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DETERMINING DIGITAL READINESS LEVELS OF THE OECD COUNTRIES WITH CRITIC-BASED ARAS METHOD

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Abstract

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Digitalization plays a significant role in the economic growth and development of countries. The attempts at digitalization made by some countries can influence the type of digitalization strategies, economic activities, and digital readiness initiatives that other countries of the world apply. This study aimed to determine the digital readiness levels of 38 OECD member countries. The CRITIC-based ARAS method, a multiple-criteria decision-making method, was used to calculate their digital readiness levels and rank them accordingly. In calculating the significance weights with the CRITIC method, Basic Needs were identified as the most important criterion, followed by Business and Government Investment, Human Capital, Start-up Environment, Ease of Doing Business, Technology Adoption and Technology Infrastructure in respective order of importance. From the results of the analyses conducted with the ARAS method using the weights determined through the CRITIC method, the rankings of the OECD member countries in terms of their digital readiness levels were obtained. According to these results, the top five countries for digital readiness levels were Luxembourg, the USA, Switzerland, Korea, and Iceland, while Costa Rica, Greece, Turkey, Colombia, and Mexico were the lowest-ranked countries.

Keywords: Digitalization, Digital Transformation, Digital Readiness Level, CRITIC, ARAS.

Jel Codes: A10, C44, O52.

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1. Introduction

In recent years, the terms, digitalization, and digital transformation have been widely encountered in different fields. Technically speaking, digitalization is a term applied to information systems and denotes digitization. In short, digitalization can be defined as the conversion of any data from analogue format to digital format, where the digitization of analogue data allows for the processing, storage, and management of data by computers (Ersöz & Özmen, 2020: 172). The term, digitalization, can also refer to the management, organization, and control of digital data and the integration of digital solutions, whereby value is generated for society, sustainability is ensured, and new opportunities are created (Parida, 2018: 23).

Digital transformation, on the other hand, is related to the adoption of current technologies to increase productivity, value creation, and social welfare. Societies that undertake digital transformation adopt rapidly changing and developing information and communication technologies (Sánchez et al., 2018: 72). In other words, digital transformation involves the effects of the changes to all aspects of human life as a result of the development and incorporation of digital technology (Stolterman & Fors, 2006).

Digitalization plays a significant role in the economic growth and improvement of countries. The digitalization initiatives applied by some countries can affect the digitalization strategies, economic activities, and digital readiness initiatives of other countries around the world.

The digital readiness levels of countries are unique to their circumstances, meaning that they have self-awareness about them and can identify areas in which they are sufficient or lacking. By understanding their deficiencies through the awareness of their digital readiness levels, countries can develop methods, policies, and strategies aimed at improving and maintaining the areas proven to be enough (Altıntaş, 2021: 404).

The relevant literature includes several studies about digital readiness. These studies can briefly be summarized as follows. Blayone et al. (2018), in their study, collected data from 179 university students in Ukraine and Georgia to compare students' digital readiness levels by country. Hong and Kim (2018), in their study, developed the Digital Readiness for Academic Engagement Scale using data obtained from 854 university students in South Korea. Sivrikova et al. (2019), in their study, analyzed the digital readiness attitudes of 200 instructors at South Ural State University using descriptive statistics. In the study by Zalite and Zvirbule (2020), the digital readiness levels of European countries were examined within the context of distance learning during the post COVID-19 period. The study by Çelen (2021) analyzed Turkey's digital readiness level using the 2019 CISCO digital readiness index component values. Nit et al. (2021), in their study, addressed the importance of digital readiness in the fight against COVID-19. In the study by Altıntaş (2021), the digital readiness levels of G20 group countries were analyzed through the ENTROPY-based VIKOR method, which used the inputs of the CISCO Digital Readiness Index component values of the individual countries. Rodriguez Moreno et al. (2021) analyzed the use of digital tools and social networks by university students during the COVID-19 pandemic has aimed. Fabregas et al. (2021) researched to the challenging effect of the COVID 19 at Polytechnic University of the Philippines. The actions were to assess its faculty members and students' readiness in adopting digital and virtual worlds as an alternative to the traditional classroom-based learning and teaching method. And finally, Kireyeva et al. (2022), in their study, highlighted the development of analysis of the degree of digital readiness and assessment methods of digital transformations, which can be used at various levels of business management to formulate digital transformation strategies.

