Community Dental Health (2024) **41,** 215–219
Received 26 March 2024; Accepted 3 June 2024; Online 12 September 2024

doi:10.1922/CDH_00069Chmelikova05

Factors affecting small dental business in rural Germany: Evidence from Hessen

Gabriela Chmelikova[1], David Stein[2], Felix P. Koch[3]

[1]*Faculty of Regional Development and International Studies/Department of Regional and Business Economics, Mendel University, Brno, Czech Republic;* [2]*Faculty of Business and Economics/Department of Business Economics, Mendel University, Brno, Czech Republic;* [3]*Faculty of Medicine, Goethe University, Frankfurt, Germany*

Objectives: To determine how social factors influence career decisions of dental service providers, particularly focusing on examining the impact of dentists' origins. ***Methods***: Online survey of Hessian panel dentists, with pairwise comparisons to a set of factors impacting their decision-making process. An Analytic Hierarchy Process examined the weighting of influencing drivers in career choice. ***Results***: Dentists from rural backgrounds were more likely to establish practices in rural areas than those from urban origins. Origin correlated with entrepreneurial intentions and a strong association of rural origin. Dentists who grew up in rural areas were 4.19 times more likely to start a business. ***Conclusion***: These findings may support efficient resource allocation and support for rural dental businesses.

Keywords*: employment, dentistry, analytic hierarchy process, career choice, rural regions, start-up firms*

Introduction

The availability of dental services in Germany varies considerably by location, with rural areas often experiencing a shortage of dental professionals, and an oversupply in urban areas (Kassenärztliche Vereinigung Rheinland-Pfalz, 2019; Bundeszahnärztekammer, 2022). Several factors contribute to this disparity. Dentists frequently prefer urban or suburban areas due to higher population density and better earning opportunities. Additionally, major cities host dental schools, universities, and training centres that attract both aspiring and established professionals. This concentration of educational institutions results in a higher density of dentists in urban areas. Furthermore, in line with the Theory of Central Places (Blažek and Uhlíř, 2020), cities offer more opportunities for specialization in fields such as orthodontics, oral surgery, and cosmetic dentistry, which can be financially rewarding and are better supported in urban settings. To address the shortage in rural areas, public institutions offer incentives such as financial support and loan forgiveness programs.

Social capital, encompassing the collective resources within social networks, facilitates cooperation and resource exchange among individuals and groups. Key scholars, including Pierre Bourdieu, James S. Coleman, Robert D. Putnam, Nan Lin, Mark S. Granovetter, and Ronald S. Burt, have explored various dimensions of social capital, highlighting its role in shaping societal dynamics. Empirical evidence shows that community social capital positively affects entrepreneurial intentions in rural communities (Doh and Zolnik, 2011; Roxas and Azmat, 2014). Crowley and Barlow (2022) found that higher levels of networking, informal connections, and tolerance further enhance entrepreneurial activity. Amini Sedeh et al. (2020) also noted that networking positively influences entrepreneurial behaviour. Thai et al. (2020) observed that social networking facilitates business creation, with interpersonal trust driving entrepreneurship in the informal sector. Their findings support the idea that strong community ties and social cohesion encourage entrepreneurial ventures. Ali and Yousuf (2019) further demonstrated that social capital not only boosts entrepreneurial intentions but also provides access to critical resources such as knowledge, mentorship, and financial support, enhancing the likelihood of successful entrepreneurship. Their conclusions align with those of Crowley and Barlow (2022), emphasizing the importance of networking and informal connections in promoting entrepreneurial activity.

Rural areas often have a higher density of social capital, creating a favourable environment for the development of social networks compared to urban areas (Chmelíková and Redlichová, 2020; Postelnicu *et al*., 2014). The dense social fabric in rural settings, characterized by strong bonds due to geographic proximity and shared experiences, facilitates rapid information dissemination, knowledge sharing, and trust among community members (Chmelíková and Redlichová, 2013). This environment supports entrepreneurial endeavours, including financial assistance, mentorship, and collaboration, reinforcing the positive impact of social capital on rural entrepreneurship (Chmelíková *et al*., 2019). Recognizing the unique dynamics of social capital in rural areas, leveraging these networks can strategically drive sustainable economic development and innovation. Social capital emerges as a powerful catalyst that can influence the success of new dental enterprises (Fukuyama, 1995). Utilizing social capital to encourage dentists to establish practices in rural areas is a valuable tool in government measures aimed at improving healthcare access in underserved regions, thereby enhancing oral healthcare and economic vitality in these communities.

