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The Trends of the Agrarian Foreign Trade of CR after Accession to EU, Competitiveness of Commodities

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Abstract

The extent of agricultural foreign trade (AFT) of the Czech Republic (CR) increased markedly after accession to EU. The first part of this article is devoted to the trends during the period of 2004 – 2008. Detailed analysis of the CR AFT has been carried out for all 24 items of the basic food goods during the same period for the assessment of competitiveness of individual commodities. The Balass indicator RCA (Revealed Comparative Advantage) was used for this analysis, as well as the Michaely index that shows the specific measure of specialization for export. The method of logarithmic decomposition, which makes it possible to determine the effect of prices and quantities to net export has also been used. This paper was processed within the framework of the Research Project of MSM 6046070906 "The economics of Czech agricultural resources and their effective use in the frame of multifunctional agri-food systems".

Key words

Agrarian foreign trade, foreign trade, competitiveness, competitive advantage, Balass RCA indicator, Michaely index

Anotace

Po vstupu ČR do EU výrazně vzrostl objem agrárního zahraničního obchodu (AZO). Vývoji v období 2004 – 2008 je věnována první část příspěvku. Pro stejné období je provedena podrobná analýza AZO ČR pro všech 24 kapitol základního potravinového zboží k posouzení konkurenceschopnosti jednotlivých komodit. K analýze byl použit Balassův ukazatel RCA „zjevné konkurenční výhody“ (Revealed Comparative Advantage) a také Michaelyův index, který ukazuje na určitou míru specializace na export. Byla také využita metoda logaritmického rozkladu, která umožňuje stanovit vliv cen a množství na čistý export. Příspěvek byl zpracován v rámci VZ MSM 6046070906 „Ekonomika zdrojů českého zemědělství a jejich efektivní využívání v rámci multifunkčních zemědělskopotravinářských systémů".

Klíčová slova

Agrární zahraniční obchod, zahraniční obchod, konkurenceschopnost, konkurenční výhoda, Balassův RCA ukazatel, Michaelyův index

Introduction

The incorporation of the Czech Republic into the European market area following its EU accession has been accompanied by a significant opening of its national economy. Its export is being assisted with a much larger trading area without customs restrictions but it is also exposed to a much tougher competition. These factors that had influenced the agrarian foreign trade during the observed period of 2004 – 2008 are demonstrated by a distinct change in the trade volume but also, gradually, by the change in the net export structure.

Some commodities have become more dominant on the foreign market while others, including the "traditional" ones, have been gradually losing their position. The European agrarian market is developing and the current situation in the CR export is documented by the results of the year 2008. The changes are particularly noticeable in comparison with the results of 2004, i.e. the year of the EU accession.

In recent years, increasingly greater attention has been paid to the issue of competitiveness at both the national and supranational level. The success in the foreign trade activities is one of the standards of success of a given sector as well as of the whole national economy. Assessment of competitiveness for a given commodity usually takes place on the basis of easily determined and quantified data using certain recommended indicators.

Data and methods

Using RCA and MI indicators

Measure of competitiveness of individual commodities of the agrarian foreign trade of the Czech Republic can be provided by the net export of a given commodity in relation to the total turnover of a given commodity or the total turnover of the agrarian trade. It is not possible to statistically determine the whole complex of economic and extraeconomic factors that influence the competitiveness of individual commodities – however, an RCA supplementary indicator (Revealed Comparative Advantage) can be used. To calculate this indicator the following method has been used. The RCA concept was expressed by its author, B. Balassa [1], as follows:

RCAj = (EXj –IMj) / (EXj +IMj) * 100

where EXj and IMj are values of export and import of the agrarian foreign trade of a "j" commodity into a given area. The RCA indices are determined for a more detailed sector structure of the agrarian production – 24 chapters of food commodities. We can consider as competitive those commodities which reach balanced high positive values of the RCA index during the observed period. The commodities whose RCA values are in high negative figures over a long period are assessed as having a non-competitive standing on the market.

The Michaely Index is used in the following form:

MIj= EXj / EX - IMj / IM

where EX and IM are values of total export and import. This index shows measure of specialization towards export or insufficient specialization in specific groups of commodities. For $0 < MI < 1$ the index indicates a certain measure of specialization for a given commodity, while for $-1 < MI < 0$ the index shows an insufficient pro-export specialization for a given commodity.

Logarithmic decomposition

If we designate export as EX, import as IM, net export as X = EX – IM, price as P, quantity as Q, with indices E for export and I for import, Δ as a change in the value and the index value (share) as IN, then INEX is an in-between-the years index of the export value, INQE and INPE are in-between-the years indexes of the export quantity and export prices, and the same is valid for import (INIM, INPI, INQI). The synthetic model of the net export analysis by logarithmic decomposition then arises from the following equations:

$$\Delta X = \Delta EX - \Delta IM \quad \text{for} \quad EX = P_E \cdot Q_E \;\; IM = P_I \cdot Q_I$$

$$\Delta EX = \Delta EX_{PE} + \Delta EX_{QE} \quad \text{and by analogy for import} \quad \Delta IM = \Delta IM_{PI} + \Delta IM_{QI}$$

and in an aggregate equation

$$\Delta X = \frac{\ln IN_{PE}}{\ln IN_{EX}} \cdot \Delta EX + \frac{\ln IN_{QE}}{\ln IN_{EX}} \cdot \Delta EX - \frac{\ln IN_{PI}}{\ln IN_{IM}} \cdot \Delta IM - \frac{\ln IN_{QI}}{\ln IN_{IM}} \cdot \Delta IM$$

where individual items on the right gradually indicate the impact of the export price and export quantity as well as the import price and quantity on the change in net export. Then logically,

- the term $\Delta EX_{PE} - \Delta IM_{PI}$ determines the export and import prices impacts on net export and
- the term $\Delta EX_{QE} - \Delta IM_{QI}$ determines the export and import quantities impacts on net export.

The impacts of individual comparable commodities can be added up into larger aggregates of agricultural as well as food net export. For usage of this method see also [3] and [4].

Results

Development of the Agricultural Foreign Trade (AFT) in Czech Republic

The value of export and import has been summarized in millions of CZK for 24 aggregates

of commodities in accordance with the CN numerical identification, and the balance and turnover were determined for 2004, the year of EU accession. The AFT export in this year was 61,526.1 million CZK, while the 93,543.6 million CZK import greater by 32,017.5 million CZK, and the total turnover exceeded 155 billion CZK.

Table 2. shows the most important items of the AFT export of the Czech Republic in 2004 and their share in the total export. The first two, CN 04 Milk, cream, eggs and CN 17 represent 25 % of export and the 6 listed commodities represent 56.4 % of export.

When we summarize the CR AFT results for 2008 in the same way, we will obtain Table 3.
The results are shown in Table 1.

CN	Commodity name	Export	Import	Balance	Turnover
1	Live animals	3 268.2	634.4	2 633.9	3 902.6
2	Meat and consumable chitterlings	2 526.4	7 231.0	-4 704.5	9 757.4
3	Fish, crustaceans, mollusks, and other water	1 240.0	1 510.7	-270.8	2 750.7
4	Milk, eggs, honey, edible products of animal	8 238.7	5 556.0	2 682.7	13 794.6
5	Products of animal origin not shown	617.5	1 026.7	-409.2	1 644.2
6	Live plants and flower products	269.2	2 664.3	-2 395.1	2 933.6
Sou	Vegetables, plants, tubers and edible roots	788.7	6 227.8	-5 439.1	7 016.5
8	Fruits, nuts, edible peelings of citrus fruit and	1 753.1	10 459.4	-8 706.2	12 212.5
9	Coffee, tea, yerba, seasonings	494.5	1 868.5	-1 373.9	2 363.0
10	Cereals	1 670.6	1 296.8	373.9	2 967.4
11	Flour-milling products, malt, starch, inulin,	2 538.5	556.7	1 981.8	3 095.2
12	Oil seeds, fruit, medicinal plants, industrial	3 619.3	2 730.5	888.8	6 349.8
13	Shellac, rubber, resins and other saps, plant	736.8	507.4	229.4	1 244.2
14	Plant materials for knitting and other plant	5.2	48.0	-42.8	53.3
15	Fats, animal and plant oils, edible waxes	1 226.3	3 984.4	-2 758.2	5 210.7
16	Products from meat, fish, crustaceans and	991.4	2 217.4	-1 226.0	3 208.8
17	Sugar and sweets	7 124.7	3 154.9	3 969.9	10 279.6
18	Cocoa and cocoa products	2 722.4	4 880.0	-2 157.6	7 602.4
19	Products from cereals, flour, starch, milk,	2 877.5	6 098.8	-3 221.4	8 976.3
20	Products from vegetables, fruits and nuts	1 719.8	4 389.2	-2 669.4	6 109.0
21	Various food products	5 910.8	7 964.4	-2 053.6	13 875.1
22	Beverages, alcohol liquids, vinegar	6 517.9	6 494.6	23.4	13 012.5
23	Scraps, waste from food industry, fodder	2 135.4	7 831.8	-5 696.4	9 967.3
24	Tobacco, manufactured tobacco substitutes	2 533.0	4 209.9	-1 676.9	6 742.9
	Total	61 526.1	93 543.6	-32 017.5	155 069.8

Source: Research Institute of Agricultural Economics and author's calculations

Table 1. Overall CR AFT in 2004.

CN	Name	%
04	Milk, cream, eggs	13.40
17	Sugar and sweets	11.58
22	Beverages, alcohol liquids	10.60
21	Food products	9.62
12	Oil seeds	5.88
1	Live animals	5.32

Source: Research Institute of Agricultural Economics and author's calculations

Table 2. The most important items of the CR AFT export in 2004 and their proportion in the total export.

CN	Commodity name	Export 2008	Import 2008	Balance (EX-IM)	Turnover (EX+IM)
1	Live animals	5 017.9	1 466.9	3 550.9	6 484.8
2	Meat and consumable chitterlings	4 069.7	1 3752.8	-9 683.2	17 822.5
3	Fish, crustaceans, mollusks, and	1 620.0	2 361.4	-741.4	3 981.5
4	Milk, eggs, honey, edible products	14 483.1	10 001.2	4 481.8	24 484.3
5	Products of animal origin not shown	542.3	1 176.0	-633.6	1 718.3
6	Live plants and flower products	288.4	3 134.0	-2 845.7	3 422.4
7	Vegetables, plants, tubers and edible	2 018.8	8 871.8	-6 853.0	10 890.6
8	Fruits, nuts, edible peelings of citrus	2 373.0	11 458.0	-9 085.0	13 831.0
9	Coffee, tea, yerba, seasonings	1 330.6	3 296.6	-1 966.0	4 627.2
10	Cereals	7 612.1	2 425.0	5 187.1	10 037.1
11	Flour-milling products, malt, starch,	3 241.0	1 124.8	2 116.2	4 365.9
12	Oil seeds, fruit, medicinal plants,	8 265.4	2 770.0	5 495.4	11 035.3
13	Shellac, rubber, resins and other	7 66.7	1 034.9	-268.2	1 801.6
14	Plant materials for knitting and other	4.9	33.6	-28.7	38.5
15	Fats, animal and plant oils, edible	3 664.3	5 141.2	-1 476.8	8 805.5
16	Products from meat, fish,	2 740.8	4 228.7	-1 487.9	6 969.5
17	Sugar and sweets	5 698.9	3 784.3	1 914.6	9 483.2
18	Cocoa and cocoa products	4 033.0	6 101.6	-2 068.6	10 134.7
19	Products from cereals, flour, starch,	5 632.1	8 725.8	-3 093.7	14 357.9
20	Products from vegetables, fruits and	2 269.2	6 541.4	-4 272.2	8 810.6
21	Various food products	8 874.6	10 515.2	-1 640.5	19 389.8
22	Beverages, alcohol liquids, vinegar	10 303.9	9 757.1	546.8	20 061.0
23	Scraps, waste from food industry,	4 749.3	8 799.6	-4 050.2	13 548.9
24	Tobacco, manufactured tobacco	7 012.5	3 406.9	3 605.6	10 419.4
	Total	**106612.5**	**129908.8**	**-23296.3**	**236521.3**

Source: Research Institute of Agricultural Economics and author's calculations

Table 3 The total CR AFT in 2008.

The CR AFT export for 2008 was worth 106,612.5 billion CZK, while import of 129,908.8 billion CZK was by 23,296.3 billion CZK greater and the total turnover exceeded 236.5 billion CZK. This means that since the 2004 accession to EU the AFT export in 2008 increased by 73.28%, the import by 38.87 %, the balance decreased by 27.24 % and the total turnover increased by 52.53 %.

When we observe the most significant items of the CR AFT export in 2008 and their proportion in the total export, the first two CN 04 Milk, cream and eggs, and CN 22 Beverages, alcohol liquids, represent 25 % of export and the 6 listed commodities represent 53.06 % of export.

CN	Name	%
04	**Milk. cream. eggs**	**13.59**
22	**Beverages. alcohol liquids**	**9.67**
21	**Food products**	**8.33**
12	**Oil seeds**	**7.75**
10	**Cereals**	**7.14**
24	**Tobacco. products**	**6.58**

Source: Research Institute of Agricultural Economics and author's calculations

Table 4. The most important items of the CR AFT export in 2008 and their proportion in the total export.

Using RCA and MI indicators

In line with the definition, the RCA indicator measures the net export (balance) for a given commodity by the attained total turnover for that commodity. The commodities which had reached balanced high positive values of the RCA index during the observed period can be considered to have been successful in export.

The RCA values from 2004 till 2008 have been calculated for all 24 groups of commodities. The results are summarized in Table 5.

In long term, only 8 aggregates of the commodities from the total of 24 have reached positive values of the indicator. These commodities are markedly more successful in the agrarian market export. When we line up the order of the first six of these commodities for the years under observation, we will obtain the Table 6.

CN	Commodity name	RCA	RCA	RCA	RCA	RCA
1	Live animals	67.49	57.20	59.31	61.58	54.76
2	Meat and consumable chitterlings	-48.21	-56.29	-60.03	-55.80	-54.33
3	Fish, crustaceans, mollusks, and other water	-9.84	-17.88	-17.56	12.52	-18.62
4	Milk, eggs, honey, edible products of animal	19.45	17.44	19.21	20.15	18.30
5	Products of animal origin not shown elsewhere	-24.89	-37.67	-32.96	-39.34	-36.88
6	Live plants and flower products	-81.65	-77.77	-77.45	-75.88	-83.15
7	Vegetables, plants, tubers and edible roots	-77.52	-67.25	-63.95	-63.77	-62.93
8	Fruits, nuts, edible peelings of citrus fruit and	-71.29	-56.07	-67.30	-64.36	-65.69
9	Coffee, tea, yerba, seasonings	-58.14	-47.77	-41.41	-40.92	-42.49
10	Cereals	12.60	70.91	41.37	47.08	51.68
11	Flour-milling products, malt, starch, inulin,	64.03	49.86	51.56	37.99	48.47
12	Oil seeds, fruit, medicinal plants, industrial	14.00	30.36	11.13	55.72	49.80
13	Shellac, rubber, resins and other saps, plant	18.43	18.04	11.54	-11.42	-14.89
14	Plant materials for knitting and other plant	-80.30	-73.22	-70.64	-81.38	-74.72
15	Fats, animal and plant oils, edible waxes	-52.93	-28.46	-23.99	-9.30	-16.77
16	Products from meat, fish, crustaceans and other	-38.21	-22.44	-27.79	-27.32	-21.35
17	Sugar and sweets	38.62	37.06	27.48	0.32	20.19
18	Cocoa and Cocoa products	-28.38	-29.97	-26.95	-25.57	-20.41
19	Products from cereals, flour, starch, milk, pastry	-35.89	-33.12	-29.60	-26.38	-21.55
20	Products from vegetables, fruits and nuts	-43.70	-40.23	-41.85	-42.27	-48.49
21	Various food products	-14.80	-16.74	-17.85	-12.33	-8.46
22	Beverages, alcohol liquids, vinegar	0.18	1.71	2.56	5.90	2.73
23	Scraps, waste from food industry, fodder	-57.15	-41.80	-38.73	-31.19	-29.89
24	Tobacco, manufactured tobacco substitutes	-24.87	-15.97	-34.52	-15.74	34.6

Source: Research Institute of Agricultural Economics and author's calculations

Table 5. The values of the RCA indicator for CR for individual aggregates of commodities during the period of 2004 – 2008 (the CN numerical identification).

Order of the		**1**	**2**	**3**	**4**	**5**	**6**
Total AFT	**2004**	**CN 1**	**CN 11**	**CN 17**	**CN 4**	**CN 13**	**CN 12**
	2005	**CN 10**	**CN 1**	**CN 11**	**CN 17**	**CN 12**	**CN 13**
	2006	**CN 1**	**CN 11**	**CN 10**	**CN 17**	**CN 4**	**CN 13**
	2007	**CN 1**	**CN 12**	**CN 10**	**CN 11**	**CN 4**	**CN 3**
	2008	**CN 1**	**CN 10**	**CN 12**	**CN 11**	**CN 24**	**CN 17**

Source: Research Institute of Agricultural Economics and author's calculations

Table 6. The order of the highest RCA values in the CR AFT for the 2004 – 2008 period.

From the viewpoint of the predominance of export over import during the listed years, the most successful were the aggregates of the following commodities: CN 1 (Live animals), CN 11 (Flour-milling products…), CN 12 (Oil seeds), CN 10 (Cereals), previously also CN 17 (Sugar, sweets), and in long term the CN 4 (Milk…).

For the MI indicator it is crucial that the proportion of a given commodity export in the total export is greater than the proportion of import of this commodity in the total import. We then obtain a positive MI value and the index shows a certain measure of export specialization.

The Michaely Index MI has been calculated for all 24 groups of the agrarian aggregates of commodities. The results are shown in Table 7.

