MEST Journal
DOI 10.12709/mest.07.07.02.02

IDSME INDEX – NEW METHOD FOR EVALUATION OF SMEs DIGITALIZATION

Milanka Bogavac
Faculty of Business and Law, "Union – Nikola Tesla" University, Belgrade, Serbia

Zoran Čekerevac
Faculty of Business and Law, "Union – Nikola Tesla" University, Belgrade, Serbia

JEL Category: **D83, L15, L86**

Abstract

This paper represents results of an examination of the current situation in the field of digitization of micro, small and medium-sized enterprises through presenting a new-created digitalization index (IDSME). It points out that it is possible to create a specific, purposeful index that will give a realistic view on the degree of digitalization in each individual micro, small and medium-sized company. The research relies on well-known indexes of digitization of economy and society used at the level of the world's leading organizations, the European Commission and world-renowned institutes. For the needs of this analysis, the authors have tested their digitization index on a sample of 226 companies from Serbia, Slovakia, and Russia. This analysis, using the IDSME index, was carried out based on research questions and corresponding hypotheses. The authors analyzed, in particular, the mutual relationship between the two of four dimensions of the IDSME index - the Integration of digital technologies in SMEs and the Connection to the Internet in a manner defined by the IDSME model. At the end of the paper, the authors present the conclusions reached during this research, along with the suggestions for the continuation of the research initiated in Milanka Bogavac dissertation.

Keywords: *IDSME, digitalization, evaluation, SME, Internet.*

1 INTRODUCTION

A success of SMEs is conditioned by many factors, and for different purposes, different factors appear more influential than others. To look at the possibilities and effects of digitization on the SME business, it is convenient to define some index that will give an easy and transparent way of assessing the results achieved and point to the possibility of improving the business. When defining the index structure, it is necessary to look at the conditions that prevail in the SMEs environment, resources, the way of using resources and many other parameters. To compare the achieved results, it is necessary to define the criteria for comparison. For this purpose, the indicators of individual parameters can be used independently or grouped. If a global comparison is to be sought, it is necessary to define indicators that will enable it. Given the complexity, composite indicators are indispensable. In their essence, these indicators are groups of indicators aggregated into one value. Composite indicators are the most used tool in evaluating the effects in a relative context since they can observe and explain complex multidimensional phenomena. Because of these

Address of the corresponding author:
Milanka Bogavac
bogavac.milanka@gmail.com

characteristics, they provide the ability to roughly assess the state or progress towards the set goal, which opens the possibility that, after detailed and focused analysis, more precise estimates of individual effects can be obtained.

Digitization of business is a complex task, with many indicators. To ensure better transparency, it is useful to group the indicators into sub-dimensions, and sub-dimensions group into dimensions so that the grouping of dimensions becomes can easily give comparable indicators - indexes. Many problems can be expected. The first problem to be encountered in determining the value of the indicator is the choice of the limit values for each of the indicators.

Due to the different dimensions of individual indicators, it is necessary to normalize their values. It is not the same if the indicator's value will be expressed in numbers or in percentages. It does not have to be that each indicator has the same significance, so it can be concluded that the indicators need to be weighted. Indicators can be entered into dimensions directly or through sub-dimensions. The sub-dimension, as a new composite indicator, has an impact on its dimension and on the value of the index, but sub-dimensions can have a different weight, also. Therefore, sub-dimensions can be weighted to increase or decrease their significance. On the same way, dimensions are by their nature new composite indicators that affect the index value, and it is possible to weight their values to increase or reduce their impact. By just weighting the values of the indicators, the sub-dimensions and dimensions, it is possible to get completely different final results from the same input data. One of the biggest challenges is precisely determining the value of the weights. The starting values of weights are defined based on literature and personal experiences and assumptions. The weighting values can be corrected by subsequent analyzes and checks of the results obtained. The aim of this paper is to present a methodology for defining the level of SME digitization based on the IDSME index. Since the problem is global when creating and analyzing the index of SME digitization, it is necessary to consider and where possible implement experiences from other similar indices. That's why while creating IDSME, new SMEs digitization index, the authors have used experiences of DESI 2017 (EC, DESI 2017 - Digital Economy and Society Index: Methodological note, 2017) and 2018. indexes (EC, DESI 2018 Digital Economy and Society Index - Methodological note, 2018), I-DESI (Foley, Sutton, Wiseman, Green, & Moore, 2018) and IDI (ITU, 2018).