Among these studies on digital readiness, only a limited number involved the use of multiple-criteria decision making methods. This study, therefore, aimed to evaluate the digital readiness levels of the 38 OECD member countries according to the criteria specified in the 2019 CISCO Digital Readiness Index, the latest year the measurements were taken, by applying the CRITIC-based ARAS method, a type of multiple criteria decision-making method.

In the following sections, the CRITIC method will be addressed in section 2, the ARAS method and its steps will be addressed in section 3, the digital readiness levels of the OECD member countries via the CRITIC and ARAS methods will be determined in section 4, and finally, the obtained results will be evaluated in section 5.

2.The CRITIC Method

The CRITIC method was first introduced in the literature with a study conducted by Diakoulaki et al. in 1995. In this method, objective weights are obtained by compiling the actual data for each evaluation criterion. The most important characteristic of the CRITIC method is not the subjective results obtained from expert opinions, but rather, it is objective weighting, which is determined using the standard deviation of criteria and inter-criteria correlation together.

The five steps of the CRITIC method are presented below (Diakoulaki, 1995: 764-765):

Step 1: Creation of the decision matrix. In the formation of the decision matrix, the decision matrix represented by X and consisting of x_{ij} values is shown in Equation (1).

$$X = \begin{bmatrix} x_{01} & x_{02} & \dots & x_{0n} \\ x_{11} & x_{12} & \dots & x_{1n} \\ . & . & \dots & . \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix} \quad i = 0,1,2\dots m \quad j = 1,2\dots n \qquad (1)$$

Step 2: Normalization of the decision matrix. The normalization of criteria is the process whereby the criteria are standardized within the range of 0 and 1. The normalization process is performed by using Equation (2) for benefit-oriented (maximization) criteria and Equation (3) for cost-oriented (minimization) criteria.

$$r_{ij} = \frac{x_{ij} - x_j^{min}}{x_j^{max} - x_j^{min}} \quad j = 1,2...n \qquad (2)$$

$$r_{ij} = \frac{x_j^{max} - x_{ij}}{x_j^{max} - x_j^{min}} \quad j = 1,2\dots n \qquad (3)$$

r_{ij}, i.and j. show the correlation coefficients between criteria.

Step 3: Creation of the correlation coefficient matrix. In this step, the correlation between the criteria is measured using Equation (4) to determine the degree of inter-criteria correlation.

$$\rho_{jk} = \frac{\sum_{i=1}^{m}(r_{ij} - \overline{r_j}).(r_{ik} - \overline{r_k})}{\sqrt{\sum_{i=1}^{m}(r_{ij} - \overline{r_j})^2 . \sum_{i=1}^{m}(r_{ik} - \overline{r_k})^2}} \quad j=1,2\dots n \ , k=1,2\dots n \qquad (4)$$

Step 4: Calculation of C_j value. C_j indicates the amount of information contained in the j. criterion. To determine the C_j value given in Equation (6), the standard deviation given in Equation (5) must first be calculated.

$$\sigma_j = \sqrt{\sum_{i=1}^{m}(r_{ij} - \overline{r_j})^2 \,/\, m - 1} \qquad (5)$$

$$C_j = \sigma_j \sum_{k=1}^{n} \left(1 - \rho_{jk}\right) \quad j=1,2\ldots n \tag{6}$$

Step 5: Calculation of criteria weights. To calculate the criteria weights, the c_j value of each criterion is calculated by proportioning the sum of the c_j values of all criteria using the formula given in Equation (7).