Correspondence to: David Stein. Email: xstein@mendelu.cz

Despite several measures by public authorities to address the shortage of dentistry in rural areas, such as financial incentives, soft loans, and housing support (e.g., KZVH-Strukturfonds, KZVS-Förderrichtlinie, KZVLB-Strukturfonds, KZV M-V Förderrichtlinie), the potential of social capital remains underutilized. This paper investigates the role of social capital in rural Germany in advancing dental entrepreneurship, aiming to determine whether social capital can effectively support the growth and sustainability of the dental sector in these regions.

Method

An internet-based questionnaire was distributed to 1,162 of all 7,384 members of regional dentist association of Hessian (LZKH) via their mobile application and direct email, ensuring anonymity. Data collection occurred from February to April 2021.

The questionnaire was developed to use an Analytic Hierarchy Process (AHP) as we assumed dentists break down complex decision-making processes into small, manageable units (pairwise comparisons), structured hierarchically and solved formally (Saaty, 1980; Sabaei *et al*., 2015). This process enables group decision-making. The questionnaire included 28 items focusing on pairwise comparisons of the nine drivers using Saaty's ratio scale.

First, a literature review identified studies via databases in Scopus, Medline Ovid and PubMed from May 2020 to August 2020 included 33 records after screening. Based on the identified publications, a thematic analysis defined the drivers for dentists' decision-making as nine heuristics: *environment for the family* (i.e. parenting, education, availability of childcare, safety, career opportunities for partner), *quality of life in private environment* (i.e. leisure activities, proximity to family and friends, emotional strain, health and wellness, social networks), *real income* (i.e. wages, economic profit, benefits and bonuses, expected future earnings), *perception of location* (i.e. own preferences of business location, cultural and community environment, similarity to the community of origin, economic conditions, cost of living), *infrastructure* (i.e. housing, transportation networks, road quality and maintenance, parking lots), *professional cooperation* (i.e. supportive work environment, distance to clinic, rate of highly qualified workers, access to professional networks), *funding conditions* (i.e. investment costs, interest rates, risk assessment, return of investment, rent), *dentist density* (i.e. professional competition) and *support programs* (i.e. rental subsidies, taxes, grants, state regulations, financial assistance). The questionnaire was validated through face validity, expert interviews, and a pre-test with 39 participants in September 2020.

The comparison of two drivers is evaluated with Saaty's *Scale of Relative Importance*, a fundamental scale. It is used to map the verbal preference expressions (equal importance/moderate importance/essential importance/very strong importance/extreme importance) and can be measured bidirectionally by a numeric scale (0-9), as shown in Figure 1.

The questionnaire enquired about participant demographics (*gender* (male/female/divers), *age* (number), *marital status* (single/married/in partnership/widowed), *children* (yes-with number/no), *persons in household* (number), *travel-to-work distance* (<10 minutes/up to 15 minutes/up to 30 minutes/up to 60 minutes/>60 minutes), *main wage earner* (yes/no/don't know), *working hours* (10-20 hours/21-30 hours/31-40 hours/41-50 hours/>50 hours/I am not practicing, *hometown* (<20,000/20,000-100,000/>100,000)). Dentists' hometown was categorized into urban and rural, and municipalities and community districts were categorized into large (>100,000 inhabitants) and medium (20,000 – 100,000 inhabitants) cities, and rural municipalities (<20,000 inhabitants) based on data from the Federal Institute for Research on Building, Urban Affairs, and Spatial Development, *Bundesinstitut für Bau-, Stadt- und Raumforschung* (BBSR). A questionnaire item related to current work status (in single practice/community practice/employed/resident/non-employed) and a further item concerned employment preference to assess the likelihood through the question "What would be your preferred choice today?" Dentists' employment options were categorised as in: (1) a single practice operated by a single dentist, (2) taking over a single practice, which involves the acquisition of an existing practice, (3) a community practice established by multiple dentists, (4) joining an existing community practice or (5) working as employee.