2 IDSME – SME DIGITALIZATION INDEX

The IDSME digitization index is the authors' contribution to researching the impact of digitization on individual SMEs. It enables SMEs to carry out self-evaluation and determine to what level they are digitized and what they need to pay attention to in their development plans. SME Digitization Index measures the progress of SMEs in the digitization process. As such, it brings a combination of relevant indicators weighted within sub-dimensions and dimensions.

The index allows four main types of analysis:

- *Overall impact assessment:* to achieve the general performance characteristics of individual SMEs, observing their overall index and results of the main dimensions of the index.
- *Zooming:* to identify areas where the performance of SMEs could be improved by analyzing the results of the sub-dimensions of the index and the individual indicators.
- *Monitoring:* to assess if there is progress over time.
- *Comparative analysis:* to compare the successes of SMEs using index results, comparing SMEs in similar activities to identify the need to improve the business environment.

IDSME was developed on the principles and recommendations given in (OECD, 2018), based on the literature analyzed in this paper and on the basis of the authors' previous experiences and knowledge. The structure of the proposed digitization index is shown in Table 1. IDSME has a three-tier structure composed of four (main) dimensions, each divided into sub-dimensions, and the sub-dimensions include one or more indicators.

Table 1 Structure of SMEs Digitalization Index (IDSME)

Dimension	Sub-dimension	Indicator	Criterion	min	max
1. Connection to the Internet (w=15%)	1a. Connectivity to broadband Internet (w=25%)	1a1. Connection to a fixed broadband Internet	Possession of an active connection	0	1
		1a2. Connection to a mobile broadband Internet	Possession of an active connection	0	1
	1b. Connection to the Internet via a public telecommunication network (w=15%)	1b1. Connection to the Internet via phone line	Possession of an active connection	0	1
	1c. Internet speed (w=30%)	1c1. Subscription to fast BB access	Declared access speed ≥ 30Mbps	0	1
	1d. Possibility to work from a remote location (w=30%)	1d1. Users of the working from remote location option	% of employees who used this opportunity in the last three months	0	10
2. Digital skills **(w=15%)**	2a. basic skills (w=35%)	2a1. Internet users	% of employees who used this service in the last three months	0	30
		2a2. E-mail users	% of employees who used this service in the last three months	0	30
		2a3. Using the Office software	% of employees who used some Office software component in the last three months	0	30
	2b. Advanced skills (w=65%)	2b1. ICT experts	% of employees	0	10
		2b2. STEM graduates	% of employees	0	20
		2b3. Programmers	% of employees	0	5
3. Integration of digital technologies (w=45%)	3a. Use of digital technologies (w=50%)	3a1. Possession of an own website	Possession of an active website	0	1
		3a2. Possession of an or more accounts on social networks	Possession of an or more active accounts on social networks	0	1
		3a3. Keeping records electronically	Possession of dedicated software	0	1
		3a4. Using of B2B e-business models	Internet activities in the last three months	0	1
		3a5. Using of B2G e-business models	Internet activities in the last year	0	1
		3a6. Using cloud computing	Possession of an active Cloud account	0	1
		3a7. Using some decision support tool	Possession of dedicated software	0	1
		3a8. Using automation	Possession of equipment	0	1
	3b. Electronic commerce (w=50%)	3b1. Online selling	Sales made online	0	1
		3b2. E-commerce turnover	% of the total turnover	0	33
		3b3. Cross-border online sales	% of the total turnover	0	25
4. Internet usage (w=25%)	4a. Communication (w=50%)	4a1. Individual video calls or video conferences	Internet activities in the last year	0	1
		4a2. Use of e-mail	% of e-mails in total correspondence	0	90

Dimension	Sub-dimension	Indicator	Criterion	min	max
		4a3. Participation in social networks	Frequency of using social networks (never, rarely, at least once a month, weekly, daily)	0	4
		4a4. Intranet possession	Network possession	0	1
	4b. Transactions (w=50%)	4b1. E-banking	% of electronic- in total banking- transactions	0	90
		4b2. Purchasing over the Internet	% Internet shopping in total purchases	0	25

Source: Authors

Dimensions by their nature are not isolated areas that have a distinct influence on the level of digitalization achieved and can only have positive effects together. For example, using the Internet is hardly imaginable without being connected to the Internet. Dimensions are chosen so that they represent logical units and can be compared in some analyzes with results obtained by other indexes, for example, Subscription to fast BB access, online selling, or e-commerce turnover.

