NTUU "KPI" 1898

Impact of Information Society on the Sustainable Development: Global and Regional Aspects

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Plan

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2. Calculations of the Index of Sustainable Development
3. Impact of Information Society on the Sustainable Development
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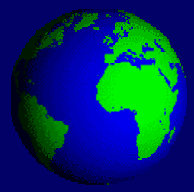

The Concept of Sustainable Development:

“System coordination of economic, ecological and human development in such a way that the quality and safety of life should not decrease from one generation to another. The environmental conditions should not worsen and the social progress should meet the needs of every person.”

Came from:
Vladimir Vernadsky (1922)

Fig.1. The Concept of sustainable development

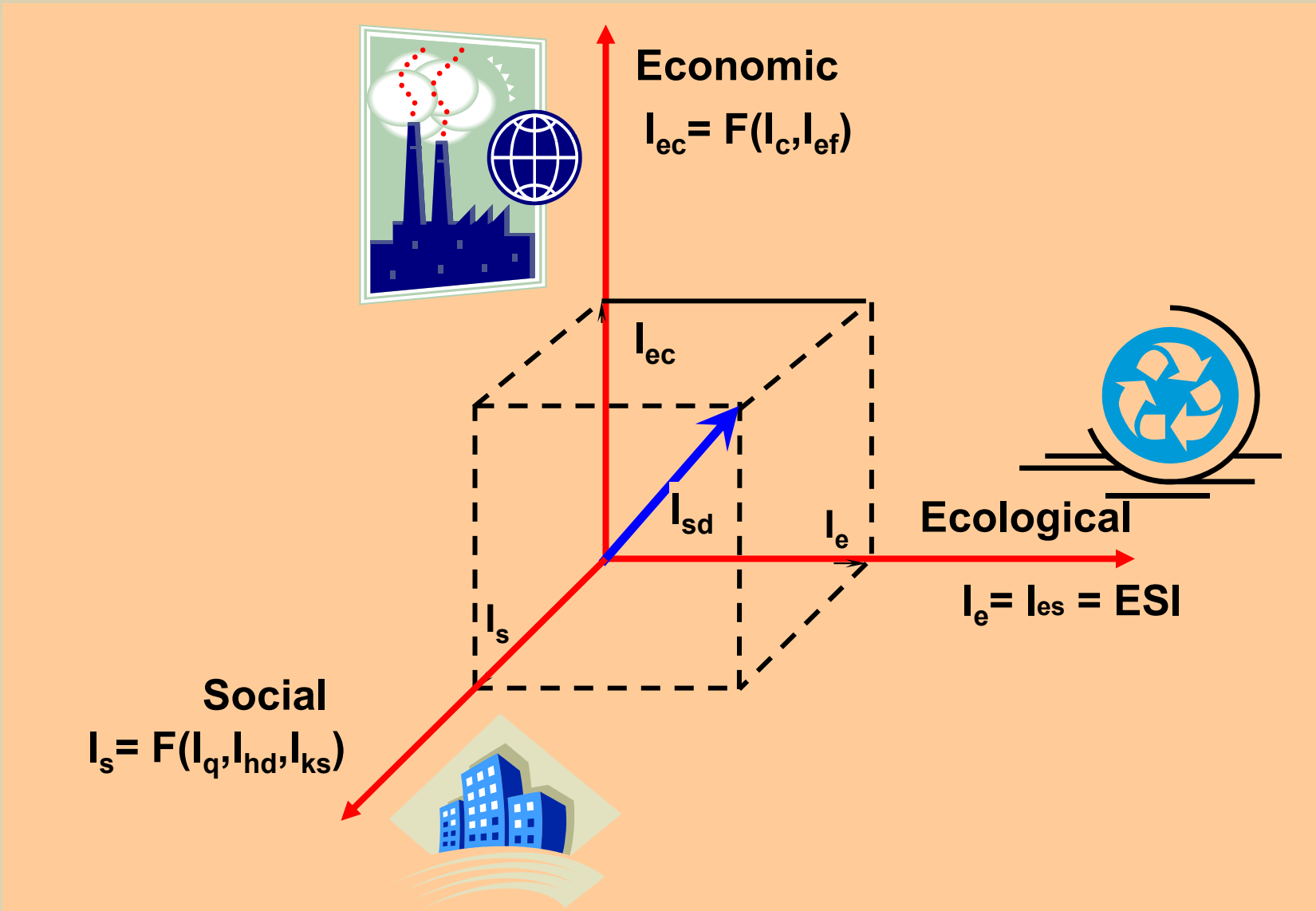

Fig.2. Global dimensions of sustainable development

Table.1. List of global indices used in calculation of (Isd)

