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

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## **Plan**

- 1. The Concept of Sustainable Development***
- 2. Calculations of the Index of Sustainable Development***
- 3. Impact of Information Society on the Sustainable Development***
- 4. Conclusions***



## 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

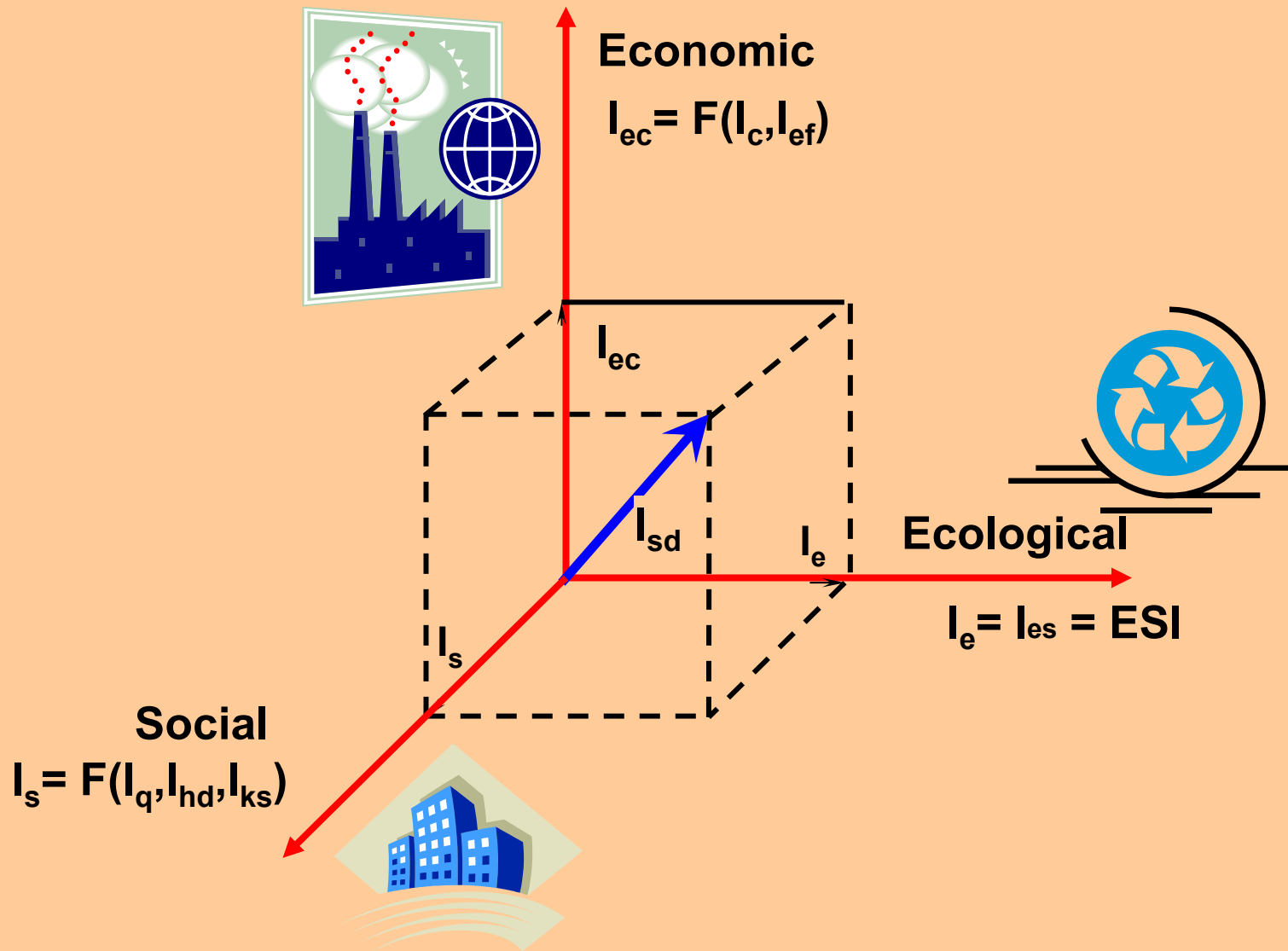
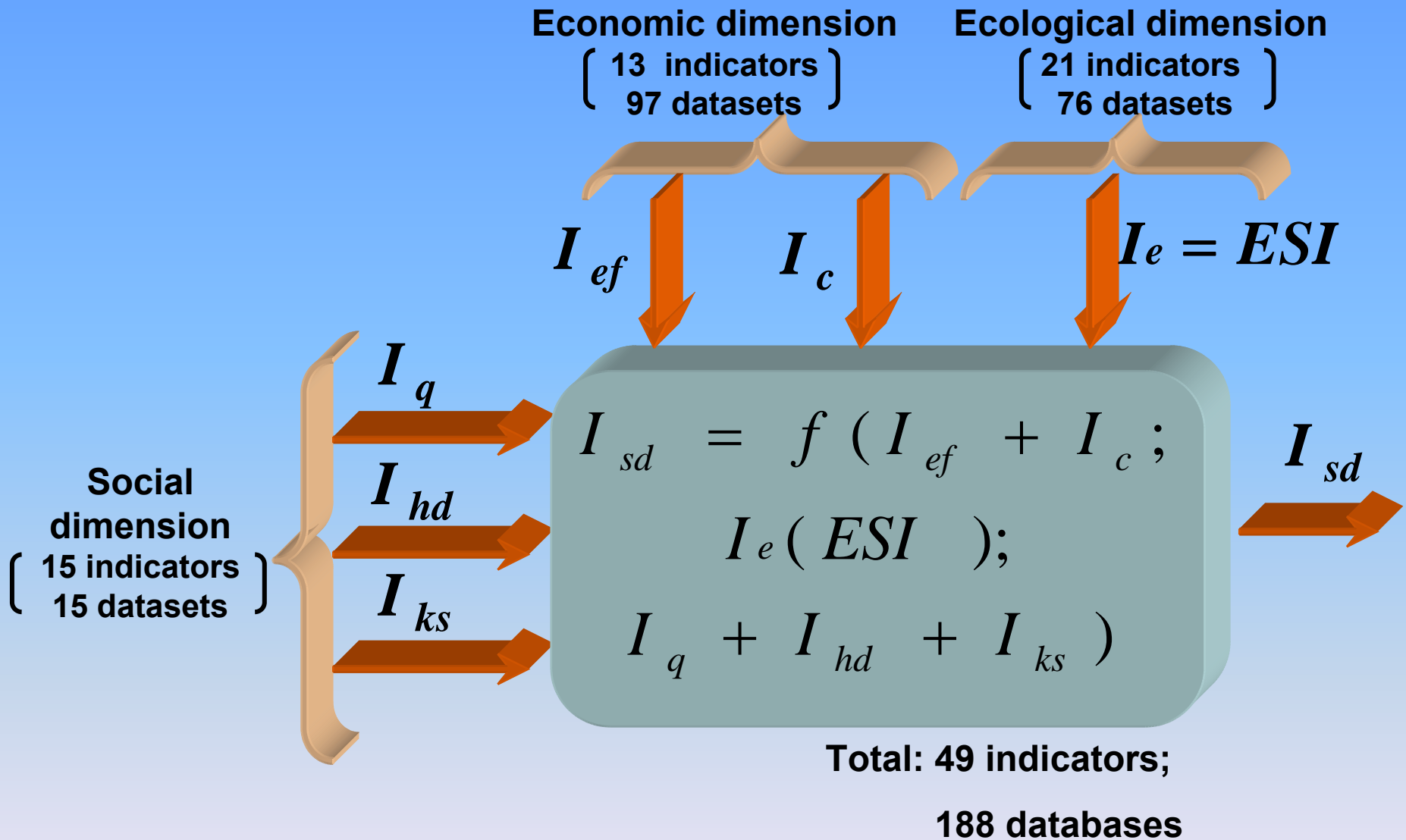