2.1 Dimension – Connection to the Internet

This dimension is today a pre-condition to all conditions. Except in extremely rare applications, e.g. connecting ATM machines or fiscal cash registers, dial-up connections to the Internet cannot be considered as a favorable solution. Therefore, fast internet connections can be considered as a very significant dimension of IDSME indicators. This dimension is divided into four sub-dimensions, each focusing on one aspect of connecting to the Internet.

The sub-dimension *Connectivity to broadband Internet* is focused on how SMEs is linked to the Internet. At that, the *Fixed broadband Internet connection* and *Connection to the mobile broadband Internet* are taken as indicators.

The sub-dimension *Connection to the Internet via a public telecommunications network* is also focused on how SMEs is connected with the Internet. As an indicator, the telephone line connection has been adopted, regardless of the technology used.

Speed as a factor influences processes in SMEs and focuses on the ability (and desire) of a business to make better use of the Internet's capabilities. As the "high-speed Internet" limit, the declared value of the Internet access speed of 30 Mbps was taken primarily because of the comparability of companies from different countries because this limit was also set for DESI. But this limit is changing every day, and many providers at the time of writing this paper offer 50 Mbps as an optimum regarding price and capacities. From 2020, with the beginning of the use of 5G technology, the speed of Internet access is expected to increase (depending on the observed criterion and the applied technology, nine to 20 times (Dave, 2018)). It is certain that the boundary speed will be a parameter that will change over time but converting to a new boundary value will not pose any technical challenge for IDSME. Therefore, from 2025, a 1 Gbps access speed could be set as a limit value. As the indicator in the model, the subscription to a fast BB access above the limit value in the observed year was taken.

The possibility to work from a remote location (or the ability to work on a remote computer) is an option that has been seriously talked about for some twenty years, and which gets its importance in time. It is used by many, from computer network administrators to employees who work on maintaining the central heating and air conditioning system for hotels, factories and remote facilities in general. This sub-dimension focuses on the willingness of SMEs to organize and use distance working. As a criterion, the percentage of employees that used this option in the last three months is taken here in relation to the total number of employees. It is obvious that if corrections are not introduced, there may be unjustified favorability of micro-companies in relation to others because if in a micro-company with one employee that employee can work from home and obtain the maximum number of points, the medium-sized company never can fully

achieve the same number of points. Therefore, the model set the limit to 10% of the total number of employees. With ten or more percent of those who worked remotely the surveyed SMEs achieve the maximum number of points according to this criterion. Given the expectations, from 2025, the limit value for this criterion could be raised to 50%.

2.2 Digital skills

To take advantages of the Internet in addition to the connection to the Internet it is essential that the employees have the appropriate digital skills, ie. that they are capable of implementing certain activities using the Internet. The "digital skills" dimension focuses on people who use the Internet and computers in general.

Since it is common for users to be divided into groups of ordinary and advanced, also here appear division on sub-dimensions:
- Basic skills and
- Advanced skills.

Given that today's and future employees are expected to master basic digital skills at weighting significantly higher values are given to advanced skills.
The sub-dimension *Basic Skills* includes three indicators:
- Internet users,
- e-mail users, and
- Office package use (regardless of software vendor).

As a criterion, the percentage share of employees who have these skills in relation to the total number of employees was used. In order to avoid the unjustified favorability of micro companies, the value of 30% of the total number of employees was taken as the limit value for all three indicators, and the period of the previous three months was observed. Considering the trends in digital skills, this limit could be raised to 50% in 2025. It is certain that now more and more employees are using the Internet, but in this analysis, the only use of the Internet for business purposes and for meeting the needs of the observed SMEs is used.
The sub-dimension *Advanced skills* includes three groups:
- ICT specialists,
- STEM graduated, and
- developers.

The first two groups include experts with formal higher education in the field of ICT, natural sciences, technology, engineering, and mathematics. The group of developers consists of all employees in SMEs who are able to write computer programs independently regardless of how they acquire this knowledge and skills. To avoid unjustified discrimination against medium-sized companies, upper limits were adopted at levels of 10% (ICT experts), 20% (STEM graduates) and 5% (developers). By introducing more extensive use of IoT and technology 5G, in 2025, these limit values could be doubled (20%, 40%, and 10% respectively).