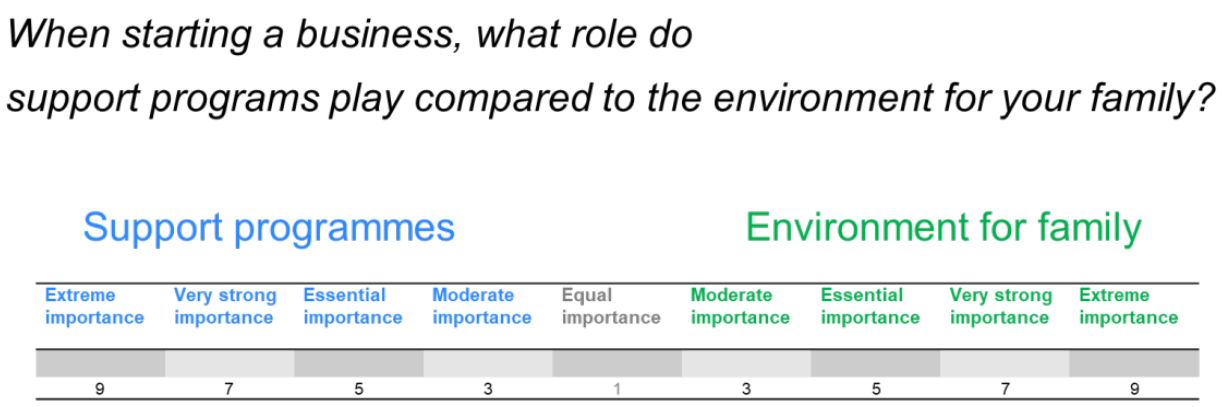

Figure 1. *Example of comparison in conducted survey of 375 Hessian dentists (2021).*

Data were analysed in four phases (Figure 2). First, the distribution of variables was described. Second, AHP was used to compare the impact of drivers on decisions between dentists of rural and urban origins. A consistency ratio (C.R.) was calculated to measure judgment inconsistencies, with C.R.≤0.2 commonly adopted to ensure transitivity of rankings, in other words, preference relations without contradictions (Dolan, 2008). Third, associations between dentists' origins and their preferences of employment option were tested with Chi squares, supplemented by ϕ, V, and C statistics. Finally, the likelihood that dentists from rural regions would establish practices compared to their urban counterparts was tested using odds ratios. Analyses were undertaken using IBM SPSS Statistics (v26).

Results

Of the 1162 Hessian dentists invited to participate, 375 (32.3%) responded. There were slightly more male than female participants (52.5% and 47.5% respectively) with a mean age of 39.9 years (range 26-64 years). Marital status varied, with 12.5% single, 31.5% in partnerships, and 54.4% married. Most (62.9%) had children (mean 1.64 children).

The current work status of 36% of participants was in single practices, 18% in group practices, 26% were employed, 19% were in residency, and 0.5% were not working. Participants' origins were split between rural (45%) and urban (54%) regions.

Most surveyed dentists of rural origin preferred a single practice (61.5%), less than a third (28.9%) of urban-origin dentists share this preference. The survey responses to "What would be your preferred choice today?" show notable differences in preferences of employment option between the two groups of dentists (Table 1). More urban origin dentists than rural origin (40.2% vs 13.6% respectively, p <0.05, Chi sq.) favoured working as employees.

The two groups ranked the selected factors influencing their employment decisions differently, whereas p stands for proportional share (Table 2). Rural dentists considered location more important, ranking it third, whereas urban dentists ranked actual income third. The order of influencing factors indicated that social structures took precedence over economic considerations. For rural participants, the top three criteria (quality of life in the private environment, environment for the family, location of the practice) accounted for 63% of the first choices. For urban participants, family environment was first, followed by quality of life in the private environment, and third, actual income, with practice location being less important. Remarkably, while the two groups were similar, they differed in the less critical lower-ranked factors.

Table 1 serves as correlation matrix plotting the origin of dentists with their preferred employment option. There was a significant ($p < 0.01$) and strong ($V = 0.36$) association between origin and employment decisions, which supports the hypothesis that rural dentists were more inclined to start a practice. The odds ratio for employment shows urban