CN	**Commodity name**	**MI 2004**	**MI 2005**	**MI 2006**	**MI 2007**	**MI**
1	Live animals	0.0463	0.0388	0.0407	0.0327	0.0358
2	Meat and consumable chitterlings	-0.0362	-0.0624	-0.0620	-0.0620	-0.0677
3	Fish, crustaceans, mollusks, and other water	0.0040	-0.0014	0.0001	0.0051	-0.0030
4	Milk, eggs, honey, edible products of animal origin	0.0745	0.0624	0.0837	0.0777	0.0589
5	Products of animal origin not shown elsewhere	-0.0009	-0.0037	-0.0026	-0.0039	-0.0040
6	Live plants and flower products	-0.0241	-0.0211	-0.0188	-0.0120	-0.0214
7	Vegetables, plants, tubers and edible roots	-0.0538	-0.0493	-0.0540	-0.0549	-0.0494
8	Fruits, nuts, edible peelings of citrus fruit and melons	-0.0833	-0.0702	-0.0688	-0.0636	-0.0659
9	Coffee, tea, yerba, seasonings	-0.0119	-0.0120	-0.0099	-0.0119	-0.0129
10	Cereals	0.0133	0.0755	0.0512	0.0550	0.0527
11	Flour-milling products, malt, starch, inulin, wheat	0.0353	0.0187	0.0206	0.0165	0.0217
12	Oil seeds, fruit, medicinal plants, industrial straw, etc.	0.0296	0.0348	0.0189	0.0574	0.0562
13	Shellac, rubber, resins and other saps, plant extracts	0.0066	0.0045	0.0033	0.0001	-0.0008
14	Plant materials for knitting and other plant products	-0.0004	-0.0002	-0.0002	-0.0002	-0.0002
15	Fats, animal and plant oils, edible waxes	-0.0227	-0.0094	-0.0046	0.0021	-0.0052
16	Products from meat, fish, crustaceans and other water	-0.0076	-0.0042	-0.0053	-0.0087	-0.0068
17	Sugar and sweets	0.0821	0.0672	0.0516	0.0120	0.0243
18	Cocoa and cocoa products	-0.0079	-0.0140	-0.0088	-0.0117	-0.0091
19	Products from cereals, flour, starch, milk, pastry	-0.0184	-0.0210	-0.0136	-0.0160	-0.0143
20	Products from vegetables, fruits and nuts	-0.0190	-0.0200	-0.0197	-0.0241	-0.0291
21	Various food products	0.0109	-0.0049	-0.0001	0.0004	0.0023
22	Beverages, alcohol liquids, vinegar	0.0365	0.0250	0.0356	0.0333	0.0215
23	Scraps, waste from food industry, fodder	-0.0490	-0.0311	-0.0230	-0.0200	-0.0232
24	Tobacco, manufactured tobacco substitutes	-0.0038	-0.0020	-0.0142	-0.0033	0.0396

Source: Research Institute of Agricultural Economics and author's calculations

Table 7. The MI Indicator value of the Agrarian Foreign Trade (AFT) of the Czech Republic during the period of 2004 – 2008.

Only ten aggregates of commodities out of 24 shows long term positive values of the MI index. his is an indication of a certain pro-export specialization of these commodities. Table 8 outlines the order of the highest positive values. From the viewpoint of the MI index the most successful during the years listed in Table 8 were the aggregates of the following commodities: CN 4 (Milk ...), CN 17 (Sugar and sweets) CN 12 (Oil seeds) and CN 10 (Cereals). To a certain extent also CN 22 (Beverages) and CN 1 (Live animals). It is interesting to note how distinctly poor is the standing of the long term aggregate commodity CN 2 (Meat). This is apparently due to the significant, growing import, particularly of pork.

Logarithmic decomposition

The use of the logarithmic decomposition method is demonstrated for the beer commodity in the in-between-the-years decomposition of the changes in the net export during 2005 and 2006, and in the decomposition of the changes in the net export during a three-year period between 2004, i.e. the year of accession to EU and the year of 2007. It is interesting to observe into what extent the changes in the quantity of export and import have an effect on the total changes and into what extent they are affected by the changes in prices.

For the beer commodity during 2005 – 2006 the net export grew by 458.81 million CZK. Contribution to this growth was made primarily by the growth of export by 449.04 million CZK and, in a positive way, also by the drop in import (9.78 million CZK). Above all, the value of export grew due to the increase in the exported quantity (559.41 million CZK), though a small decrease in the price of export reduced the balance of net export by 110.37 million CZK. A smaller quantity of import also contributed positively to the overall balance (19.14 milion CZK), while the higher prices for import had a negative effect (-9,36 million CZK). The overall effect of quantity on the total balance was positive (578.55 million CZK), and the overall effect of prices was negative (-119.73 million CZK).

During the 2004 – 2007 period the net export of beer increased by 884.04 million CZK. Export itself increased by 963.72 million CZK, and import also increased moderately by 79.69 million CZK. The greater exported quantity (1121.27 million CZK) had a marked effect on the change in the net export. The attained export price decreased moderately,

Order of the		**1**	**2**	**3**	**4**	**5**	**6**
AFT total	**2004**	**CN 17**	**CN 4**	**CN 1**	**CN 22**	**CN 11**	**CN 12**
	2005	**CN 10**	**CN 17**	**CN 4**	**CN 1**	**CN 12**	**CN 22**
	2006	**CN 4**	**CN 17**	**CN 10**	**CN 1**	**CN 22**	**CN 11**
	2007	**CN 4**	**CN 12**	**CN 10**	**CN 22**	**CN 1**	**CN 11**
	2008	**CN 4**	**CN 12**	**CN 10**	**CN 24**	**CN 1**	**CN 17**

Source: Research Institute of Agricultural Economics and author's calculations

Table 8. The order of the highest MI values in the CR AFT for the 2004 – 2008 period.

Initial data							
	Value of	Quantity	Price of	Value of	Quantity	Price of	Net
	mil. CZK	t	CZK/t	mil. CZK	t	CZK/t	mil. CZK
2005	3 655.82	3141214.	1 163.82	288.38	215	1 337.46	3 367.44
2006	4 104.86	3628925.	1 131.15	278.61	201	1 382.37	3 826.25
Results of the breakdown (in millions of CZK)							
	Change	Change	Change	Effect of	Effect of	Effect of	Effect of
	ΔX	ΔEX	ΔIM	ΔQ_E na X	ΔP_E na X	ΔQ_I na X	ΔP_I na X
2005, 2006	458.81	449.04	-9.78	559.41	-110.37	-19.14	9.36

Source: Research Institute of Agricultural Economics and author's calculations

Table 9. In-between-the-years decomposition of the net export of beer for 2005 – 2006.

Initial data							
	Value	Quantity	Price of	Value of	Quantity	Price of	Net
	mil.	t	CZK/t	mil. CZK	T	CZK/t	mil. CZK
2004	3	2850418.6	1 249	243.09	326	744	3 318.43
2007	4	3766326.7	1 202	322.78	246	1 307	4 202.47
Results of the breakdown (in millions of CZK)							
	Change	Change	Change	Effect of	Effect of	Effect of	Effect of
	ΔX	ΔEX	ΔIM	ΔQ_E na X	ΔP_E na X	ΔQ_I na	ΔP_I na X
2004-	884.04	963.72	79.69	1 121.27	-157.55	-78.73	158.41

Source: Research Institute of Agricultural Economics and author's calculations

Table 10. The breakdown of net export for the beer commodity during the 2004 – 2007 period.

which showed in the total balance negatively (decrease by 157.55 million CZK). The decreased quantity of import had a positive effect of 78.73 million CZK, but due to the fact that import in 2007 was realized for distinctly higher prices, this price effect showed in the total balance as a loss of 158.41 million CZK. The total effect of quantity on the total balance was positive (1200 million CZK), and the total effect of prices was negative (-315.96 million CZK).

Conclusion

The extent of agricultural foreign trade of the Czech Republic has increased markedly following the country's accession to EU.

During the period of 2004-2008 the export of agrarian commodities increased by 73 %, import increased by 38.87 %, the balance decreased by 27.24 % and the total turnover increased by 52.53 %. This statistics indicates that the Czech agrarian products can be successful in the demanding market. The structure of exported commodities has also changed.

Through the use of the RCA indicators and MI indices it is possible to select commodities which have proved to be competitive on the EU market and were successful due to a certain measure of their specialization.

The method of logarithmic analyses the attained in-between-the-years results of export, and shows to what extent they had been achieved through the changes in the quantity and through price effects

Using concrete results of the CR agrarian export it has been demonstrated that the selected indicators can serve as suitable tools for the analysis of net export. The analyses can also provide useful information for the managers of agrarian enterprises about the success potential of specific commodities of the agrarian production on the foreign markets.

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Sustainable growth rate in the strategic analysis of brewery industry

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Abstract

An analysis of sustainable growth rate could considerably improve an assessment of Strategic Business Unit's potential. The sustainable growth rate analysis enabled us to compare a possible growth rate within the brewery industry with a growth rate that firms had achieved. To demonstrate this in more depth, we presented a case study of the brewery industry in Poland and Czech Republic.

Key words

Growth, strategic analysis, seer industry, corporate growth.

Anotace

Analýza trvale udržitelné míry růstu by mohla značně zlepšit hodnocení potenciálu Strategického Obchodního Svazu. Analýza trvale udržitelné míry růstu nám umožnila porovnat potenciální míru růstu v pivovarnickém průmyslu s mírou růstu, kterou firmy již dosáhly. Pro hlubší vysvětlení jsme v článku uvedli případovou studii pivovarnického průmyslu v Polsku a České Republice.

Klíčová slova

Růst, strategická analýza, analýza průmyslu, společenský růst.

Introduction

A main purpose of the study was to analyze connections between growth, financing growth and a strategic analysis of a company. A subsequent literature review has been performed which lead to some interesting findings and conclusions. One of financial tools – a sustainable growth rate analysis has been incorporated into the strategic analysis of chosen brewing companies in Poland and the Czech Republic. Results of the analysis showed many similarities as well as differences in running global businesses locally.

A corporate growth is an important issue that has been challenging managers for many years. To accomplish the corporate growth, firms seek to create a value by serving customers through differentiated goods and services. But the growth of sales and assets itself is neither a company's key objective, nor a guarantee of value creation. Additionally, an unrestrained growth may be inconsistent with established financial policies. If there is no cooperation between the strategic planning objectives and the financial managers growth objectives, financial policies become mutually incompatible. To increase this lack of cooperation, certain strategic tools incorporating the financial aspects of effectiveness could be established.

A key issue regarding strategic planning models that are presented in the literature1 is that they do neither explicitly consider financing, nor the amount of cash flow that is sufficient to finance the strategy. Many models are currently available to assist companies in the efficient allocation of resources. However, those models do not analyze abilities of companies to finance certain strategies. There are models that include financial aspects, but only a level of financial resources is taken into account, which is not sufficient criterion from the efficiency and value creation perspective. Such an analysis can be completed using the SPACE model

[1] There are many literature positions on strategic analysis and strategic planning, among which is: Hooley G., Saunders J., Piercy N.: *Marketing Strategy and competitive positioning*, third edition, Pearson Education Limited 2004

(Strategic Position and Action Evaluation), created by H. Rowe, R. Mason, K. Dickel [10], that analyzes a strategic position of company and evaluates its activities.

Another strategic planning model, a growth/share matrix, developed by the Boston Consulting Group (BCG matrix), does include an issue of cash flows, but it implicitly assumes that a the market share expresses an ability to generate cash and the market growth rate – necessary capital expenditures [4]. However, in practice, it does not always work that way. For example, let us take into account a business that has a low market share in a mature, slowly growing market. If capital investment requirements are low in relation to the cash generated from the operations, it could be a lucrative business to invest in. At the same time, a business having a high market share might not always generate an excess of cash, because this depends on the capital investment requirements of the business and the profit margin it yields.

Other models, such as the General Electric matrix, created by McKinsey & Company, do not consider cash flow issues at all. Instead, they analyze the ROI ratio, i.e. investment rate of return. The ROI has no direct relationship to cash flows and is not perceived in the financial management literature as a ratio revealing the effectiveness of various financial strategies.

The strategic analysis could be noticeable improved by integrating it with financial planning models that could show an ability of a company to generate cash. The sustainable growth model, that we have considered and discussed in this paper, is an analytical framework illustrating factors that have an impact on cash sufficiency.

Sustainable growth rate

The model of sustainable growth rate, analyzed in details in the 1977 article by R.C. Higgins [5], describes a balance in reference to funds financing growth of company and expenditures for sales growth. Many characteristics and nuances of this financial planning model have been addressed in a number of sources [1, 2, 3, 8, 9, 11, 12]. According to Higgins, sustainable growth is an annual percentage increase in sales consistent with a firm's established financial policies. In Higgins model, factors that influence the maximum sustainable long-term sales growth rate have financial character, i.e., a return on assets, a debt-to-equity ratio, the total assets to equity, a profit margin, and a dividend payout ratio. The sustainable growth rate model is an analytical tool for firms wanting to maintain a target payout ratio and capital structure without issuing a new equity, providing an estimate of the annual percentage increase in sales that can be supported by, and is internally consistent with firm's financial policies. If higher growth is realized, it can be sustained under conditions of modifying one or more company financial policies, including an additional external financing. The opposite situation with lower sales growth enables firms to increase dividends, reduce leverages or increase the investment in networking capital.

One of general assumptions that narrow possibilities of an application of the model is a stable external environment in which the company operates. Funds available for investments consist of retained earnings, depreciation write-offs and an increase of debt proportional to an increase in equity. Therefore, it is assumed that no new common stock would be issued. Those funds finance the increase of company's assets. Depreciation write-offs are used as a whole to renew an amortized part of the assets, while retained earnings finance the increase in assets related to sales growth. Consequently, the company growth is financed by its retained earnings.

Depending upon the company's specific situation and the market it operates in, it may not be possible to use this model in practice. There are four assumptions that limit an application of the model for planning purposes: 1. Depreciation write-off equaling the investment expenditures incurred to maintain the current level of sales, 2. Retained earnings being the only internal source of financing the company's growth, 3. The company being financed according to an optimal capital structure, 4. The company not issuing new stock. The abolition of those restrictions would be aimed at a more adequate calculation of the funds available to finance new activities and their investment requirements [4]. A more realistic model that changes the limiting assumptions was presented by V. Govindarajan and J. Shank [4]. It could especially be applied when sales growth cannot be financed by retained earnings. This model could be implemented for a wide range of strategic problem

solving and decision making processes, together with the strategic analysis tools.

As a result of our literature review findings, the aim of this article is to apply the sustainable growth model to a strategic analysis of leading companies in the brewery industry operating in Poland and the Czech Republic.

A formula for the cash sustainable growth rate will be derived from a framework introduced by Govindarajan and Shank [4]. This framework will reveal sources of internally generated cash that Higgins model overlooked. A specific market and a financial situation within brewery industry leaders makes Higgins model unsuitable for the analysis.

Givindarajan and Shank [4] aimed at defining and determining factors of a "cash sufficient" company. A company that has an ability to maintain a cash equilibrium could be defined as "cash sufficient". That is, funds available for investments equal the funds required for the investment.

Available sources of financing are:

Internally generated capital – this depends on two major factors: operating efficiency resulting from a return on sales and financial strategies that include a tax planning and a dividend policy,

Financial leverage – a debt is an important source of financing that allows a company to achieve a higher return on equity by maintaining a constant return on assets. A debt-to-equity-ratio cannot be increased indefinitely. Investors would accept a higher risk related to a higher leverage only if they expect to earn higher rates of return,

New equity – in theory, a new issue of equity is an available source of financing, but there are many market conditions that lower realistic possibilities of using it.

Investment requirements depend upon an amount of cash required to maintain the current capacity and to support the growth of sales. An intensity of the investment depends on the industry in which the company operates in. Factors that determine fund requirements include:

Working capital requirements that support incremental sales,

Investment in plant and equipment supporting incremental sales, as well as investment required to increase the capacity,

Required reinvestment in plant and equipment to maintain the current production capacity.

Achieving a financial equilibrium would enable the funds available for investment to be equal to the funds required to be invested.

In the presented framework, growth is being financed without issuing new stock and without modifying the financial strategy in terms of using a debt. Therefore, the debt-to-equity-ratio is maintained and the dividend policy remains unchanged.

Funds financing the growth of company can be presented as:

$$\textbf{(Retained Earningst + Depreciation write-offt) + (Retained Earningst + Depreciation write-offt) (Debtt-1/Equityt-1)} \quad \textbf{(1)}$$

Following Govindarajan and Shank framework, both sides of the equation will be divided by sales revenues. An important assumption to include is that funds available for investment and investment requirements are proportionally related to sales revenues. From a methodological point of view, these linear relationships are only suitable for application in certain circumstances. Explaining the changes of depreciation write-offs by the changes in sales revenues is not always correct. But, taking into account that depreciation is a derivative of the investment in fixed assets and the relationship between investment expenditures and sales growth is well-grounded, the linear relationship could be justified, although usually to be observed only in large corporations.

$$\mathbf{FO' = (m(1 - d) + DW') + (m(1 - d) + DW')\left(\frac{D}{E}\right)} \quad \textbf{(2)}$$

Where:

FO' = FO/S0 – funds from operations financing the growth as a percentage of sales,
S0 = sales revenues at the beginning of the period,
m = profit margin,
d = payout ratio,
DW' = depreciation write-off as a percentage of sales,
D = debt, and
E = equity.

Incorporating a growth rate in the above equation, multiplying both sides by S0 and conducting some simple conversions, we can derive the amount of required financing for the next period.

$$\boldsymbol{FO = (1+g)S_0(m(1-d)+DW')\left(1+\frac{D}{E}\right)} \quad \textbf{(3)}$$

Where:

g = growth rate of sales

The sustainability assumption will be met if the funds financing the company's growth are spent to finance the increase in assets required, only to realize increased sales. On the right hand side of the cash sufficiency equilibrium equation there are the required capital expenditures that can be presented in the following equation:

$$\boldsymbol{\Delta CE = \Delta FA + \Delta NWC + Rei} \quad \textbf{(4)}$$

Where:

Δ CE = capital expenditures for asset growth,
Δ FA = increase of fixed assets related to sales growth,
Δ NWC = increase of net working capital, and
Rei = capacity maintenance reinvestment rate.

Therefore, the growth in sales requires investment in additional fixed assets and net working capital. In this model, it is assumed that the entire depreciation write-off is not entirely spent on maintaining the current level of sales. If the capacity maintenance reinvestment rate, Rei, is lower than the depreciation write-off, the remaining amount could be used to finance future growth. The equation presenting the funds required to be invested as relation to sales then becomes:

$$\boldsymbol{CE' = (gS_0)FA' + (gS_0)NWC' + \big((1+g)S_0\big)Rei'} \quad \textbf{(5)}$$

Where:

CE' = CE/S0
FA' = FA/S0
NWC' = NWC/S0
Rei' = Rei/S0

The key factors of this sustainable growth model are presented as a percentage of sales. One could criticize it for simplifying the reality. Although, while other results of financial planning procedures are given in values, the assumptions here are made on a basis of percentage of sales. Therefore, the level of simplicity is similar.