Measure of sustainable development	Global index	Constituents (49 indicators, 188 datasets)	Source
Economic (Iec)	Ic-Growth competitiveness index	3 indicators, 47 sets of data	World Economic Forum [www.weforum.org]
	Ief – Economic freedom index	10 indicators, 50 sets of data	Heritage Foundation [www.heritage.org]
Ecological (Ie)	Ies – Environmental Sustainability Index	21 indicators, 76 sets of data	Yale University, USA [www.yale.edu/esi]
Social (Is)	Iq – Quality-of-life index	9 indicators	Economist Intelligence Unit [www.en.wikipedia.org]
	Ihd – Human development index	3 indicators	United Nation Development program [www.hdr.undp.org]
	Iks – Knowledge society index	3 indicators, 15 sets of data	UNDESA, [UN, NE.04.C.1.2005]

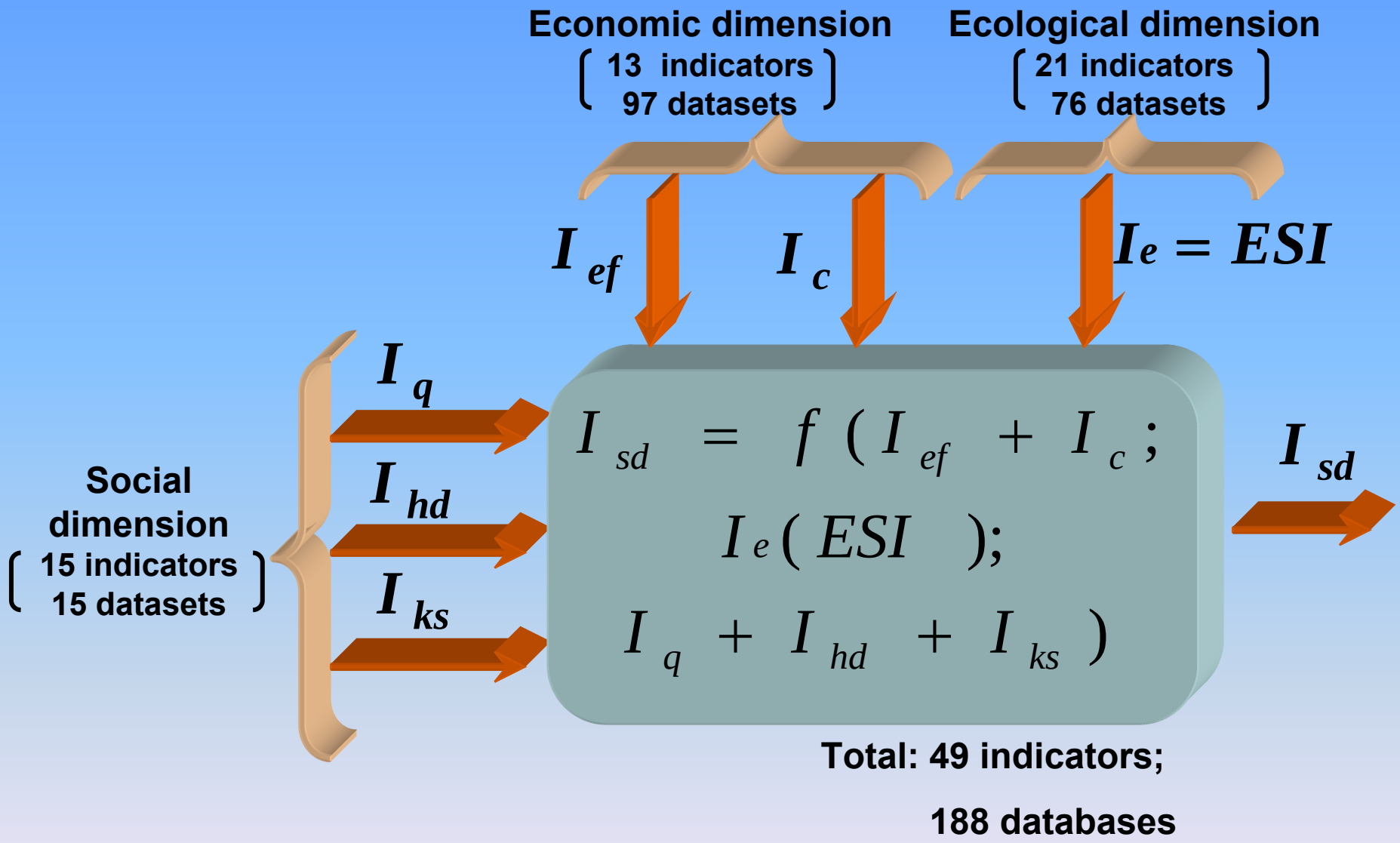

Fig.3. Mathematical model of sustainable development (Model 1)

Table.2. Ranking of countries by the index of sustainable development

Ranking	Country	GGP per capita by the parity of purchasing capacity (thous. dol. USA)	Index of sustainable development	Index of the economic measure	Index of the ecological measure	Index of the social measure
1	Finland	29,650	*0,786*	0,567	0,751	0,802
2	Iceland	41,804	*0,780*	0,561	0,708	0,839
3	Sweden	30,590	*0,774*	0,538	0,717	0,84
4	Norway	39,590	*0,755*	0,488	0,734	0,829
5	Switzerland	33,580	*0,738*	0,538	0,637	0,82
6	Luxemburg	69,737	*0,738*	0,558	0,618	0,816
7	Denmark	32,490	*0,731*	0,563	0,582	0,828
8	Canada	34,150	*0,720*	0,525	0,644	0,777
9	Ireland	36,790	*0,716*	0,559	0,592	0,779
10	Australia	31,010	*0,716*	0,532	0,61	0,792
11	New Zealand	25,110	*0,713*	0,526	0,61	0,79
12	Austria	31,420	*0,708*	0,504	0,627	0,785
13	USA	41,529	*0,695*	0,562	0,53	0,779