2.3 Integration of digital technologies

Dimension the *Integration of digital technologies* focuses on the degree to which SMEs are ready to use digital technologies in their doing business regardless they are used on the Internet, or they are part of the intranet or even they are used on individual computers. Therefore, the dimension is divided into two sub-dimensions:
- The use of digital technologies and
- Electronic commerce

Sub-dimension the *Use of digital technologies* includes eight indicators:
- Possession of a website,
- Possession of account on social networks,
- Keeping records electronically,
- Use of the B2B e-business model,
- Using of the B2G e-business model,
- Using cloud computing,
- Using the decision support tools and
- Using automation.

Subdimension *Electronic commerce includes* three indicators:
- Online selling
- E-commerce turnover
- Cross-border online sales.

Electronic commerce via a website is an important element in SMEs digitizing, but not all SMEs are necessarily online oriented. It is possible that some highly digitized SMEs do not deal with e-selling, and that they offer and implement their services (and/or products) in another way. Therefore, the sub-dimension Electronic Commerce is weighted with a value of 0.3 and a sub-dimension of the use of digital technologies with a value of 0.7.

Indicators of the sub-dimension the Use of digital technologies and an online selling indicator are taken with values 1 (possesses, uses) or 0 (do not possess, do not use). As the limit value of online turnover compared to the total sells, 1/3 was taken. For the limit value in cross-border sells, the value of 25% of total online sales has been adopted. All above the limit values is adopted with a value of 1.

2.4 Internet usage

The *Internet Usage* dimension focuses on the types of activities that SMEs have on the Internet, primarily on communications and business transactions. Therefore, two sub-dimensions were selected:

- Communication and
- Transactions.

Sub-Dimension Communications includes four indicators relating to external and internal communications:

- Video calls (single or video conferencing),
- Use of e-mail,
- Participation in social networks and
- Possession of intranets.

The use of video calls and the possession of the intranet are encoded with 1 (uses, has) and 0 (does not use, does not have). The use of e-mail is viewed as a percentage share in total written correspondence, and participation in social networks is differentiated according to the frequency of using social networks ranging from 0 (never used) to 1 (used daily), with values of 0.25 (rare), 0.5 (once a month) and 0.75 (once a week).

The sub-dimension Transactions includes the propensity of SMEs, Internet users, to execute online transactions. It focuses on two indicators:

- Electronic banking i
- Shopping via the Internet.

As a criterion for *Electronic Banking*, the percentage of electronic in total banking transactions was taken. For the indicator *Purchasing over the Internet*, the share of e-purchases was taken in relation to the total purchase. In order to provide more relevant results, the limit value for this indicator was taken as 25% of the total purchase, and all above this value was encoded as 1.

The criteria for each of the indicators are shown in Table 1.

2.5 Normalization

As with other similar indicators, and with IDSME it is necessary to normalize and equalize units before aggregation. Normalization is performed with IDSME using the min-max method by the linear projection of each indicator on a scale in the range 0 to 1. The zero corresponds to the minimum value and one to the maximum value. Table 1 shows the criteria and limit values of the indicators.

It should be noted here that the choice of maximum and minimum values can have a significant impact on the index value. Calculation of the normalized value of the indicator is done by subtracting from the actual value of the observed indicator (X) the minimum value that the indicator can have (the lower limit value x_{min}), and then dividing by the difference between the upper and lower limit values ($x_{max} - x_{min}$). In this way, it is achieved that the minimum normalized value of the indicator is 0, and the maximum is 1. The normalization of the indicators of the use of e-mail can be used as an example. Let the measured value be 80%. The upper and lower limit values are 90% and 20% respectively. The normalized value of this indicator would be calculated as follows:

$X_N = (X–x_{min})/(x_{max}-x_{min}) = (80-20)/(90-20) = 0.857$

If the upper and lower limit values were adopted as 100 and 0 respectively, the normalized value of the indicator would be:

