be shaped by drawing attention to the network nodes where knowledge is created and retained (Quin, et al., 1998). Open source communities are well-known examples of this type of ecosystem based on knowledge exchange (Koenig, 2012), so recent research suggests that colocation can also mean virtual proximity, thus creating the ability to collaborate between actors. According to the innovation ecosystem approach of Engel & del Palacio (2011), fostering growth, interaction and the creation of innovative startups around so-called knowledge centers is emphasized.

It is generally accepted that ecosystems require providers of complementary innovations, products or services that may belong to different industries and are not obliged to enter into contractual agreements, but nevertheless have significant interdependence. In this sense, ecosystems do not fit into the classic company-supplier relationship, the “porter” value system.

The Triple Helix approach is basically oriented to describe a truly functioning innovation system, but it does not take into account complex social dynamics of the system. Jucevicius and Grumadaite’s (2014) analysis interprets a gradual shift from an innovation system to an “innovation ecosystem” in a comprehensive study discussing aspects like coevolution, self-organization, and imbalance. This study starts takes the assumption that while institutional and systems theories are rather static, the development of innovation ecosystems requires a more dynamic approach.

Sherman and Shultz (1998) defined complexity as follows: “Complexity refers to a state of the universe that is integrated, yet too rich and varied to be understood by us in a simple mechanical or linear way. In this way, we can understand many parts of the universe in ways, but larger and more complex related phenomena can only be approached on the basis of principles and patterns, not from details. Complexity deals with the nature of appearance, innovation, learning and adaptation.”

In his review study, Mason (2007) provides a detailed overview of the antecedents and theoretical characteristics of complex systems. Given that complex systems are generally on the verge of chaos and equilibrium, complexity theory and chaos theory are contiguous. However, some authors (e.g., Cilliers, 1999) keep the discussion between chaos theory versus complexity theory. Although complex systems carry some degree of unpredictability, they are not entirely chaotic. One reason for this is spontaneous self-organization and the ability to adapt, which is ultimately able to ensure the sustainability of the system. While there is no uniform theory of complexity, there is a relative consensus in the literature on some key concepts: self-organization, network structure, existence on the verge of chaos (Kelly, 2003).

What makes complex systems so interesting is that as a result of the interaction between its parts, the behavior of the parts changes in such a way that the whole system follows a new pattern of behavior that differs from the properties of the parts. That is, the behavior of the whole system cannot be predicted from the examination of the parts alone, the global

properties follow new rules (Vicsek, 2003). The complex and turbulent environment leads to the concept of Complex Adaptive Systems (CAS). The Complex Adaptive Systems (CAS) approach can offer valuable perspectives for understanding and describing innovation ecosystems. This kind of perspective, based on complexity theory, takes into account the complex dynamic nature of the system and focuses on productive self-organization rather than forcing top-down linear solutions.

In the last decade, the topic of Complex Adaptive Systems (CAS) has been developed through broad research background. Carmichael and Hadzikadic (2019) summarize the principles of CAS, highlighting the peculiarity of complex systems that system-level characteristics cannot be understood or defined from the side of system components. Lansing (2003) approaches complex systems from several perspectives; citing mathematical, economic, life science examples. Bonnici (2015) defined complex systems as systems that contain diverse elements, are interconnected, can be interpreted as a whole, have the ability to learn based on experience, and are able to adapt to changing external conditions. Complex systems are not driven by a single manager but by a collective force. The interpretation of classical business models in complex systems raises interesting questions. Hybrid solutions, i.e., hierarchical structures and CAS features, can be present together. Kaufmann (1993) has addressed the topic of self-organization in several of his publications.

Complexity theory, then, does not seek to predict the future or determine the "ideal" state of a system, but rather to describe the present and to bring to the fore what can be changed. The "if the inputs are set correctly, the desired outputs will follow" attitude does not necessarily work by nature in the development of complex systems such as innovation ecosystems.

To date, therefore, the dilemma is the exact definition of a feature as "complex", as well as its relationship to similar terms such as complex and intricate. In fact, complexity theory is about studying complex or difficult situations. While business and industrial systems need to have the highest level of complexity, organizations themselves prefer simplicity.

3. INNOVATION ECOSYSTEMS AS COMPLEX SYSTEMS

The extent to which innovation ecosystems should be seen as different from, or rather complementary to traditional innovation systems is still the subject of researches. The innovation system as an approach has been traditionally based on the approach of institutional economics and related systems research (business systems, social systems or clusters). The innovation ecosystem, on the other hand, examines the nature of successful innovation systems and emphasizes that the system is much more than the sum of its parts. The innovation ecosystem depends only partly on the presence of components, much more on their identity, significance, networking capabilities, culture of trust, and pragmatic collaboration. In this respect, therefore, the innovation ecosystem approach complements rather than contradicts the innovation systems approach, as traditional logic suggests that elements must be created first before we can talk about their relationship (Jucevicius & Grumadaite, 2014).

The development of complex dynamic, non-hierarchical systems is not so much about finding the right composition of elements, but rather about interpreting their relationships and interactions in a non-linear and non-hierarchical way. It is not a question of defining the system and its boundaries, but of facilitating the self-organization of the actors and the behavior of the system based on multiple interactions.

As a conclusion of the literature review, it can be concluded that the innovation ecosystems can be well described in the perspective of the complex systems theory, rather than either the usual system theory or the classic institutional innovative approaches.

4. CONCEPTUALIZATION AND METHODOLOGY OF THE PAPER

Based on the scientific researches it is apparent that the various authors approach the complex systems theory in different ways. There are certain features basically agreed by most researches but there are also some specific attributes by the researchers. Taking the complex systems theory gives a proper frame for further discussions and investigations of innovation ecosystem. This way, first, the relevant descriptive features are intended to be defined. Then, the actual results of the authors can be used for further discussions. Finally, the already developed innovation ecosystem model might be further developed based in the findings.

The ZalaZONE Science Park is located next to the ZalaZONE automotive proving ground, for which the analysed innovation ecosystem model is being developed. The ZalaZONE automotive proving ground started its operations in 2019, and the ZalaZONE Research and Technology Center was established in the same year as the first multiplicatory effect of the proving ground which is in its full range available from 2021. This provides the basis and indicator of the innovation ecosystem model. The main catalysator was the appearance of the proving ground, but current forward-looking plans have made it necessary to extend it, creating an ecosystem at the center of research that requires the development of a complex innovation system in the ZalaZONE environment.

5. EXPLANATION OF THE ZALAZONE INNOVATION ECOSYSTEM MODEL

ZalaZONE Science Park has three main poles which are detailed in the followings.

5.1. Pole_1: The ZalaZONE Automotive Proving Ground

Given the growing trends in automated driving and driving assistant technologies, both manufacturers and developers are facing the challenge of limited vehicle testing and validation capabilities. While traditional testing options are only available to OEMs, open test tracks are mostly reserved. Furthermore, European test facilities do not appear to be prepared for the needs of high technology in an ever-changing environment. There is clearly a high demand for a cutting-edge testing environment in the market. Most facilities are outdated, others have to cope with full utilization. Few of them are able to meet complex needs for self-driving and automated mobility solutions, where multiple functions can be tested in different technical situations in a secure environment. Thus, ZalaZONE's automotive

testing facility and its environment in Zalaegerszeg (www.zalazone.hu) manages a significant market niche. The decision of the Hungarian government in 2016 was followed by the rapid implementation of the project with its completion in 2021.

5.2. Pole_2: Involvement of Development Centers and Industrial Sites

The main goal is to involve companies that are either primarily involved in the development chain (like a development center) or rely on high value-added activities. As the vast majority of European test tracks are committed to a vehicle manufacturer and it is generally true that other test tracks do not have the surface to test such complex and advanced technologies and that ZalaZONE geographical location is optimal, this offers significant benefits for a local development center unit.

The other major industrial investment was made in 2020 in the field of advanced defense industry to choose Zalaegerszeg as the site for the construction of a new vehicle fleet to be manufactured and delivered from locally. This industrial extension led to the need for a test track section specifically for testing and validation off-road vehicles. In addition, further capacities are created for various testing purposes, to validate current modern technologies (e.g. EMC or extreme climate conditions). Still, open areas are available for companies intending to settle in the future that are closely related to the high-tech industry, testing and validation in line with focus of the park.

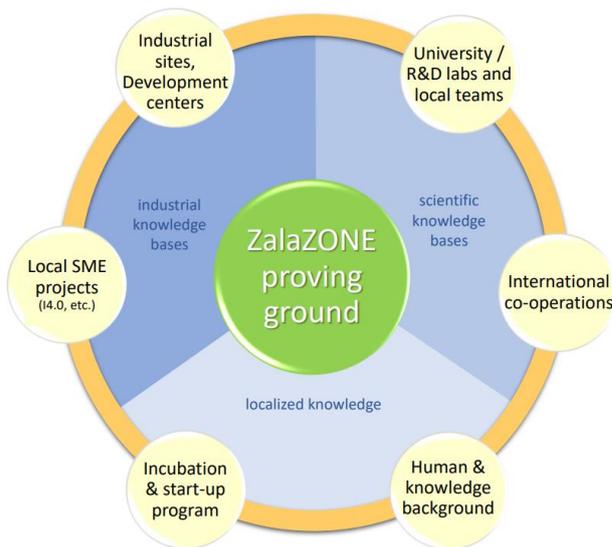
5.3. Pole_3: The ZalaZONE Research and Technology Center

The aim of the development of the ZalaZONE Science and Innovation Park is to promote the creation of an innovation ecosystem in the vicinity of the ZalaZONE test track, thus contributing to the strengthening of the translational impact of the facility and the strengthening of the related knowledge background. As a result of the development, companies in the park can build on the knowledge base of universities and other service providers that set up research and development bases locally and lead the way in cooperation, research and development and innovation. This results in an innovation ecosystem that strengthens the economic stimulus role of actors based on mutual synergies. Within the park, the ZalaZONE Research and Technology Center implements a research, innovation and educational environment where the foundation of practical outputs and practical knowledge, the expansion of developments that meet economic and industrial needs and value-added research are paramount. It gives space to various universities and research institutes to develop their developments related to the automotive test track. It also provides an opportunity for professional solutions to industry problems in close collaboration with industrial companies that develop and apply global leading technologies. The center's professionals and collaborating partners provide research, development, innovation and technical service solutions to emerging industrial problems and challenges in the automotive, mechatronics, software and communications technology developments, as well as mechanical engineering, manufacturing and materials technologies.

5.4. The ZalaZONE Innovation Ecosystem Model

Figure 2 shows the functional areas of the ZalaZONE Science and Innovation Park.

Figure 2: Model of ZalaZONE innovation ecosystem model



Source: own editing

The model is based on the Triple Helix approach (industry-governmental-academia collaboration). It is based on the proving ground for the automotive industry as key governmental investment. It relies on additional local resources, industrial resources and scientific (university, research institute) resources. The other six main development areas that have been set up are based on this consideration of balance of research and commercial economy, reflecting the key goals of the ecosystem:

- Development centers, industrial actors: the aim is to involve companies that either carry out activities that are primarily part of the development chain (as a development center) or that operate on high value-added activities.
- University-industrial laboratories: the aim is to involve industrial-oriented research laboratories that serve research purposes in addition to service activities, can use the test track infrastructure to create value, and their activity can extend beyond the park.
- Incubation and start-up program: the aim is to accommodate start-up business initiatives that fit into the ecosystem and collaboration system of the science and innovation park.
- Strengthening the human and intellectual background: the aim is to ensure the successful functioning of the ecosystem and the human background needed for it, as well as its continuous development.
- Linking to SME and partner projects: the aim is to help ecosystems emerge along regional and cooperating SME networks as local integration.
- International co-operations: the aim is the external integration of the innovation ecosystem into the global value chain.

6. INITIATIVES TO SUPPORT THE INNOVATION ECOSYSTEM DEVELOPMENT IN HUNGARY

Figure 3 shows an overview of the governmental programs to support innovation ecosystem programs, illustrating that there is a wide range of toolbox available in Hungary for companies and institutions active in the field of research and development and innovation. Most of the structures we have mentioned are industry-university-research-centered project opportunities, which will also appear in ZalaZONE park.

Figure 3: Hungarian innovation ecosystem tender structure



Source: Ministry of Innovation and Technology (2021)

The key tools and programs also relevant and used at ZalaZONE innovation ecosystem are:

- Science Park program (SP)
- Competence Centers (KK)
- National Laboratory (NatLab)
- Thematic Excellence Programs (TKP)
- Different EU-funded and nationally subsidized project constructions (industry-university cooperations)

6.1. Competence Centers as Development Research Infrastructures

The main goals of the call are:

- to create R&D&I capacity that meets the needs of industrial partners,
- to develop competitive products and services,
- to develop the competitive production of products, as a result of which the products concerned remain or become marketable a partner companies.

In order to achieve the above objectives, the Competence Centers seek to develop an organizational form of industrial-service higher education cooperation that is suitable for:

- R&D activity based on the competencies of the higher education institution in line with industrial development trends to build infrastructure capacity,
- a significant number of young researchers in Hungary (graduate, doctoral, postdoctoral) integration, launching new MSc-level courses, industrial PhD dual courses,

- competitive products and services in continuous cooperation with economic partners to develop,
- long-term R&D cooperation with the established research and infrastructural capacity with economic partners,
- development of innovative business models.

During the application, the university and the company in consortium form can carry out the research in which the university has a leading role.