14	Germany	28,250	*0,687*	0,51	0,57	0,777
15	The Netherlands	30,920	*0,684*	0,524	0,537	0,787

Table.2.(cont.) Ranking of countries by the index of sustainable development

16	Japan	30,750	*0,680*	0,48	0,573	0,793
17	England	31,150	*0,674*	0,543	0,502	0,773
18	Estonia	14,800	*0,662*	0,533	0,582	0,658
19	Uruguay	8,869	*0,647*	0,382	0,718	0,659
20	Chile	12,120	*0,642*	0,511	0,536	0,678
21	France	30,640	*0,641*	0,438	0,552	0,754
22	Spain	25,370	*0,626*	0,455	0,488	0,758
23	Israel	21,310	*0,623*	0,454	0,509	0,725
24	Latvia	11,862	*0,618*	0,42	0,604	0,649
25	Belgium	30,660	*0,615*	0,468	0,444	0,755
26	Italy	27,960	*0,613*	0,411	0,501	0,759
27	Kosta Rika	9,000	*0,607*	0,372	0,596	0,685
28	Czech Republic	17,600	*0,602*	0,459	0,466	0,703
29	Slovakia	15,513	*0,601*	0,428	0,528	0,673
30	Hungary	16,047	*0,601*	0,424	0,52	0,686
31	Croatia	11,870	*0,596*	0,367	0,595	0,661
32	Korea	23,360	*0,591*	0,444	0,43	0,729

Table.2.(cont.) Ranking of countries by the index of sustainable development

33	Malaysia	10,450	*0,590*	0,413	0,54	0,643
34	Greece	22,340	*0,586*	0,392	0,501	0,703
35	Panama	6,760	*0,583*	0,363	0,577	0,646
36	Brazil	8,760	*0,581*	0,347	0,622	0,61
37	Columbia	7,330	*0,565*	0,35	0,589	0,597
38	Poland	12,825	*0,559*	0,401	0,45	0,667
39	Bulgaria	8,664	*0,549*	0,365	0,5	0,628
40	Mexico	10,000	*0,546*	0,373	0,462	0,649
41	Tunis	7,910	*0,544*	0,37	0,518	0,586
42	Bolivia	3,680	*0,542*	0,322	0,595	0,556
43	Romania	6.105	*0.519*	0.34	0.462	0.616
44	Russia	9.81	*0.5.15*	0.319	0.561	0.52
45	Moldova	2,280	*0,506*	0,33	0,512	0,529
46	Trinidad	11,720	*0,500*	0,391	0,363	0,599
47	Ukraine	6,500	*0,485*	0,319	0,447	0,554
48	Egypt	3,930	*0,484*	0,337	0,44	0,535