$$W_j = \frac{C_J}{\sum_{k=1}^{n} C_k} \quad j=1,2\ldots n \;\; , k=1,2\ldots n \tag{7}$$

3.The ARAS Method

The ARAS (Additive Ratio Assessment Method) method, a multiple-criteria decision-making method, was developed by Zavadskas and Turskis in 2010 (Zavadskas & Turskis, 2010). In the ARAS method, the utility function values of the alternatives are compared with the optimal alternative utility function value. For example, in a problem where the optimal score is 100, if the highest score of the criteria is 80, the optimality value of the criterion is evaluated as 80%, not 100%, as in the other methods (Yıldırım, 2015). The ARAS method involves the following steps (Zavadskas & Turskis, 2010):

Step 1: Creation of the decision matrix

$$X = \begin{bmatrix} x_{01} & x_{02} & \cdots & x_{0n} \\ x_{11} & x_{12} & \cdots & x_{1n} \\ . & . & \cdots & . \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix} \quad i = 0,1,2\ldots m \quad j = 1,2\ldots n \tag{8}$$

Here, x_{ij} denotes the performance value of the *i.* alternative shown in the *j.* criterion, and x_{0j} denotes the optimal value of the *j.* criterion. Optimal values can be determined using Equation (9).

$$\text{If } max_i x_{ij} \text{ then } x_{0j} = max_i x_{ij} \\ \text{If } min_i x_{ij}^{*} \text{ then } x_{0j} = min_i x_{ij}^{*} \tag{9}$$

Step 2: Normalization of the decision matrix. The normalization of criteria is the process whereby the criteria are standardized within the range of 0 and 1. In normalization, the normalized values of the criteria desired to be maximum or minimum according to the purpose of the problem are calculated with the help of the following formulas.

For the criteria desired to be maximum: $$\bar{x}_{ij} = \frac{x_{ij}}{\sum_{i=0}^{m} x_{ij}} \tag{10}$$

For the criteria desired to be minimum: $$\bar{x}_{ij} = \frac{1/x_{ij}}{\sum_{i=0}^{m} 1/x_{ij}} \tag{11}$$

Step 3: Creation of the weighted normalized decision matrix. Weighting is performed by using the significance coefficients of the criteria. The significance coefficients of the criteria must satisfy the condition $0 < w_j < 1$. The normalized weights are obtained using the following formula.

$$\hat{x}_{ij} = \bar{x}_{ij}.w_{ij} \tag{12}$$

In the Equation, w_j denotes the significance coefficient of the j criterion, while $\bar{x}_{ij}$ denotes the normalized value of the j criterion.

Step 4: Calculation of the optimality function (S_i). Here, optimal values are calculated for each alternative. The calculation of the values of alternatives is performed using Equation (13).

$$S_i = \sum_{j=1}^{n} \hat{x}_{ij} \qquad i = 0, 1, \ldots, m \qquad j = 1, 2, \ldots, n \tag{13}$$

Step 5: The utility degree of each alternative is calculated by proportioning K_i and S_i values to the optimality function S_0, as shown in Equation (14).

$$K_i = \frac{S_i}{S_0} \qquad I = 0, 1, \ldots, m \tag{14}$$

The obtained K_i values are used to examine the efficiency of the utility functions of the alternatives. The ranking of the K_i values of the alternatives from largest to smallest reflects an ordering of the alternatives from the best situation to the worst situation (Zavadskas & Turskis, 2010: 165).

4. Application

Various indices have been developed to determine the digital readiness levels of countries. These indices help nations seeking to benefit from the advantages offered by digitalization to understand how well or poorly positioned they are.