6.2. National Laboratories as Outstanding Scientific Hubs in Some Disciplines

The National Laboratory is a collaborative, institutionalizing, dynamic arena for the social, economic and environmental utilization of research results, opening up a new, international dimension to exploratory and experimental approaches. The main objectives of the National Laboratory program are:

- concentration of Hungarian professional know-how in a given topic area,
- developing competencies capable of responding internationally to major global challenges,
- social, economic and environmental utilization of research results (knowledge transfer).

In the field of research and development, the establishment of 17 Laboratories has started, including the National Laboratory of Autonomous Systems, involving ZalaZONE ecosystem, too.

6.3. Thematic Excellence Program

The Thematic Program of Excellence (TKP) was launched in 2019 with the intention of providing higher education institutions and other research institutes to carry out their research programs primarily meet the criteria of innovation and practical applicability. The main goals of the program are:

- designed for higher education building on the professional excellence of institutions and public research institutes (hereinafter referred to as "institutions"),
- so-called thematic research programs to carry out in order to support R&D activities like:
 - a product with a significant scientific and / or technical novelty, technology or service be developed and / or;
 - the product, technology or service resulting from the thematic research be commercially viable and / or;
 - the system of research conditions is improved;
 - the supply of researchers should recover;
 - greater embedding in the international research community;
 - the focus on research and development and innovation should be more pronounced in higher education institutions and the operation of research sites;

- the results of the research are used from a social, economic and environmental point of view, support initiatives to this end;
- establish cooperation with other RDI actors;
- the business of the product, technology or service resulting from the thematic research or promote its social utility.

6.4. Economy Development and Innovation Operational Program (GINOP)

In response to the challenges, the program intends to apply the policy objectives as follows:

- creating a more competitive and intelligent Europe through innovative and smart economic transformation and regional ICT connectivity promotion of PO1 (technological processes);
- creating a more social and inclusive Europe with social rights in Europe implementation of the pillar PO4 (labor market processes);
- creating a Europe closer to its citizens for all types of regions promoting sustainable and integrated development and local initiatives PO5 (changes affecting sustainability).

In this context, ZalaZONE partners were also in competition to join these calls, including the following main areas:

- Digitization, automation: thanks to rapid technological development the entire vertical of business operations is changing. The production, sales and corporate governance processes are equally affected by new technologies widespread.
- New operating models: the development and transformation of the global market, global value chains changes, digitization are both new types of business models, new operating models encourages or forces the use of businesses. The importance of innovation is increasing. In some ways here The generational change characteristic of a wide range of Hungarian enterprises can be classified which also makes a change in the operating and management model of enterprises necessary.
- The revaluation of a sustainable economy: mitigating the effects of climate change and in order to reduce the burden on the environment, it is necessary to reduce the volume of greenhouse gases and the generation of waste. Therefore, businesses green aspects are becoming increasingly important in resource management, such as building a circular economy and accelerating decarbonisation.

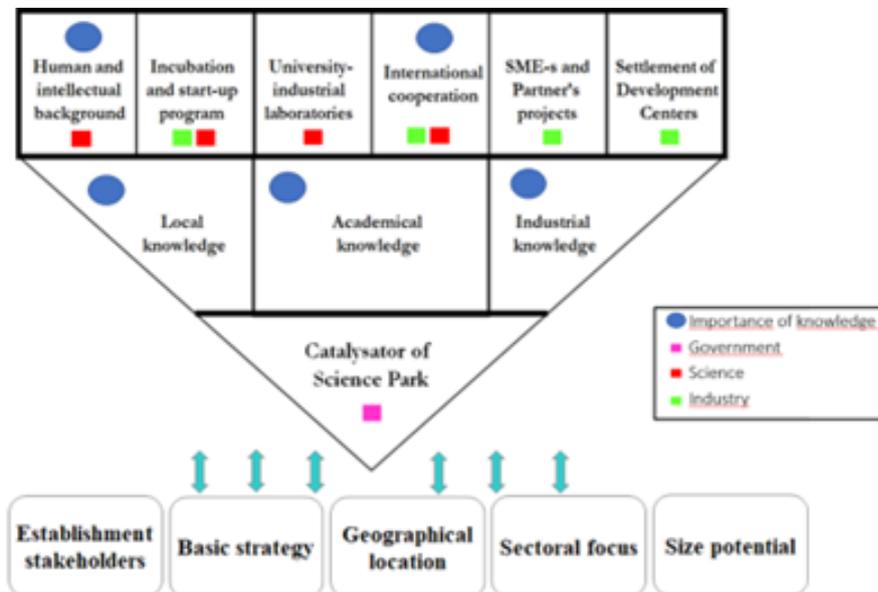
Based on all this, it can be concluded that the integrated application of innovation economy development tools are effective to reach concentrated results so as to reach internationally outstanding performance and support growing of an innovation ecosystem.

7. SUMMARY AND CONCLUSIONS

The aim of the research was to summarize the theoretical themes related to the research of the Science Parks as innovation ecosystems. Based on these contexts, it was attempted to draw conclusions about the concentration points of researches related to the ZalaZONE innovation ecosystem model. Based on the considerations, the authors further developed the

already published model of innovation ecosystem, using literature findings, triple helix concepts, ZalaZONE experiences and governmental program benefits as shown in Figure 4. The model and findings in the field of using complexity theories to understand, describe and develop innovation ecosystems are subject of running and further researches.

Figure 4: The revised innovation ecosystem model of Toth (2021)



Source: own editing

References

1. Adner, R. (2006). Match your innovation strategy to your innovation ecosystem. *Harvard Business Review*, 84(4), 98-107.
2. Arthur, W. (1989). Competing technologies, increasing returns, and lock-in by historical events. *Economy Journal*, 99(394), 116-131.
3. Bonnici, T-S. (2015). Complex Adaptive Systems. ResearchGate, DOI: 10.1002/9781118785317.weom120209
4. Carayannis, E., & Campbell, D. (2009). 'Mode 3' and 'Quadruple Helix': toward a 21st century fractal innovation ecosystem. *International Journal Technology Management*, 46(3/4), 201-234.
5. Carmichael, T., & Hadzikadic, M. (2019). The Fundamentals of Complex Adaptive Systems, DOI: 10.1007/978-3-030-20309-2_1, 2-16
6. Cilliers, P. (1999): Complexity and postmodernism. Understanding complex systems - Reply to David Spurrett. *South African Journal of Philosophy*, 18(2), 275-278,
7. Engel, J., & del Palacio, I. (2011). Global Clusters of Innovation: The case of Israel and Silicon Valley. *California Management Review*, 53(2), 27-49.
8. Etzkowitz, H., & Leydesdorff, L., 2000. The dynamics of innovation: from Nation Systems and „Mode 2” to a Triple Helix of university–industry–government relations. *Research Policy*, 2, 109-123.

9. Gomes, A., Leonardo, L., Salerno, A., Ikenami, M., & Kazuo, R. (2018). Unpacking the innovation ecosystem construct: evolution, gaps and trends. *Technol. Forecast. Soc. Chang.*, 136, 30-48.
10. Granstrand, O., & Holgersson, M. (2020). Innovation ecosystems: A conceptual review and a new definition. *Technovation*, 90-91, 201098.
11. Hannah, D., & Eisenhardt, K. (2018). How firms navigate cooperation and competition in nascent ecosystems. *Strateg. Management Journal*, 39(12), 3163-3192.
12. Jucevicius, G., & Grumadaite, K. (2014): Smart development of innovation ecosystem, 19th International Scientific Conference; Economics and Management 2014, ICEM 2014, 23-25.4.2014., Riga, Latvia, Procedia - Social and Behavioral Sciences 156 (2014) 125-129
13. Katri, V. (2015). Business, Innovation, and Knowledge Ecosystems: How They Differ and How to Survive and Thrive within Them. *Technology Innovation Management Review*, 5(8), 17-24.
14. Kauffman, S., & Macready, W. (1995). Technological evolution and adaptive organizations: Ideas from biology may find applications in economics. *Complexity*, 1(2), 26-43.
15. Kelly, E-M. (2003). *Complex Systems and Evolutionary Perspectives on Organisations*. Pergamon, Elsevier Science.
16. Kiss, G. (2013). Comparing the IT skills and the programming knowledge of Hungarian students specialized in informatics with Romanian students attending a science course or a mathematics-informatics course. *Teaching Mathematics and Computer Science*, 21-40.
17. Koenig, G. (2012). Business Ecosystems Revisited. *Management*, 15(2), 208-224.
18. Lansing, J. S. (2003): Complex Adaptive Systems. *Annu. Rev. Anthropol*, 32, 183-204.
19. Mason, R. B. (2007). The external environment's effect on management and strategy: A complexity theory approach. *Management Decision*, 45(1), 10-28.
20. Moore, J. (1993). Predators and prey: a new ecology of competition. *Harvard Business Review*, 71(3), 75-86.
21. Nambisan, S., & Baron, R. (2013). Entrepreneurship in innovation ecosystems: entrepreneurs' self-regulatory processes and their implications for new venture success. *Entrepreneurship Theory Practice*, 37(5), 1071-1097.
22. Quin, J., Anderson, P., & Finkelstein, S. (1998). New Forms of Organizing In H. Mintzberg & J. B. Quinn (Eds.). *Readings in the Strategic Process* (pp. 362-374). Upper Saddle River, NJ: Prentice Hall.
23. Rohrbeck, R., Holzle, K., & Gemunden, H. (2009). Opening up for competitive advantage: how Deutsche Telekom creates an open innovation ecosystem. *R. D. Management*, 39(4), 420-430.
24. Sherman, H., & Shultz, R. (1998). *Open Boundaries: Creating Business Innovation through Complexity*. Boston, MA: Perseus Books.
25. Vicsek, T. (2003). Egyszerű és bonyolult. Komplexitás elmélet. Magyar Tudomány 2003/3.
26. Westhead, P., & Batstone, S. (1998). Independent Technology-based Firms: The Perceived Benefits of a Science Park Location. *Urban Studies*, 35(12), 2197-2219.
27. <https://nkfi.gov.hu/palyazoknak/felsooktatasi-ipari/felsooktatasi-ipari>
28. <https://nkfi.gov.hu/palyazoknak/nkfi-alap/kompetencia-kozpontok-letrehozasa-2019-131-kk/palyazati-felhivas-2019-131-kk>
29. <https://nkfi.gov.hu/tkp2021>
30. <https://nkfi.gov.hu/palyazoknak/innovacios-okoszisztema/nemzeti-laboratoriumok>
31. https://www.palyazat.gov.hu/gazdasagfejlesztési_es_innovacios_operatív_program_pluSZ

32. Palkovics L.: ELI Science Park – Innovációs ökoszisztéma fejlesztési koncepció, 2019, Emberi Erőforrások Minisztériuma
33. <https://docplayer.hu/104734760-Eli-science-park-innovacios-okoszisztema-fejlesztesi-koncepcio-prof-dr-palkovics-laszlo.html>

The Impact of Brand Experience on the Cognitive Dissonance and the Mediating Role of the Perceived Brand Authenticity in the Purchase of Eco-Friendly Products

Inga Träger

University of Salzburg - SMBS

Salzburg, Ausustria

e-mail: inga.traeger@stud.sbg.ac.at

1. INTRODUCTION

More and more people want to live more sustainably. The reasons are various because due to profound global developments such as climate change, globalization, increasingly limited resources and the high burden of microplastics in the environment, consumers are becoming more and more aware of the need to pay attention to sustainability when buying products. Studies also confirm that the issue of environmental protection is becoming more firmly established in society and is changing consumer behavior. As the Sustainable Report 2020 for Germany clearly shows, the target group of LOHAS has increased (Tongaat Hulett, 2020, p. 20) by 20% between 2016 and 2020 alone. These are consumers who strive for a sustainable lifestyle and pay attention to sustainability when buying products. Awareness of healthier and more sustainable lifestyles has grown to different degrees not only in Germany but also worldwide (Thøgersen et al., 2015, p. 390). Therefore, it can be assumed that environmentally friendly products will continue to play an important role in the future, as not only the attitudes of consumers towards sustainable products are changing positively, (Browning & Romm, 2012, p. 128), but also the negative impact on nature can be reduced as a result (Chuvieco et al., 2018, p. 1379)

However, consumer behavior often follows its own logic, which is based on personal attitudes on the one hand and guided by values, motives and emotions on the other. In addition, consumers make their purchase decisions based on different product attributes, which at the same time, according to Jones et al. (2017, p. 135), fit the customer's self-concept. From their point of view, different aspects such as price, perceived brand quality, previous experience, functionality, ease of procurement, environmental benefits, and social factors play a role here.

In addition, a high product density and confusing product descriptions often make it difficult for customers to make well-considered purchasing decisions. Concerning green products, customers, therefore, do not objectively assess and often misjudge the consequences due to the excessive use of resources and the climate impact, etc. of products, which can result in harmful consumption behavior. While some companies are making efforts to conduct sustainability reporting and certification, the measures are far from sufficient to adequately communicate the benefits of sustainable products to consumers (König-Rutt & Scalisi, 2020).

From the customer side, a shift in customer needs can be observed, especially in the purchase of sustainable products, and presents both consumers and brands with new challenges. The reasons for this are very multifaceted, but consumers' perceptions of quality (Wu et al., 2018), risk (Eggert, 2006), and price (Zhang et al., 2018) play an important role.