Table.3. Indicators and datasets characterizing the information society

№	Description	Weighting coefficients
	A. Index of the knowledge society (*Iks*)	
1	• Years of scooling	0.066
2	• Yong population	0.066
3	• Newspapers per 1000 pop.	0.066
4	• Internet users per 10000 pop.	0.066
5	• Main Phone Liners per 100 pop.	0.066
6	• Call Phones per 100 pop.	0.066
7	• R&D Expenditure (% of GDP)	0.066
8	• Pupils per teacher	0.066
9	• Gini Index	0.066
		Q_{ks}=0.60
	B. Growth Competetiveness Index (*Ic*)	
10	• Call Phones per 100 pop.	0.050
11	• Internet users per 10000 pop.	0.050
12	• Internet hosts per 10000 pop.	0.050
13	• Main Phone Liners per 100 pop.	0.050
14	• Personal Computers per 100 pop.	0.050
		Q_c=0.25

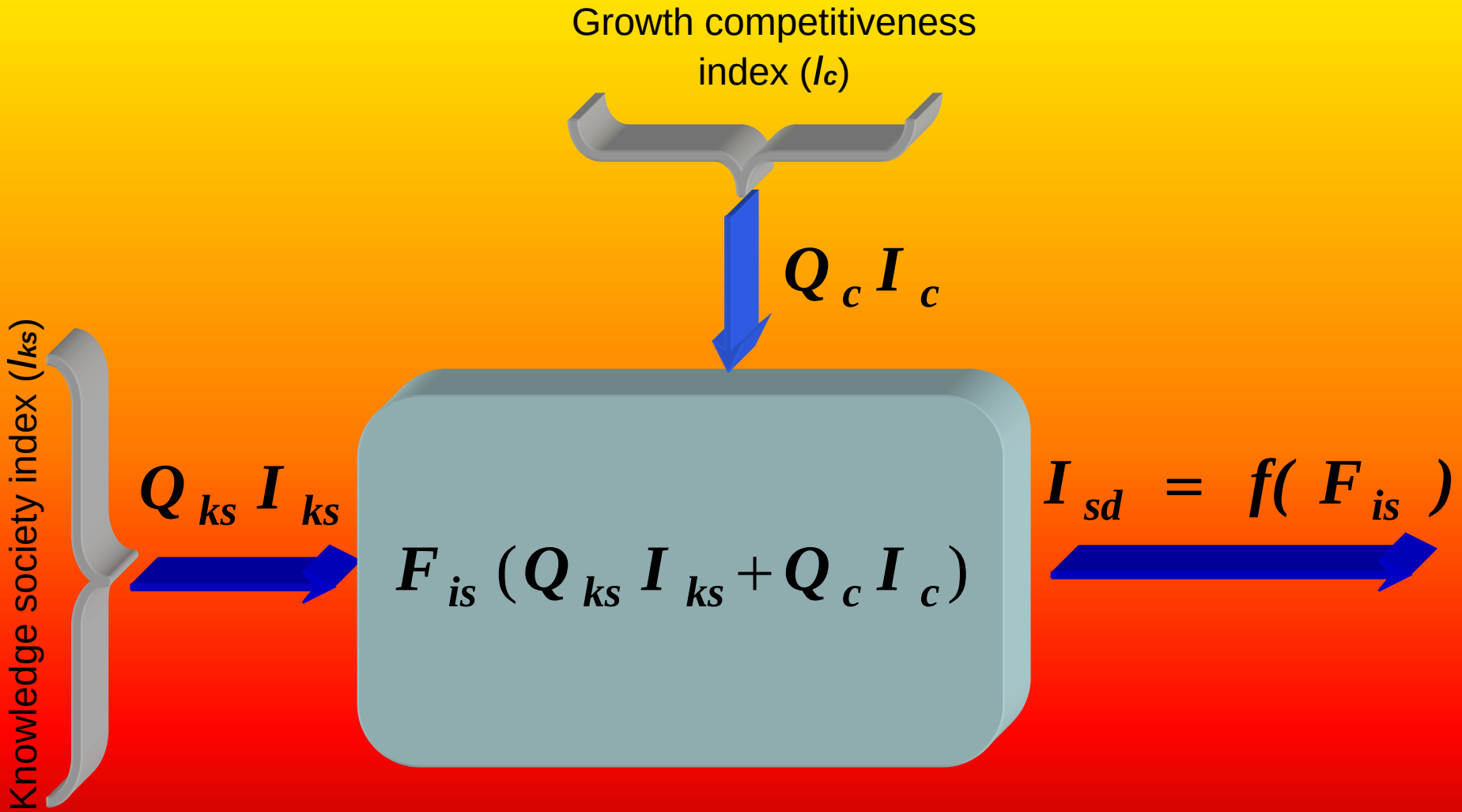

Fig. 4. Estimation of the information society impact on sustainable development (Model 2)

Table.4. Ranking in accordance with the information society impact on sustainable development

Ranking	Country	Index of sust. develop-ment (Isd)	Index of economic dimension (Iec)	Index of ecological dimension (Ie)	Index of social dimension (Is)	Impact of IS on sust. develop-ment %
1	Denmark	0.731	0.563	0.582	0.828	11.046
2	Japan	0.680	0.480	0.573	0.793	10.847
3	Great Britain	0.674	0.543	0.502	0.773	10.808
4	Germany	0.687	0.510	0.570	0.777	10.682
5	Israel	0.623	0.454	0.509	0.725	10.664
6	Netherlands	0.684	0.524	0.537	0.787	10.614
7	Belgium	0.615	0.468	0.444	0.755	10.606
8	Sweden	0.774	0.538	0.717	0.840	10.545
9	USA	0.695	0.562	0.530	0.779	10.496
10	France	0.641	0.438	0.552	0.754	10.343
11	Switzerland	0.737	0.538	0.637	0.820	10.298
12	Iceland	0.780	0.561	0.708	0.839	10.289