$X_N = (X-x_{min})/(x_{max}-x_{min}) = (80-0)/(100-0) = 0.8$

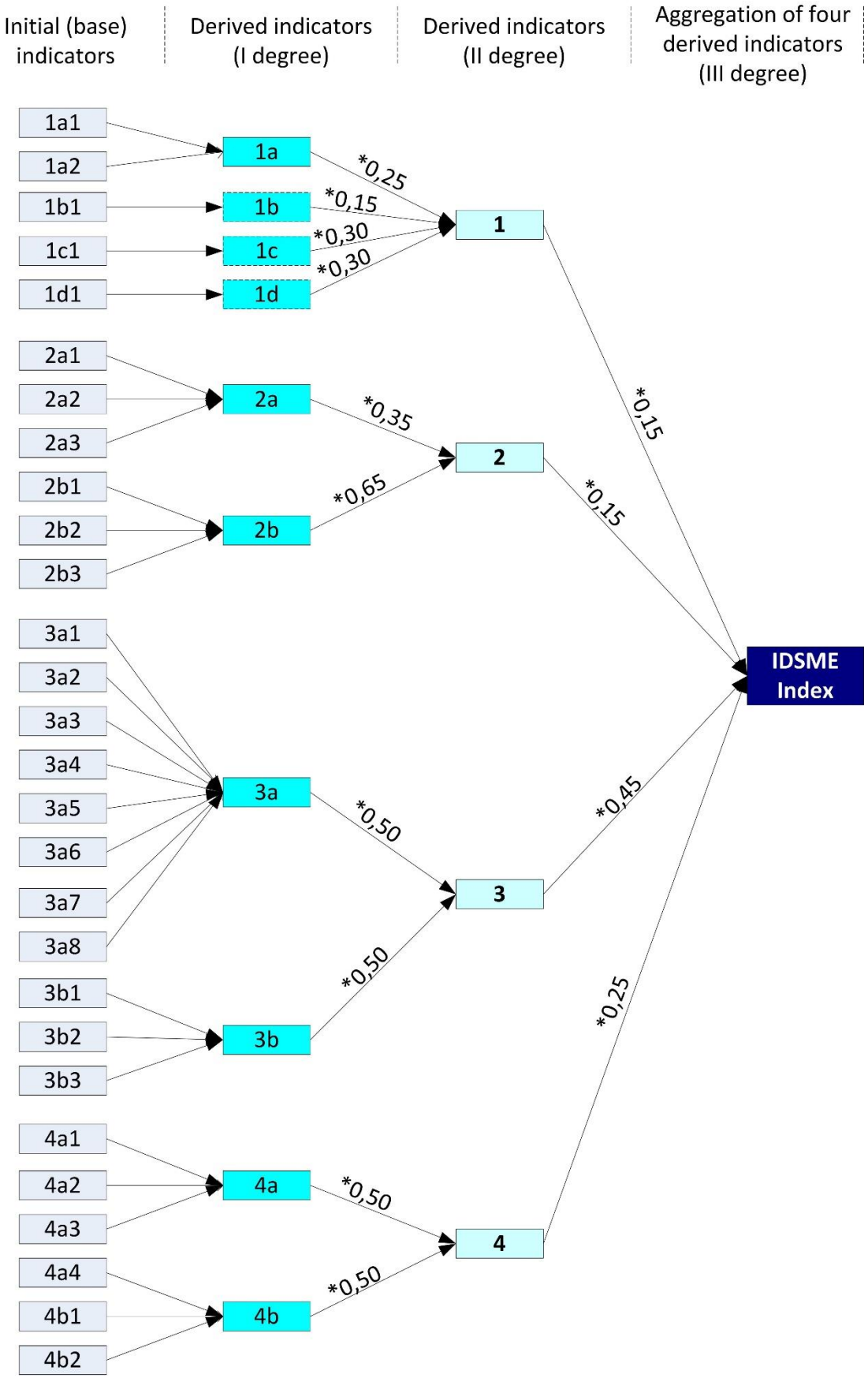
In case the upper limit is adopted as 80, and the bottom remains 0, the X_N would be

$X_N = (X-x_{min})/(x_{max}-x_{min}) = (80-0)/(80-0) = 1.0$

These differences later influence the values of the sub-dimensions, dimensions, and indexes, so they need to be carefully selected and tested for their robustness.

2.6 Weighting

It is difficult to choose dimensions, sub-dimensions, and indicators so that they reflect the state, and have the same weight, i.e. to have the same impact. It is, therefore, necessary to make



Slika 6 Prikaz agregacija indikatora pri određivanju IDSME indeksa

Izvor: Autor

corrections using correction coefficients and determine the weight of individual influences. This is a very delicate action because it is possible to change the final results by correcting the weights. Considering that this is the first analysis using IDSME model, a decision has been made that the weighting is based on available literature and previous experience, so that the results as they are obtained are analyzed without any subsequent corrections. Possible corrections could be made after several consecutive years of monitoring the observed SMEs and calculating their IDSMEs.