To complicate matters, various study results show that while consumers indicate that they are motivated to buy sustainable products, they do not necessarily do so in practice (Tan et al., 2016, p. 290). Various studies dealing with customers' barriers to purchasing sustainable products mention a variety of factors such as quality perception or lack of information (Bray et al., 2011, p. 290). However, denial of responsibility and confusion, cynicism and mistrust of information, and harm neutralization also play a significant role in consumption decisions (Bray et al., 2011, p. 290; Johnstone & Tan, 2015, p. 296; Tan et al., 2016, p. 290). Consequently, there are many reasons why customers decide against green products, even though they are actually in favor of green consumption and they still do not develop cognitive dissonance after the purchase.

Therefore, this paper addresses the question of whether the expectations and cognitive dissonance of customers are influenced by the brand experience and the mediating role of brand authenticity in purchasing decisions and whether, as a result, customers are willing to pay more for sustainable products. According to researchers such as de Madeiros et al. (2016, p. 166), price is an important driver in the purchase of green products. The study results show that the environmental attractiveness of a price premium of up to 10% appears to be justified. They see an effect of higher prices on the interplay between high involvement and the willingness to pay more. Further, Chekima et al. (2016, p. 3448) notes that price is a less significant factor as a moderating effect for consumers. However, the price factor fades into the background when consumers' pro-environmental attitudes, eco-labelling, and cultural values of closeness to nature prevail. This would also explain why acquiring knowledge about the sustainable manufacture of products and the consequences of harmful consumption has a positive effect on consumers' attitudes, perceptions, and thus on their purchase intentions (Sun & Wang, 2019, p. 860).

Due to the issues described above, it seems to make sense to take a closer look at the connection between buyers' expectations of green products and the emergence of cognitive dissonance. Therefore, the paper first wants to explain why customers are motivated to buy sustainable products, but then decide in favor of conventional products. The considerations take into account the activating and cognitive processes of consumer behavior that play a role in the purchase of sustainable and premium-priced products. In addition, the experiential and media environments are considered in more detail.

The paper refers to an approach that, in the context of green product purchasing, uses narrative brand communication to convey authenticity through narrative transport, thereby creating brand experiences. As researchers such as Ryu et al. (2019, p. 356) confirm the effectiveness of narrative communication and telling real and emotional stories about the brand and its products can be a successful differentiator in today's "information economy". Authentic brand stories can depict the narrative of a company in a particularly realistic way and to evoke behavioral change through their special persuasive impact. Furthermore, narrative brands influence the brand experience of customers, so that brand experiences

build the affective, cognitive, behavioral, and sensory connections between consumers and the brand, thus enriching brand-consumer relationships and green brand knowledge.

2. THE LITERATURE REVIEW AND THE THEORETICAL FRAMEWORK

2.1. Introduction

This paper describes how, in the case of green brands and products, consumer expectations can change through brand experiences and the associated cognitive dissonance. In addition, the mediating role of brand authenticity is considered more closely in this context. The paper argues that in the context of sustainable products, consumers perceive green brands as authentic through the use of narrative brand communication and therefore have a stronger brand experience as customers' expectations are changed and consequently cognitive dissonance is influenced. Hence, customers may be rather willing to pay more for sustainable products because customer expectations influence perceptions, as the reasons for a sustainable product purchase prevail and price consciousness does not dominate.

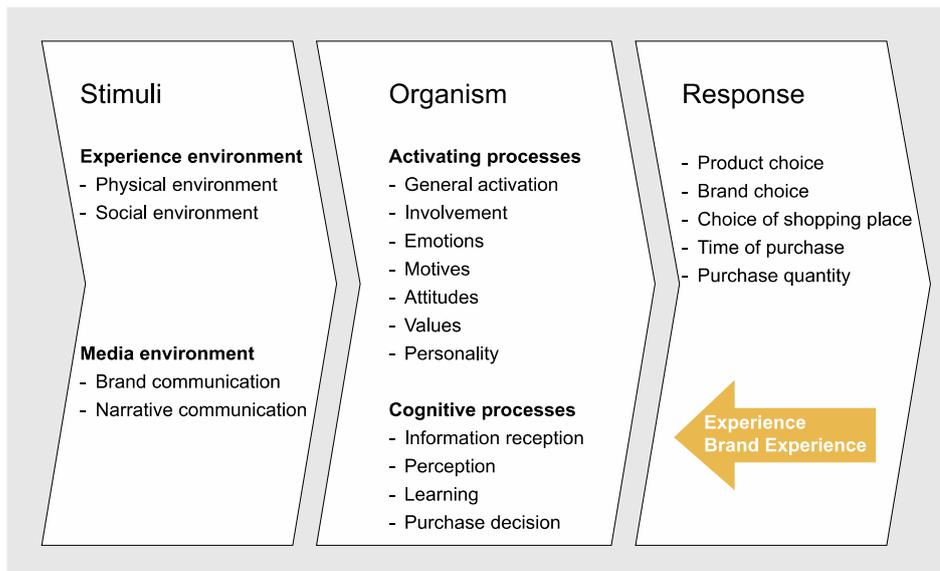
2.2. Eco-friendly Products

Mostly, consumers make their purchase decisions based on different product features, which at the same time, according to Jones et al. (2017, p. 135), fit the customers' self-concept. From their point of view, different aspects such as price, perceived brand quality, previous brand experience, functionality, ease of sourcing, environmental benefits, and social factors play a role here. In the case of green products, various researchers see price as an important factor (de Medeiros et al., 2016; Sun & Wang, 2019), therefore, environmentally friendly products are particularly suitable for the description, as they are usually more expensive than conventional products due to more elaborate production processes (Liobikiene et al., 2016, p. 40). Furthermore, a shift in customer needs can be observed in green consumption, which is why sustainable products also have different characteristics than conventional products. Environmentally friendly products are primarily aimed at LOHAS lifestyle-oriented people, who, due to their positive attitudes towards sustainable products, are more willing to pay for intangible features such as improved environmental quality in addition to the usual features (Choi & Feinberg, 2021, p. 1). They are produced, developed, and transported without chemical substances or other harmful materials. Furthermore, they should not have any negative impact on the consumer or their environment (Tjärnemo & Södahl, 2015, p. 131). Here, other clues such as consumers' attitudes towards environmental protection and cultural value (e. g. nature awareness) influence green purchase intention play a crucial role (Chekima et al., 2016, p. 3436). Not only de Medeiros et al. (2016), but also La Rosa and Jorgensen (2021) conclude that consumers are willing to pay on average 10% more for environmentally friendly products due to their green attitudes and preferences. They have a certain confidence in the performance of the product and they understand that they can contribute to the preservation of the environment (la Rosa & Johnson Jorgensen, 2021, p. 166).

2.3. The SOR-Model

The stimulus-organism-response model (SOR) of consumer behavior provides an overview of how human behavior patterns can be explained (Woodworth, 1929). Here, activating and cognitive processes take place in consumers in different facets, which in this example lead at best to a sustainable product choice.

Figure 1: SOR model of consumer behavior with a narrative brand communication approach, based on Robert S. Woodworth, 1929



2.4. Eco-friendly Products, Reasons to Buy, and Willingness to Pay the Premium Price

Sustainable products are generally more expensive than conventional products, so they are particularly suitable in this context for clarifying the conditions under which consumers are willing to pay more for sustainable products. To address this, Sun and Wang (2019, p. 872) provide an interesting study on consumers' understanding of their purchase intentions for green products and find that green brands can better convey the existing price difference between conventional and green products and their benefits, as green products are usually produced due to higher production costs. Netemeyer et al. (2004, p. 211) define the willingness to pay a premium price as "the amount a customer is willing to pay for his/her preferred brand over comparable/lesser brands of the same package size/quantity" (Aaker, 1996, p. 106). The following section describes various reasons that may cause customers to pay more for sustainable products or inhibit purchase intentions toward green products.

First, the intention to pay a higher price for sustainable products may be generally associated with higher income. Zhang et al. (2018) and Paul et al. (2016, p. 125) confirm previous research projects that higher income is more likely to lead to positive purchase decisions for healthy and sustainable products.

Second, Wang et al. (2021, p. 7) describes different reasons associated with sustainable consumption that cause customers to pay a higher price. For example, positive attitudes toward green products can be a reason to buy sustainably and make it more likely that customers choose green products.

In contrast, thirdly, a higher price can be a reason that inhibits the buyer's intention to choose a green product. To this end, Wang et al. (2021, p. 8) describes that the reasons against buying expensive and sustainable products directly influence the intention and purchase decision. However, the settings themselves often remain rather unaffected by. So, if the reasons dominate over too high a price, customers may not ultimately make the sustainable purchase, despite positive attitudes toward green consumption (Wang et al., 2021, p. 3).

2.5. Cognitive Dissonance and Motivation to Buy Green Products

Furthermore, customers are able to knowingly weaken or ignore their reasons for sustainable consumption. Buyers are thus more likely to avoid the effect of cognitive dissonance, which Festinger (1957, p. 206) understands as a precondition followed by an activity that should lead to a reduction in dissonance since cognitive dissonance is perceived as strong and unpleasant. Buyers will therefore actively try to avoid the situations so that the dissonance is not reinforced. Dissonance is referred to as a paradoxical feeling in a person's mind or an unpleasant state that arises when a person has two conflicting feelings at the same time. Festinger (1957, p. 205) describes cognitive dissonance as a psychological state based on conflicting beliefs, opinions, and knowledge.

In the case of green product purchases, cognitive dissonance does not seem to play a major role insofar as consumers may opt for conventional products instead of green ones but do not develop any cognitive dissonance even though their attitudes towards sustainable products are positive. This would also partly explain why customers are not always willing to pay more for green products despite their positive attitudes towards sustainable consumption. Ohtomo and Hirose (2007, p. 123) address the issue and examine the reactive processes that show discrepancies between pro-environmental attitudes and behaviors. The study shows that consumers accept environmentally harmful behavior when pro-social motivations conflict with pro-self-motivations. This raises the question of how to improve pro-self-motivation.

Pickett-Baker and Ozaki (2008, p. 290) also deal with the question of why consumers are motivated to buy sustainable products but often do not do so in practice. Their study results suggest that general consumer attitudes are often not specific enough to trigger environmentally friendly action. Thus, this study also shows that often subjective interests affect the relationship between values and behavior. Thus, one might suspect that subjective interests do not match consumers' expectations of green products and perceptions when buying products. Therefore, the next section describes an approach to explain how customers' expectations of green consumption are influenced by brand experiences and the mediating role of brand authenticity.

In this context, Wang et al. (2021, p. 8) also views the lack of experience with environmentally conscious consumption as a reason and suggests that the reasons for buying green products should be promoted first. In addition, according to Zhang et al. (2021, p. 1505), it would be useful to promote differentiated perception and safety awareness among consumers. In Zhang's (2021) study, customers are more likely to choose expensive and sustainable foods if they know the brand and trust the brand's product information. As other green consumption studies confirm, those consumers are more likely to buy green products who are well informed about environmental issues and are aware of the socio-economic improvements compared to conventional products (Tanner and Kast, 2003, p. 883; Song et al., 2019, p. 95). Sun and Wang (2019, p. 872) also argues that green brands should provide more information, knowledge, and experience. In this framework, the brands' experience in research and practice is a well-known approach, which will be further explained in the following paragraphs.

2.6. Green Brand Experience and Its Influence on Cognitive Dissonance

The concept of brand experience has been discussed extensively in theory over the past two decades (e. g. Brakus et al., 2009; Schmitt et al., 2015; Lemon & Verhoef, 2016). Brand experience is considered a brand-related behavioral variable, which Brakus et al. (2009) define as consumers' internal subjective sensations, feelings, cognitions, and behavioral responses, elicited by brand-related stimuli and „part of a brand's design and identity, packaging, and marketing communications and in environments in which the brand is marketed or sold.“ They conceptualize a brand experience scale, often cited in the literature, which includes a sensory, affective, intellectual, and behavioral dimension. From their perspective, brand experience through brand personality affects consumer satisfaction and loyalty (Brakus et al., 2009; Schmitt et al., 2015).

Kazmi et al. (2021) explore the issue of brand experience concerning green products, focusing on the green customer value of products through three main factors. The researchers describe how consumers perceive the risk of the green brand experience, the quality of the green brand experience, and the green brand experience. They argue that the main drivers of behavioral intention change for green products are increased perceptions of quality, reduced perceptions of risk, and improved brand experience. This shows that the brand experience with green products can have a positive effect on the perception of the respondents. The next sections will explain in more detail what effects the brand experience has in connection with cognitive dissonance.

Regarding cognitive dissonance, Festinger describes on the one hand that dissonance can develop due to previous experiences (Festinger, 1957, p. 214). On the other hand, Cohen and Goldberg (1970, p. 315) confirm in an earlier study that experiences in return can also reduce cognitive dissonance. Consequently, after a product purchase, the cognitive dissonance can either be weakened or strengthened by the experiences customers have with the brand and the products. In this context, the following sections show a close link between brand experiences and authenticity, especially for green brands and their products.