The CISCO Digital Readiness Index (CDRI), which was last prepared in 2019, was developed by an organization in the U.S. called CISCO to determine countries' digital readiness levels. This multifaceted index provides important data on countries. The index includes seven main criteria and related sub-criteria. In the study, these seven main criteria – Basic Needs (C1), Business and Government Investment (C2), Ease of Doing Business (C3), Human Capital (C4), Start-Up Environment (C5), Technology Adoption (C6), and Technology Infrastructure (C7) were used to determine digital readiness levels. The 38 OECD-member countries represented the alternatives. To begin the application, the weights of the criteria were first calculated using the CRITIC method, and then the ranking of the countries' digital readiness levels was performed using the ARAS method.

4.1. The CRITIC Method

As shown above, the first step of the CRITIC method is to create a decision matrix. In this study, the decision matrix was prepared using the data obtained from CISCO.

Once the decision matrix was created, the significance weights of the evaluation criteria were calculated using the CRITIC method. As all the criteria were maximization oriented, the decision matrix formed in the first step of the CRITIC method was normalized using Equation (2). The normalized decision matrix is presented in Table 1.

Table 1
Normalized Decision Matrix

	C1	C2	C3	C4	C5	C6	C7
Germany	0,82	0,70	1,00	0,82	0,21	0,52	0,64
America	0,61	0,85	0,75	0,78	0,51	1,00	0,70
Australia	0,95	0,50	0,80	0,88	0,47	0,51	0,56
Austria	0,86	0,83	0,94	0,67	0,10	0,67	0,44
Belgium	0,82	0,53	0,54	0,56	0,21	0,42	0,48
Czech Republic	0,64	0,35	0,58	0,72	0,15	0,25	0,47
Denmark	0,77	0,72	1,00	0,83	0,26	0,58	1,00
Estonia	0,57	0,34	0,57	0,84	0,45	0,41	0,62
Finland	0,86	0,66	0,93	0,80	0,30	0,52	0,64
France	0,91	0,46	0,75	0,48	0,16	0,35	0,50
Holland	0,86	1,00	0,80	0,84	0,23	0,55	0,87
England	0,84	0,50	0,88	0,78	0,45	0,52	0,58
Ireland	0,82	0,50	0,53	0,85	0,24	0,49	0,63
Spain	0,98	0,32	0,63	0,52	0,15	0,37	0,41
Israel	0,91	0,80	0,33	0,69	0,46	0,27	0,40
Sweden	0,93	0,86	0,97	0,84	0,35	0,62	0,59
Switzerland	0,95	1,00	0,87	0,91	0,29	0,63	0,76
Italy	0,95	0,33	0,54	0,31	0,05	0,26	0,32
Iceland	0,95	0,17	0,64	1,00	0,54	0,62	0,76
Japan	1,00	0,57	0,77	0,82	0,30	0,57	0,62
Canada	0,84	0,43	0,64	0,89	0,22	0,86	0,54
Colombia	0,00	0,12	0,03	0,20	0,08	0,11	0,00

Korea	0,89	0,76	0,82	0,89	0,43	0,57	0,58
Costa Rica	0,61	0,06	0,23	0,11	0,08	0,38	0,16
Latvia	0,30	0,20	0,28	0,74	0,18	0,28	0,41
Lithuania	0,25	0,20	0,28	0,70	0,12	0,33	0,37
Luxembourg	0,89	0,94	0,62	0,45	1,00	0,85	0,62
Hungary	0,43	0,20	0,00	0,51	0,12	0,20	0,38
Mexica	0,30	0,10	0,05	0,04	0,08	0,00	0,03
Norway	0,91	0,58	0,86	0,79	0,35	0,63	0,63
Poland	0,48	0,21	0,37	0,66	0,08	0,26	0,44
Portugal	0,82	0,19	0,51	0,44	0,15	0,24	0,34
Slovakia	0,41	0,18	0,19	0,54	0,14	0,30	0,34
Slovenia	0,82	0,30	0,51	0,71	0,13	0,24	0,42
Chile	0,64	0,18	0,44	0,40	0,23	0,31	0,28
Turkey	0,27	0,10	0,21	0,00	0,06	0,02	0,18
New Zealand	0,84	0,30	0,93	0,94	0,49	0,57	0,49
Greece	0,80	0,00	0,31	0,29	0,00	0,20	0,29

In the next step, the correlation coefficient matrix consisting of the linear correlation coefficients (ρ_{jk}) was formed by using Equation (4), as shown in Table 2.