This approach is not an exception in world practice, because even now globally recognized indices have passed a similar path and are experiencing their evolution. To simplify the calculation itself, it was decided that the indicators themselves are not weighted and are considered to have the same impact. The weighting is done on sub-dimensions and dimensions, and the individual weights are marked with *w* and are shown in Table 1 and Figure 1.

2.7 Aggregation

The aggregation of indicators in IDSME was done on the way that the indicators were aggregated into the sub-dimensions (I degree), then the weighted values of the sub-dimensions were aggregated into dimensions (II degree), and, finally, the weighted values of the dimensions were aggregated into the IDSME index. In the case of IDSME aggregation for the i-th SME, the following formula was used:

$$IDSME(SME_i) = Connection\_to\_the\ Internet\ (SME_i)_i*0{,}15 + Digital\_skills(SME_i)*0{,}15 + Integration\_of\_digital\_technologies\ (SME_i)*0{,}45 + Internet\_usage(SME_i)*0{,}25$$

The aggregation procedure is shown in Figure 1.

The used tags are explained in Table 1.

The IDSME index is a super-indicator of the degree of digitization of the observed SME or SMEs group.

3 RESEARCH

3.1 Contents of the research, the sample, and its structure

The survey covered 226 SMEs in Russia, Slovakia, and Serbia. Among the surveyed SMEs there were 47 medium-sized enterprises, 96 small enterprises, and 83 micro enterprises. The division within the SMEs was carried out based on the criteria set out in (EC, 2003).

The survey included questionnaire processing with forming concrete conclusions on the issues raised in the survey, as well as the analysis of the degree of digitization of surveyed SMEs using the IDSME index. In the analysis using the IDSME index, using statistical methods null hypotheses were checked.

Respondents were given the opportunity to fill in the survey anonymously, without providing personal data and data on SMEs, except for the number of employees which is a key figure for all subsequent calculations. In addition to paper-based polls, a three-language survey was published using the https://docs.google.com[1]

3.2 Methodology

Maybe the biggest problem in studying a phenomenon in social sciences is the inability to perform a laboratory-controlled experiment. The researcher usually relies on the statistics as a tool and then appears the new problem, the removal of noise in the results.

One of the most commonly used methods is (scientific) observation. It was used at the beginning of this research. Of the general methodological methods in this research, analytical and synthetic methods, induction and deduction, as well as historical and comparative methods, were used. Multivariate analysis was used when necessary. Given that the analysis involves SMEs at the global level for analysis, more favorable macroeconomic analyzes are available, but in individual cases, the methods of microeconomic analysis have been used. These methods were written in a number of

[1] The example of the survey can be found at https://forms.gle/w451cD1413AxDCbz7

methodological guidelines for the preparation of scientific papers, as well as in (Miljević, 2007) (Pejanović, 2007) (Bradford, 2017) (Camarinha-Matos, 2012) (Zav'yalova, et al., 2014), so they will not be explained here additionally.

This research is exploratory (what) with elements of explanatory (why) and descriptive (how much and how). Within the research, relevant research objects have been identified and explained. As a part of the descriptive analysis of the phenomenon, they are broken down into sections sufficient for the analysis to be successfully carried out and that proper legality can be observed. In doing so, both deduction and induction were used.

The research also used an empirical method as an analytical method that allows reliable conclusions on the interdependence of individual observed elements and trends in individual phenomena. Statistical analysis included relevant data which enabled the detection of the rules of mass phenomena covered by this analysis.

The hypothesis testing process was carried out as follows:

1. Defining the boundary of significance;
2. Writing hypotheses, null and alternative;
3. Selection of sample or samples, and calculation of parameters;
4. Determination of the limits of rejecting the null hypotheses;
5. Determining whether the null hypotheses can be rejected; and
6. Defining and presenting conclusions according to tested hypotheses.

3.3 Research

The research covered various aspects of the digitization of SMEs, and there is formed a research question: *What is the relation of the integration of digital technologies in SMEs and their connection to the Internet in the manner defined by the IDSME model*.

Significant on this issue is that it allows seeing how SMEs use the potentials of Internet access, i.e. how much employees use the opportunity to create web sites, social networking, cloud computing, automation, modern communications, but also online trade, domestic and cross-border. The answer to this question is uncertain, and discussable, as many SMEs are not oriented to online trade, although they have a high degree of digitization in other parameters.