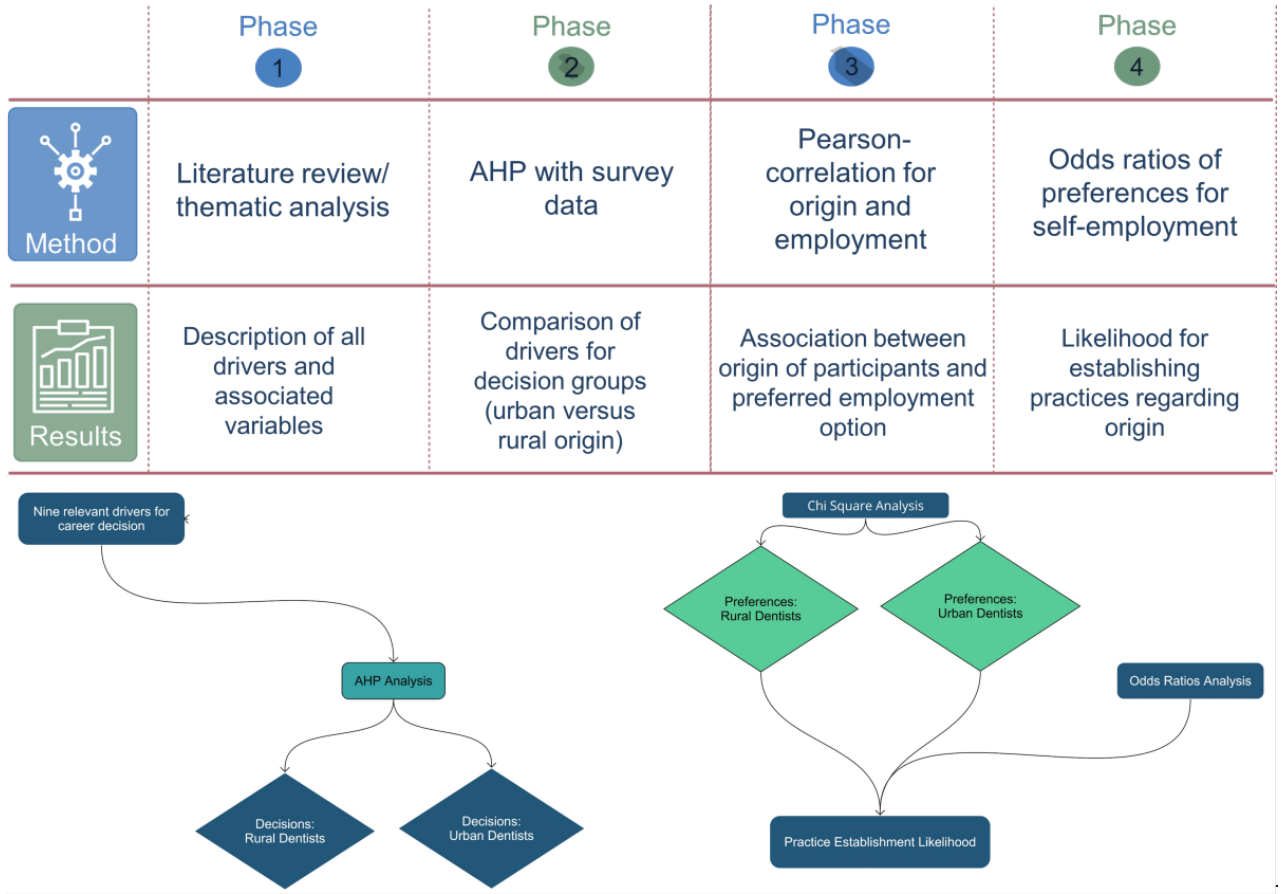

***Figure 2**. Analytical model of variables and their relationships.*

Table 1. Current preferences of employment status of 375 Hessian dentists.

	rural origin % (n = 171)	*urban origin % (n = 204)*	*Total % (n = 375)*
Set up a new single practice	32.7	13.2	22.1
Take over a single practice	28.7	15.7	21.6
Set up a new community practice	3.5	6.9	5.3
Join a community practice	21.1	24.0	22.7
Work as employee	14.0	40.2	28.3

Table 2. Comparison of AHP-rankings of 375 Hessian dentists (by urban vs rural origin).

	urban			*rural*	
	rank	*%*		*rank*	*%*
Environment for the family	1	23.1	Quality of life in priv. environm.	1	26.4
Quality of life in priv. environm.	2	21.8	Environment for the family	2	23.4
Real income	3	16.3	Location of the practice	3	13.6
Location of the practice	4	12.8	Real income	4	11.8
Infrastructure	5	10.5	Infrastructure	5	7.9
Professional cooperation	6	5.9	Dentist density	6	6.5
Funding conditions	7	4.2	Funding conditions	7	5.7
Dentist density	8	3.0	Professional cooperation	8	2.5
Support programs	9	2.4	Support programs	9	2.2
	C. R.= 0.11			*C. R.= 0.16*	

C.R. = (CI/RI≤0.2)

dentists were 4.19 times more likely to work as employees than their rural counterparts (OR: 0., 95%CI = 2.46, 6.89). These results demonstrate a strong link between dentists' origins and their business decisions, with a notable preference for practice ownership among those from rural regions.