To achieve the expected cash sufficiency equilibrium, both amounts derived from equations (3) and (5) must be equal.

$$\boldsymbol{(1+g^*)S_0(m(1-d)+DW')\left(1+\frac{D}{E}\right) = (g^*S_0)FA' + (g^*S_0)NWC' + \big((1+g^*)S_0\big)Rei' \quad (6)}$$

$$\boldsymbol{(1+g^*)S_0(m(1-d)+DW')\left(1+\frac{D}{E}\right) = (g^*S_0)FA' + (g^*S_0)NWC' + \big((1+g^*)S_0\big)Rei'} \quad \textbf{(5)}$$

Where:

g* = sustainable growth rate

If all parameters are known, a sales growth rate that makes the equilibrium possible could be derived.

This is the maximum growth in sales that a firm can sustain without changing any financial policies:

$$\mathbf{g^*} = \frac{\mathbf{FO - Rei'}}{\mathbf{FA' + NWC' + Rei' - FO}} \quad \textbf{(7)}$$

The sustainable growth rate model could be also presented in a more detailed manner that includes value drivers:

$$\mathbf{g^*} = \frac{\left[\left(\left(\mathbf{m_{EBIT} - I'}\right)\mathbf{(1-T)(1-d)} + \mathbf{DW'}\right) \times \left(1 + \mathbf{D/E}\right) - \mathbf{Rei'}\right]}{\mathbf{[FA' + NWC']} - \left[\left(\left(\mathbf{m_{EBIT} - I'}\right)\mathbf{(1-T)(1-d)} + \mathbf{DW'}\right) \times \left(1 + \mathbf{D/E}\right) - \mathbf{Rei'}\right]} \quad \textbf{(8)}$$

Where:

mEBIT = EBIT (Earnings Before Interest and Taxes) margin,
I' = interest on debt as a percentage of sales, and
T = effective tax rate.

The objective for most companies is to plan and maintain the relationship between the funds available and the funds required in balance in the long term perspective. The presented analytical tool could therefore be used both for the entire company, as well as for a particular strategic business unit.

Whereas the overall equilibrium should be maintained, single business units could be either net suppliers of cash used for growth or net absorbers of cash. Well composed portfolios of such businesses can make company's grow faster than if they were made up of balanced units. As a planning tool, the sustainable growth model could be used to manage certain factors, the ones that are the key policy issues in a unit, while considering the other factors as being fixed by the policy decisions.

Comparing the actual growth rate of sales with the sustainable growth rate forecast ex-post could reveal how the company is managing growth, if there was a space in the market for growth strategies and how these strategies were financed. In business practice, companies seldom focus their efforts on maintaining a financial equilibrium. However, this analysis applied for planning purposes could improve the cooperation between strategic, planning and financial managers to establish growth objectives compatible with financial policies. It is also a useful tool that could help in a strategy formulation, although it only supports the decision process which depends on risk-taking predispositions and individual features of the top management. It is worth noting that a negative sustainable growth rate can indicate that the amount of investment made by a company will not be balanced by available funds.

Application of sustainable growth rate in strategic analysis

The application of this strategic analysis tool has been completed on an example of four leading beer producers, two in Poland and two in the Czech Republic. A purpose of the study was to illustrate the sustainable growth rate analysis for units operating in a mature industry. However, since Polish companies didn't finance their growth by retained earnings, the application of the basic sustainable growth rate model was infeasible. Therefore we found Govindarajan and Shank model more appropriate.

A general overview of the beer market in Poland reveals similar features to the Czech Republic market, although the consumption per capita differed remarkably. In Poland, in 2008, the consumption per capita was 93 liters, while in the Czech Republic, it was 161 liters. A phase of the market in its life cycle was similar, however. Both markets were in their stage of saturation and producers were seeking market niches with different beer flavors. They were also exploring export possibilities, taking Russia as an example.

Another similarity is that both markets are concentrated. In Poland, two leading producers cover over 76 % of the market. In the Czech Republic, there was 67 % respectively. In both countries, the leading companies are owned by multinational corporations. SABMiller plc owns Grupa Kapitałowa Kompania Piwowarska SA, with 43 % of the market share in Poland, and Plzensky Prazdroj a.s. which has 49 % of the market share in the Czech Republic. The second biggest producers are owned by Heineken in Poland (Grupa Żywiec

SA – 33,5 % of market share) and CVC Capital Partners, an investment company in the Czech Republic (Pivovary Staropramen a.s. – 17 % of market share). Heineken holds the third largest Czech Republic producer - Královský Pivovar Krušovice – where the market share is 14 %, as well as other well known beer brands like: Starobrno, Velke Brezno and Krasne Brezno.

The analysis of the sustainable growth rate was conducted on the basis of calculations of parameters in the equation (8). A forecast of the sustainable growth rates in period t1 was completed using data from the period t0, following the comparison withactually achieved sales growth rates. Tables 1 and 2 illustrate results for Polish market leaders, Grupa Kapitałowa Kompania Piwowarska SA and Grupa Kapitałowa Żywiec SA, for the years 2004-2008. Except for the highest market shares, these companies had the highest growth rates of sales in the analyzed period, and their brand portfolios were very popular in Poland. Tables 3 and 4 illustrate results for leading companies that operated in the Czech Republic market, Plzensky Prazdroj a.s. and Pivovary Staropramen a.s., for the years 2004-2007 . Both companies had constant growth rates of sales on similar level. They also held the most popular beer brands in the Czech Republic.

Parameter	2004	2005	2006	2007	2008
DW'	5,6%	5,0%	4,3%	4,1%	4,1%
D/E	70,7%	76,8%	42,1%	32,2%	66,2%
m EBIT	22,91%	20,81%	21,81%	21,19%	20,82%
I'	1,1%	1,2%	0,8%	0,9%	1,1%
T	23,2%	19,2%	18,4%	19,2%	18,3%
d	100,0%	100,0%	100,0%	100,0%	100,0%
Rei'	4,6%	4,0%	3,3%	3,1%	3,1%
FA´	41,2%	43,0%	43,9%	37,0%	37,1%
NWC´	2,4%	4,4%	-2,8%	1,2%	0,5%
g*	13,1%	12,8%	11,3%	7,3%	6,4%
g	8,0%	10,5%	11,6%	15,5%	14,7%

Source: own elaboration

Table 1: Parameters of the sustainable growth rate calculation for Grupa Kapitałowa Kompania Piwowarska SA (Poland) for the years 2004-2008.

Parameter	2004	2005	2006	2007	2008
DW'	5,8%	8,7%	8,2%	7,6%	6,9%
D/E	42,3%	43,2%	76,8%	101,9%	127,0%
m EBIT	10,0%	15,9%	14,3%	16,0%	15,2%
I'	1,0%	1,2%	0,9%	1,0%	1,7%
T	15,9%	20,1%	22,3%	20,3%	20,0%
d	110%	123%	102%	101%	92%
Rei'	4,8%	7,7%	7,2%	6,6%	5,9%
FA´	40,5%	56,9%	48,8%	44,3%	39,8%
NWC´	3,1%	0,3%	-1,9%	-2,4%	0,7%
g*	-22%	6%	2%	17%	26%
G	13%	-22%	11%	11%	8%

Source: own elaboration

Table 2: Parameters of the sustainable growth rate calculation for Grupa Kapitałowa Żywiec SA (Poland) for the years 2004-2008.

Parameter	2004	2005	2006	2007
DW'	10,32%	9,93%	10,86%	8,94%
D/E	117,22%	97,11%	70,17%	64,84%
m EBIT	28,95%	31,83%	34,12%	32,37%
I'	1,83%	1,43%	0,39%	0,42%
T	33,28%	28,42%	24,19%	24,55%
D	87,13%	69,06%	57,50%	57,73%

Rei'	9,32%	8,93%	9,86%	7,94%
FA´	100,32%	98,54%	97,65%	99,79%
NWC´	0,02%	2,79%	-0,83%	-10,93%
g*	4,45%	22,09%	30,88%	38,91%
G	21,41%	4,11%	3,53%	6,41%

Source: own elaboration

Table 3: Parameters of the sustainable growth rate calculation for Plzensky Prazdroj a.s. (the Czech Republic) for the years 2004-2007.

Parameter	2004	2005	2006	2007
DW'	12,01%	12,79%	11,15%	11,70%
D/E	66,35%	59,77%	28,16%	28,60%
m EBIT	0,60%	10,15%	9,67%	20,42%
I'	0,00%	0,00%	0,00%	0,00%
T	0,00%	29,66%	30,69%	10,29%
D	0,00%	0,00%	0,00%	0,00%
Rei'	11,01%	11,79%	10,15%	10,70%
FA´	60,48%	59,45%	62,12%	62,41%
NWC´	32,34%	9,29%	9,45%	18,51%
g*	22,95%	12,03%	41,19%	21,63%
G	8,21%	2,24%	3,20%	6,21%

Source: own elaboration

Table 4: Parameters of the sustainable growth rate calculation for Pivovary Staropramen a.s. (the Czech Republic) for the years 2004-2007.

Analysis of growth and investment opportunities

In Polish market, there is still a room for growth because a sales volume is increasing constantly, and acquisition activities can be observed, whereas in the Czech Republic market, the revenues on sales of beer products grew at a level similar to the inflation rate. SABMiller realizes the strategy of market leaders in both countries. The top brands of Kompania Piwowarska will not be able to earn any more market share between other brands because the market is very close to its saturation point, especially considering lager. Therefore, one of the activities of Kompania Piwowarska, aiming at gaining a higher market share, is promoting small regional brands of newly acquired microbreweries to become all-Poland brands.

This type of strategy typically requires financing, but in the case of Kompania Piwowarska, it is conducted by an increasing asset turnover. A similar situation can be observed in Grupa Żywiec where the asset turnover was increasing each year. Kompania Piwowarska had the highest actual growth rate and was the only company exceeding its sustainable growth rate.

In the Czech Republic, the asset turnover in both companies was maintained at the same level. Moreover, the effectiveness of the assets was much lower than in Polish companies. This may result from a different beer production technology. If not, it should result in an asset restructuring. The profit margin was much higher in the Czech Republic than in Poland, differing significantly between both companies.

Analysis of financing activities

Czech Republic leaders financed their operations internally, a support of debt was especially low in Staropramen. The dividend in Staropramen wasn't paid for the entire analyzed period, where in Plzensky Prazdroj it was about 60 % throughout the period. A payout ratio was the main parameter influencing levels of sustainable growth rates which were much higher than the actual growth rates. This reveals that the financing strategy was conservative, even though the market was mature and there were not many attractive investment possibilities. At the same time, in Poland, almost 100 % of the profits were paid out as dividends to capital owners in both the companies. Kompania Piwowarska used a debt to a moderate extent, although the leverage doubled in the last year. Grupa Żywiec had a much higher and constantly growing debt-to-equity ratio.

Looking at the companies from a perspective of a cash sufficiency and the equilibrium, the situation in both countries seems to be unstable. It was expected that in the mature market, companies

should aim at maintaining a balance between financing requirements and funds available for financing. Except for Kompania Piwowarska, all other analyzed companies had cash surpluses that were not reinvested in local activities, but rather spent by the corporations globally.

Implementation into strategic analysis

The sustainable growth model served to highlight the interdependency between sales growth objectives and established financial policies. Therefore, as a strategic analysis tool, it illustrated cash surpluses and cash requirements, as well as the interrelationships between parameters that influenced the results. Although in three of four cases a higher growth rate could be achieved according to the sustainable growth rate model, the real growth rate was much lower. It resulted in cash surpluses. It is also important to note that there was no room for a high growth in the market. In case of both the countries, the market was either oversaturated, or close to a saturation point. The companies were trying to look for market niches and export possibilities, but were not fully utilizing their internal financing possibilities. A question then arises as to why those companies are not aimed at achieving the cash sufficiency equilibrium.

Aggressive financial strategies in Poland may have resulted from a good situation in the capital market in the first half of 2008. It seems that the companies didn't have problems with obtaining finances then. Therefore, there was no need to adjust the sustainable growth rates to expected levels of actual growth rates of sales revenues.

A data analysis of four beer producers shows also that a general financial policy outline depends on a global financial policy of corporations that own local breweries, with certain adjustments to local market requirements and conditions. This was directly observed during the operation interviews in SABMiller in Poland and in the Czech Republic.

As a general conclusion it can be stated that leading Polish beer producers follow more aggressive financing strategies than Czech beer producers. Companies operating in Poland used leverage to bigger extent than producers in the Czech Republic. There was also a higher effectiveness among Polish companies resulting either from more traditional beer production cycles or restructuring needs in the Czech Republic. Incorporating sustainable growth rate into the strategic analysis and in the decision making process of a new strategy implementation may enable companies to increase their cash sufficiency and the creation of added value.

Adding three new dimensions to the sustainable growth rate analysis would be necessary. Firstly, one should analyze how to apply the sustainable growth concept to minor companies which operate in a mature market. In this case, calculations based on aggregated financial parameters would not be possible, therefore the sustainable growth model could lose its allure. Secondly, in some cases the corporate growth could be achieved only via acquisition and there is a need to know how acquisitions affect the sustainable growth rates. Thirdly, from a global corporate perspective, a complete analysis of all strategic business units (SBUs) of sustainable growth rates and their capital requirements would build an interesting case of "internal" capital market where each SBU competes for a capital that could be provided from corporate global activities.

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Competitiveness of Agrarian Areas in the Stavropol Region

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Abstract

Regional development is determined by possessing specific competitive advantages and their constant improvement. The problem how to increase competitiveness of the areas remains one of the most important for the agrarian sector. Russian economic policy aims at the stable development of the agro industrial complex (and agriculture as its central part). Therefore it is necessary to analyze competitiveness not only on the country level, but also on the regional and sub-regional scale. In this paper we have analyzed the major factors influencing the competitiveness of agricultural areas in the Stavropol region.

Key words

Competitiveness, agrarian areas, Stavropol region, regional and sub-regional scale.

Anotace

Regionální rozvoj je určen vlastnictvím zvláštních konkurenčních výhod a jejich stálým zlepšováním. Problém, jak zvýšit konkurenceschopnost oblastí zůstává jednou z nejdůležitělších otázek agrárního sektoru. Cílem ruské hospodářské poliky je stabilní rozvoj zemědělsko-průmyslového komplexu (a zemědělství jako jeho hlavní části). roto je nutné analyzovat konkurenceschopnost nejen na úrovni země, ale také v regionálním a sub-regionálním měřítku. V tomto článku autoři analyzovali hlavní faktory ovlivňující konkurenceschopnost zem,ědělských oblastí ve Stavropolském regionu.

Klíčová slova

Konkurenceschopnost, zemědělské oblasti, Stavropolský region, regionální a sub-regionální měřítko.

Introduction

The aim of the paper is to analyse a state of legal regulation of information and communication technologies in the food industry in the CR in comparison with the Community law. To meet the given objective it was necessary to carry out a detailed study of the current publication sources from the area of national legislation and the Community law. The main methods used in the research were primarily an analysis of the legal regulations, a comparison, an abstraction, and a deduction analogy. Primary data sources used were acts, decrees and regulations in the areas of processing and trading of food products in the conditions of the CR.

During the process of economic globalization competitiveness for markets, investments, innovations and new technologies became much more intense not only between commodity producers, but also between the agricultural areas. The prospects for the development of the agricultural areas is conditioned by the availability and constant improvement of competitive advantages for a better participation in the interregional division of labor in order to raise the living standards. The problem of improving the competitiveness of the regions is one of the most pressing challenges now, as will be shown later in this paper.

The problem of the development of competitive rural areas is most directly related with the problem of differentiating competitive advantage in space, the optimal use of available resources, the choice of standards for production based on a demand, the availability of a skilled workforce and of competent

suppliers (Pilipenko, 2005). The identification of the geographic scope of competitive advantage is necessary to determine the main objects of policies to improve the competitiveness of regions. This is especially important for rural areas, because the industry activity for the rural population is agriculture with its apparent limits in the spectral and spatial principles of governance. The spatial aspects of competitive advantages were first considered in relation to the differentiation between countries in the global economy. Later on the study of competitiveness shifted to the study of competitive advantage at the regional level (O Brien, 1992). The South Federal District of Russia (SFD) contains the Stavropol region. The South Federal District of Russia is a very important agricultural production area.

The Stavropol region

The main goal of modern economic policy of Russia is to build effective and sustainable development of agro-industrial complex (AIC), the central core of which is agriculture. The agriculture in Russia is characterized by large scale farming and one of the major suppliers of agricultural products is the South Federal District. The large agro-industrial complex, which is in transition to a market economy is pointed to make significant contributions to fostering the objectives of economic and social revival of Russia. Taking 29.9% of the territory of Russia, it accounts for 13 % of the population. The total production value of all economic activities of the Southern Federal District Organizations amounted to about 3 trillion. rubles in 2007 (CFSS, 2007).

The territory of SFD comprises, see Figure 1, 8 republics, 3 regions (oblasts) and 2 regions (krays), one of which is the Stavropol region - a major commodity producer of agricultural products throughout the country, 47 % of its population is living in 307 rural municipalities.