Table 2
Inter-Criteria Correlation Matrix

	C1	C2	C3	C4	C5	C6	C7
C1	1,00	0,56	0,75	0,50	0,41	0,56	0,60
C2	0,56	1,00	0,72	0,55	0,54	0,71	0,71
C3	0,75	0,72	1,00	0,69	0,44	0,73	0,78
C4	0,50	0,55	0,69	1,00	0,46	0,66	0,81
C5	0,41	0,54	0,44	0,46	1,00	0,66	0,53
C6	0,56	0,71	0,73	0,66	0,66	1,00	0,73
C7	0,60	0,71	0,78	0,81	0,53	0,73	1,00

After creating the inter-criteria correlation matrix, the Cj values for each criterion were calculated using Equations (5) and (6). The Cj values are presented in Table 3.

Table 3
C_j Values

	C1	C2	C3	C4	C5	C6	C7
C_j	0,66	0,64	0,55	0,61	0,57	0,44	0,39

In the final step of the method, the significance weights for all criteria were calculated using Equation (7), the results of which are shown in Table 4.

Table 4
The CRITIC Criteria Weights

	C1	C2	C3	C4	C5	C6	C7
W_j	0,171	0,166	0,143	0,158	0,148	0,114	0,100

Based on the criterion weights calculated with the CRITIC method, Basic Needs (0,171) was determined to be the most significant criterion, followed in respective order of significance by Business and Government Investment (0,166), Human Capital (0,158), Start-Up Environment (0,148), Ease of Doing Business (0,143), Technology Adoption (0,114), and Technology Infrastructure (0,100).

4.2. The ARAS Method

After the weights of the criteria were calculated using the CRITIC method, the ARAS method was applied to rank the alternatives.

As in the CRITIC method, the first step of the ARAS method involved creating a decision matrix. The X_0 values shown in the first row in Table 5 were calculated using Equation (9). Accordingly, since all the criteria included in the study were maximization oriented, the maximum value was taken from the values of each criterion shown in the column to perform the calculations.

Table 5
The Decision Matrix

W_j	Max **0,171** **C1**	Max **0,166** **C2**	Max **0,143** **C3**	Max **0,158** **C4**	Max **0,148** **C5**	Max **0,114** **C6**	Max **0,100** **C7**
X_0	3,98	2,48	3,76	3,43	2,56	2,22	3,44
Germany	3,90	2,11	3,76	3,25	0,68	1,63	2,53
America	3,81	2,29	3,41	3,21	1,40	2,22	2,69
Australia	3,96	1,87	3,49	3,31	1,30	1,62	2,34
Austria	3,92	2,27	3,68	3,11	0,42	1,82	2,03
Belgium	3,90	1,90	3,12	3,00	0,67	1,51	2,13
CzechRepublic	3,82	1,68	3,18	3,16	0,52	1,30	2,12
Denmark	3,88	2,14	3,76	3,26	0,79	1,70	3,44
Estonia	3,79	1,67	3,16	3,27	1,24	1,50	2,50
Finland	3,92	2,06	3,67	3,23	0,89	1,63	2,55
France	3,94	1,81	3,41	2,92	0,55	1,42	2,19
Holland	3,95	2,48	3,56	3,30	0,88	1,72	2,84
England	3,91	1,87	3,60	3,21	1,25	1,63	2,39
Ireland	3,90	1,87	3,11	3,28	0,74	1,59	2,51
Spain	3,97	1,64	3,25	2,96	0,52	1,44	1,97
Israel	3,94	2,24	2,84	3,13	1,27	1,32	1,93
Sweden	3,95	2,31	3,72	3,27	1,01	1,75	2,41
Switzerland	3,96	2,48	3,58	3,34	0,87	1,77	2,85
Italy	3,96	1,66	3,12	2,75	0,29	1,31	1,75
Iceland	3,96	1,46	3,26	3,43	1,45	1,75	2,85
Japan	3,98	1,95	3,44	3,25	0,89	1,69	2,49
Canada	3,91	1,78	3,27	3,32	0,70	2,05	2,30
Colombia	3,54	1,40	2,42	2,65	0,35	1,13	0,94
Korea	3,93	2,18	3,51	3,32	1,20	1,69	2,39
Costa Rica	3,81	1,32	2,70	2,56	0,37	1,46	1,35