Discussion

These findings suggest that the features of social capital, as present in rural areas and influenced by a comprehensive set of social determinants derived from the Analytical Hierarchy Process (AHP) analysis, are important for dentists. Our results support the hypothesis that rural origin, which fosters the development and utilization of social resources to build social capital, positively influences entrepreneurial motivation. The higher entrepreneurial intentions observed among rural dentists can be partly attributed to the stronger social capital in these communities. A rich network of social connections and communal ties not only provides aspiring entrepreneurs with valuable resources and information but also fosters a sense of belonging and commitment to the local community. This increased social embeddedness likely enhances the perceived feasibility and attractiveness of starting a dental practice in rural areas, despite potential challenges.

In contrast, urban dentists, placed less emphasis on social capital factors, are more likely to seek employment without entrepreneurial risk. This aligns with the Theory of Central Places (Blažek and Uhlíř, 2020), which states that employment with its structured work schedule and predictability offers better work-life balance and reduces administrative burdens, making it attractive to those prioritizing consistency and personal time.

Ali and Yousuf (2019) argue that access to crucial resources such as knowledge, mentorship, and financial support is higher in rural areas, contributing to the greater entrepreneurial intention among rural-origin dentists. This supports the findings of Doh and Zolnik (2011) and Roxas and Azmat (2014), who observed similar trends. Strong ties due to geographic proximity and shared knowledge, highlighted by Chmelíková et al. (2019) and Postelnicu (2014), are also key factors in this dynamic.

Status-quo bias influenced newly licensed dentists, especially recent graduates. The requirement to practice as an assistant dentist for at least two years often leads to a preference for the security of permanent employment. This bias, coupled with the lack of university-acquired business knowledge, results in many dentists opting for employment over self-employment, thus limiting their potential for growth and innovation in the field of dentistry. This analysis implies that the combination of fewer employment opportunities and greater value of social capital increases the likelihood of dentists pursuing self-employment in independent practice.

Utilizing social capital in rural areas to encourage dentists to establish their businesses may be a potent tool within government strategies to improve healthcare access in underserved regions. Rural communities often have strong social networks and close-knit relationships among residents, making them ideal for such initiatives. Government programs can strategically leverage these social connections to promote dental practices by incentivizing residents to engage in discussions, referrals, and outreach to attract dental professionals. By fostering a culture of community-driven healthcare support, governments can create an environment where dentists feel welcomed and supported, making the

prospect of setting up a practice in rural areas more appealing. Additionally, financial incentives, grants, or subsidies can be provided to mitigate the initial challenges dentists may face when establishing practices in remote regions.

One strategy to address the undersupply of dental services in rural areas could be to establish paid internships for dental students in high-risk or underserved regions. These internships would offer practical exposure to practicing dentistry in rural communities, incentivizing students to explore rural practice settings. This exposure could foster an interest in studying dentistry and establishing dental businesses in these areas post-graduation.

Given the underestimation of economic factors in the AHP results, future dental professionals should be equipped with the skills needed to succeed as entrepreneurs in rural areas. Dental education programs should incorporate business management knowledge into their curricula. Dentists, particularly in underserved regions, need not only clinical expertise but also entrepreneurial skills to overcome the challenges of running a practice. Including courses on business management, marketing, financial planning, and practice administration can empower dental students to make informed decisions about establishing and managing their practices. Promoting business education can nurture a generation of dentists better prepared to start and sustain successful dental practices in rural communities.

The shortage of dental professionals in rural areas can partly be attributed to limited opportunities for education and training. To address this issue, increasing the number of study places in dental schools, specifically targeting students interested in practicing in underserved regions, is essential. By expanding the capacity of dental education programs, more students can be trained to meet the healthcare needs of rural communities. Offering scholarships, grants, or incentives to students who commit to practicing in rural areas upon graduation can create a pipeline of skilled dentists dedicated to serving these communities. This approach would contribute to a more equitable distribution of dental services and alleviate the shortage of oral healthcare providers in rural settings.