Stavropol Region has a good economic performance: the volume of retail trade 1.5 %, and the volume products of agriculture 3.1 %.of Russian total. We know that economic growth in

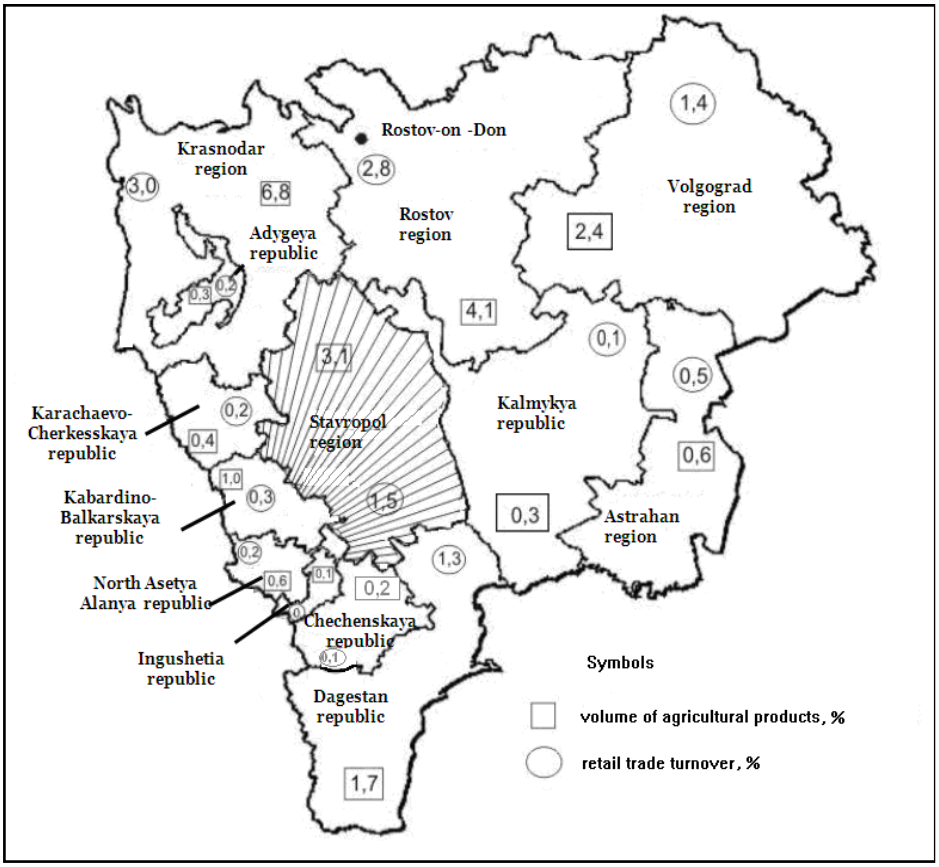

Figure 1: Volume of agricultural products (% of Russian total) and retail trade turnover (% of Russian total), (2007).

the region is dependent on the economic growth of the districts, which is achieved by higher competitiveness. Therefore, the problem of ensuring and enhancing the territorial competitiveness should be the primary objective of research at this moment. As of 1 January 2009 the number of population of the Stavropol region amounted to 2.705 million people, of whom 1.267 million people reside in rural areas (47 %), see Table 1 (CFSS, 2008). Some districts do not have an urban population, and do only have an agricultural focus, such as Alexandrovsky, Andropovsky, Apanasenkovsky, Arzgirsky, Grachevsky and etc..

Currently, the rural areas face a period of stabilization of industrial and social-economic change. Average monthly salary is increasing, farming and small-scale business is developing. However, there are many problems in rural districts, in particular, the growing disparity in living standards between the urban and rural population. As we already know, competitive advantage is the ability to use objective advantages and to produce something exceptional in comparison to others. It is based primarily on the inequality in objective positions of the managing subjects. And of course, it is very interesting to study the factors or variables, which make a particular territory more competitive than another one. The core element of information for decision-making in the field of competitiveness is the data about the behavior of competitors, about their competitive positions. Therefore, the selection of the most important

Districts	**Total numbers of**	**Urban**	**The number of rural**
Alexandrovsky	50109	0	8
Andropovsky	34877	0	11
Apanasenkovsky	34487	0	11
Arzgirsky	26926	0	8
Blagodarnensky	63613	33075	13
Budennovsky	116990	65224	13
Georgievsky	160316	69202	14
Grachevsky	35897	0	8
Izobilnensky	100008	58710	12
Ipatovsky	65805	28133	15
Kirovsky	66515	23014	9
Kochubeevsky	205458	129106	15
Krasnogvardeysky	39974	0	11
Kursky	51555	0	12
Levokumsky	45995	0	11
Mineralovodsky	234210	76712	13
Nephtekumsky	68625	26495	10
Novoalexandrovsky	64329	26538	11
Novoselitsky	25531	0	8
Petrovsky	79285	39491	12
Predgorniy	505103	397160	15
Sovetsky	70910	40475	6
Stepnovsky	22596	0	7
Trunovsky	34408	0	6
Turkmensky	26302	0	11
Shpakovsky	475276	424701	11
Stavropolsky Region	2705100	1438036	281

Table 1: Administrative divisions of Stavropol Region.

variables, in the analysis of competitiveness will be very useful for organizing decisions in the sphere of competitiveness management (Skopina, 2004).

Competitiveness and its indicators

For more information, describing the living standards of rural residents of Stavropol region, we used the data of State Statistics Committee of the Stavropol region on the following indicators in 2006, 2007 and 2008 years:

- population size,
- average number of working-age population,
- wages,
- the average monthly vage,
- financial results for all enterprises and organizations,
- the size of investments in fixed assets,
- size of investment in housing,
- the number of putting into commissioned housing,
- total volume of agricultural products in the trend over the past 3 years,
- production of livestock products,
- production of milk,
- the volume of occupied territory,
- the proportion occupied by the market,
- urban population,
- the number of residents with higher education,
- the number of residents with secondary special education,
- the number of residents with the basic (school) education,
- the number of residents without education.

In order to investigate which of the 21 variables listed above are related to competitiveness, a principal component analysis (PCA) has been applied. The usual criteria in PCA were applied: Eigen value larger than one, loadings on components larger than 0.5 and, theoretically sound labeling of at least the main component. The final result is given in Table 2. The first component is the competitiveness, which explains about 80 per cent of the total variance. The ten variables listed in this table have high loadings (weights) on the first component which can be clearly labeled as competitiveness. Therefore, these variables are used in the subsequent analysis of this paper. Table 3 is based on Table 2, in which the data have been standardized to a common denominator. Table 3 presents all the results, taking into account the formulas used for the process of scaling values. Analyzing both tables we can see that the most important variables are the ones relating to wages, housing and education. The low level of wages has become one of the most powerful and permanent factors of destabilization the socio-economic situation in the country. The level of wages in Russia is the lowest among all developed countries.

This is partly due to differences in the structure of money incomes of urban and rural areas.

The name of the selected variables	Competitiveness	Component two
1. Total numbers of population, persons	0,955	0,250
2. Economically active population, persons	0,892	0,392
3. Total wage, mln. rub.	0,986	-0,153
4. Average wage for one person, rub. for one pers.	0,530	0,578
5. Privet investments, rub.	0,934	-0,227
6. Privet investments for housing, rub.	0,909	-0,392
7. Putting into operation of accommodation, m^2	0,954	-0,261
8. Whole volume agricultural products, mln. rub.	0,809	-0,539
9. Urban population, persons	0,969	0,181
10. Population with higher education, persons	0,898	0,374

Table 2: Competitiveness and the factor loadings of its relevant variables .

Districts	Total numbers of population	Econo-mically active population	Total wage	Average wage for one person	Privet investments	Privet investments for housing	Putting into operation of accom-modation	Whole volume agricultural products 2008	Urban popula tion	Population with higher education
Alexandrovsky	0.057	0.036	0.010	0.120	0.006	0.001	0.001	0.006	0.000	0.038
Andropovsky	0.025	0.003	0.006	0.474	0.008	0.004	0.001	0.000	0.000	0.004
Apanasenkovsky	0.025	0.026	0.011	0.000	0.012	0.000	0.002	0.019	0.000	0.028
Arzgirsky	0.009	0.001	0.003	0.128	0.013	0.000	0.000	0.022	0.000	0.001
Blagodarnensky	0.085	0.043	0.023	0.224	0.020	0.011	0.007	0.026	0.078	0.046
Budennovsky	0.196	0.164	0.085	0.137	0.065	0.025	0.066	0.009	0.154	0.245
Georgievsky	0.285	0.131	0.075	0.293	0.102	0.046	0.046	0.042	0.163	0.219
Grachevsky	0.028	0.043	0.002	0.228	0.013	0.005	0.017	0.001	0.000	0.046
Izobilnensky	0.160	0.104	0.097	1.000	0.024	0.023	0.073	0.020	0.138	0.111
Ipatovsky	0.090	0.079	0.029	0.154	0.041	0.015	0.021	0.016	0.066	0.084
Kirovsky	0.091	0.067	0.024	0.399	0.023	0.032	0.030	0.054	0.054	0.072
Kochubeevsky	0.379	0.345	0.196	0.237	0.363	0.087	0.092	0.189	0.304	0.367
Krasnogvardeysky	0.036	0.025	0.020	0.364	0.088	0.002	0.007	0.089	0.000	0.026
Kursky	0.060	0.041	0.011	0.233	0.001	0.000	0.001	0.003	0.000	0.044
Levokumsky	0.048	0.032	0.008	0.046	0.024	0.008	0.001	0.006	0.000	0.034
Mineralovodsky	0.439	0.362	0.252	0.323	0.493	0.141	0.301	0.034	0.181	0.299
Nephtekumsky	0.095	0.073	0.042	0.473	0.067	0.000	0.003	0.008	0.062	0.077
Novoalexandrovsky	0.086	0.061	0.032	0.269	0.196	0.025	0.029	0.068	0.062	0.065
Novoselitsky	0.006	0.016	0.007	0.234	0.004	0.001	0.001	0.060	0.000	0.017
Petrovsky	0.117	0.078	0.038	0.239	0.025	0.009	0.011	0.026	0.093	0.083
Predgorniy	1.000	1.000	0.437	0.889	0.342	0.175	0.308	0.014	0.935	1.000
Sovetsky	0.100	0.066	0.042	0.400	0.040	0.014	0.010	0.057	0.095	0.070
Stepnovsky	0.000	0.001	0.000	0.064	0.000	0.001	0.001	0.008	0.000	0.001
Trunovsky	0.024	0.020	0.011	0.266	0.015	0.004	0.010	0.083	0.000	0.021
Trunovsky	0.008	0.000	0.002	0.057	0.002	0.005	0.001	0.014	0.000	0.000
Shpakovsky	0.938	0.651	1.000	0.557	1.000	1.000	1.000	1.000	1.000	0.693

Table 3: Data taking into account the formulas of the translation for each indicator.

In particular, for urban residents the wage is the most significant kind of personal income. The greatest share in the structure of the monetary component of the budgets of rural households is the revenues from the sale of products produced in households. Also, this is due to the fact that the majority of the rural population is employed in industries with low wages - the agricultural and processing industry. As a result, in recent years, the average monthly wages of city residents has exceeded the average wages in rural areas by more than 70%.

Increasing wages and putting into operation of accommodation will help to alleviate the problems of the population in the socio-demographic sphere. It will positively affect the growth of the competitiveness of rural areas and, therefore, the Stavropol region and the whole country.

A prominent role in enhancing territorial's competitiveness, as shown by the data obtained, are the variables associated with the level of education. Raising the educational level of people is directly linked to improving the quality of life. Illiteracy hinders the development of public private sector and the economy as a whole.

Using existing statistical data, we found that a significant part of the population of the Stavropol region have not attended higher and secondary special education, which in turn limits the ability of people to make the right decisions for their financial health in the future. Improving the literacy level has become a public task and should be regarded as one of the priorities of our state. Unfortunately, the statistics do not provide an indication of the quality of education. The growth of the educational level of the population is the most important condition for the formation of an agent in the labor market. Education expands the possibility to using the ability of people to find a job. It allows them to correctly assess the situation, to make a decision and to implement it. This is illustrated by the experience of countries with developed market economies.

Typically, than the higher the educational level of the population, the lower the level of the unemployment rate. The role of education in achieving sustainable socio-economic development, in the growth of competitiveness of country and strengthening of their position in the world market and world economy is constantly increasing..

The competitiveness of the Stavropol districts

Based on the existing data and the use of a deterministic method for pattern recognition, the levels of competitiveness for all municipalities of the Stavropol region were established. The more similar numbers among the competitors in the market, the greater the competition between them, and in our case, as shown in Figure 2, we can see that the difference between the level of competition is very significant from 0.004 to 0.778 units.

We have divided the areas of analyzing in four groups according to the degree of competitiveness: (from 0 - up to 0.1) - less competitive (areas with low level of competitiveness), (from 0.1 - to 0.2) - competitive areas (areas with medium level of competitiveness), (from 0.2 - to 0.3) - more competitive areas (areas with a high level of competitiveness), (from 0.3 - to 1.0) – market's leaders (districts with a very high level of competitiveness).

Noteworthy to mention is that the some of districts are desperately competing with each other - areas like Georgievsky (0.128) and Izobilnensky (0.123), Kochubeevsky (0.238) and Mineralovodsky (0.254) and etc.. The leading position is occupied by the Shpakovsky district. This indicates that the Shpakovsky district is the most competitive and likely to have better living conditions than its competitors. The highest level of income is in the regional center (Shpakovsky district).

Among the rural areas are the most higher earnings in the near suburbs and in the districts the most productive in agriculture and advanced processing of agricultural raw materials (Izobilnensky, Kochubeevsky, Mineralovodsky districts). The worst performance is to be seen in the peripheral districts with less favorable economic and natural-climatic conditions (Apanasenkovsky district on the border with Kalmykiya, Arzgirsky district, Soviet district, Levokumsky district, Trunovsky district) or unsafe neighborhood with Chechnya (Kursky district).

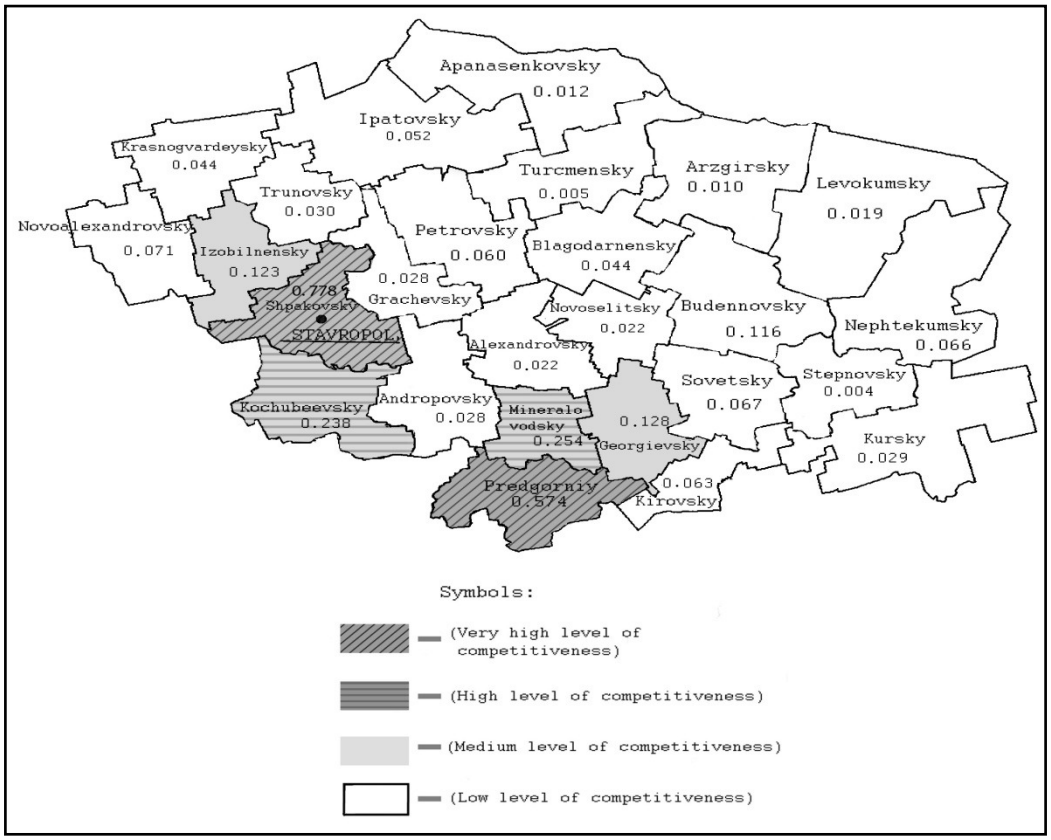

Figure 2: Ranking of districts by the level of competitiveness within the taking into account the 2008 value of the indicators.

The greater competitiveness of the Stavropol is built up by a system of connecting of its districts with other territories participating in overall business and trade. Over the last decade as a result of the sharp decline in agricultural production and worsening of the financial situation of the agricultural sector, the disparities between village and town have increased with respect to favorable conditions of life. One of the reasons for the economic poverty in rural areas is the lack of domestic agricultural production and its weak adaptation to the globalization process (Skopina, 2004).

Conclusion

Variables related to education, housing and wages are the most important factors improving the competitiveness of a region.

The most competitive districts are small in numbers - 2 out of 26. Therefore, in order to increase the level of territorial's competitiveness of the Stavropol region, it is necessary to pay close attention to the formation of a favorable climate of life for the rural residents, those districts that are less competitive.

Thus, to achieve a higher level of the competitiveness of the Stavropol region, a more substantial and sound public policy is needed for those districts which do not have a shortage of skilled manpower, lack financial support and, moreover, are faced in the worst weather conditions. Otherwise they would not be able to survive the competition and will disappear from the market space and, thereby, lose its appeal.

There is need to further develop a methodology for determining the level of competitiveness of regions and districts that will help, firstly, to identify the priority districts for ensuring the competitive agricultural production, which in turn will increase the level of socio-economic development of the whole region. And, secondly, this methodology will help to determine the potential, prospect and the opportunity for regional policy.

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IT for more effective team collaboration

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Abstract

ICT bring new possibilities in support of team cooperation, above all in creation and sharing of common content. On base of comparison of various systems for support of the cooperation it was found out that some systems purposefully solve a flow of time planning in a firm environment (e.g. Novell GroupWise), others supports in various way a cooperation in common contents space (discussion groups, Wiki, WCMS). Changes in approach to cooperation management appear in the social network. A substantial phenomenon of the present systems for cooperation support is their virtuality. The common space is „somewhere“ and a user can share (use) it from anywhere, if he/she is connected to the internet. An example still more often used is Google Apps.

Key words

Collaborative software, groupware, GroupWise, Moodle Forums, Wiki, CMS, social networks, Google docs.

Anotace

ICT přinášejí nové možnosti při podpoře týmové spolupráce, a to především při vytváření a sdílení společného obsahu. Na základě porovnání různých systémů pro podporu spolupráce bylo zjištěno, že některé systémy řeší cílevědomě tok plánování času ve firemním prostředí (např. Novell GroupWise), jiné podporují různě spolupráci nad společným obsahovým prostorem (diskusní skupiny, Wiki, WCMS). Změny v přístupu k řízení spolupráce se objevují v sociálních sítí. Podstatným jevem současných systémů pro podporu spolupráce je jejich virtualita. Společný prostor je „někde“ a uživatel ho může sdílet (využívat) odkudkoliv, pokud je připojen k internetu. Příkladem, který se stále častěji využívá, jsou Google Apps.

Klíčová slova

Software pro podporu spolupráce, groupware, GroupWise, Moodle Forums, Wiki, CMS, sociální sítě, Google docs.

Introduction

Information and communication technologies (ICT) bring new possibilities not only for the written and visual communications (e-mail, chat, videoconference, voiceIP, etc) but also for the collaboration of people.