In this analysis, Connection to the Internet will be considered as an independent variable, and the Integration of digital technology is a dependent variable.

Within the Digital Technology Integration, two sub-dimensions are observed:

- The use of digital technologies and
- Electronic commerce.

The null hypothesis for this research question can be set in the form:

H_o: *There is no connection between dimensions the Integration of digital technologies into SMEs and the Connection of SMEs to the Internet according to the parameters included in the dimensions "Integration of digital technologies" and "Connection to the Internet" IDSME 2018 index.*

An alternative hypothesis for a research question can be defined in the form:

H_1: *There is a connection between dimensions the Integration of digital technologies into SMEs and the Connection of SMEs to the Internet according to the parameters included in the dimensions "Integration of digital technologies" and "Connection to the Internet" IDSME 2018 index.*

Table 2 shows the results of statistical data processing for the relationship between the integration of digital technologies and the connection of SMEs to the Internet for the observed SME group.

Based on the results shown in Table 2, the Pearson coefficient, in this case, can be viewed as $\rho = 0.27136$. The p-value is statistically significant and significantly lower than the set limit value of 0.05. So, the null hypothesis can be rejected, and we can accept the alternative hypothesis.

According to classifications given in (Owen, 2016), (Papić, 2014), (Taylor, 1990) and (Cohen, 1988), the correlation is at the level of *weak positive*

.

Table 2 Results of statistical data processing for the relationship between dimensions the Integration of digital technologies and the Connection of SMEs to the Internet for the observed SME group

Regression Statistics	
Multiple R	**0.27136**
R Square	0.07364
Adjusted R Square	0.06950
Standard Error	0.08165
Observations	226

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.11872	0.11872	17.806	**3.55369E-05**
Residual	224	1.49350	0.00667		
Total	225	1.61222			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.1289	0.0137	9.4069	6.336E-18	0.1019	0.1559
X Variable 1	0.6086	0.1442	4.2198	3.554E-05	0.3244	0.8929

The linear regression equation on the basis of the obtained results gets shape:

$$y \approx 0{,}1289 + 0{,}6806 * x$$

where:

x – *the* value of the dimension Connection of SMEs to the Internet, and

y – the value of the dimension Integration of digital technologies

The verification of the interdependence between these two dimensions was carried out also using the Wilcoxon Signed-Rank test. According to this test, the obtained value was p = 0.4772, which did not create the conditions for breaking the null hypothesis that there was no difference between these two dimensions.

4 CONCLUSIONS

Within the conclusions, we should first point out that the IDSME index represents a new model for assessing the degree of digitization of SMEs. The IDSME index is primarily aimed at SMEs' self-evaluation, to allow them to look at their achievements and weaknesses, and to develop plans to improve their business. Using the IDSME index, they will be able to see their position and improve what can be improved.

IDSME is particularly suitable for comparing SMEs within a group of SMEs that deal with the same or similar activity, as the analysis will include the same indicators, and the results will be more comparable.

A detailed survey showed that the model included the most influential indicators and that the dimensions of the index were selected to reflect the situation without major overlaps.

IDSME proved to be useful for analyzing the state of digitization in SMEs and should continue to develop including a larger number of SMEs. The current data could be analyzed as soon as they would be obtained, without a need to wait for the reports of official statistical institutions, so the IDSME index itself would have a significant advantage over other similar indices.

Considering the announced introduction of 5G networks, the criteria regarding the speed of Internet access should be changed and the limit value should be raised to a higher level in the year 2025.

In the case of a significant increase in the base of surveyed SMEs, the IDSME index could be modified to adapt to individual industries, but this does not have to be a dominant requirement if it maintains its current purpose, to serve for self-evaluation of SMEs.

WORKS CITED

Bradford, A. (2017, 08 04). *What Is Science?* Retrieved from LiveScience.

Camarinha-Matos, L. M. (2012). *Scientific Research Methodologies and Techniques*. Retrieved from Uninova.pt: http://www.uninova.pt/cam/teaching/SRMT/SRMTunit2.pdf

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.).* Hillsdale, NJ.

Dave. (2018, 02 26). *Confirmation: 28 GHz 5G 1.4 Gbps Median: 3.5 GHz 5G Massive MIMO 490 Mbps*. Retrieved from Wireless One: http://wirelessone.news/10-r/988-confirmation-qualcomm-5g-speed-models-similar-to-my-reporting

EC. (2003, 05 06). Definition of Micro, Small and Medium-sized Enterprises Adopted by the Commission. *Official Journal of the European Union*, 39-41.