Table.4(cont.). Ranking in accordance with the information society impact on sustainable development

13	New Zealand	0.713	0.526	0.610	0.790	10.247
14	Austria	0.708	0.504	0.627	0.785	10.213
15	Czech Republic	0.602	0.459	0.466	0.703	10.210
16	Spain	0.626	0.455	0.488	0.758	10.149
17	Norway	0.755	0.488	0.734	0.829	10.128
18	Finland	0.786	0.567	0.751	0.802	9.968
19	Poland	0.559	0.401	0.450	0.667	9.892
20	Hungary	0.601	0.424	0.520	0.686	9.879
21	Luxemburg	0.735	0.557	0.618	0.815	9.833
22	Tunis	0.544	0.370	0.518	0.586	9.820
23	Italy	0.612	0.411	0.501	0.759	9.763
24	Malaysia	0.589	0.413	0.540	0.643	9.741
25	Slovakia	0.602	0.428	0.528	0.673	9.698
26	Australia	0.716	0.532	0.610	0.792	9.692
27	Canada	0.721	0.525	0.644	0.777	9.502
28	Romania	0.519	0.340	0.462	0.616	8.781
29	Egypt	0.482	0.337	0.440	0.528	9.399

Table.4(cont.). Ranking in accordance with the information society impact on sustainable development

30	Mexico	0.545	0.373	0.462	0.649	9.394
31	Costa Rika	0.606	0.372	0.596	0.685	9.348
32	Greece	0.586	0.392	0.501	0.703	9.340
33	Estonia	0.662	0.533	0.582	0.658	9.296
34	Bulgaria	0.549	0.365	0.500	0.628	9.288
35	Chile	0.642	0.511	0.536	0.678	9.272
36	Latvia	0.618	0.420	0.604	0.649	9.183
37	Croatia	0.596	0.367	0.595	0.661	9.031
38	Moldova	0.506	0.330	0.512	0.529	8.996
39	Ukraine	0.486	0.319	0.447	0.554	8.996
40	Trinidad	0.500	0.391	0.363	0.599	8.955
41	Panama	0.583	0.363	0.577	0.646	8.928
42	Ireland	0.717	0.559	0.592	0.779	8.784
43	Russia	0.515	0.319	0.561	0.520	8.618
44	Uruguay	0.648	0.382	0.718	0.659	8.358
45	Columbia	0.566	0.350	0.589	0.597	8.189
46	Brazil	0.581	0.347	0.622	0.610	7.850