Latvia	3,67	1,49	2,77	3,18	0,59	1,34	1,97
Lithuania	3,65	1,50	2,76	3,14	0,46	1,40	1,86
Luxembourg	3,93	2,41	3,24	2,89	2,56	2,03	2,48
Hungary	3,73	1,49	2,38	2,95	0,46	1,23	1,89
Mexica	3,67	1,37	2,45	2,49	0,35	0,99	1,01
Norway	3,94	1,96	3,57	3,22	1,00	1,77	2,51
Poland	3,75	1,51	2,89	3,10	0,35	1,31	2,03
Portugal	3,90	1,48	3,08	2,88	0,54	1,29	1,80
Slovakia	3,72	1,47	2,64	2,98	0,50	1,36	1,78
Slovenia	3,90	1,62	3,08	3,15	0,48	1,29	2,00
Chile	3,82	1,47	2,99	2,84	0,72	1,37	1,64
Turkey	3,66	1,37	2,67	2,45	0,32	1,01	1,40
New Zealand	3,91	1,62	3,66	3,37	1,33	1,69	2,17
Greece	3,89	1,25	2,81	2,73	0,17	1,24	1,67

After the decision matrix was created, the normalized decision matrix was obtained with the help of the formula given in Equation (10) for maximization-oriented criteria. Following the creation of the normalized decision matrix, the weighted normalized decision matrix was developed by performing the required calculations using the criteria weights determined by the CRITIC method and the formula presented in Equation (12). After the optimality function values were calculated using Equation (13), the utility degree of each alternative was determined using Equation (14). The optimality function values (S_i) and utility degrees (K_i) of the alternatives are given in Table 6.

Table 6
S_i and K_i Values

	Si	**Ki**
X_0	0,0390	1,0000
Germany	0,0271	0,6947
America	0,0315	0,8085
Australia	0,0289	0,7420
Austria	0,0258	0,6617
Belgium	0,0248	0,6358
Czech Republic	0,0234	0,5995
Denmark	0,0288	0,7399
Estonia	0,0275	0,7060
Finland	0,0278	0,7140
France	0,0242	0,6209
Holland	0,0293	0,7511
England	0,0287	0,7366
Ireland	0,0260	0,6666
Spain	0,0234	0,5990
Israel	0,0276	0,7081
Sweden	0,0292	0,7482
Switzerland	0,0294	0,7549
Italy	0,0214	0,5494
Iceland	0,0294	0,7538
Japan	0,0275	0,7041
Canada	0,0265	0,6789
Colombia	0,0184	0,4714

Korea	0,0294	0,7539
Costa Rica	0,0199	0,5104
Latvia	0,0225	0,5779
Lithuania	0,0219	0,5608
Luxembourg	0,0360	0,9227
Hungary	0,0210	0,5376
Mexica	0,0181	0,4642
Norway	0,0282	0,7237
Poland	0,0216	0,5547
Portugal	0,0222	0,5696
Slovakia	0,0215	0,5524
Slovenia	0,0229	0,5862
Chile	0,0227	0,5827
Turkey	0,0186	0,4783
New Zealand	0,0286	0,7343
Greece	0,0192	0,4932

The ranking of the countries' digital readiness levels, as shown by the ranking of the K_i values from largest to smallest, is given in Table 7.