Collaboration of people is a fundamental factor in the success of every team, community or the whole society. Systems with different degrees of sophistication that are used for the support of collaboration of people have been developed. These systems serve, first of all, for the creation and sharing of a common content. The basis for collaboration is always common space, e.g. a boardroom, chalkboard, flipchart or a shared database. The essential feature of collaboration is the fact that this space creates the necessary medium for the exchange of knowledge and of the common unstructured data. The collaboration space creates the framework within which the total value of knowledge exceeds the mere sum of knowledge of individual participants.

Modern ICTs make it possible not only to create and manage these common spaces (shared databases) but they, in particular, make it possible to create independent virtual work teams and their mutual communication. The user links up with a particular team, shares knowledge with it and participates in the solution of a certain task.

The authors of this article focus on what systems for the collaboration support are best for a given team, and they also search for the answer to the question of why 80-90% of the young generation are using social networks such as Facebook or Twiter, while the older generation generally rejects this solution and considers it to be a "technological bubble".

Aims and Methodology

The aim of this article is to provide a detailed evaluation and comparison of selected systems (technologies) from the viewpoint of the collaboration support and to point out their advantages and disadvantages. The aim is also to evaluate in a synthetic manner the various approaches and formulate recommendations for their use. In order to provide effective management, an analysis and evaluation of the trends in the use of the systems is essential. Successful teams utilize rationally the new systems of management, which are appropriately supported by ICT. Literature resources and experience acquired at the Department IT CULS Prague have been used in this study.

Results

The systems for the support of collaboration (collaborative software or groupware, or group support systems) represent software which can significantly assist the solutions of different tasks.

Each system for the support of collaboration supports to a greater or lesser degree three basic functions: coordination, cooperation and communication. The following selected systems for the support of collaboration have been analysed: Novell GroupWise, discussion groups – Moodle forums, Wiki, Web contents management systems (WCMS), social networks and Google Docs. The actual evaluation and comparison of the functionality of the different systems is provided by means of the tables which have been methodically based on Table 1 as a template.

GroupWise workflow

The GroupWise product (the Novell Company solution) has been used at the Czech University of Life Sciences for several years as a basic postal system. It is the most widespread, efficient and very safe alternative to the MS Exchange system. As the GroupWise name indicates, the functionality is much wider here – it is a comprehensive platform for team collaboration (communication of individuals, teams, support of projects solution, checking tasks, sharing information, resources, means and data).

Due to the use of the open source solution and respecting of open standards, its operation is not linked to specific types of equipment or operational platforms of individual users – team members (Windows, Linux, MacOS). Likewise, its operation is not limited by the work location of the user (classical, web or wireless client). The GroupWise system can be operand on standard network server operation systems (Windows, NetWare and Linux - SUSE, Red Hat). The users identity is verified against the Novell eDirectory and the system supports all important standards such as SSL (Secure Sockets Layer), S/MIME (Secure Multipurpose Internet Mail Extension), PKI (Public Key Infrastructure) and TLS (Transport Layer Security) in the same way as against the other data directory services with the LDAP support.[5]

Function	Activity	Explanation
Coordination - teamwork	Management of collaboration	Options for the management of people – e.g. monitoring their tasks according to a schedule
Cooperation	Creation of common space, mostly of the knowledge database	Creating and updating of databases of structured and unstructured data
Communication	Online or offline communication	Access to the shared space, possibility of mutual communication

Table 1: General comparison of the functionality of collaborative software.

High security and the overall functionality under a heavy workload in the demanding university environment was also the main mason for the selection of this system under the condititons of the Czech University of Life Sciences.

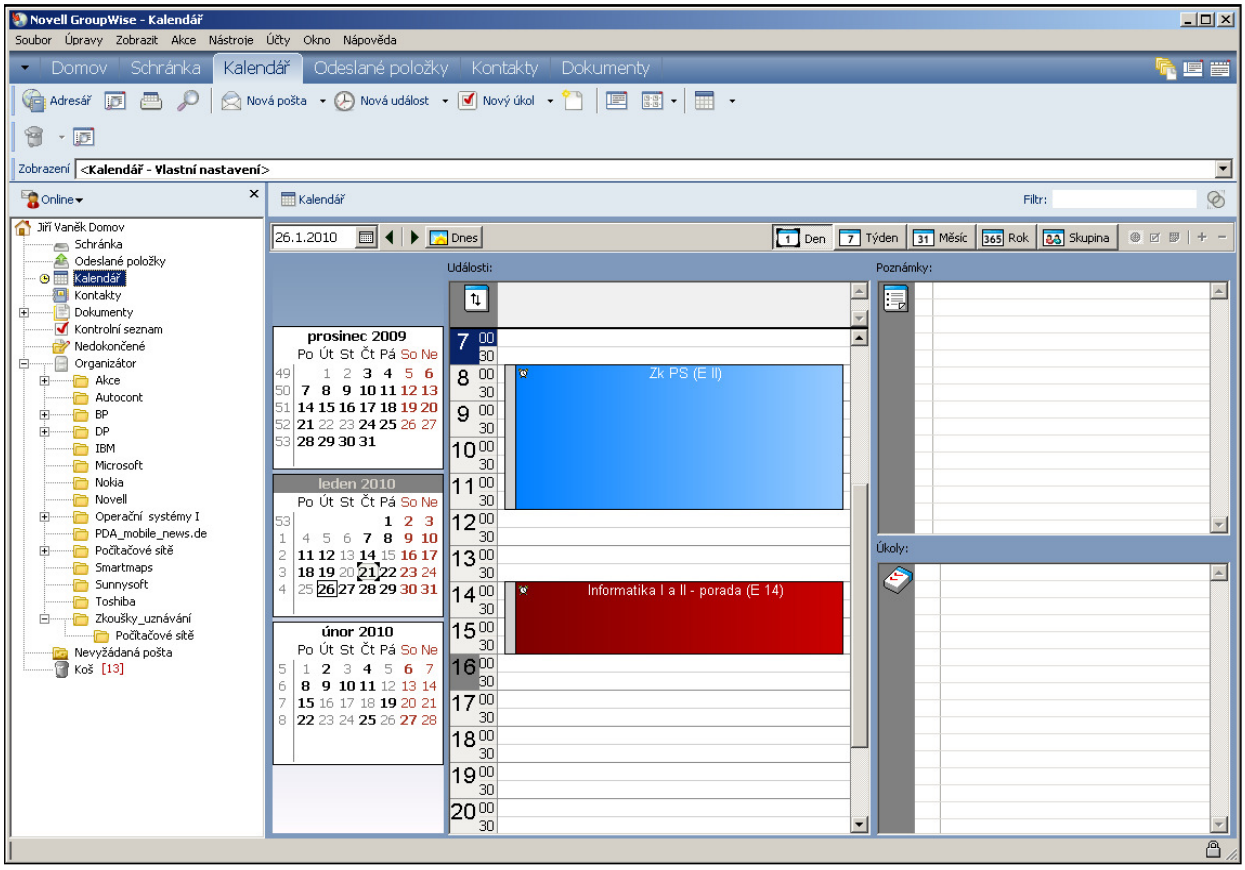

Figure 1: A classical desktop of the GroupWise client at the CULS Prague (calendar – mail box – notes - tasks).

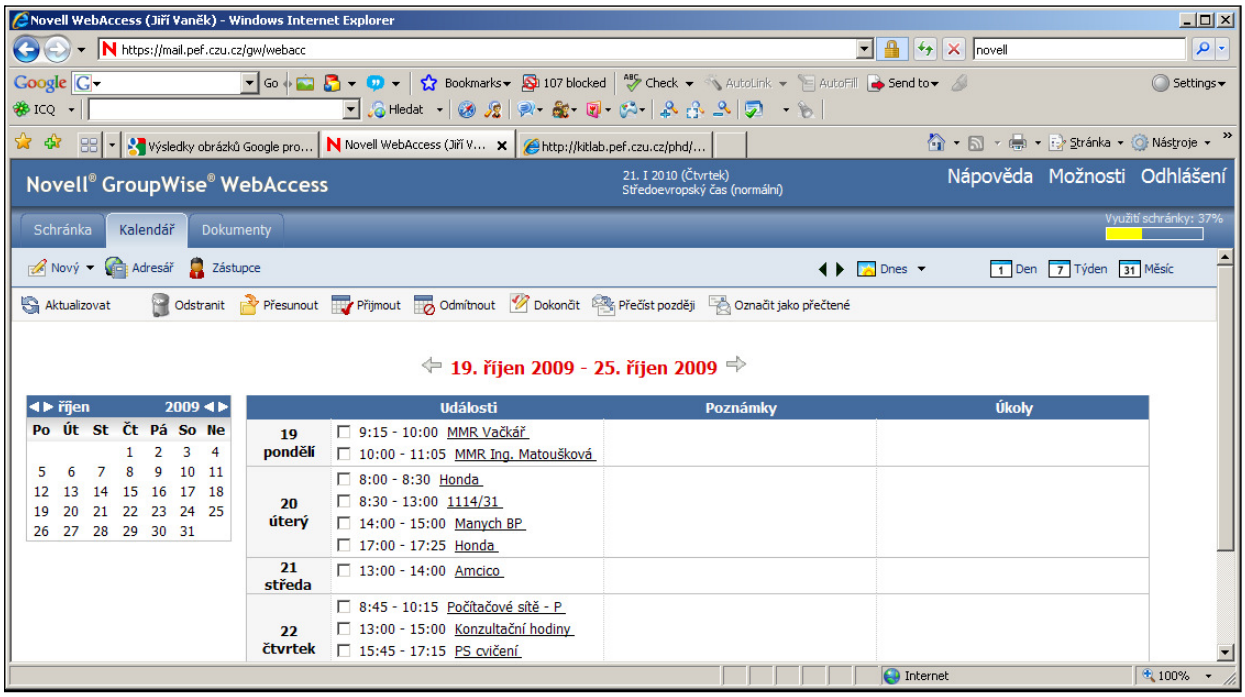

Figure 2: The CULS Prague WebAccess application of the GroupWise (calendar).

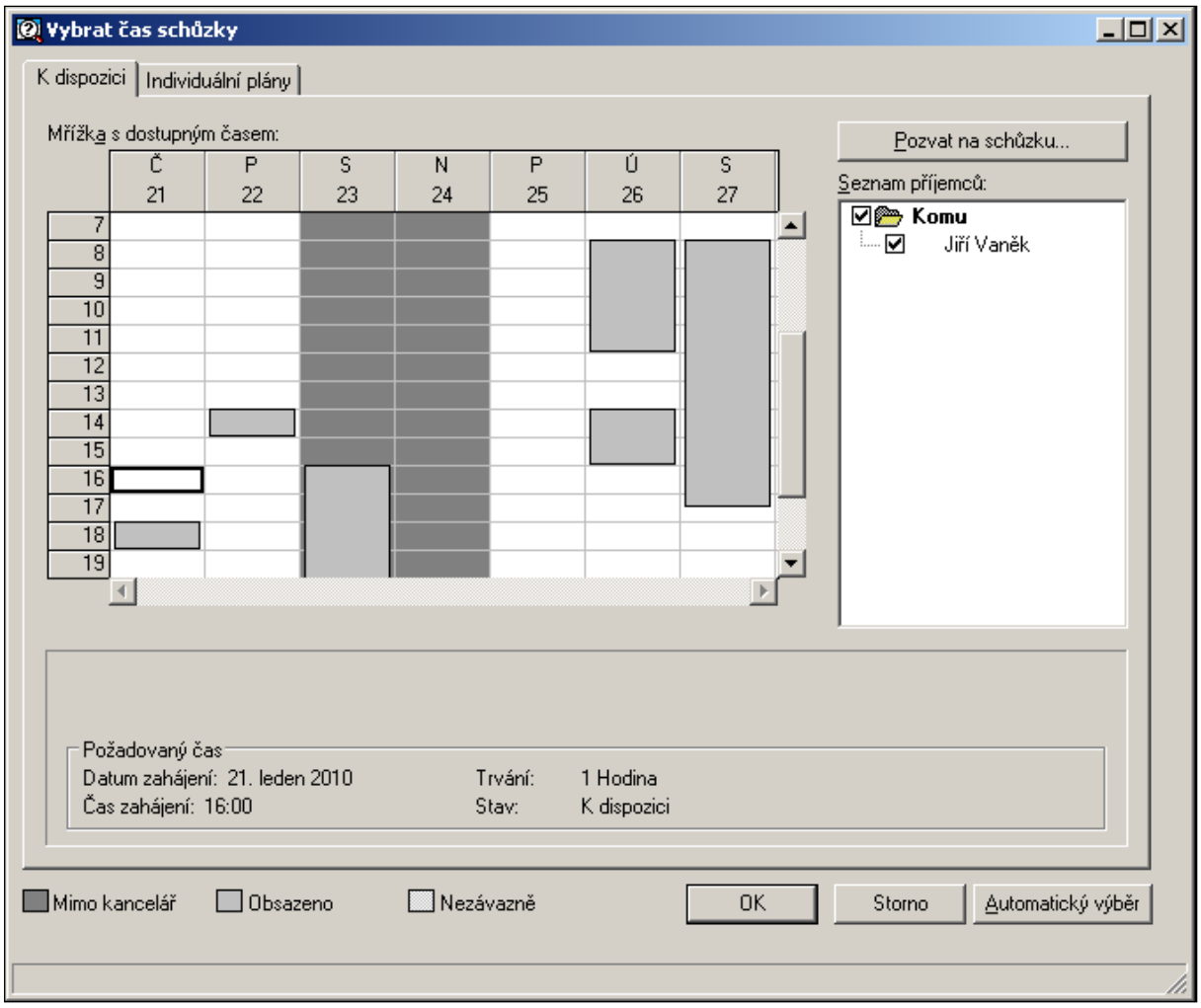

Figure 3: GroupWise planned appointment (meeting) – a shared calendar.

Function	Activity	Evaluation
Coordination	Transfer and sharing of information and resources between project leaders and team members regardless of where they work (theoretically in real time)	Information at the right place and at the right time. Detailed modelling of the organizational structure (real as well as virtual teams), rights and group rights.
Cooperation	Providing accessibility and sharing of resources, planning activities, planning resources, delegating tasks and authorities, checking deadlines, management of documents and their versions.	Support of team collaboration, including the use of social networks principles (blogs, wiki, shared and personal work spaces).
Communication	As a standard it is online by means of a classical desktop of the client, alternately by means of the web interface, or with the use of a wireless client.	Emphasis on security, without limitation by the HW platform or by the operational system of the work stations, support of mobility. There is no limitation by the operational system of the server.

Table 2: Evaluation of GroupWise (workflow) technology.

Result of GroupWise

GroupWise represents a comprehensive commercial tool for team collaboration which is an interesting and fully comparable alternative for the MS Exchange systems or Lotus Notes. Its advantage is in the central management of users and their access rights. It enables a controlled flow of the messages transfer. To some extent the software installation at the client side end is a disadvantage.

Discussion Groups (newsgroups) are a tool which assists in communication (discussion) with other users on specific topics. Within the framework of the LMS Moodle system, the so called forum is available to participants of every course. The forum is a virtual space for inquiries and exchange of views. The course participants can ask questions to which teachers as well as other students can respond. It is possible to create the so called thread – thematic areas, which then enable other students to find answers to previously discussed issues.[9]

Discussion Groups – Moodle forum

Result of Discussion Groups

Discussion Groups are a suitable tool for an informal exchange of views. However, if the exchange is not managed the discussion group can become congested and non-transparent.

The Wiki technology

Wiki is a technology for the content creation – or, more precisely, for the creation of hypertext documents which make it possible not only to add content in a similar manner as that in the discussion groups, but they also allow changing (updating)

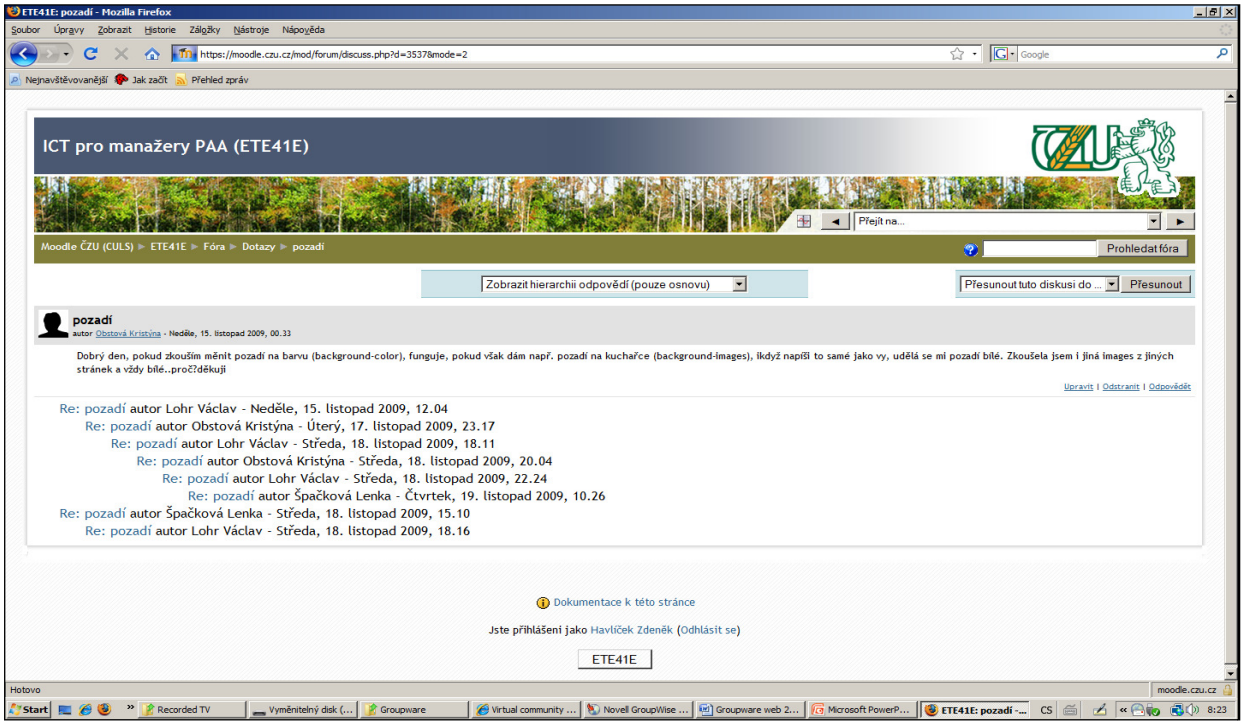

Figure 4: Forum on moodle.czu.cz.