2.7. Perceived Green Brand Authenticity

For a successful brand experience, the authors of Experience Economy, Gilmore and Pine (2008, p. 50) claimed that it is important to offer customers authentic and exclusive experiences. In addition, further studies confirm that brand authenticity in connection with brand selection has high potential (Morhart et al., 2013, p. 201; Spiggle et al., 2012, p. 979). The meaning of authenticity is essentially associated with „stability, endurance, consistency, particularity, individuality, trustfulness, credibility, keeping promises, genuineness, and realness“. In marketing research, brand authenticity is understood as a variable that results in the consumer's attitude towards the brand. Hence, consumers attribute a high degree of authenticity to a brand when they are satisfied with a brand (Bruhn et al., 2012, p. 568). In connection with green brands and their products, brand experience, which is an important factor for consumer perception and behavior, (Brakus et al., 2009, p. 54; van der Westhuizen, 2018, p. 180) is therefore closely associated with brand authenticity. Because if customers question the authenticity of companies' environmentally friendly claims and uncover false claims of being green, this leads to the phenomenon of "greenwashing" (Wang, 2017, p. 897). From this point of view, the study examines how brands' green claims work in consumers' purchasing decisions. If customers do not trust the claims of brands and their environmental performance, then they no longer perceive the ecological functionality of the products, and consumer skepticism and perceived risk to environmental friendliness increase (Pittman & Sheehan, 2021; Pittman et al., 2022, p. 107). Pittman's (2022, p. 115) study, in line with the present paper, uses brand authenticity as a mediating variable. In their study, they assume that the stronger brands are perceived as authentic, the stronger the suspicion of greenwashing can be avoided. As a result, consumers are more likely to believe a brand and abstract claims about environmental sustainability as a social impact norm become more salient. Consequently, it can be assumed that due to communicating brand authenticity in connection with brand experiences, green purchasing decisions are more likely to be made and, according to Kumar, customers are more willing to pay a higher price (Kumar & Kaushik, 2022, p. 35).

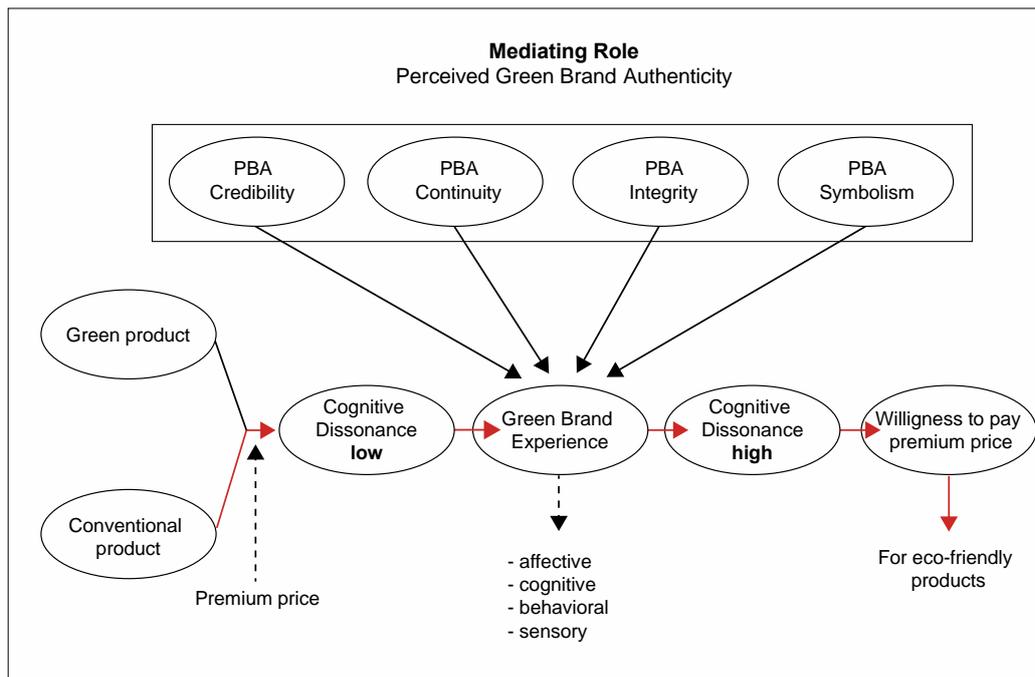
2.8. Narrative Brand Communication

Hamby et al. (2019, p. 1023) examine the influence of narrative messaging that promotes brand authenticity and found that stories about, for example, a company's values can evoke a stronger perception of brand authenticity. In this respect, according to Leitfelder (2014), narrative communication enables emotional access and insights and reduces manipulation. He describes narrative communication as a design and narrative approach which, in the field of sustainability and design communication, is not only based on pure facts but works as a multimodal approach with metaphors, narratives, and real images (Leitfelder, 2020, p. 34).

Huang and Guo (2021, p. 65) also work on the question of what impact the communication strategies of green brands have on perceived brand authenticity. From their perspective, it seems proven that compelling brand stories have positive effects on brand trust and brand authenticity. Especially given the problem of greenwashing and the general skepticism of consumers, green brands and their products benefit from authenticity. Therefore, rhetorical addresses with brand stories are particularly effective in conveying green brand values.

Based on the previous considerations, the variables of brand experience, cognitive dissonance, the mediating role of brand authenticity, and the willingness of customers to pay a premium price for green products are adopted into the theoretical framework model in the following figure. The four dimensions of credibility, continuity, integrity, and symbolism of Kumar's (2022) model of perceived authenticity are integrated as they are presumably among the brand experience drivers in the context of green product purchasing.

Figure 2: Theoretical framework model



3. CONCLUSION

Studies on green products show that personal purchasing decisions in this area have many different facets based on consumers' perceptions and expectations, which are driven by individuality, knowledge, emotions, cognitions, motivation, and trust in a green brand and its products, and are important factors in the purchase of sustainable products.

In this regard, the brand experiences that consumers have with green brands can help to improve customer satisfaction. And if consumers are satisfied with a green brand, they will probably be willing to pay more for the green product. In this customer engagement process, the brand experience with a green brand could potentially lead to inhibiting the emerging cognitive dissonance after green product purchase (high price, low experience quality, etc.). Narrative brand communication is a suitable communication tool for this purpose, as it can transport particularly real content and thus promote the perceived green brand authenticity of consumers. This is because the resulting quality of experience and the improved understanding of social norms can possibly trigger a change in consumer behavior and the product price is not in the first place.

In summary, in this context, it is the perceived green authenticity of a brand in a mediating role and the brand experience that creates consumer behavioral change. This would mean that the stronger the green brand authenticity is perceived by consumers, the stronger the brand experience has a positive influence on satisfaction. Based on this, it seems plausible that fewer people would choose conventional products if they are more satisfied with green products due to the perceived brand authenticity and brand experience while avoiding the cognitive dissonance after buying conventional products.

Finally, this topic has not yet been described in research in the context of narrative brand communication (Kumar and Kaushik, 2022, p. 12). Therefore, future research could consider the conceptual framework to better understand the relationships between brand experience, perceived green brand authenticity, and its influence on cognitive dissonance. However, the challenge remains that consumers need to engage with a green brand before they understand the benefits of a green brand and are likely to be willing to pay a premium price as a result.

References

1. Aaker, D. A. (1996). Measuring Brand Equity Across Products and Markets. *California Management Review*, 38(3), 102-120.
2. Brakus, J. J., Schmitt, B. H., & Zarantonello, L. (2009). Brand Experience: What Is It? How Is It Measured? Does It Affect Loyalty?. *Journal of Marketing*, 73(3), 52-68.
3. Bray, J., Johns, N., & Kilburn, D. (2011). "An Exploratory Study into the Factors Impeding Ethical Consumption. *Journal of Business Ethics*, 98(4), 597-608.
4. Browning, W., & Romm, J. (2012). *Greening the workplace, Design for Sustainability: A Sourcebook of Integrated Ecological Solutions*.
5. Bruhn, M. et al. (2012). Brand authenticity: Towards a deeper understanding of its conceptualization and measurement. *Advances in Consumer Research*, 40, 567-576.
6. Chekima, B. C. et al. (2016). Examining green consumerism motivational drivers: Does premium price and demographics matter to green purchasing?. *Journal of Cleaner Production*, 112, 3436-3450.
7. Choi, S., & Feinberg, R. A. (2021). The lohas (Lifestyle of health and sustainability) scale development and validation. *Sustainability*, 13(4), 1-17.
8. Chuvieco, E. et al. (2018). Factors affecting environmental sustainability habits of university students: Intercomparison analysis in three countries (Spain, Brazil and UAE). *Journal of Cleaner Production*, 198, 1372-1380.
9. Eggert, A. (2006). Intangibility and Perceived Risk in Online Environments. *Journal of Marketing Management*, 22(5/6), 553-572.
10. Festinger, L. (1957). *A Theory of Cognitive Dissonance*.
11. Hamby, A., Brinberg, D., & Daniloski, K. (2019). It's about our values: How founder's stories influence brand authenticity. *Psychology and Marketing*, 36(11), 1014-1026.
12. Huang, C., & Guo, R. (2021). The effect of a green brand story on perceived brand authenticity and brand trust: the role of narrative rhetoric. *Journal of Brand Management*, 28(1), 60-76.
13. Wang, H-J. (2017). Determinants of consumers' purchase behaviour towards green brands. *The Service Industries Journal*, 37(13/14), 896-918.

14. Johnstone, M. L., & Tan, L. P. (2015). An exploration of environmentally-conscious consumers and the reasons why they do not buy green products. *Marketing Intelligence and Planning*, 33(5), 804-825.
15. Jones, R. J. et al. (2017). Gender Makes a Difference: Investigating Consumer Purchasing Behavior and Attitudes Toward Corporate Social Responsibility Policies. *Corporate Social Responsibility and Environmental Management*, 24(2), 133-144.
16. Kumar, V., & Kaushik, A. K. (2022). Engaging customers through brand authenticity perceptions: The moderating role of self-congruence. *Journal of Business Research*, 138, 26-37.
17. Leinfelder, R. (2020). Das Anthropozän. 25-45.
18. Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. *Journal of Marketing*, 80(6), 69-96.
19. Liobikiene, G., Mandravickaite, J., & Bernatoniene, J. (2016). Theory of planned behavior approach to understand the green purchasing behavior in the EU: A cross-cultural study. *Ecological Economics*, 125, 38-46.
20. de Medeiros, J. F., Ribeiro, J. L. D., & Cortimiglia, M. N. (2016). Influence of perceived value on purchasing decisions of green products in Brazil. *Journal of Cleaner Production*, 110, 158-169.
21. Morhart, F. et al. (2013). Brand authenticity: An integrative framework and measurement scale. *Journal of Consumer Psychology*, 25(2), 200-218.
22. Netemeyer, R. G. et al. (2004). Developing and validating measures of facets of customer-based brand equity. *Journal of Business Research*, 57(2), 209-224.
23. Ohtomo, S., & Hirose, Y. (2007). The dual-process of reactive and intentional decision-making involved in eco-friendly behavior. *Journal of Environmental Psychology*, 27(2), 117-125.
24. Paul, J., Modi, A. and Patel, J. (2016): "Predicting green product consumption using theory of planned behavior and reasoned action," *Journal of Retailing and Consumer Services*, 29, 123-134.
25. Pickett-Baker, J., & Ozaki, R. (2008). Pro-environmental products: Marketing influence on consumer purchase decision. *Journal of Consumer Marketing*, 25(5), pp. 281-293.
26. Pine, B. J., & Gilmore, J. H. (2008). The eight principles of strategic authenticity. *Strategy and Leadership*, 36(3), 35-40.
27. Pittman, M., Oeldorf-Hirsch, A., & Brannan, A. (2022). Green Advertising on Social Media: Brand Authenticity Mediates the Effect of Different Appeals on Purchase Intent and Digital Engagement. *Journal of Current Issues and Research in Advertising*, 43(1), 106-121.
28. Pittman, M., & Sheehan, K. (2021). Brand Authenticity and Strategic Response to Crises: Symbolic Effects of Donation Type on Purchase Intent and Digital Engagement. *Journal of Current Issues and Research in Advertising*, 42(3), 215-235.
29. la Rosa, A., & Johnson Jorgensen, J. (2021). Influences on consumer engagement with sustainability and the purchase intention of apparel products. *Sustainability*, 13(19).
30. König-Rutt, S., & Scalisi, M. (2020): Capgemini invent, Attitude Behaviour Gap: Warum Konsumenten vorgeben nachhaltig leben zu wollen, es aber nicht tun. Available at: <https://www.capgemini.com/de-de/2020/07/invent-attitude-behaviour-gap/>
31. Ryu, K. et al. (2019). Effect of a brand story structure on narrative transportation and perceived brand image of luxury hotels. *Tourism Management*, 71, 348-363.
32. Schmitt, B. H., Brakus, J., & Zarantonello, L. (2015). The current state and future of brand experience. *Journal of Brand Management*, 21(9), 727-733.

33. Song, W., Ren, S., & Yu, J. (2019). Bridging the gap between corporate social responsibility and new green product success: The role of green organizational identity. *Business Strategy and the Environment*, 28(1), 88-97.
34. Spiggle, S., Nguyen, H. T., & Caravella, M. (2012). More than fit: Brand extension authenticity. *Journal of Marketing Research*, 49(6), 967-983.
35. Sun, Y., & Wang, S. (2019). Understanding consumers' intentions to purchase green products in the social media marketing context. *Asia Pacific Journal of Marketing and Logistics*, 32(4), 860-878.
36. Tan, L. P., Johnstone, M. L., & Yang, L. (2016). Barriers to green consumption behaviours: The roles of consumers' green perceptions. *Australasian Marketing Journal*, 24(4), 288-299.
37. Tanner, C., & Kast, S. W. (2003). Promoting Sustainable Consumption: Determinants of Green Purchases by Swiss Consumers. *Psychology and Marketing*, 20(10), 883-902.
38. Thøgersen, J. et al. (2015). Consumer buying motives and attitudes towards organic food in two emerging markets: China and Brazil. *International Marketing Review*, 32(3/4), 389-413.
39. Tjärnemo, H., & Södahl, L. (2015). Swedish food retailers promoting climate smarter food choices-Trapped between visions and reality?. *Journal of Retailing and Consumer Services*, 24, 130-139.
40. Tongaat Hulett (2020). Sustainability Report 2020. *Tongaat Hulett Sustainability Report 2020*, 249.
41. Wang, J., Shen, M., & Chu, M. (2021). Why is green consumption easier said than done? Exploring the green consumption attitude-intention gap in China with behavioral reasoning theory. *Cleaner and Responsible Consumption*, 2, 100015.
42. van der Westhuizen, L. M. (2018). Brand loyalty: exploring self-brand connection and brand experience. *Journal of Product and Brand Management*, 27(2), 172-184.
43. Wu, H. C. et al. (2018). What drives green brand switching behavior?. *Marketing Intelligence and Planning*, 36(6), 694-708.
44. Zhang, B. et al. (2018). Consumers' perceptions, purchase intention, and willingness to pay a premium price for safe vegetables: A case study of Beijing, China. *Journal of Cleaner Production*, 197, 1498-1507.