Table.5. Ranking of Smart countries in accordance with the information society impact on sustainable development

Ranking	Country	Index of sustainable development (Isd)	Index of economic dimension (Iec)	Index of ecological dimens. (Ie)	Index of social dimens. (Is)	Impact of IS on sustainable development %
1	Denmark	0.731	0.563	0.582	0.828	11.046
2	Sweden	0.774	0.538	0.717	0.840	10.545
4	Switzerland	0.737	0.538	0.637	0.820	10.298
3	Iceland	0.780	0.561	0.708	0.839	10.289
5	Norway	0.755	0.488	0.734	0.829	10.128
7	Finland	0.786	0.567	0.751	0.802	9.968
6	Luxemburg	0.735	0.557	0.618	0.815	9.833
8	Australia	0.716	0.532	0.610	0.792	9.692
9	Canada	0.721	0.525	0.644	0.777	9.502
10	Ireland	0.717	0.559	0.592	0.779	8.784

Table.6. Ranking of G8 countries in accordance with the information society impact on sustainable development

Ranking	Country	Index of sustainable development (Isd)	Index of economic dimension (Iec)	Index of ecological dimension (Ie)	Index of social dimension (Is)	Impact of IS on sustainable development %
1	Japan	0.680	0.480	0.573	0.793	10.847
2	Great Britain	0.674	0.543	0.502	0.773	10.808
3	Germany	0.687	0.510	0.570	0.777	10.682
4	USA	0.695	0.562	0.530	0.779	10.496
5	France	0.641	0.438	0.552	0.754	10.343
6	Italy	0.612	0.411	0.501	0.759	9.763
7	Canada	0.721	0.525	0.644	0.777	9.502
8	Russia	0,515	0,319	0,561	0,520	6,360

Table.7. Ranking of former socialist countries in accordance with the information society impact on sustainable development

Ranking	Country	Index of sustainable development (Isd)	Index of economic dimension (Iec)	Index of ecological dimens. (Ie)	Index of social dimens. (Is)	Impact of IS on sustainab. develop. (%)
1	Czech Republic	0.602	0.459	0.466	0.703	10.210
2	Poland	0.559	0.401	0.450	0.667	9.892
3	Slovak Republic	0.602	0.428	0.528	0.673	9.698
4	Romania	0.519	0.340	0.462	0.616	9.498
5	Estonia	0.662	0.533	0.582	0.658	9.296
6	Bulgaria	0.549	0.365	0.500	0.628	9.288
7	Latvia	0.618	0.420	0.604	0.649	9.183
8	Croatia	0.596	0.367	0.595	0.661	9.031
9	Moldova	0.506	0.330	0.512	0.529	8.996
10	Ukraine	0.486	0.319	0.447	0.554	8.996

Table.8. Impact of Information Society on the Sustainable Development

Groups of countries	Average Impact (%))	Correlation between Fis and Isd	Correlation between Corruption Perception and Isd
1	2	3	4
46 countries	9,711	K_{FI}=0,87	0,916
G8	10,132	K_{FI}=0,783	0,833
Smart countries	10,008	K_{FI}=0,737	0,707
Post Sov. Countries	9,409	K_{FI}=0,985	0,904

$$\text{Impact} = 5{,}37\,\frac{\text{Ic}}{\text{Isd}} + 6{,}6\,\frac{\text{Iis}}{\text{Isd}};$$

$$K_{xy} = \frac{\sum_i x_i\, y_i}{\sqrt{\sum_i x_i^2 \sum_i y_i^2}};$$

Conclusions (Fig. 5)

- The new sustainable development measuring system (metric) was worked out as a new tool for investigation. This tool allows to receive the quantitative estimations of the sustainable development process depending on the groups of economic, ecological and social indicators and datasets.
- The impact of information society on sustainable development was studied on the global and regional scale based on the sustainable development mathematical model.
- The created tool allows to develope the recommendations regarding the ways of improving the standards of life quality and safety in particular countries and regions of the world by the advance of information society and competitive growth parameters.