Function	Activity	Evaluation
Coordination	All participants have the same rights.	Only the teacher can delete entire thread
Cooperation	Shared space for storing short messages, enquiries and replies	The shared space is well arranged
Communication	Communication is offline and operates only amongst the participants of the course	Participant can receive notice of a new contribution

Table 3: Evaluation of the Discussion Group (Forum) technology.

existing content. Collective creation of the content is provided by means of markup language and access to wiki is possible via any browser. The Wiki technology is generally known through the Wikipedia application. Wikipedia (a combination of the words wiki and encyclopedia - Wiki wiki means "quick" in Hawaiian) is a multilingual web encyclopedia which is being generated by the cooperation of voluntary contributors from around the world. Its aim is the creation and worldwide distribution of freely available encyclopedic information. Wikipedia exists in more than 250 language versions. The Czech version contains more than 140 000 articles.

Wiki, as an open source software, can be used for sub-applications. It has been used at CULS Prague for several years for the processing of the project teams documentation within the framework of the course unit Internet Technology.

Result of Wiki Technology

The Wiki Technology is suitable for creating a structured content. Users can easily update the generated content. Part of Wiki is also the management of the users and versions of the content.

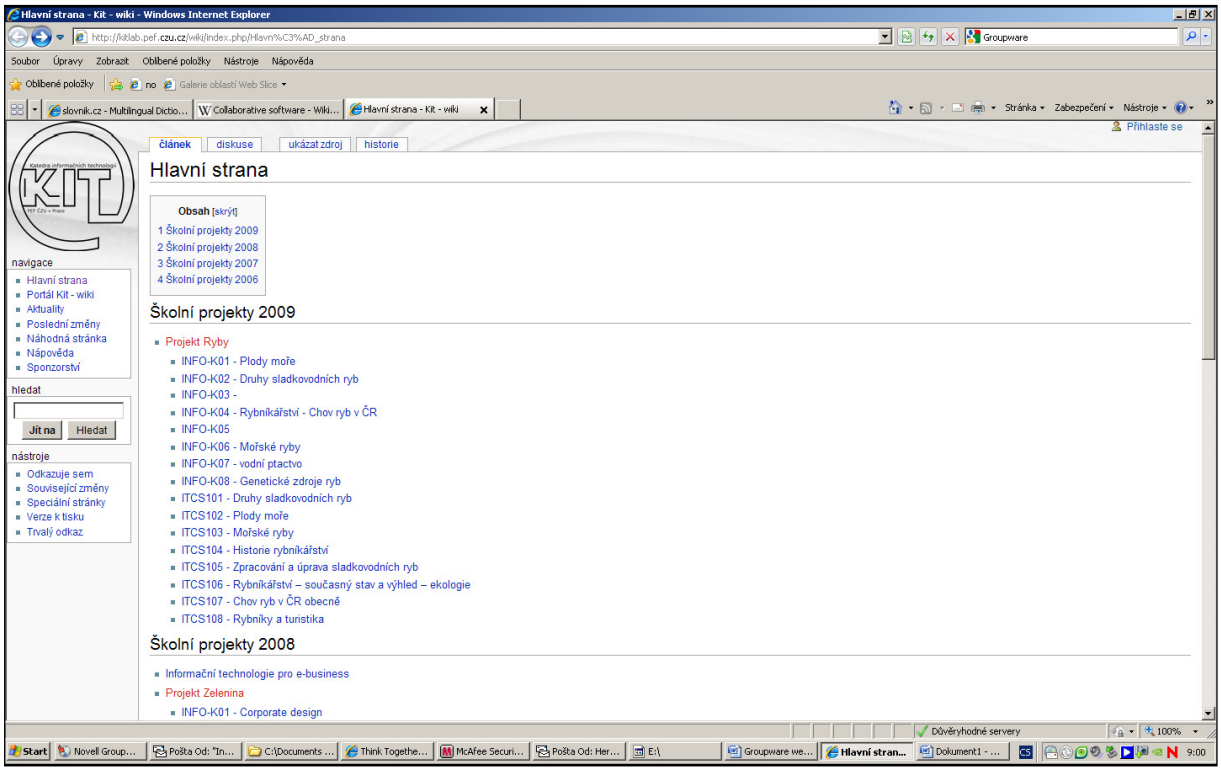

Figure 5: Wiki application at the DIT, CULS Prague.

Function	Activity	Evaluation
Coordination	All participants have the same rights .	The system manager only supervises and usually does not interfere. Wiki avoids obligatory registration procedures.
Cooperation	Shared space for editing and inserting content	Shared space can be easily updated and supplemented
Communication	Communication is off-line	Communication is generally anonymous, but it is possible to set the rights (limitations) for individual users

Table 4: Evaluation of the Wiki technology.

Content Management Systems

CMS (Content Management System) represent the software for the management of documents. It's most frequent use is in the area of the web content management, where the letter W is added before the CMS abbreviation, i.e. WCMS. CMS can also be described as an editorial or publication system. Its main functions include editing and publication of documents which usually takes place in WYSIWIG (What you see is what you get) of the text editor. The management systems make it possible to publish important information (documents, tasks) on www. At the same time the published content can be classified for different audiences (marketing, management, businessmen, etc).

In respect of its functionality each CMS has two parts: the users interface (frontend) and the administrator interface (backend).

The basic administrator functions of CMS include:

- publication of documents (articles),
- administration of users, including the management of access rights to the documents,
- administration of files (documents, images or galeries),
- management of modules which can include e.g. discussion forums, chats or calendars.

There is a great range of selection from amongst the CMS systems. Many CMS's are offered as free software but often various commercial solutions are being offered. Systems for the administration of contents vary by their range, purpose of use and technology. The most frequent combination of applied technologies is the PHP programming language and the MySQL database.

Examples of WCMS systems which are distributed as OSS (Open Source Software):

- E-learning – LMS (Learning Management System) - e.g. Moodle system,
- Communication tools, e.g. Wordpress which aims predominantly at creating and administration of personal pages and blogs. It is a multiplatform publication system which is based on the GNU GPL licence. Its advantages include easy operation, simple administration, easy distribution and output quality,
- Commerce – e.g. the Joomla+ ZenCart system used for administration of a small electronic shop.

Result of WCMS

Web Content Management System (WCMS) are suitable for publication and updating contents on www and sharing views on published content. The systems usually use a variety of graphic templates.

Social networks

Social networks represent specific environment for their users. They concern a location in which communication and presentation of views takes place. Social relationships are created here and to a certain extent the user lives here. A social network can also be a source of ideas and can contribute towards sharing and creation of knowledge.

The social networks bring a possibility of profit for their user. The users have their wishes, requirements, they get informed, but they also shop. The social network has a potential for using

Functionality	**Activity**	**Evaluation**
Coordination	Managed publication of messages	Easy updating of the web content
Cooperation	Minimal, only through discussion groups and chats	Shared space is used predominantly by administrators
Communication	Communication can be online – chats or in the form of discussion group	Communication is focused towards the published content

Table 5: Evaluation of the CMS.

targeted advertisements. The operators have a relatively great quantity of information about their users and direct marketing in this environment gets a new shape.

From 2008 to 2009 there was a repeated statistical survey which concerned the knowledge of students in the area of social networks.

The surveys of the world social networks of Facebook, LinkedIn and MySpace show that between the two years the awareness of the Facebook social network experienced the fastest growth – by more than 65 percentage points. That means that Facebook isnow known by practically all students. The percentage of users of this social network has grown to the value of 72, that is almost three quarters. Usage of the Czech social networks has experienced a significant fall.

The most frequently used network of the students – Spoluzaci.cz (= fellow-students) dropped by almost nine percentage points, while the other networks were also weakening. In the second place there was the only more important network which boosted its strength – Rajce.net (= tomato). It is practically a specialized network for sharing photographs. Its growth is probably due to its specialisation, simplicity of use and usefulness.

Result of Social networks

Social networks are a suitable platform for an exchange of views and for making contacts with other people with similar interests. Sharing the contents ranges from easy to dangerous.

Technologie Google Docs

The new technologies from the Google Company include several web applications (which are described as Google Apps), the functions of which are similar to those of the common office applications. Google Docs is the best known one.

This technology serves the individual as well as collective creation, editing and sharing of documents (texts, spreadsheet files, presentations and questionnaire forms). Any registered user of Google services can use them free of charge without the necessity of having to install anything

on their computers. The only condition is having a browser with permitted JavaScript. Google Docs can cooperate (import and export) with the most widely used text editors (Open Office, MS Office) and provides very similar options (basic functions and formatting).

The advantage of Google Docs is the option of a number of users being able to work on the same document simultaneously (changes are dynamically displayed on the screens of all simultaneously working editors). Another advantage is the option of an easy publication of the resulting document on the Internet. Due to the increasing number of options Google Docs is also becoming an alternative for the common text editors, spreadsheets and presentations.

Function	**Activity**	**Evaluation**
Coordination	Creating networks (groups)	Every participant can join some network (group). Management within the framework of a group is minimal.
Cooperation	In groups. Every participant has “friends“	Groups are virtual and the published content can be misused
Communication	Communication is very easy and direct	Communication is sometime supported by amusing elements and advertising

Table 6: Evaluation of social networks.

Function	**Activity**	**Evaluation**
Coordination	Collaborating team generates documents	Whoever creates (starts) a document can give rights to other participants for updating the content
Cooperation	Creating a joint document	Changing the document is accessible to all co-authors

Communication	Communication is very easy by means of the web browser	Communication (editing documents) is similar to that in the common text editors

Table 7: Evaluation of the Google Docs technology.

Result of Google Docs

Google Docs technology is suitable for the creation, editing and sharing of various types of documents. It brings the greatest advantages for team collaboration on the same document. The users interface is similar to that in the common office applications.

Conclusion

On the basis of analytical comparison of several typical products from the area of the systems for the support of collaboration it is possible to present the following conclusions – recommendations.

Ever more frequently there are tendencies towards the shared data spaces being saved "somewhere", but we do not know where. However, we have access to these data anytime and from anywhere. The so called clouds are being formed, abstract places with many computers which are distributed at many locations. The network applications, such as Google Docs or Microsoft Live Mash, require from the user's end only a quality Internet connection, but the saved data are not quite under the control of the users.

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Product	**Advantages**	**Disadvantages**	**Recommendation**
Novell GroupWise	Central administration of users and their access rights. It enables a managed flow of messages transfer	Disadvantage for a full use of the system is the necessity of having to install the software at client side	Comprehensive commercial tool for team collaboration. Similar to MS Exchange or Lotus Notes
Discussion groups – eg. Moodle Forum	Tool for an informal exchange of views	Unmanaged discussion group can become congested and messy	Standard tool for exchange of views
Wiki technology	Technology for the creation of structured content and its versions	It is necessary to ensure administration of users to prevent documents deformation.	Open Source product for the creation and publication of contents (eg. Wikipedia)
Systems for administration of content (WCMS)	For the publication and updating of content on www and sharing views on unpublished content. Systems usually utilize a variety of graphic templates.	A great range of a variety of products in many different versions.	There are several WCMS's (eg. WordPress, ZenCart) which are used for the creation and updating web sites.
Social networks	Platform for exchange of views and establishing contacts with other people with similar interests.	Sharing content is easy, sometime dangerous or can be misused.	Social networks are first of all a popular communication environment for the young generation. They are gradually becoming part of business.
Google Docs	For the creation, editing and sharing a variety of types of documents.	Nobody guarantees the content will be archived.	For team collaboration on the same document.

Table 8: Systems for collaboration - the final summary.

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Quality Evaluation of Electronic Data Exchange System between Business and State Authorities

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Abstract

The paper presents a new view of quality evaluation of a system of electronic data exchange between a business and government. A method for evaluation of the electronic data exchange system between a business and state authorities is presented in the paper. The method is called CBG (Communication between Business and Government). A goal of the CBG method is to evaluate the system of electronic data exchange between a business and state authorities, not only to evaluate applications such as an electronic data box or an electronic submission of tax. A pilot version of the CBG method provides a tool to evaluate and measure important attributes of the electronic data exchange system between businesses and state authorities.

Key words

Electronic data exchange, state authority, evaluation of quality, attribute, method.

Anotace

Příspěvek představuje nový pohled na možnosti hodnocení kvality elektronického systému výměny dat mezi podnikem a státní správou. V článku je navržena metodika hodnocení kvality elektronické výměny dat mezi podnikem a státní správou — metodika CBG (Communicaton between Business and Government). Cílem metodiky CBG je ohodnotit celý systém elektronické výměny dat mezi podnikem a státní správou, nikoliv jednotlivé aplikace, jako jsou např. datové schránky nebo elektronická podání. V pilotní verzi metodika CBG poskytuje možnost ohodnotit a změřit důležité atributy, které popisují fungování systému výměny dat mezi podnikem a státní správou.

Klíčová slova

Elektronická výměna dat, státní správa, hodnocení kvality, atribut, metodika.

Introduction

Since recent time, businesses have increased an effort to use electronic workflow and electronic exchange of documents among businesses. There are clear contributions in doing that - savings of time and costs on paper document workflow. On the other hand, issues of security, archiving and storage of electronic data need to be solved.

Bodies of the Czech state authorities have started to offer a modern way of electronic communication with enterprises and individuals, for example a network of checking and submission spots (Czech POINT), or an information system of data boxes, electronic submissions at different state offices and other ways. Enterprises can also communicate with state authorities by means of a common electronic mail or download, and fill forms at a website of state authority. All communication channels constitute a system of electronic data exchange between an enterprise and a state authority. It is wanted to make a qualitative evaluation of such a system.

Material and methods

A goal of the paper is to analyze choices of evaluation of quality of the electronic data exchange system between an enterprise and state authorities.

A basic platform is a literature overview and an analysis of state-of-the-art of electronic

communication between an enterprise and state authorities. There is an analysis of techniques of quality evaluation of a software and an information system. After synthesis of theoretical facts and expert suggestions, the method of evaluation of quality of the electronic data exchange system between an enterprise and state authorities is proposed. The method is to be checked in one practical example.

Electronic communication of business

There are several levels of the electronic communication. A company usually communicates with:

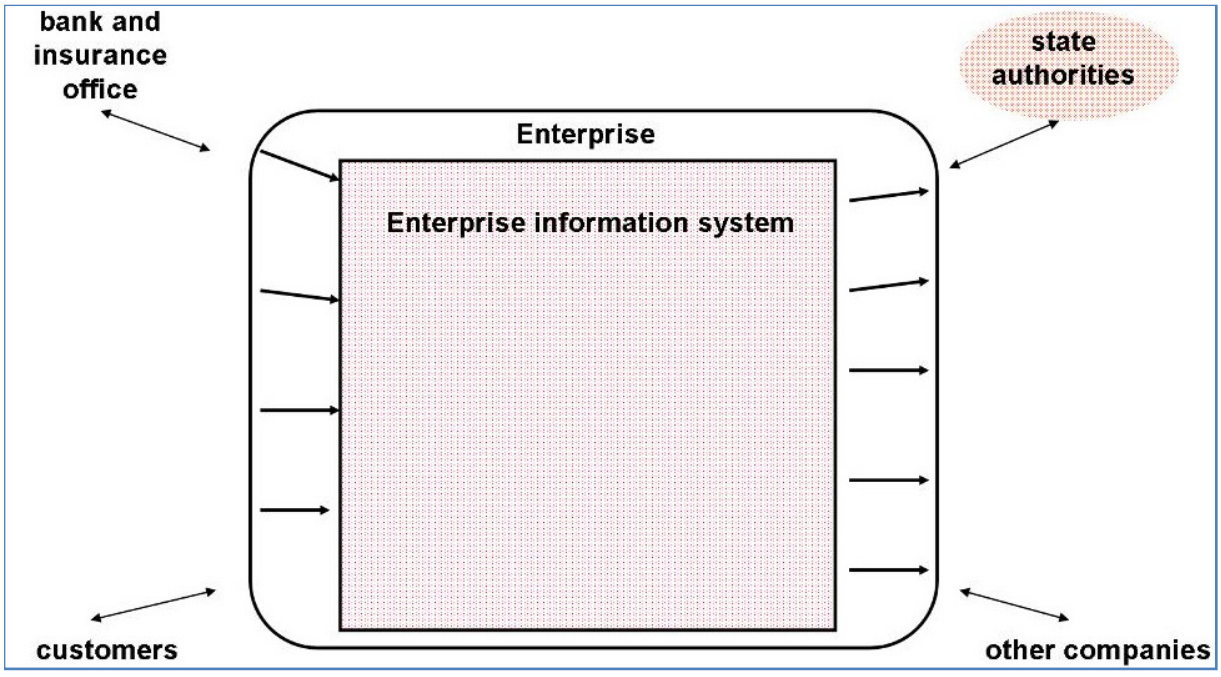
- internal;
- other companies;
- customers;
- state authorities;
- bank and insurance offices.

Each level of communication has some differences that have to be accepted by a company. For example, a communication of company with a tax authority has to comply with the law and notices. When the company communicates with a costumer, it must accept a form of the communication that is expected from the costumer.

The current state and level of a communication between a company and state authorities is described in a research of the Czech Statistical Office [1] and Peterka [2].

The extent of the electronic communication among businesses (B2B, Business-to-Business) is very dependent on a size of business. While the smallest companies utilize the electronic communication B2B in less than 19 percent, the largest companies in more than 60 percent, as states Peterka [1] in an analysis of data exchange among enterprises in the Czech Republic.

In January 2009, 66 percent of companies responded that they communicated with the public administration through the Internet in 2008. The communication with the public administration through the Internet was mostly used by large companies (more than 250 employees) in 96 percent. On the contrary, small companies (from 10 to 49 employees) used the Internet towards the public administration in 59 percent. Generally, the smaller company, the lesser is the involvement in the electronic communication with state authorities [1]. The paper introduces a procedure how to evaluate the communication between a business and



Source: Own source

Figure1: Levels of communication of business.

state authorities. The authorities include all organizational units of the state that are listed in a methodology of the Czech Statistical Office in a research of usage of the information and communication technology in a public office in 2008. The organizational units are: ministries, courts, prosecution, labour offices, offices for surveying, mapping and cadastre, hygienic site services, state veterinary administration and a few other [1].

Quality evaluation of electronic data exchange

In general, the business process is a sequence of activities that transform input and measureable resources into output. The output is added with a value. The resources are: money, people, knowledge, other intangible assets, other processes' products or products and services purchased outside the company, machines and equipment, ICT, buildings, other tangible assets and energy.