Public Interest Conditions Reshaped: A Critical Analysis of Merger Cases in South Africa

Anton van Wyk

North-West University
11 Hofmann Street, Potchefstroom, South Africa
e-mail: anton.vanwyk@nwu.ac.za

Anmar Pretorius

North-West University
11 Hofmann Street, Potchefstroom, South Africa
e-mail: anmar.pretorius@nwu.ac.za

Derick Blaauw

North-West University
11 Hofmann Street, Potchefstroom, South Africa
e-mail: derick.blaauw@nwu.ac.za

Abstract

Since the inception of the Competition Act in South Africa in 1998, public interest considerations (PICs) have been an integral part of merger review in South Africa. The Competition Act stipulates which conditions should be considered but does not provide guidelines or standards on the factors, specific to each case, to be evaluated. The aim of the paper is to investigate to what extent PICs were considered and applied in the final merger decisions and to identify observed trends in merger cases for the period 2010 to 2019. A unique database was compiled from newsletters, annual reports, and case files of the competition authorities in South Africa. This formed the basis for statistical analysis. A quantitative analysis approach with the use of a logit estimation was employed where the type of PIC enforced was used as the dependent variable. The regression results indicate that employment conditions are enforced in most of the cases with BEE conditions increasing. PICs are most likely to be imposed when the acquiring firm is an international firm, operates in the mining and manufacturing sector, realizes high profits and if the total assets of the merged entity increase in value. The results provide valuable insights into how the merger landscape in South Africa differs from experiences in other countries. The database further provides for the adjudication of merger cases in a coherent and case sensitive manner.

Keywords

Competition policy, mergers, public interest

Earnings Management and Going Concern During COVID-19: Evidence from IFRS Context

Mohammed M. Yassin

Al-Zaytoonah University of Jordan

Amman, Jordan

e-mail: mohammed.yassin@zuj.edu.jo

Osama S. Sha'aban

Al-Zaytoonah University of Jordan

Amman, Jordan

Abstract

During COVID-19 pandemic, the going concern assumption became questionable. Firms was struggling to survive through using different tools such as earnings management. This study aimed to explore the effect of earnings management practices on the going concern assumption. An online questionnaire was distributed to accountants working Jordanian firms. A sample of 150 questionnaires was valid for analysis. The findings of OLS regression suggest that, during COVID-19, firms tried to manage earnings as a tool to continue operating. The results should help policymakers and regulators to rethink the flexibility given to managers in dealing with financial reporting.

Keywords

IFRS, COVID-19, earnings management, going concern, Jordan

1. INTRODUCTION

COVID-19 had a direct effect on the continuity of firms. Liquidity and distress are intensified, and the threat of bankruptcy becomes more probable. In turn, these threats have an impact on the firms' related parties. The costs of these failures are substantial to the capital providers, as well as to the management and employees, who may lose their jobs ((Charitou, Lambertides & Trigeorgis, 2007). "In such a setting, there is a growing concern about the quality of the information provided in financial statements by managers, especially of financially distressed firms because their incentives to manage earnings are potentially magnified" (Tsipouridou & Spathis, 2014, p. 38).

Firms' managers have the power to use their judgment in preparing financial statements and determining earnings, which could be called earnings management (Franceschetti, 2018). The earnings management became a hot issue facing economies around the world (Al-Sraheen, 2019). Earnings management could be seen as an ethical activity that covers suspicious activities (Saleh, Abu Afifa & Alsufy, 2020). Yassin, Abdallah and Al-Ibbini (2015) indicated that engagement in earnings management practices could be a result of weak performance.

One of the main objectives of the accounting standard setters is to provide users with transparent, safe and complete financial information (Yassin & Al-Khatib, 2019). Recently, the effect of the COVID-19 pandemic on the firms' financial performance had an increased attention of standard setters. They became concerned about how the pandemic will affect the accuracy of financial numbers.

The actual performance of a firm could be hidden through the practices of earnings management, in addition, the shareholder may not have the power to make or evaluate decisions correctly (Toumeh & Yahya, 2019). Therefore, giving managers a space of flexibility in using their judgment and personal estimations will increase earnings management practices, especially in the recent COVID-19 pandemic.

Based on that, the main purpose of the study is to discover the effect of earnings management on the going concern assumption of the firms during the COVID-19 pandemic, which gave companies the flexibility to adjust and make some changes to their financial reporting. Although this topic has been previously investigated in the context of countries with large economies (Tsipouridou & Spathis, 2014), this study contributes by highlighting a different viewpoint of IFRS users in developing economy, that is, Jordan. In addition, the study shows the practices of financial statements preparers in Jordan. Finally, the study will examine these viewpoints of preparers under the COVID-19, which is considered as the main contribution of this study.

This paper proceeds as follows. Section 2 provides a literature review summarizing the relationship between earnings management and going concern, in addition, this section develops hypothesis. Section 3 presents the research methodology. Section 4 shows data analysis and results discussion. Finally, the paper concludes.

2. LITERATURE REVIEW & HYPOTHESES DEVELOPMENT

As the contingency theory suggests, business actions are heavily depending on external and internal variables. Managers have flexibility in choosing the best strategies for any changes in business situations at any period of time (Fielder, 1974). This paper will try to provide empirical evidence on this theory, suggesting that during the COVID-19 pandemic, firms will tend to use earnings management practices as a tool for a business firm to continue its operations.

Prior studies provide different evidence on this relationship. Bartov, Gul and Tsui (2001) examined the predictability power of different accrual models in detecting earnings management. By using Jones model and modified Jones model (Dechow, Sloan & Sweeney, 1995), they found a significant positive correlation between the absolute value of discretionary accruals and the likelihood to receive a qualified audit opinion. Similarly, Sengupta and Shen (2007) re-examine the same relationship and found that firms with low accruals quality are more likely to receive a going-concern audit opinion. Finally, Francis and Krishnan (1999) using a large sample of US listed firms, found the same result, assuring that the auditors of low accruals quality firms are more likely to issue qualified opinions for asset realization uncertainties and for going-concern problems, than auditors of firms with low absolute levels of accruals. This relationship is stronger for firms with large negative accruals. As other capital markets around the world, it is expected that Jordanian capital market faces greater amount of information asymmetry due to COVID-19, and firm's management may have incentives to exercise earnings management (Yassin, Shaban, Al-Sraheen, & Al Daoud, 2022).

Managers of firms with financial reports that reflect poor financial performance try to beautify the current and future performance by using the flexibility provided by the accounting standards, especially the standards that deal with revenue, accounts receivable, deferred revenues, such practices may create space for management to engage earnings management (Azizah, 2021).

Savova (2021) argued that under an extraordinary event such as COVID-19, going concern seems to be an essential issue for many companies. Dencey (2020) stated that it is important for business entity to understand their resilience under uncertain conditions such as COVID-19 and what assumptions should be taken into consideration in the process of preparing the interim financial statements are during 2020 on the going concern basis. Therefore, based on the previous discussion, the hypothesis of the study could be formulated as follows:

H₀: There is no significant effect of the earnings management practices on the going concern assumption during COVID-19 pandemic.

3. METHODOLOGY

This section provides a brief description of the sample characteristics, the process of data collection and the measurement of dependent and independent variables.

3.1. Sampling

The target population and the sample of this study consists of accountants and auditors in Jordanian companies, which are required to apply IFRS. Each person in the sample represents a unit of analysis. An online questionnaire was prepared and then sent to respondents on April 2022. 156 of the respondents replied. The questionnaires that were suitable for analysis are 150, which is seen as a convenience sample. A major drawback of the online questionnaires is related to the generalizability of results, which is based on the idea that the final sample of respondents may misrepresent the target population optimally. The respondents of the questionnaire were working as accountants in different and diversified industries. Table 1 provides the demographical characteristics of the respondents.

3.2. Research Model

This study used the ordinary least square regression (OLS) as the primary statistical tool to analyze data and achieve the main objective of the study. The research model is shown in equation (1) below.

$$GC_i = \beta_0 + \beta_1 EM_i + \varepsilon_i \quad (1)$$

Where:

GC_i is the going concern practices of respondent i

EM_i is the practices of earnings management of respondent i

ε_i is the error term

Table 1: Demographical characteristics of respondents

Demographical Variable	Responses	
	n	%
<i>Gender</i>		
Male	100	67
Female	50	33
<i>Total</i>	<i>150</i>	
<i>Age</i>		
< 18	0	0
18-29	81	54
30-44	44	29
45-60	18	12
> 60	7	5
<i>Total</i>	<i>150</i>	
<i>Education</i>		
Did not complete high school	8	5
High school	31	21
College degree	30	20
Bachelor degree	71	47
Post graduate degree	10	7
<i>Total</i>	<i>150</i>	

<i>Job Level</i>		
Owner / Executive	16	11
Senior Manager	25	17
Middle Manager	27	18
Intermediate level	21	14
Entry Level	44	29
Other	17	11
<i>Total</i>	<i>150</i>	

3.3. The Questionnaire

The questionnaire consists of three different sections. The first one covered the demographical characteristics of respondents as shown in table 1 and the description of the firms which they are working for, as shown in table 2.

Table 2: Firms description

Characteristics	Responses	
	n	%
<i>Firm Type</i>		
Public shareholding firm	82	55
Others	68	45
<i>Total</i>	<i>150</i>	
<i>Industry</i>		
Education	29	19
I am currently not employed	23	15
Advertising & Marketing	21	14
Business Support & Logistics	14	9
Healthcare & Pharmaceuticals	11	7
Food & Beverages	7	5
Construction, Machinery, and Homes	5	3
Finance & Financial Services	5	3
Manufacturing	5	3
Government	4	3
Airlines & Aerospace (including Defense)	3	2
Nonprofit	3	2
Real Estate	3	2
Telecommunications, Technology, Internet & Electronics	3	2
Transportation & Delivery	3	2
Agriculture	2	1
Automotive	2	1
Entertainment & Leisure	2	1
Retail & Consumer Durables	2	1
Utilities, Energy, and Extraction	2	1
Insurance	1	1
<i>Total</i>	<i>150</i>	

Table 3 shows the second section of the questionnaire which asked questions about the earnings management as the dependent variable. Following (Barth, Gómez-Biscarri, & Kasznik, 2012) and (Cohen, Dey, & Lys, 2008) a five-Likert-scale was used to measure the independent variable items (EM1-EM5). The Cronbach's alpha for these items was 0.888, indicating that the measure was valid.

Table 3: Descriptive statistics of independent variable

Variable	Item		Cronbach's alpha	<i>n</i> = 150	
	ID	Item		<i>M</i>	<i>SD</i>
<i>EM_i</i>		<i>Earnings management practices</i>			
	EM1	We apply the process of accelerating the timing of sales through increasing the amount of discounts or any other lenient credit terms		3.52	1.23
	EM2	We use the personal judgments to meet expectations		3.51	1.18
	EM3	We select among alternative solutions in a certain accounting standard, in an attempt to meet expectations		3.61	1.23
	EM4	We claim increases in the revenue that is not corresponding to an increase in cash flows		3.50	1.24
	EM5	We report increases in the earnings only in the results of the last quarter of the year		3.49	1.22
	EM	<i>Overall</i>	0.888	3.53	0.97

The dependent variable, that is the going concern was tapped by five items (GC1-GC5) adapted from (Moss Adams, 2022). These items were asked to respondents, requiring them to indicate their responses toward documentation and evaluation of the going concern assumption in their business firms. The Cronbach's alpha for these items was 0.862, indicating that the measure was valid.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The means and the standard deviations of the independent variable (earnings management) for the responses (*n* = 150) are shown in table 3. The table indicates that the scores for the overall variable was moderate (*M* = 3.53, *SD* = 0.97). Regarding the individual five questions, the results were very close, the mean ranged from 3.49 to 3.61. For the dependent variable (going concern), table 4 also shows moderate scores (*M* = 3.56, *SD* = 1.18). In addition, the individual question results were very close ranging from 3.48 to 3.61.