Table 7

Country Rankings According to Their Digital Readiness Levels

Alternatives	K_i	Rankings
Luxembourg	0,9227	1
America	0,8085	2
Switzerland	0,7549	3
Korea	0,7539	4
Iceland	0,7538	5
Holland	0,7511	6
Sweden	0,7482	7
Australia	0,7428	8
Denmark	0,7420	9
England	0,7366	10
New Zealand	0,7343	11
Norway	0,7237	12
Finland	0,7140	13
Israel	0,7081	14
Estonia	0,7060	15
Japan	0,7041	16
Germany	0,6947	17
Canada	0,6789	18
Ireland	0,6660	19
Austria	0,6617	20
Belgium	0,6358	21
France	0,6209	22
Czech Republic	0,5995	23
Spain	0,5990	24
Slovenia	0,5862	25
Chile	0,5608	26
Latvia	0,5779	27

Portugal	0,5696	28
Lithuania	0,5608	29
Poland	0,5547	30
Slovakia	0,5524	31
Italy	0,5494	32
Hungary	0,5376	33
Costa Rica	0,5104	34
Greece	0,4932	35
Turkey	0,4783	36
Colombia	0,4714	37
Mexica	0,4642	38

According to the results of the study, which involved the application of the CRITIC and ARAS methods in an integrated manner to evaluate and determine the digital readiness levels of the OECD countries, the countries were ranked in the following order from best to worst: Luxembourg, the USA, Switzerland, Korea and Iceland, the Netherlands, Sweden, Australia, Denmark, Britain, New Zealand, Norway, Finland, Israel, Estonia, Japan, Germany, Canada, Ireland, Austria, Belgium, France, Czech Republic, Spain, Slovenia, Chile, Latvia, Portugal, Lithuania, Poland, Slovakia, Italy, Hungary, Costa Rica, Greece, Turkey, Colombia, and Mexico.

5. Conclusion

The digital transformations of countries affect their development in many areas, such as economic, technological, social, technical, education, and finance areas. Therefore, it is important to determine their digital readiness levels for these areas affected by digitalization. Countries that determine their digital readiness levels by utilizing the readiness data related to these areas can recognize those areas in which they have either sufficient or deficient readiness levels and conduct studies to take the necessary improvement measures in those areas where they are deficient.

This study aimed to determine the status of the OECD countries' digital readiness levels using the index developed by CISCO and the integration of two multiple-criteria decision making methods. Using the data obtained from the CISCO Digital Readiness Index reports, the digital readiness levels of the OECD countries were obtained for each evaluation criterion. The significance weights for each evaluation criterion were first calculated with the CRITIC method. Based on these calculations, the criterion of Basic Needs was determined to be the most important criteria, followed by Business and Government Investment, Human Capital, Start-Up Environment, Ease of Doing Business, Technology Adoption, and Technology Infrastructure, in respective order of importance.

After determining the significance weights of each criterion with the CRITIC method, the digital readiness levels of the countries were determined using the ARAS method. The results of the analysis conducted using the ARAS method revealed that the top five countries in terms of digital readiness levels were Luxembourg, the USA, Switzerland, Korea, and Iceland, respectively, while the five countries with the lowest digital readiness levels were Costa Rica, Greece, Turkey, Colombia, and Mexico, respectively. These rankings indicate that the countries in the top rank in terms of their digital readiness levels are at enough levels in terms of basic needs, private and public investments, ease of doing business, human capital, start-up environment, technology adoption, and technological infrastructure; whereas countries at the lowest ranks, which included Turkey, are not at sufficient levels in terms of these same areas of measurement. It is recommended, therefore, that countries with insufficient digital readiness levels should place greater importance on these issues by implementing policies and strategies aimed at increasing their digital readiness levels.

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