The process can be classified either as a main process or as a subsidiary process. The main process leads to fulfilment of business goals and creates an added value that is paid by a customer. It is a sequence of activities that starts from a customer's requirement to its satisfaction and payment. Subsidiary processes can be supported even externally without a threat to the business. An internal support of the subsidiary processes is used either to prevent a risk, or to reduce costs.

The electronic data exchange is a subsidiary process according to characteristics stated above. The process is conducted between two companies or between a company and a state authority. Under the process of electronic data exchange, ICT resources and working hours of people are consumed, while a data message is transmitted. The result is an electronic delivery of data. An added value is time and cost savings that would be spend if the data exchange were not conducted electronically.

Companies want to get the best business process performance which means to perform activities with the lowest possible costs and at the same time with the best possible value for a final customer. The measure of performance and quality of the process is a subject matter of a business process management (BPM).

Electronic data exchange is conducted by means of ICT, i.e. software and hardware. Software and hardware are generally products and they can be evaluated as products from different points of view. A set of all significant product characteristics and a degree to which they fulfil requirements are called quality. An evaluation of quality of the software is a subject matter of a special scientific discipline. Vaníček [4] mentions also a quality in use of software product besides the quality of a product. Then it is possible to measure a quality of the process of electronic data exchange as the quality in use.

The measurement of the product quality or the quality in use always regards requirements of a user of the product.

The standard ISO 9000 [3] specifies a requirement as a need or expectation that is: a) stated, b) generally implied, c) or obligatory (e.g. according to a legal act). Special requirements are described in a document, for example in a purchase contract. The phrase "generally implied" means a common practice in a company, of a customer or other interest groups. Requirements have to be generated from real needs of the interest groups.

Requirements are stated in a form of required value of a measure of each attribute that is called an indicator. Then, a real value is measured and is compared to the required value of the measure. Results of the comparison are aggregated into a final evaluation. The final evaluation of the quality can be stated for example in an ordinal scale that represents the quality as: excellent, good, sufficient and insufficient.

The software quality measurement is a subject of international standards ISO/IEC 9126, 14598 and 12119. All three norms were accepted by the Czech Normalisation Institute as CSN norms. The paper written by Vaníček [4] describes three different views of the software quality evaluation:

1. External quality, as a measure of satisfaction of requirements of a product user. It can be measured after the product is finished.
2. Internal quality that is given by characteristics of a software product during its implementation. It predicts its quality into the future.

3. Quality in use that evaluates a quality of process of the product use after its implementation.

The quality is divided by ISO/IEC 9126 into six different categories called quality characteristics.

FUNCTIONALITY: is an ability of a product to ensure required functions (it is important to have functions available, neither a manner, nor price of functions).

RELIABILITY: is an ability of a product to ensure the required level of performance and provided services under given conditions.

USABILITY: is an ability of a product to be used with an adequate effort needed to get to know functions of the product and to use it under given circumstances.

EFFICIENCY: is an ability of a product to ensure services with adequate demands on system resources and in an adequate time.

MAINTAINABILITY: is an ability of a product to be adjusted to requirements of a user during its usage, an ability to improve revealed insufficiencies, to develop and improve functions or an ability to change the environment for the product (hardware, software, but even legislative).

PORTABILITY: is an ability of a product to cooperate with other systems on data and process level, including systems that run on different platforms (data, software and hardware).

To get a finer structure of requirements, there are quality sub-characteristics of each characteristic. The last level of the structure is an quality attribute that can be physically measured. An attribute can have influence on several sub-characteristics that come under different quality characteristics.

Presumptions for quality evaluation of electronic data exchange system between business and state authorities

An idea of the quality evaluation of the data exchange between a business and state authorities is based on several presumptions. Presumptions are motivated by practical demands that were recognized during the literature review and the research in practice.

1. Presumption: *Is the use of ICT in a business in compliance with the real business processes?* The deployment of ICT in a business is a contribution, if there is compliance between the information system architecture and business processes.
2. Presumption: *Does the electronic communication in the business bring a real cost and time savings in comparison with the other ways of communication?*The significant contribution of ICT is brought by the electronic communication among companies and their information systems.
3. Presumption: *Is it possible to receive and send electronic data in a format acceptable to the information and communication system of a partner subject?*There is a need for a standardization of data transfer between a business and particular state organs.
4. Presumption: *What is the degree to which users´ requirements are fulfilled by the electronic data exchange?* There is a need of a quality evaluation of the electronic data exchange system between a business and state authorities.
5. Presumption: *Are the data valid, consistent and without redundancy?*There is a need of data sources integration, especially to remove duplicity of data which emerges from the electronic data exchange between a business and state authorities.

The procedure that is designed and described further, shall verify presumptions stated above and become a basis for a new method of the quality evaluation of the electronic data exchange system between a business and state authorities.

Method proposal of quality evaluation of electronic data exchange system between business and state authorities

A method is proposed on the basis of a theoretical study and an analysis in the previous chapter. A construction of the method was supported with knowledge and experience of developers of

information systems for businesses and state authorities. Also requirements of users of information systems from several agricultural businesses are included.

The proposed method is assigned for the quality evaluation of the electronic data exchange process between a business and state authorities. It is not intended for an evaluation of particular applications that support the data exchange because these applications have been still being developed, updated and changed. Hence the management of businesses is interested in the final effect of information systems used in a company, the method measures the quality in use, as it was described in the previous chapter. The method evaluates the quality in use of the electronic data exchange system from the point of view of people working in state authorities and businesses.

In the further text, the new method is shortly called CBG (Communication between Business and Government) method.

The following contributions are expected with the proposed CBG method:

1. An opportunity to assess the quality of the electronic data exchange system between a business and state authorities according to these characteristics:
   - **Characteristic no. 1 — Effectiveness:** an ability of the system to ensure achievement of goals in precise and full manner.
   - **Characteristic no. 2 — Productivity:** an ability of the system to ensure effectiveness with an adequate use of resources.
   - **Characteristic no. 3 — Safety:** an ability of the system to permit only an adequate degree of risk of threat to people, environment, property or business interests under the use of system in the given context.
   - **Characteristic no. 4 — Satisfaction:** of a user with use of the system.
2. An opportunity to asses the quality of electronic data exchange system between a business and state authorities from a point of view of different parties:
   - system users (employees in a state office or in a private company),
   - management (of a state office or of a private company),
   - developers (in a software development company),
   - an independent evaluator (a person that independently assesses a quality of the system, such as an auditor or an independent consultant).
3. CBG method shall become a tool both for the company and the state office users to assess the contribution of ICT in a communication between the company and state authorities.
4. CBG method evaluates the electronic communication between a company and state authorities excluding regions and municipalities because they are characteristic of large differences in ICT utilization.
5. System developers can identify new opportunities to the use ICT in state offices and in private companies.
6. State office managers can identify new areas of improvement of the electronic communication for the state and legislation. In the Czech Republic, the method can have impact on e-government projects as Czech POINT, data boxes and base registries.

CBG method: Sequence of steps	User	Manager	Developer	Evaluator
1.Definition of the electronic data exchange system requirements of groups of users	✓			✓
2. Transformation of requirement into attribute measuers.				✓
3. Weighting of attribute measures.	✓			✓
4. Quantification of indicators that should be achieved.	✓			✓
5. Measure of actual attribute values.	✓			✓
6. Comparison of indicators values with actual attribute values.				✓
7. Aggregation of results and final recommendations.		✓	✓	✓

Table 1: List of steps of CBG method.

The first step, groups of users and their requirements are defined. This is done by an evaluator together with a representative of users in an organization. The representative is designated by a manager.

The second step, the evaluator transforms the requirements into attributes and their numerical representation of measures called indicators. Each attribute belongs to at least one of the quality characteristics. Each quality characteristics is represented by one or more attributes. The evaluator sets one question for each attribute for a questionnaire (see step 5). A result of this step is an evaluation form for each quality characteristics of the system (see the appendix).

The third step, the representative of users together with the evaluator set weight to every attribute. The reason is that each attribute has a different importance for the particular group of users. In spite of the fact that weighting is a very subjective activity, it shall be conducted with responsibility and by an experienced worker in the company. Possible mistakes must be taken into account. To minimize a mistake, a weight is set according to a scale in the following table (the second column in the table holds a per cent value of the weight).

very high importance	100%
high importance	75%
average importance	50%
little importance	25%
no importance	0%

Table 2: Weight of the attribute importance in the quality evaluation of the electronic data exchange systém.

The fourth step, the representative of users and the evaluator set indicators. The required value of each indicator is expressed with points. Each attribute is assessed with points that mean a level of agreement of a respondent with the statement or question that describes the attribute of the quality characteristics. The range of scale is from one to five points and is associated with following levels of accordance (see the Table 3).

The fifth step, the evaluator measures actual values of attributes. The values are weighted and filled in an evaluation form for every quality characteristics. The evaluation form is filled in by a representative and the evaluator during an interview. There is one statement or question for each attribute of quality in the form. A respondent allocates an appropriate number of points to each statement or question by a level of accordance (see Table 4).

1 point	not done yet
2 points	partially done
3 points	done with average quality
4 points	done with very good quality
5 points	perfectly done

Table 3: Points assignment to the attribute of characteristics.

The sixth step, indicators' values and actual values are compared by the evaluator. After, results are aggregated and a final statement about a quality of the system is made. The final quality assessment in ordinal scale is in the following table.

excellent	1
good	2
sufficient	3
insufficient	4

Table 4: Final quality assessment by the CBG method.

The seventh step, the evaluator summarizes results of the quality assessment and formulates recommendations for the organization in a form of steps that shall increase the quality in given areas and shall get the organization closer to the indicated values. The recommendations are delivered to the manager of the organization and to the developer of the information system.

Results and discussion

The method for quality evaluation of the electronic data exchange system between a business and state authorities (CBG method) was verified in practice. However, the CBG method needs to be verified in at least two different organizations that already utilize the electronic communication with state authorities.

The author supposes that the method will be also applicable to the evaluation of quality of the electronic data exchange system in municipalities and regions.

The proposed CBG method is for the evaluation of electronic data exchange system between a business and state authorities. A goal of the method is to evaluate the system of electronic data exchange between a business and state authorities, not only to

evaluate applications such as an electronic data box or an electronic submission of tax. A pilot version of the method CBG provides a tool to evaluate and measure important attributes of the electronic data exchange system between a business and state authorities. According to the comparison of the indicated values and actual values it is possible to formulate the final quality assessment of the electronic communication between a company and state authorities and to suggest a recommendation for improvements.

Appendices

Evaluation form – sample

An evaluation form in the following table is to be built by an evaluator in cooperation with a representative of users in an organization – see step 2 of the method CBG.

The form is filled in by the evaluator in steps 3, 4 and 5 of the method during an interview with a representative of users in an organization utilizing the electronic communication with state authorities.

	Attribute	Question	Weight (0-100%)	Required (1-5)	Actual (1-5)
1	Accordance in legislation	Is there a legislative or a law proposition of the data exchange? ***Example: Submission of the value added tax form.***			
2	Rate of accordance with legislation	To which extent is the data exchange in accordance with the requirements of the legislation? ***Example: Are there all required items in the electronic form for the value added tax submission?***			
3	Accordance with referential data	Are there referential data in the state authority's registry? (Relates to data exchange with state authorities) ***Example: Corporate income tax return.***			
4	Accordance with the verification of referential data	Is it possible to verify the data message with the referential data? ***Example: Access to Registers of Economic Subjects / Entities (ARES)***			
5	Rate of accordance of referential data	To which extent are data in accordance with the referential data? (Relates to data provided to state authorities) ***Example: Income tax return of the corporation that moved to new address and did not report the change to the tax office.***			
6	Accuracy	Accuracy of figures (In compliance with the limits constituted by a law or provision)			
7	Accordance with the data standard	Is there the data format standard for the given case? (XML, EDI, etc.) ***Example: Tax administration portal (Ministry of Finance), Portal for farmers (Ministry of Agriculture)***			
8	Rate of accordance with the data standard	To which extent does the electronic data exchange application utilize the given standard? ***Example: The compatibility of data files with the web application of the state office.***			

9	Application interoperability	Is the application interoperable with the other application? ***Example: Data transfer from the enterprise information system of the farm in the Portal for farmers at the Ministry of Agriculture.***			
10	Objectivity	Give the data the real picture? ***Example: Data in the Land Parcel Identification System (LPIS)***			
11	Authenticity of data	Is the data message authentic? (Is there the guaranty of authenticity of the document as the electronic signature or original paper document?) ***Example: Electronic submission of social security***			
	Total score				

Source: Own source

Table 5: Evaluation form.

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Digital Europe – Chance for Job in Hungary

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Abstract

The 35 percents of EU total population use the advanced Internet services. This rate is very low and has to increase in the next years, because the employed person needs ICT user's skills. At the first level the digital literacy and at the second level the higher knowledge of ICT acquiring is very important, because nowadays, without these abilities it is not so easy to get qualified jobs in Hungary. In the information society it is very important to measure the digital literacy. For this measuring we have to ask the users to evaluate their own knowledge. In the World Internet Project evaluation we did not find a significant disparity between the evaluation of average Internet knowledge usage and that of the computer usage. In both cases, most people thought that their knowledge was good. Approximately every tenth person surveyed characterized his or her knowledge as outstanding and in a similar proportion the users thought their knowledge is weak. Taking part in organized courses and training can help to increase the digital literacy and ICT users' skills. This taking part is decreasing parallel with increasing of age. That is why we need to take into account how we can connect these "older" people to the lifelong learning programmes, where we use the e-Learning tools. Nowadays, the importance of e-Learning is growing rapidly, partly due to the information and communication technologies in the information/knowledge-based society is developing. The goal is to enable the knowledge and skills to help the individual to become an active member of society, teamwork, motivation, and to possess the skills necessary for finding a place in the labour market.

Key words

Digital Europe, digital literacy, e-Learning, Lifelong learning, Knowledge patent, education.

Anotace

35 procent z celkové populace EU využívá vyspělé internetové služby. Tento podíl je velice nízký a v příštích letech se musí zvýšit, protože zaměstnaná osoba potřebuje znalosti uživatele ICT. Je velice důležité, aby byla na první úrovni vyžadována digitální gramotnost, na druhé pak vyšší znalost ICT, protože dnes bez těchto dovedností není v Maďarsku lehké získat kvalifikované pracovní místo. V informační společnosti je velmi důležité měřit digitální gramotnost. Pro toto měření se musíme žádat uživatele, aby zhodnotil své vlastní znalosti. Ve hodnocení Světového internetového projektu jsme nenalezli významnou disparitu mezi hodnocením průměrných uživatelských znalostí internetu a uživatelských znalostí osobního počítače. V obou případech si většina lidí myslí, že jejich znalosti jsou dobré. Přibližně každý desátý dotazovaný charakterizoval své znalosti jako vynikající a podobný podíl úživatelů považovalo své znalosti za slabé. Účast v organizovaných kurzech a školení může pomoci zvýšit digitální gramotnost a uživatelské znalosti ICT. Tato účast má snižující analogii se zvyšujícím se věkem. Proto musíme brát v úvahu to, jak můžeme zapojit tyto „starší" lidi do celoživotních výukových programů, kde využíváme e-learningové nástroje. Důležitost e-learningu v současné době rapidně stoupá, částečně díky informačním a komunikačním technologiím v informačně/znalostně-založené společnosti. Cílem je využít znalosti a dovednosti k pomoci jednotlivcům, aby se mohli stát aktivními členy společnosti, týmové práce, aby získali motivaci a znalosti nezbytné k nalezení místa na pracovním trhu.

Klíčová slova

Digitální Evropa, digitální gramotnost, e-learning, celoživotní vzdělávání, znalostní patent, vzdělávání.

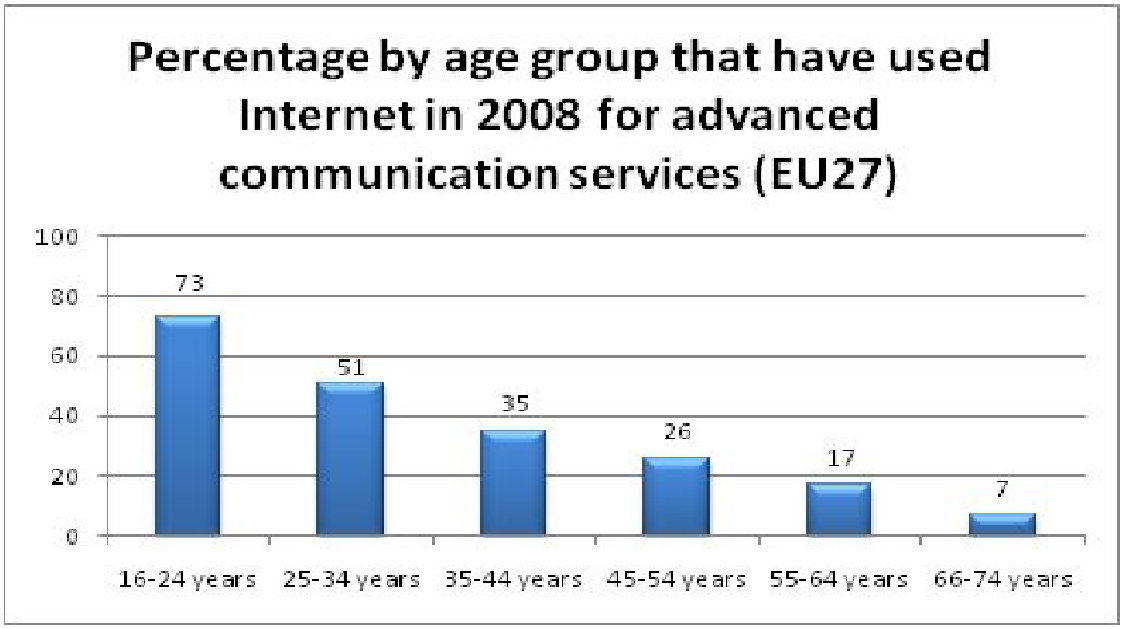
Introduction

Europe promises to become even more digital in the years to come. Only 35 percents of the total population in the EU have used advanced Internet services in 2008. It is markedly different for people between 16 and 24: 73% of them have recently used Internet for advanced data transmission. With these young, regular and intensive Internet users, there is a whole generation of „digital natives" ready to apply innovations like web 2.0 to business and public life. It is in this new generation that there is a real growth potential for Europe. These digital natives will be turning into consumers with an important purchasing power. This is the reason why the EU believes that rolling out and development of high speed broadband internet - via fixed or wireless connections - could create around one million jobs in Europe, and spur broadband-related growth in economic. Based on the World Bank data each 10% of additional broadband penetration yields 1.3% extra growth (World Bank, 2007).