Fig.2. Global dimensions of sustainable development

**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**

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

**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

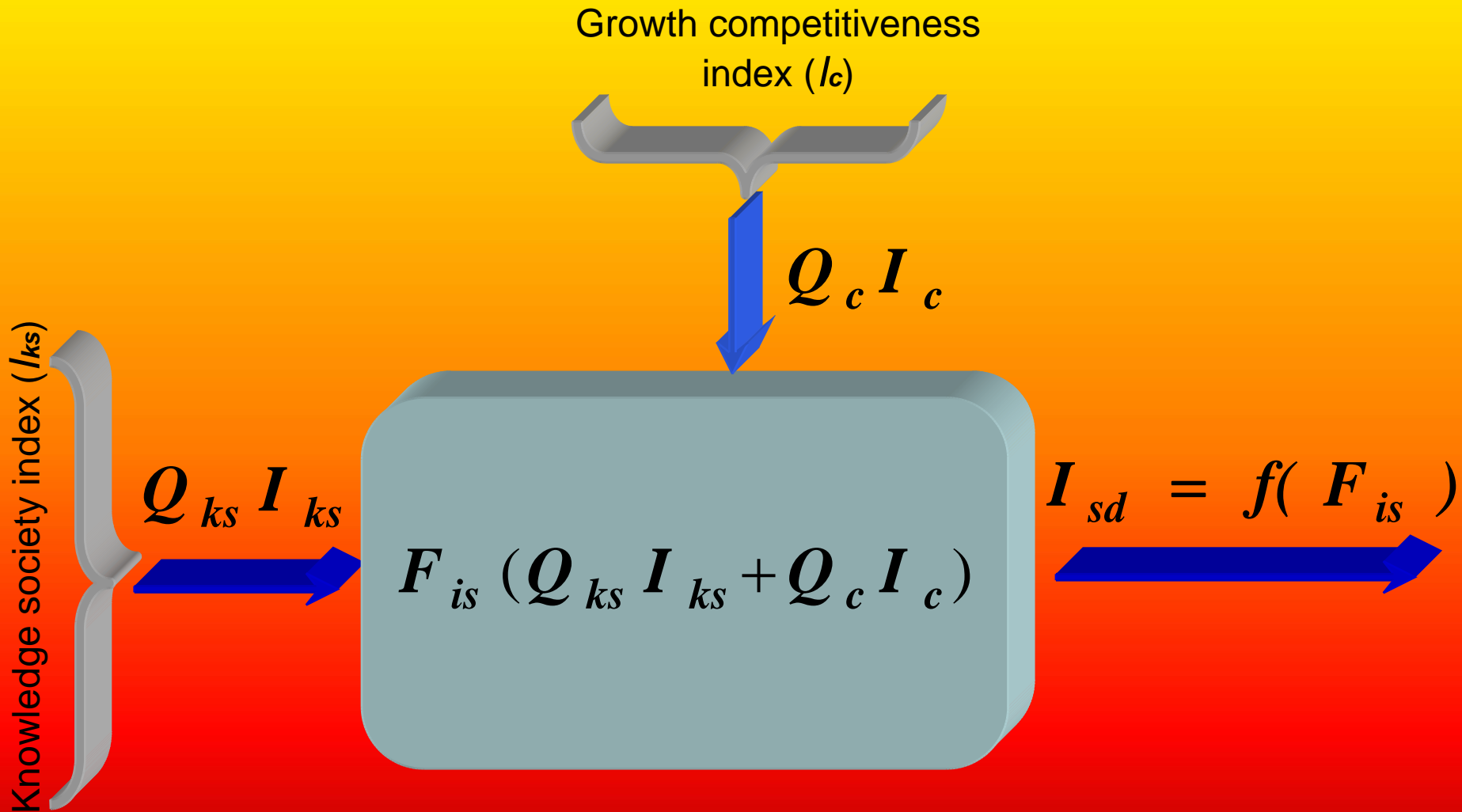
**Table.2.(cont.) Ranking of countries by the index of sustainable development**

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

No	Description	Weighting coefficients
<b>A. Index of the knowledge society (<i>I<sub>ks</sub></i>)</b>		
1	• Years of schooling	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
		<b>Q<sub>ks</sub>=0.60</b>
<b>B. Growth Competetiveness Index (<i>I<sub>c</sub></i>)</b>		
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
		<b>Q<sub>c</sub>=0.25</b>



**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**

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

**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**

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

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

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

**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**

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



## 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

$$\text{Impact} = 5,37 \frac{I_c}{I_{sd}} + 6,6 \frac{I_{is}}{I_{sd}} ;$$

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

# 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 develop 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.