Collaboration between dental schools, local communities, and relevant organizations is crucial for supporting the establishment of dental businesses in rural areas. Partnerships can facilitate community engagement, resource sharing, and awareness campaigns about the importance of oral healthcare. Dental schools can work with local clinics, public health departments, and community centers to provide outreach programs, preventive services, and educational sessions. Such collaborations can also create opportunities for dental students to gain firsthand experience in rural practice settings and build relationships with potential patients. By involving local stakeholders, dental schools can tailor their educational programs to address the specific needs and challenges of each community, enhancing the overall impact of their efforts.

The study acknowledges the limitations of the Pearson -test, such as sensitivity to sample size and its inability to establish causal relationships. Additionally, the study's focus on dentists' origin as the main predictor may overlook other factors that influence career decisions. Despite these limitations, the study provides insights into the potential role of social capital in rural dental business development.

In summary, this article highlights the importance of social determinants in allocating the supply of dentistry. By understanding the relationship between dentists' origin, career decisions, and business preferences, policymakers, and stakeholders can better support the establishment of dental practices in rural areas and improve resource allocation for more efficient healthcare delivery. This support requires a multifaceted approach that combines education, practical experience, community engagement, technological innovation, paid pupil internships, business education, more study places, and collaborative partnerships. These initiatives may alleviate the misallocation of dental services to improve oral health and overall well-being in rural regions.

An ethical board approval was not required for this study as the online survey conducted was anonymous and did not contain any ethically concerning questions. By participating in the survey, each participant consented to the use of their anonymised data.

References

Ali, A. and Yousuf, S. (2019): Social capital and entrepreneurial intention: empirical evidence from rural community of Pakistan. *Journal of Global Entrepreneurship Research* **9**, 1–13.

Amini Sedeh, A., Beck, J., Forghani Bajestani, M. (2020): Perceptual versus institutional determinants of entrepreneurial entry. *Journal of Small Business and Enterprise Development* **27**, 329–346.

Blažek, J. (2020): Teorie Regionálního Rozvoje. *2nd ed. Prague, Karolinum Press*.

Bundeszahnärztekammer (2022): Statistisches Jahrbuch 2021/2022. Berlin, *Arbeitsgemeinschaft der deutschen Zahnärztekammern e.V. (BZÄK)*.

Chmelikova, G. and Redlichova, R. (2013): Start-ups and their Role in the Economy. *Region in the development of society*, 129-136.

Chmelíková, G., Krauss, A. and Dvouletý, O. (2019): Performance of microfinance institutions in Europe—Does social capital matter? *Socio-Economic Planning Sciences* **68**, 100670.

Chmelíková, G. and Redlichová, R. (2020): Is there a link between financial exclusion and over-indebtedness? Evidence from Czech peripheral municipalities. *Journal of Rural Studies* **78**, 457–466.

Cohen, M.P. (2000): Note on the Odds Ratio and the Probability Ratio. *Journal of Educational and Behavioral Statistics* **25**, 249–252.

Crowley, F. and Barlow, P. (2022: Entrepreneurship and social capital: a multi-level analysis. *International Journal of Entrepreneurial Behavior & Research* **28**, 492–519.

Fukuyama, F. (1995): Social Capital and the Global Economy. *Foreign Affairs* **74**, 89.

Kassenärztliche Vereinigung Rheinland-Pfalz (2019): Versorgungsatlas 2019. *Kassenärztliche Vereinigung Rheinland-Pfalz*.

Postelnicu, L., Hermes, N. and Szafarz, A. (2014): Defining Social Collateral in Microfiance Group Lending. *Microfinance Institutions*. Palgrave Macmillan, London, 187–207.

Roxas, H. and Azmat, F. (2014): Community social capital and entrepreneurship: analyzing the links. *Community Development* **45**, 135–150.

Saaty, T.L. (1980): Multicriteria decision making. *The analytic hierarchy process; planning, priority setting, resource allocation*. New York, McGraw-Hill.

Sabaei, D., Erkoyuncu, J., Roy, R. (2015): A Review of Multicriteria Decision Making Methods for Enhanced Maintenance Delivery. *Procedia CIRP* **37**, 30–35.

Siegel, J.A. and Siegel, W. (1972): Absolute judgment and paired-associate learning: Kissing cousins or identical twins? *Psychological Review* **79**, 300–316.

Simon, H.A. (1960): The new science of management decision. New York, Harper & Brothers.

Thai, M.T.T., Turkina, E. and Simba, A. (2020): The impact of national social capital on business creation rates in the formal vs informal sectors. *International Journal of Entrepreneurial Behavior & Research* **26**, 1739–1768.