Table 4: Descriptive statistics of dependent variable

Variable	Item ID	Item	Cronbach's alpha	<i>n</i> = 150	
				<i>M</i>	<i>SD</i>
<i>GC_i</i>		<i>Going concern practices</i>			
	GC1	All relevant events that is related to the firm's ability to continue as a going concern have been documented		3.56	1.15
	GC2	The entity's current financial condition at the financial statements date is documented		3.57	1.16
	GC3	The entity's conditional and unconditional obligations due or anticipated within one year after the date of the financial statement issuance are documented		3.61	1.17
	GC4	Possible financial difficulties are identified, such as, arrearages in dividends, default on loans, a need to restructure debt, and a dispose of substantial assets are documented		3.59	1.22
	GC5	External adverse matters, such as, legislation, legal proceedings, that might impair the firm's ability to operate; loss of a principal customer or supplier loss of a key franchise, or license are documented		3.48	1.21
	GC	<i>Overall</i>	0.862	3.56	1.18

4.2. Multivariate Analysis

The study employed OLS regression to estimate the going concern by the earnings management practices. Table 5 showed that the Durbin Watson statistic was around 2, which indicate the absence of autocorrelation problem in the sample. The results of OLS regression identified that the model was statistically significant at ($p \leq 0.01$), which indicate that there is a tendency for respondents to apply the practices of earnings management as a tool for the going concern practice of the business firm during the COVID-19 pandemic, thus reject H_0 and support the alternative hypotheses. When looking at the r-squared value, it could be noticed that practicing earnings management by respondents had explained about 64% of the variance in going concern. Overall, these findings support the finding of Yassin, Shaban, Al-Sraheen and Al Daoud (2022), Savova (2021), Azizah (2021) and Dencey (2020).

Table 5: OLS regression results

Variable	Model
(Constant)	.807*** (4.569)
<i>EM_i</i>	.803*** (16.167)
R-square	.642
Durbin Watson	1.948
F-value	261.387***
Number of Observations	150

* Significant (at $p \leq 0.1$); ** Significant (at $p \leq 0.05$); *** Significant (at $p \leq 0.01$); t-statistic is between brackets

5. CONCLUSION

The aim of this study is to test the effect of practicing earnings management on the assumption of going concern, under the impact of the COVID-19. The study was applied in Jordan as a developing country which require firms to apply IFRS. The pandemic of COVID-19 had caused a variety of economic and social threats (Walmsley, Rose, & Wei, 2020). These threats had motivated firms towards practicing earnings management practice in a way to keep continuing its operations.

The descriptive statistics results indicate that the individual questions for both the earnings management and going concern scored moderate and close results, without outliers. The OLS regression results suggest that going concern is predicted by practicing of earnings management during the pandemic of COVID-19 in Jordan.

Overall, the results should help regulators and policymakers in reshaping the way that managers deal with financial reports through rethinking about the flexibility that is given to managers in preparing their financial statements.

The limitations of this study his study must provide opportunities for future research in the areas of earnings management and going concern. This study is conducted in the Jordanian context only, so we have to exercise caution when generalizing our results. This research could be extended by future research that use different contexts other than Jordan, in addition to use different accounting legislations other than IFRS. Also, further research could apply a comparison between different countries.

Acknowledgment

This paper is based on a project that was funded and supported by Al-Zaytoonah University of Jordan [Scientific research project No. 25/11/2020-2021]. We would like to thank the conference chair and the anonymous reviewers for their helpful and valuable comments and suggestions. Any remaining errors are our own.

References

1. Al-Sraheen, D. (2019). The role of the audit committee in moderating the negative effect of non-audit services on earnings management among industrial firms listed on the Amman Stock Exchange. *Afro-Asian Journal of Finance and Accounting*, 9(3), 349-361.
2. Azizah, W. (2021). Covid-19 in Indonesia: Analysis of Differences Earnings Management in the First Quarter. *Jurnal Akuntansi*, 11(1), 23-32.
3. Barth, M., Gómez-Biscarri, J., & Kasznik, R. (2012). Fair value accounting, earnings management and the use of available-for-sale instruments by bank managers. Retrieved from dadun.unav.edu
4. Bartov, E., Gul, F., & Tsui, J. (2001). Discretionary-accruals models and audit qualifications. *Journal of Accounting and Economics*, 30(3), 421-452.
5. Charitou, A., Lambertides, N., & Trigeorgis, L. (2007). Earnings behaviour of financially distressed firms: The role of institutional ownership. *Abacus*, 43(3), 271-296.

6. Cohen, D., Dey, A., & Lys, T. (2008). Real and accrual-based earnings management in the pre-and post-Sarbanes-Oxley periods. *The accounting review*. Retrieved from meridian.allenpress.com
7. Dechow, P., Sloan, R., & Sweeney, A. (1995). Detecting earnings management. *Accounting Review*, 70(2), 193-225.
8. Dencey, K. (2020). *COVID Makes Clear Why We Need to Improve Corporate Reporting*. Retrieved from IFAC: <https://www.ifac.org/knowledge-gateway/preparing-future-ready-professionals/discussion/covid-makes-clear-why-we-need-improve-corporate-reporting>
9. Fielder, F. (1974). The contingency model: new direction for leadership utilization. *Journal of Contemporary Business*, 3(1), 65-79.
10. Franceschetti, B. (2018). *Financial Crises and Earnings Management Behavior*. Springer.
11. Francis, J., & Krishnan, J. (1999). Accounting accruals and auditor reporting conservatism. *Contemporary Accounting Research*, 16(1), 135-165.
12. Moss Adams. (2022). *Going Concern Evaluation Checklist*. Retrieved 5 14, 2022 https://www.mossadams.com/getmedia/91941edf-b668-471c-809d-e1a660415b3c/Moss-Adams_Going-Concern-Evaluation-Checklist.pdf, from Moss Adams LLP Web site.
13. Saleh, E., Abu Afifa, M., & Alsufy, F. (2020). Does Earnings Quality Affect Companies' Performance? New Evidence from the Jordanian Market. *Journal of Asian Finance, Economics and Business*, 7(11), 33-43.
14. Savova, K. (2021). Global Impact of COVID 19 on the Concept of "Going Concern". *Globalization and its Socio-Economic Consequences 2020*. 92, 1-13.
15. Sengupta, P., & Shen, M. (2007). *Can accruals quality explain auditors' decision making? The impact of accruals quality on audit fees, going concern opinions and auditor change*. Retrieved from <http://ssrn.com/abstract=1178282>.
16. Toumeh, A., & Yahya, S. (2019). A Review of Earnings Management Techniques: An IFRS Perspective. *Global Business and Management Research: An International Journal*, 11(3), 1-13.
17. Tsiouridou, M., & Spathis, C. (2014). Audit opinion and earnings management: Evidence from Greece. *Accounting Forum*, 38-54.
18. Walmsley, T., Rose, A., & Wei, D. (2020). *Impacts on the U.S. Macroeconomy of Mandatory Business Closures in Response to the COVID-19 Pandemic*. Retrieved from <https://doi.org/10.2139/ssrn.3570117>
19. Yassin, M., & Al-Khatib, E. (2019). Internet financial reporting and expected stock return. *Journal of Accounting, Finance & Management Strategy*, 14(1), 1-28.
20. Yassin, M., Abdallah, A., & Al-Ibbini, O. (2015). Earnings Quality Determinants: Literature Review and Research Opportunities. *The 14th International Scientific Conference held in Al-Zaytoonah University of Jordan*. Amman.
21. Yassin, M., Shaban, O., Al-Sraheen, D., & Al Daoud, K. (2022). Revenue standard and earnings management during the COVID-19 pandemic: A comparison between IFRS and GAAP. *Journal of Governance & Regulation*, 11(2), 80-93.

Implications of Multi-Homing for Multi-Sided Platforms: A Literature Review

Goran Vlašić

Faculty of Economics & Business, University of Zagreb
Trg J. F. Kennedyja 6, Zagreb, Croatia
e-mail: gvlasic@efzg.hr

Kristijan Keleminić

Innovation Institute
Desinicka 5, Zagreb, Croatia
e-mail: kkeleminic@innovation-institute.eu

Fran Živković

Innovation Institute
Desinicka 5, Zagreb, Croatia
e-mail: fzivkovic@innovation-institute.eu

Abstract

Since Internet and digital technologies gave consumers and companies plenty of new possibilities and reshaped the context in which consumers are buying products, services and experiences, it is crucial for managers and researchers to address those new purchase decisions horizons. One of the hot topics in terms of digital marketing and business in general are platforms; whether it is a traditional platform or a digital platform, it has gained popularity among businessmen and a lot of them are trying to define their businesses as platforms. Even though platforms have their goals of connecting as many individuals and organizations as possible in the pursuit of exploitation of network externalities consumers are often prone to not choose only one platform as their „go to“ place for every solution that the platform offers. A concept which is known as a multi-homing is therefore coined, and it describes a situation where consumers are visiting more than one platform for the solution of the same problem. The manuscript explores how multi-homing creates platform, market and brand dynamics which shift competitive game to the level of platforms.

Keywords

Multi-homing, two-sided platforms, multi-sided platforms

Many services have evolved into platforms, in which a trusted intermediary mediates between different sides of the platform. Such developments have led to significant changes in brand strategies, as trust shifts from brands which are on the platform, to the platform provides. Such developments have led to platforms becoming some of the strongest players in different industries (e.g. Facebook, Amazon, Google, Apple, etc). However, as benefits to platforms increase, so does the interest of new commers into challenging the existing platforms – providing multi-homing options for all sides involved. Such competitive context forces platforms to re-consider their approach as multi-homing costs are much lower than costs of leaving the dominant platform. This leads to new platform dynamics, which are further explored in this paper.

1. TWO-SIDED AND MULTI-SIDED MARKETS

Context in which some market actor is not providing consumers with the own produced goods or services but with more of it or only from other producers exists for a long time. Even after the academia took interest in it in the start of the third millennia, the context when the goal is to get the two or more sides on board has been seen as almost nothing new (Gürkaynak et al., 2017). The idea is too broadly described since, in order for the transaction to be made, there has to be at least two sides for it. Nowadays, even in the most traditional markets there can be found more than two sides of it.

Theory on multi-sided markets evolved with the understanding of platforms in different industries and context. Two-sided market is a market context in which a platform connects two segments of its users and imposes appropriate charging for each side (Rochet & Tirole, 2006). The idea is to gather at least two sides of the market which could benefit from connecting and exchanging value and then charging the service of connecting rather than doing the job by itself. That way everybody can find the friction in the system and bring value to it without being specialized in particular good production. Examples of two-sided markets can be found everywhere; e.g. Apple Store, where idea is to gather software developers from the world and let them sell their software through Apple platform while gathering a lot of end users that are willing to buy it, card systems such as Visa that connect retailers and cardholders or Amazon which connects buyers and sellers. In digital world, Google Ads is the perfect example of a two-sided market – it connects people/organization that want to communicate or promote some messages with users of the Internet who are willing to exploit the possibilities of web search browser for free while having consent to give some of its data to marketers.

In literature, characteristics of two or multi-sided markets, just as almost any other concept, depends on the author of article or book. For example, Jia, Cusumano & Chen (2019) state that characteristics of multi-sided markets are: a) existence of different types of customers with different prices set, b) existence of network externalities, where platform gains benefits with additional participant added on the platform while network effects are both indirect and direct, c) existence of multi-lateral market power, where platform exerts power on every side of the market, d) actor valuations are exogenous to any direct interactions on the other sides and e) actors from each side interact either with all or a random subset of actors from another side and are equal in terms of value to actors from another side. Liu et al. (2021) define

characteristics of two-sided platforms as following – the fees are transaction based, sellers are free to join competing platforms and buyers are free to join competing platforms. Two main components of a platform in a two-sided market are focusing on the growth of a) installed user base and b) availability of complementary products (Cennamo & Santalo, 2013), and that platforms are based on the theory of network externalities and the theory of multi-product pricing.

Unfortunately, running a platform on multi-sided markets is not a simple task for its managers. The core idea from the theory could be that the goal is to have as many users as possible and as many options as possible, and consequently having good financial and business performance. But aside from researches (e.g. Cennamo & Santalo, 2013) that found that winner-take-all strategies (where the main idea is to grow big as fast as possible) proved even detrimental to performance, there are numerous problems for managers to address, which include but are not limited to:

- pricing structure of the product (Jia, Cusumano & Chen, 2019)
- users pricing structure; what side to charge and how much (Armstrong & Wright, 2007)
- the threat of envelopment; when another rival offers your platform functionality as a part of its multi-platform bundle (Eisenmann, Parket & Van Alstyne, 2011)
- competing on the terms of high switching costs (Henderson & Clark, 1990)
- multi-homing (Belleflamme & Peitz, 2019)
- chicken and egg dilemma (Rochet & Tirole, 2003)
- antitrust and other law issues (Gürkaynak et al., 2017)

In the next part of this paper, multihoming will be taken as one of the problems to face in terms of platforms on multi-sided markets and it will be further discussed.

2. MULTI-HOMING EFFECTS

Market environment in terms of how many platforms is one side of the market using can be described through two major scenarios– single-homing scenario and multi-homing scenario. Multi-homing is a context where users are simultaneously registered on multiple platforms, where in single-homing users are loyal to only one platform (Yu et al., 2021). For example, on the taxi services market, some users are registered to Bolt, Uber and Lyft (companies that are solving the same market problem of transportation); when in need of a taxi service, a user can look up at prices and conditions on every platform, therefore does not need to be loyal to only one and can create possible problem for the platform that acquired him first. In digital world, media industry is one of the best examples of multihoming; decades ago, people would have to buy multiple newspapers in order to multi-home and gather relevant news. Today, in digital world, multi-homing is just a click away for a user. Internet, Web browsers and even aggregators of news made it easier for people to switch between providers; the cost of multi-homing is zero to little so consumers are more frequently multi-homing in the search for better news with smaller cost of information search. In literature, video game industry is one of the most popular contexts for multihoming analysis and network effects of two-sided markets in general (e.g. Corts & Lederman, 2009; Landsman & Stremersch, 2011; Clements &

Ohashi, 2005). One of the possible explanations in that lies in the nature of industry which has been a part of (at least) two-sided markets for a long time. Earlier mentioned taxi services are another industry which is researched upon a lot (e.g. Leng et al., 2016; Jiang & Zhang, 2018) because of its nature – focus is on the modern taxi services platforms such as Uber and Bolt where there are 3 sides and, since the companies are almost “all digital“, the data is presumably easy to get.