EC. (2017, 03 02). *DESI 2017 - Digital Economy and Society Index: Methodological note.* Retrieved from ec.europa.eu: ec.europa.eu/newsroom/document.cfm?doc_id=43048

EC. (2018, 05). *DESI 2018 Digital Economy and Society Index - Methodological note.* Retrieved from European Commission Digital Single Market: http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=52297

Foley, P., Sutton, D., Wiseman, I., Green, L., & Moore, J. (2018). *International Digital Economy and Society Index 2018.* Luxembourg: Publications Office of the European Union. Retrieved from https://ec.europa.eu/digital-single-market/en/news/international-digital-economy-and-society-index-2018

ITU. (2018, 09 19). *The ICT Development Index (IDI): conceptual framework and methodology.* Retrieved from International Telecommunications Union: https://www.itu.int/en/ITU-D/Statistics/Pages/publications/mis2016/methodology.aspx

Miljević, M. I. (2007). *Metodologija naučnog rada.* Pale: Filozofski fakultet Univerziteta u Istočnom Sarajevu.

OECD. (2018). *Handbook on constructing composite indicators: methodology and user guide.* Paris: OECD Publishing. Retrieved from http://www.oecd.org/els/soc/handbookonconstructingcompositeindicatorsmethodologyanduserguide.htm

Owen, A. (2016, 01). *Pearson's correlation*. Retrieved from Statstutor: http://www.statstutor.ac.uk/resources/uploaded/pearsons.pdf

Papić, M. (2014). *Primijenjena statistika u MS Excelu.* Zagreb: Naklada Zoro.

Pejanović, R. (2007). O nekim metodološkim fazama i postupcima u ekonomiji (i agroekonomiji). *Letopis naučnih radova, 31*, 174-186.

Taylor, R. (1990). Intetion of the Correlation Coefficient: A Basic Review. *JDMS*, 35-39. Retrieved from https://journals.sagepub.com/doi/pdf/10.1177/875647939000600106

Zav'yalova, N., Golovina, A., Zav'yalov, D., D'yakonova, L., Mel'nikov, M., Saginova, O., . . . Stroganov, I. (2014). *Metodologiya i metody nauchnykh issledovaniy v ekonomike i menedzhmente.* Moskva - Ekaterinburg: Rossiyskiy ekonomicheskiy universitet im. G. V. Plekhanova.

Note

This research was conducted within the framework of the preparation of the doctoral dissertation of Milanka Bogavac.

Received for publication:	20.04.2019
Revision received:	07.05.2019
Accepted for publication:	10.07.2019

How to cite this article?

Style – **APA** *Sixth Edition:*

Bogavac, M., & Cekerevac, Z. (2019, July 15). IDSME Index – New Method for Evaluation of SMEs Digitalization. (Z. Cekerevac, Ed.) *MEST Journal, 7*(2), 9-20. doi:10.12709/mest.07.07.02.02

Style – **Chicago** *Sixteenth Edition:*

Bogavac, Milanka, and Zoran Cekerevac. 2019. "IDSME Index – New Method for Evaluation of SMEs Digitalization." Edited by Zoran Cekerevac. *MEST Journal* (MESTE) 7 (2): 9-20. doi:10.12709/mest.07.07.02.02.

Style – **GOST** *Name Sort:*

Bogavac Milanka and Cekerevac Zoran IDSME Index – New Method for Evaluation of SMEs Digitalization [Journal] // MEST Journal / ed. Cekerevac Zoran. - Belgrade – Toronto : MESTE, July 15, 2019. - 2 : Vol. 7. - pp. 9-20.

Style – **Harvard** *Anglia:*

Bogavac, M. & Cekerevac, Z., 2019. IDSME Index – New Method for Evaluation of SMEs Digitalization. *MEST Journal,* 15 July, 7(2), pp. 9-20.

Style – **ISO 690** *Numerical Reference:*

IDSME Index – New Method for Evaluation of SMEs Digitalization. **Bogavac, Milanka and Cekerevac, Zoran.** [ed.] Zoran Cekerevac. 2, Belgrade – Toronto : MESTE, July 15, 2019, MEST Journal, Vol. 7, pp. 9-20.