Another angle for describing this concept is in a situation of a new entrant to the market; when a new competitor enters the market, users can decide to switch/stay (single-homing) or adopt both platforms (multi-homing). The issue for managers lies in a fact that every combination of either single-homing or multi-homing on every side of the market creates a different context and requires a different strategy for a platform. One situation is when one side of the market is multi-homing while the other is single-homing – the solution can be exclusive contracts which can improve the surplus of agents on the multihoming side (Fuyuki, 2021). Another situation is when both sides are multi-homing; in that case, subsidizing one side for maximization of profits show zero to little results (Bakos & Halaburda, 2020). Some platforms are trying to attract customers from other platforms by giving them free promotion for products on its platforms; in return, if the product is new (for example new software), developers are adopting sequential launch on other platforms (Zhang, Hou & Zhang, 2020). For a defined period of time, the platform that enlisted the software is able to capture some of the users from the other platforms and the software can get a traction in sales through free promotion. In return, the developers postpone enlisting of that software on other platforms and give the exclusive platform some head start. Another strategy is to act as a barrier with imposed limitations for multihoming (Rangaswamy et al., 2020) but sometimes it can backfire in form of customer frustration. In terms of financial models, making difficult to replicate liquidity can be as well a part of the strategy for a platform (Wirtz & Ehret, 2019).

Since the competitive games are so complex with multi sided markets, the primary strategy to tackle multi-homing is differentiation from competitors (Gawer & Cusumano, 2014), which is applicable across all industries and markets and does not need to specifically account for multihoming behaviour of every side. Multi-homing has been analyzed using diverse methodologies and utilizing different perspectives (see Table 1).

Table 1: Research contributions on the concept of multi-homing

Authors	Key observed variables	Methodology	Conclusions
Trabucchi & Buganza (2021)		Case study	Multi-homing facilitates the dissemination process. Co-opetition strategies are helpful in the launching of platform.
Athey, Calvano & Gans (2016)	Consumer switching Market prices Profits Quantity and quality of content	Modelling Descriptive statistics	Consumer multi-homing increases share of advertisers single-homing on individual publishers and decrease publisher prices, profits and efficiency.

Bakos & Halaburda (2020)		Modelling	When both sides are multi-homing, there is no interdependence between pricing decision on the two sides by the same platform.
Choi (2010)	Tying arrangements	Modelling	Tying arrangements do not automatically foreclose competing products. Tying induces more consumers to multi-home and makes platform-specific exclusive contents available to more consumers.
Park, Seamans & Zhu (2018)	Ad price Ad circulation Ad rate charged TV in market % of specific education Number of multihoming consumers	Descriptive statistics Regression	Newspaper market companies with multi-homing customers are more likely to have higher subscription prices, circulation and ad rates than others.
Zhang, Hou & Zhang (2020)	Switching costs Prices Delay time effort Product quality	Modelling	When switching costs increase, the price on one platform will decrease while the prices on other platform will increase to compensate for the lost customers.
Belleflamme & Peitz (2019)	Value in buyer-seller transaction Profits	Modelling	Total value created in seller-buyer transaction has the most impact on seller competition.
Fuyuki (2021)	Social welfare* Consumer surplus Total surplus Exclusive dealing	Modelling Descriptive statistics	In market equilibrium, some platform creates exclusive contracts with all sellers or not at all. When there are externalities, exclusive dealing is crucial for social welfare.
Yu et al. (2021)	Switching behaviour, Gender, Age, Marital Status, Income, Drive Time, Driving Age, In Black List, Locality, Wait Time, Passenger Tip, Avg Gap, Max Gap	Regressions (RF-MNL, MLR)	Most of the multi-homing drivers are non-local and aged between 30-40. Majority of multi-homers switch between 2 platforms. More than 25% of drivers registered on platforms are multi-homing.
Zha et al. (2018)	Surge pricing of the platform	Modelling	Drivers prefer surge pricing while consumers do not.
Liu et al. (2018)	Drivers experience of travel time, distance, signalized intersections,	Filtering methods Descriptive statistics	Drivers multi-homing behaviours decrease single-homing drivers surplus, while both single-homing and multi-homing riders could be better off once multi-homing is allowed.

	turnings, Number of platforms, Buyer heterogeneity, Total welfare Platform fees	(based on taxi tracing records)	
Jiang & Zhang (2018)	Crusing modes, market sharem drivers profit and ratio of the market leader, Double apping	Modelling (based on GPS trajectories)	Passenger and drivers multihoming have the opposite effect on the platform. Ridesharing companies are in "Prisoners dilemma.
Leng et al. (2016)	Travelling distances, Idle time lengths, Consumer surplus	Descriptive statistics	The money promotion in taxi services brings benefits to customers because there are more taxi drivers and less idleness.
Venkataraman, Ceccagnoli & Forman (2018)	Employees, Sales Revenue, Partnership Duration, Human Capital, Specialist Firm, Multi-homing	Regression	Firms organizational routines have an independent and positive effect on the firms strategy of multihoming.
Anderson, Foros & Kind (2018)	Market entry, merger advertisement prices, producer surplus, welfare	Modelling Descriptive statistics	Consumers multihoming has the result of media platforms being able to charge only incremental value prices to advertisers.
Anderson, Foros & Kind (2017)	Prices, single and multipurchase, heterogeneity of consumers, product functionality, consumer surplus, profits,	Modelling Descriptive statistics	Presence of U shaped relationship between equilibrium prices and functionality levels in multipurchase.
Bryan et al. (2019)	Cost of idleness, wait time, prices, profit, multihoming	Modelling	If only consumers mutihome, idleness is lowe in duopoly than in monopoly, coming to zero in term of both agents multihoming. Restricting multhoming reduce the total welfare.
Baojun, Lin & Bo (2019)	Multiproduct purchase Content value, prices, Differentiation	Descriptive statistics Modelling	When two distributors are sufficiently differentiated, their profits are higher under multiproduct purchase than under single-product purchase.
Landsman & Stremersch (2011)	Multihoming Platform age Plaftform market share	Regression Descriptive statistics	Multihoming negatively affects platform sales - but the effect decreases with greater platform age and market share (because both reduce adoption uncertainty).

	Number of applications Platform-seller app fit, Platform price, Platform sales		The larger the market share of a mature platform among buyers, the more apps will be multihomed. The larger the market share of a nascent platform, the fewer applications for it will be multihomed.
Corts and Lederman (2009)	Price, Number of software releases, Number of titles, Platform age, Platform base, Rivals base,	Regression	Single-homing limits the potential of sales because software is not available to other platforms. Hardware compatibility is not the only factor affecting the scope of network effects (non-exclusiveness is another)
Finley and Basaure (2018)	Throughput, Network layout, Number of end users, network switching and multihoming user fractions, mean opinion score (MOS)	Modelling	Consumers are significantly increasing throughput of switching only in low user density context.

As we can see from the previous analysis, aside from providing the best strategies in certain business contexts and analysing surplus of the either consumer or producer, we can segment the literature of multihoming into the next categories:

- a) antecedents of multihoming (person based, product based, platform based)
- b) consequences of multihoming (effect on sales/demand, price structures, customer utility)

Since there are various industries shown in the literature, further discussion will be more focused on the taxi services industry, with a short overview of the market dynamics for every side of the market. The primary conclusion of covered literature is that multi-homing has different effects on platform, riders and drivers.

Multi-homing generally has negative effect on platform sales, which can be posed as logical outcome since both riders and drivers want to reduce their waiting time and increase their profit or reduce their prices, and multi-homing makes it less possible (see Landsman and Stremersch, 2011; Corts and Lederman 2009). Including financial benefits for both drivers and riders (Leng et al., 2016), without clear results for platform itself. In multi-homing within multi-sided markets literature, when platform prefers to impose single-homing, it is harming at least one side of the market (Belleflamme & Peitz, 2019). In the taxi services context, based on the current literature, it would harm both riders and drivers that prefer to be more efficient. Furthermore, according to a general literature, multi-homing has negative effect on platform sales (Jeitschko & Tremblay, 2019), but the effect is almost zero when company is mature and has a big market share (Landsman & Stremersch, 2011). That can be explained through the network externalities, which are greater when the company has a lot of users. Comparing that theory to taxi services, there is no research done that could disprove or confirm that.

Interesting fact is that more than 25% of the drivers are multi-homing; primarily between 2 platforms (Yu et al., 2021). It would be interesting to connect the theory of market maturing and share and see what are the behaviours of drivers in different context. For drivers, best strategy should be having no to little waiting time because they are money and efficiency focused; waiting is a big opportunity cost for them. Multi-homing is therefore a way for drivers to increase their efficiency in a context where supply exceeds demand. Jiang and Zhang (2018) discovered that they are in fact able to acquire higher profits with multi-homing. While driving with a taxi, it is not common to hear or see that they are double-apping (as the context where they are using two platforms in order to decrease waiting time) so they do not have to wait; in the end, they can get a higher amount of rides in their shift. In comparison of single-homing and multi-homing drivers, multi-homing drivers have bigger surplus because of their behaviour (Liu et al., 2018)

Passengers strategy in terms of time efficiency should be multi-homing since it gives them the opportunity to increase their chances of getting a successful ride and decrease their waiting time (Jiang and Zhang, 2018). It is consistent with other studies in terms of taxi services (e.g. Liu et al., 2018).

From the discussion above, it can be implied that multi-homing has the most negative impact on platform which has to fight for every consumer and rider. No one is considered loyal and both sides want to either reduce their waiting time or save their income. That is not surprising since almost all of the platforms, especially in sharing economy, were born on the idea of removing some market friction. If some platform is not the best solution, consumers are going to find another solution. That is consistent with some studies that has shown that platforms (in sharing economy) have a little brand value, and are not active in forming one's identity (Bardhi & Eckhardt, 2012). That being said, it is clear that if there is a lower level of attachment between a consumer and a brand (in this case a platform) that the possibility of multi-homing is higher. Multi-homing literature is not mentioning enough a concept of loyalty, which is in taxi services (an industry that is frequently researched upon) on a low level (Reynolds, 2019), and present a major effect that could change and improve the theory of multi-homing.

3. FUTURE RESEARCH

After decades of research in areas of multi-sided markets and phenomenon of multi-homing, there are still some missing areas that has to be enlightened. Many researchers found that the effect of multi-homing is positive on consumers by giving them more choice or decreasing the price, and negative on platforms in terms of decreasing the revenue (Yu et al, 2021). Further research should explore: (a) the Impact of platform differentiation on consumer multi-homing behaviour; (b) relationship between multi-homing and perceived quality and satisfaction; and (c)

3.1. Impact of Platform Differentiation on Consumer Multi-Homing Behaviour

Taxi service industry is one of the most researched upon in terms of multi-homing (e.g. Ke et al., 2019; Benjaafar et al., 2022). Multi-homing in the riding service market is present at both market agents; drivers and riders. Whether its decreasing waiting time, increasing chances of successful ride (Jiang and Zhang, 2018) or lower prices for consumers, or decreasing waiting time for drivers, both of them are trying to maximize the value they can get from their platforms. Since one of the most popular and the biggest platforms for taxi services, Bolt and Uber, are common context of multi-homing, the big question is differentiation. Since drivers and their cars are the main product of the platform, and some drivers are alternately changing platforms in order to get a ride, a presumption could be made that there is no significant differentiation among them. Both quality and experience could be practically identical, not taking into account technical platform specifications, price and some other variables.

Differentiation is a strategy that is present among both marketers and academia for many decades. Its main goal is to acquire uniqueness through some of the elements of the company or offering (Renko, 2005). In terms of multi-sided platforms, differentiation is based on either quality of products (vertical differentiation) or characteristics and prices (horizontal differentiation) (Gürkaynak et al., 2017). When a platform enters a new market with a differentiated offering, there is a possibility that it is going to acquire some customers and nudge others to multi-home (Evans, 2013), since its value proposition could have better fit with the values that some consumers have.

Among research in multi-homing literature, some authors state that differentiation should lead to single-homing behaviour (Gawer & Cusumano, 2014). That argument seems logical at the first sight, but there is a whole different perspective disregarded. For example, if one platform has significant differentiation level in the industry, there is a possibility that it will attract more users than others. On the same note, from the customer perspective of view, if there is a market with more than one differentiated, or distinctive product, there is no reason for him to multi-home and enjoy in both products. So, one of the question should be when do consumers multi-home because of differentiation, and when do they single-home because of the same reason? Both contexts are possible, since you can multi-home not because of the significant level of differentiation among companies, but because of the low level of it; if nothing is distinctive, you have no reason to be loyal to one.

Another question is perception of differentiation among platforms. Bigger issue for differentiation is when providers of the product or services is multi-homing because they are the ones that create perception of differentiation. Just as it was with the taxi services, same issue could be raised in hotel industry and some others. Perception of differentiation is in the eye of the beholder, or in this case consumer, so nowadays when there is large number of platforms in every market, it would be interesting to see how are different digital markets seen in terms of differentiation. Human interaction is one of the elements of platform interaction in some cases. If people are more loyal to some company because of the human interaction and the relationship with its personnel, research should look upon presence of human interaction on platform in order to conclude for differences. Even though there could be presumption that older people are prone to be more loyal to some brands, some authors (e.g. Phua et al., 2020) found that older consumers are not more loyal to older brands. In the

mentioned research, context was grocery retailing so it has no digital technologies and learning time taken into consideration, so even seen as a futile, age could be of a big interest in that research, among digital literacy and general propensity of a consumer to try test new products.

3.2. Relationship Between Multi-Homing and Perceived Quality and Satisfaction

Another important question is the level of satisfaction among single-homing users versus multi-homing users. Based on getting the same experience and product, through a prolonged period of time, it would be interesting to see whether single-homing users have higher overall satisfaction with the satisfied needs than the other ones. Aside from satisfaction, guilt should be taken into consideration. Are single-homing users happier and without guilt when put into perspective of being loyal to some provider (especially if there is a human contact involved) than multi-homing users who are not loyal?

Long time ago some hotels and other accommodation providers used to market its services only through word of mouth and their own channels. Nowadays, a lot of providers are managing their own sales channel (e.g. web site and direct reservations) and at the same time are present on some digital accommodation platforms (such as AirBnB and Booking). Digital platforms are making available for consumers to sort information through prices which is a problem is a company strategy is differentiation, which is a case for a lot of hoteliers (Becerra et al., 2013) since it is proven that it can lead to more sustainable revenues than low-cost strategies (Banker et al., 2014).

Since sense of being different brings value to consumers, and it can be provided with consuming differentiated offerings, crucial question is whether platforms in tourism are decreasing the satisfaction of consumers. Seeing the same hotel listed next to the cheap apartment could degrade the value that the consumer could get from the experience. Also, quality is questionable; why should a consumer believe that it has higher quality than some cheap alternative apartment positioned right next to it on some platform? Perceived differentiation among accommodation providers that are listed only through their own sites should be compared to the providers that are listed among others on platform, accounted for satisfaction that both contexts were able to measure.

3.3. Multi-Homing in a Video Game Industry

Video game industry is, as stated before, researched upon in terms of platformization. One of the results found is that market share and maturity of a platform are crucial variables for explaining platforms multi-homing, where developers are more prone to single-homing when they are nascent (Landsman & Stremersch, 2011). It would be interesting to find what are the consumers characteristic that are influencing video game industry multi-homing. On the contrary, video game industry is one of the industry where loyalty to game publishers is high (Yap, 2019; Palomba, 2016). One of the elements to look upon in terms of multi-homing in this industry is whether multi-homing is playing different games on every console played, or playing the same game on different consoles.

Contrary to taxi services, this industry has platforms that has distinct differentiation points so people can develop a more significant relationship with their brands. In researching antecedents of loyalty in game publisher's industry, Palomba (2016) tested three variables – video game genre, gender and network externalities (in terms of their peers playing), but the research has many limitations. It would be interesting to see whether the time of console possession and customer satisfaction are significant factors for multi-homing.

Also, some research was done in terms of success of a genre in the context of multi-homing, but it would be of a great value to see the comparison of performance of the single-homed games (e.g. Splatoon exclusive on Nintendo Switch) versus multi-homed games (e.g. Fifa on Nintendo Switch, PC and PlayStation). Number of channels as well as the exposure to larger number of people should be taken into account, since entry barrier is a big factor in game console industry. As it is a case in the software industry, sequential launch is a possible solution (Zhang, Hou & Zhang, 2020) but it presumably has different impact on the differentiation level perceived later for the game developer and even the whole platform. Digging deeper in the video-game industry could be of very significance for game consoles nowadays since there is oligopoly situation with strong competition and hypothesized unlikeness between users of platforms (i.e. Play Station, Nintendo and Xbox).

4. CONCLUDING REMARKS

Two or multi-sided markets are market environments in which the general task for the platform is to bring two or more clusters of its users and impose different charging mechanisms for each and every one. Success depends on the ability of its managers to attract as many users and price them appropriately, which means that a platform can subsidize one side of its market in order to attract the other one. On two or multi-sided markets, multi-homing is a context where one user is simultaneously using more than one platform for the same problem solution. It can happen on any side of the market; there are many markets where both providers or intermediaries and end-users are multi-homing. One of the best examples for that situation is taxi services market where drivers are “double-app-ing” in order to shorten their idleness time and earn more in a period of time. On the other side, riders are using more than one platform for their own benefits, making the whole loyalty system incentives more complex. Nowadays multi-homing cost is almost zero since there are many Internet solutions and market aggregators that are existing almost only for the purpose of increasing multi-homing behaviour, which challenges a concept of loyalty.

Nevertheless, platforms are fighting hard in order to make their users loyal; some of the strategies are either increasing barriers or incentivizing single-homing. In order to provide a solution for multi-homing, market specificities should be analysed a potential market response should be calculated, since there is no universal strategy that works. Research focus should shift into direction of determining successful strategies of the “traditional” companies. While many traditional companies lost its competitive battle with platforms, some of them are still managing to win in a complex battle with other traditional companies and platforms as well. Fighting more than one type of battle is hard, but platforms are evolving on the

markets with a problem of friction; if market have some areas of improvement, there is a high possibility that a platform will arise and try to solve some problem more efficiently.

As platforms became markets where brands compete, multi-homing results in platforms competing on the market of platforms. In other words, competitive game has shifted “level-up”, requiring platforms to differentiate and compete in, what might have seemed as a “winner-takes-all” competitive game. Although initially increasing competitiveness among platforms, as context matures, platforms consolidate toward a few dominant platforms which prevail. Further research should identify determinants of successful platforms in the consolidation phase of their development in order to provide insights for managing multi-sided platforms in multi-homing contexts.

References

1. Anderson S. P, Foros Ø., & Kind H. J. (2019) The importance of consumer multihoming (joint purchases) for market performance: Mergers and entry in media markets. *Journal of Economics and Management Strategy*, 1-13.
2. Anderson, S. P., Foros, Ø., & Kind, H. J. (2017). Product functionality, competition, and multi-purchasing. *International Economic Review*, 58(1), 183-210.
3. Armstrong, M., & Wright, J. (2007). Two-sided markets, competitive bottlenecks and exclusive contracts. *Economic Theory*, 32, 353-380.
4. Athey, S., Calvano, E. & Gans, J-S. (2016) The Impact of Consumer Multi-homing on Advertising Markets and Media Competition. *Stanford Business School Working paper*.
5. Bakos, Y., & Halaburda, H. (2020) Platform Competition with Multi-Homing on Both Sides: Subsidize or Not? Available at SSRN: <https://ssrn.com/abstract=3545723>
6. Banker, R. D., Mashruwala, R., & Tripathy, A. (2014). Does a differentiation strategy lead to more sustainable financial performance than a cost leadership strategy?. *Management Decision*.
7. Baojun, J., Lin, T., & Bo, Z (2019) Competition of Content Acquisition and Distribution Under Consumer Multipurchase. *Journal of Marketing Research*, 1-19
8. Bardhi, F., & Giana Eckhardt, M. (2012). Access-Based Consumption: The Case of Car Sharing. *Journal of Consumer Research*, 39(4), 881-898.
9. Becerra, M., Santaló, J., & Silva, R. (2013). Being better vs. being different: Differentiation, competition, and pricing strategies in the Spanish hotel industry. *Tourism management*, 34, 71-79.
10. Belleflamme, P., & Peitz, M. (2019). Managing competition on a two-sided platform. *Journal of Economics & Management Strategy*.
11. Benjaafar, S., Ding, J. Y., Kong, G., & Taylor, T. (2022). Labor welfare in on-demand service platforms. *Manufacturing & Service Operations Management*, 24(1), 110-124.
12. Binken, J. L. G., & Stremersch, S. (2009). The Effect of Superstar Software on Hardware Sales in System Markets. *Journal of Marketing*, 73, 88-104.
13. Bryan, K. A, & Gans, J. S. (2019) A theory of multihoming in rideshare competition, *Journal of Economics and Management Strategy*, 28, 89-96

14. Cennamo, C., & Santalo, J. (2013). Platform competition: Strategic trade-offs in platform markets. *Strategic Management Journal*, 34(11), 1331-1350.
15. Cennamo, C., & Santalo, J. (2013) Platform competition: Strategic trade-offs in platform markets. *Strategic Management Journal*, 34, 1331-1350
16. Choi, J. P. (2010). Tying in two-sided markets with multi-homing. *The Journal of Industrial Economics*, 58(3), 607-626.
17. Clements, M. T., & Ohashi, H. (2005). Indirect Network Effects and the Product Cycle: Video Games in the U.S., 1994–2002. *Journal of Industrial Economics*, 53(4), 515-542.
18. Corts, K. S., & Lederman, M. (2009). Software Exclusivity and the Scope of Indirect Network Effects in the U.S. Home Video Game Market. *International Journal of Industrial Organization*, 27(2), 121-136.
19. Eisenmann, T., Parker, G., & Van Alstyne, M. (2011). Platform Envelopment, *Strategic Management Journal*, 32(12), 1270-1285.
20. Evans, D. S. (2013). Economics of vertical restraints for multi-sided platforms. *University of Chicago Institute for Law & Economics Olin Research Paper*, (626).
21. Finley, B., & Basaure, A. (2018). Benefits of mobile end user network switching and multihoming. *Computer Communications*, 117, 24-35.
22. Fuyuki, S. (2021) Exclusive contracts and multihoming agents in two-sided markets. *MPRA Paper*, No. 110070
23. Gawer, A., & Cusumano, M. A. (2014). Industry platforms and ecosystem innovation. *Journal of Product Innovation Management*, 31(3), 417-433.
24. Gürkaynak, G., İnanlı, Ö., Diniz, S., & Yaşar, A. G. (2017). Multisided markets and the challenge of incorporating multisided considerations into competition law analysis. *Journal of Antitrust Enforcement*, 5(1), 100-129.
25. Henderson, R., & Clark, K. (1990). Architectural innovation: the reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35, 9-30.
26. Jeitschko, T. D., & Tremblay, M. J. (2019). Platform competition with endogenous homing. *International Economic Review*.
27. Jia, X., Cusumano, M-A., & Chen, J. (2019). An Analysis of Multi-Sided Platform Research Over the Past Three Decades: Framework and Discussion, Working paper Draft, Tsinghua University & MIT Sloan School of Management.
28. Jiang, W., & Zhang, L. (2018). Evaluating the effects of double-apping on the smartphone-based e-hailing service: A simulation-based study. *IEEE Access*, 6, 6654-6667.
29. Ke, J., Cen, X., Yang, H., Chen, X., & Ye, J. (2019). Modelling drivers' working and recharging schedules in a ride-sourcing market with electric vehicles and gasoline vehicles. *Transportation Research Part E: Logistics and Transportation Review*, 125, 160-180.
30. Landsman, V., & Stremersch, S. (2011). Multihoming in Two-Sided Markets: An Empirical Inquiry in the Video Game Console Industry. *Journal of Marketing*, 75(6), 39-54.
31. Leng, B., Du, H., Wang, J., Li, L., & Xiong, Z. (2016). Analysis of taxi drivers' behaviors within a battle between two taxi apps. *IEEE Transactions on Intelligent Transportation Systems*, 17(1), 296-300.

32. Liu, C., Teh, T., Wright, J., & Zhou J. (2020). Multihoming and oligopolistic platform competition.
33. Palomba, A. (2016) The antecedents of interactive loyalty, *Online Journal of Communication and Media Technologies*, 6(2).
34. Park, K-F., Seamans, R., & Zhu, F. (2017) Multi-Homing and Platform Strategies: Historical Evidence from the US Newspaper Industry. *Harvard Business School*, 18-32.
35. Rangaswamy, A., Moch, N., Felten, C., van Bruggen, G., Wieringa, J. E., & Wirtz, J. (2020). The Role of Marketing in Digital Business Platforms. *Journal of Interactive Marketing*.
36. Renko, N. (2009). *Strategije marketinga*. Zagreb: Naklada Ljevak.
37. Reynolds, P. (2019). When Disruptors Become Followers: Uber, Lyft and Their Loyalty Potential. *Mobile Marketer*. Retrieved from <https://www.mobilemarketer.com/news/when-disruptorsbecome-followers-uber-lyft-and-their-loyalty-potential/550432/>
38. Rochet, J-C., & Tirole, J. (2006). Two-sided markets: a progress report. *RAND Journal of Economics*, 37(3), 645-667.
39. Trabucchi, D., & Buganza, T. (2021). The power of two-sided platforms to disseminate resistant innovations. *Management Decision*, 59(13), 1-14.
40. Venkataraman, V., Ceccagnoli, M., & Forman, C. (2018). Multihoming within Platform Ecosystems: The Strategic Role of Human Capital, *Georgia Tech Scheller College of Business Research Paper No. 18-8*. Retrieved from SSRN: <https://ssrn.com/abstract=3134846> or <http://dx.doi.org/10.2139/ssrn.3134846>
41. Yu, J., Mo, D., Xie, N., Hu, S., & Chen, X. (Michael). (2021). Exploring multi-homing behavior of ride-sourcing drivers via real-world multiple platforms data. *Transportation Research Part F: Traffic Psychology and Behaviour*, 80, 61-78.
42. Yup, B. (2019) *What Make Gamers Loyal to Game Publishers: Examining Brand Loyalty in the Video Game Industry*, Masters Degree Thesis. Sunway University Business School
43. Zha, L., Yin, Y., & Du, Y. (2017). Surge pricing and labor supply in the ride-sourcing market. *Transportation Research Procedia*, 23, 2-21.
44. Zhang, X., Hou, W., & Zhang, W. (2020). Simultaneous or sequential? Multihoming launch strategies for mobile applications with consideration of promotion and switching costs. *International Journal of Production Research*, 1-22.



www.innovation-institute.eu

www.gbcsummer.com

www.gbcwinter.com

ISSN 1848-2252