The Table 1. shows the EU-27 countries in the rank of persons, who are employed with the ICT users skills. Here can be seen that Hungary is the 7th in the rank, so it is clear why at the first level the digital literacy and at the second level the higher knowledge of ICT is so important. Nowadays, without these abilities it is not easy to get qualified jobs in Hungary.

The Information Society

The information society (International Telecommunication Union, 2009) needs continuous knowledge and enhanced reproduction. The products of leading-edge technologies of the information society provide faster and more immediate information-production.



Source: Eurostat

Figure 1: Percentage by age group that have used Internet in 2008 for advanced communication services (EU-27).

Ranking	Country	%	Ranking	Country	%
1.	Luxembourg	29,1%	15.	Cyprus	18,9%
2.	United Kingdom	25,2%	16.	Belgium	18,8%
3.	Lithuania	23,4%	17.	Germany	18,3%
4.	Denmark	22,8%	18.	Czech Republic	18,3%
5.	Malta	22,4%	19.	France	17,8%
6.	Latvia	21,3%	20.	Austria	17,5%
7.	**Hungary**	**20,9%**	21.	Spain	16,0%
8.	Sweden	20,0%	22.	Slovakia	15,9%
9.	Finland	20,0%	23.	Poland	15,4%
10.	The Netherlands	20,0%	24.	Greece	12,9%

11.	Slovenia	19,6%	25.	Bulgaria	12,1%
12.	Italy	19,4%	26.	Portugal	11,8%
13.	Ireland	19,2%	27.	Romania	9,8%
14.	Estonia	18,9%			

Source: Eurostat

Table 1: Percentage of persons employed with ICT user's skills (EU-27) (2008).

The knowledge-based society is a learning-based society. Beside the rapid, steadily growing knowledge the individual skills and knowledge continuously become out-of-date. Anyone who wants to hand on the information society labour market has to study in all his or her life. The typical studying with parallel working is the distance learning, medium of which is increasingly the Internet. The Internet is gradually the all-embracing communication medium of the economy, politics, science and culture in the information society. The Internet contains many tens of millions of pages of written documents, which can be very diverse, but it is a valuable repository of information and knowledge.

The information society is not only creating new opportunities but may intensify the existing inequalities or may even create the new inequalities. Of course, one of the key aims of the EU strategy was that the ICT tools (Internet5) should contribute to reduce the existing inequalities, and to reduce the digital divide deepening. The most important objective is to work on reinforcing the digital literacy and to promote obtaining it because it can bring the effective usage of computers to the daily work. This ability to create, structure and subsidy expansion of digital literacy is necessary.

In most cases, in the context of the information society, almost the only means of information technology - the devices are discussed. These would be the dysfunctional assets in themselves if there were not people who use these tools for a given purpose. They can also be used for the digital literacy.

In the information society, the teaching and learning are partly transformed. The e-Learning has number of tools, which were developed for this service. The existing on-line learning materials compared to a deeper knowledge providing more detailed support for interactivity are insufficient. It is necessary to develop new curricula, which would be part of the Community work, and free software based on new technological opportunities (WIKI - Web 2.0 technology) can be created.

Due to the development of new technology, the teacher-student interactivity is changing. Using the Internet expands the range of options for access to information. As a result of this the teacher's role gets significantly transformed as his or her task is not just to be the source of knowledge but also to be the leader of learning, motivation and also to be assisting. The solution of the new situation will be helped if all aspects of mobile, various teaching methods (cooperative work, collaborative work, problem-based teaching) provide the enabling environment for students.

Digital Literacy

Digital literacy (Internet4; Jones-Kavalier and. Flannigan, 2006) means both the necessary knowledge of how to use the computer and the Internet, as well as the ability to receive, organize, and critically evaluate the information. Regarding the digital literacy levels, much can be told by what proportion the certain social groups use these various tools. The really questions are, how digital literacy levels are formed among these users and which skills are necessary for the effective use of computer and Internet. There are several ways to measure the digital literacy. We try to analyse it from three different angles of the user knowledge. Firstly, we evaluate the knowledge of computer and Internet usage on the basis of a “self-classifying” examination, according to which we can understand how confidently the surveyed utilize these tools based on their own opinion. This subjective classification can be supplemented by an examination in which the groups of the surveyed took part in formal education (computer technology courses and trainings). On the basis of questions concerning various computer functions, we can try to give conclusions about the digital literacy level, as we can see the exact level of complexity of the tasks that various user groups are capable of carrying out.

The most obvious way to measure the digital literacy is to ask the users to evaluate their own knowledge. In the World Internet Project evaluation (Internet1) - which made it in every two years - there was not found a significant disparity between the evaluation of average internet knowledge usage and that of computer usage. In both cases, most people thought that their knowledge was good. Approximately every tenth person surveyed characterized his or her knowledge as outstanding and in a similar proportion the users thought their knowledge was weak.

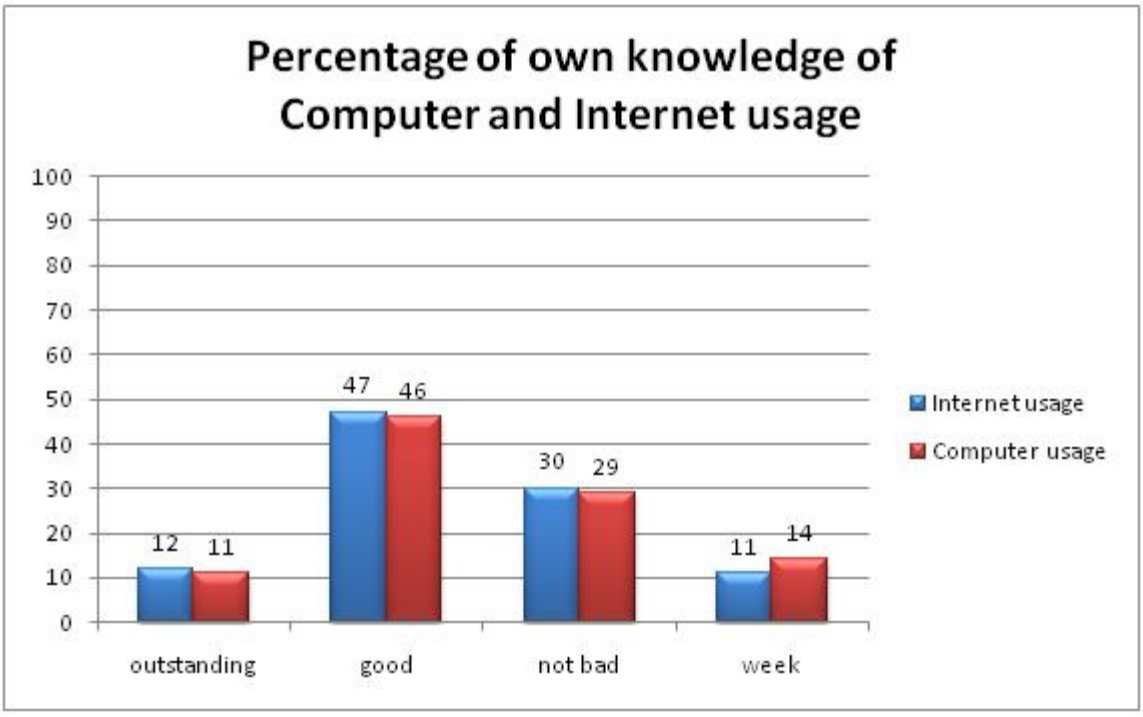
We have to take into account the more important social and demographic indexes to this distribution. In this case we can observe the greatest deviations with the changing of age. With an increase in age (mostly in the case of those above the age of 30) the proportion of users who judge their own knowledge as either good or outstanding steadily decreases. This correlation is true both in the cases of computer and Internet usage.

It seems that 57% of the computer users can be termed as confident, while 59% of the group of Internet users stated that their knowledge of Internet usage was either good or outstanding. It is obvious that while the use of digital technology does not cause difficulties for more than two-thirds of the users below the age of 30, merely 43-55% of the users above the age of 30 can be termed as confident in this regard. This data reinforces the observation that new informational and communicational tools are natural for the generation that grew up with digital tools, while the use of the computer and the internet give rise to significant challenges for the older generation.

Generally, a person is digital scripturist who recognizes when he needs information. In practice, 5 levels of digital literacy are distinguished:

1. The information literacy - the user is able to recognize the nature and extent of information, which is needed.
2. Efficiently and effectively reaching the desired information.
3. Source criticism (to process the information and integrate the knowledge).
4. Effectively usage of the information to reach the goal.

Understanding the value of the information, understanding the economic, legal, and



Source: World Internet Project - 2007

Figure 2: Percentage of own knowledge of Computer and Internet usage.

5. ethical context, using the information adequately.

The European e-Skills Week (it is a Hungarian initiation) - which is organised in Hungary in 2010 - will highlight the growing demand for skilled ICT users and professionals to drive a competitive and innovative Europe. This campaign seeks to inform students, young professionals and SMEs about the vast range of opportunities that ICT-related jobs present. The event is expected to involve 300,000 participants in more than 100 activities. Public authorities, ICT companies, education institutions, and students will engage in hundreds of activities, training events, competitions and much more. The events will take place across Europe with more than 20 participating countries.

Hungary intends to reach 1 million people in the Microsoft Digital Literacy Programme (Internet2), whose objectives can be summarized in the following 5 points:

1. The distribution of digital literacy and training opportunities for community technology centres (ECDL centres, libraries, telecentres, etc.).
2. High-quality, industry-controlled curricula and qualifications insure.
3. Awareness of the importance of digital literacy, particularly in the unemployed and older workers, to increase the labour market opportunities.
4. The widest possible dissemination of digital literacy and business communities in order to develop local economics and trade.
5. The small and medium-sized staff 21st century skills of awareness, which will help to increase the competitiveness of firms.

The programme takes 3 years and 350 thousand people, over 5 years 1 million people will want to train digital literacy, including helping disadvantaged young people, people over 45 years of age, and location of the labour market. Presumably, the national ECDL exam centre will provide its network of more than 500 sites, which target 1 million students. Microsoft "digital literacy" programme that can be acquired on the basis of knowledge acquisition can be an important step in the digital illiteracy eradication, however, the program is much more complex - understanding the ECDL certificate as containing the desire to obtain it; it gives the basic knowledge and is appropriate for participants.

The Lisbon Strategy set out principles "slightly" modified in Hungary, about 3 million people to be trained in digital literacy. It is expected to play a major role in the ECDL centres, and the government to create motivation by subsidies.

Courses and training

Taking part in organized courses and training can be helpful to increase the digital literacy and ICT users' skills (Havlicek and Vanek, 2005). This taking part is decreasing parallel with increasing of age (Figure 3.). The confidence of the youth is obviously partially due to the fact that the instruction of informatics and computer technology in elementary and secondary schools is natural today. It is not surprise that 90% of those belonging to the 14–17 years age group declared that they had taken part in such instructions. At the same time, among the entire population, the value of this index is barely above 34% and with an increase in age, the proportion of people with such experience decreases.

In spite of the fact that several training programs have been launched which target the "grandparent" generation, merely six percent of those belonging to the 60 and above age group have ever taken part in such training programmes today. Besides the oldest age group, the proportion of those between the ages of 40 and 60 who have participated in such a training program (20–27%) could be a warning sign, since it is this age group who is most in need of computer technology instruction - as it is among them that the proportion of those possessing digital literacy is the lowest.

Source: World Internet Project-2007

Figure 3: Percentage of people who have taken part in any computer technology training programme or courses (World Internet Project-2007).

e-Learning in education

Nowadays, the importance of e-Learning is growing rapidly, partly due to the information and communication technologies in the information/knowledge-based society is developing. The e-Learning to the linked concepts of "knowledge society", "lifelong learning" and "training modularisation" as they are implementing the e-Learning has a crucial role to play.

The whole lifelong learning with continuous access to the learning of the knowledge society, sustainable knowledge and skills is necessary for participation in the knowledge acquisition and its continuous updating. In lifelong learning from birth to the old age up becomes a standard process, which is including all forms of learning.

The goal is to enable the knowledge and skills to help the individual to become an active member of society, teamwork, and motivation and to possess the skills necessary for finding a place in the labour market. The lifelong learning is the modulation of the training to drive interoperability and transparency as a strong supporter of the economic (large number) e-Learning courses realization.

The information communication technologies in lifelong learning, knowledge patent modularisation relationship (Internet3) and the special role of the e-Learning is shown in the Figure 4.

The e-Learning systems and the functional point of view, the actors include the following components:

- Text, multimedia, and other curriculum elements,
- Curriculum development System (LCMS, Learning Content Management System),
- Electronic curricula and component database,
- E-learning Educational Framework (LMS, Learning Management System),
- Content developer, student, teacher/tutor.

In the last decade, we can find more and more examples of using the e-Learning (Cebeci and Erdogan, 2005) in agricultural and rural development sectors (Nikos et al., 2010). Please to see the following samples.

- Rural-eGov IEEE LOM AP (ReGov LOM) - Support the training of rural and agricultural small and medium enterprises (SMEs).
- FAO Agricultural Learning Resources AP (FAO Ag-LR) - Provide structured access to information on FAO's capacity and institution building services and learning resources.

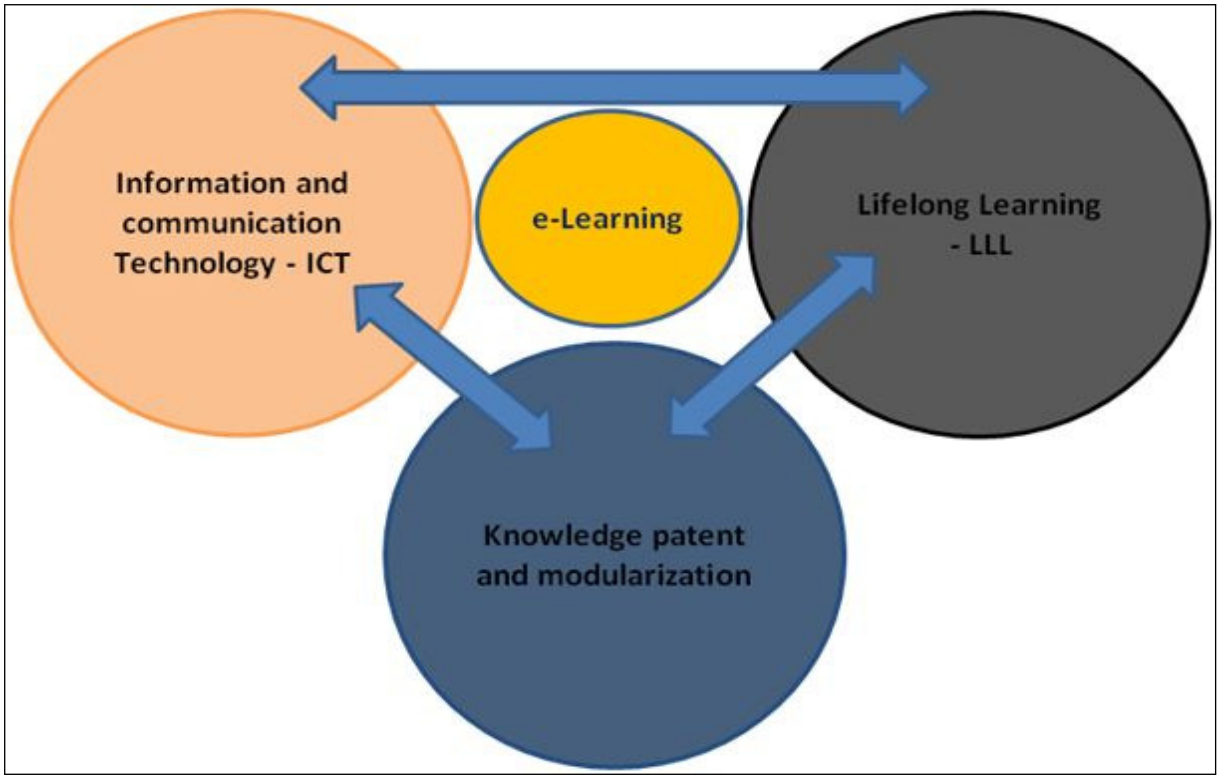


Figure 4.: The e-Learning central role in the LLL, ICT and knowledge-patents modularization relationship.

1. CGIAR LOM Core AP (CG LOM Core) - Supporting 15 international agricultural research centers in developing countries.
2. BIOAGRO LOM AP - Facilitate the annotation/description of learning resources that are collected and described in the Bio@gro Web Portal.
3. Biosci Education Network (BEN) AP - Developing and maintaining digital library collections of biological sciences teaching and learning resources.
4. Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program (SANREM CRSP) AP - Support sustainable agriculture and natural resource management decision makers in developing countries.
5. TrAgLor LOM AP (Cebeci et al., 2008) - Aims to promote an infrastructure for learning objects in agriculture, food, environment, forestry and veterinary sciences.
6. Intute: Health and Life Sciences AP (Intute AP) - Provides the online access to a large database of resources that cover four main subjects: Science and Technology, Arts and Humanities, Social Sciences, and Health and Life Sciences.
7. EcoLearnIT LOM AP - Digital repository of reusable learning objects that manages and hosts various resources focused on soil, water and environmental sciences, and provides authoring tools to develop learning objects.

Conclusion

The digital literacy is the base of knowledge-based society and economy. The EU pays a particularly great attention to the physically isolated, socially detached, socially disadvantaged people, migrants, and over 50 years of training those people. Vulnerability of these groups is likely to increase if they cannot study the basic information and communication tools.

The Web allows the development and spreading of the growing importance of collaborative work. Participation in a project is no longer subject to any time or location, and a significant part of project takes place in the virtual space. This increases the freedom of workers and job opportunities.

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- IBAN code of the account for international payment: CZ7901000000196026830237
- BIC (Swift) code of the bank: KOMBCZPPXXX
- Specific symbol will be generated for everyone when they register within the system
- The payment of the conference fee does not guarantee publication in the conference proceedings.

IMPORTANT INFORMATION FOR AUTHORS

Instructions for authors are available at http://ap.pef.czu.cz

All papers will undergo a double blind review process and will be evaluated based on their originality, interest, contribution to the body of knowledge, relevance, applicability and publishability. The authors will be notified about the review outcome after the review process.

The accepted full papers will be published in the refereed Conference Proceedings which will be sent to **Thomson Reuters** for evaluation and eventual registration in the **Web of Science** database.

Papers sent after the deadline and those that do not comply with the instructions will not be accepted.

Papers that do not fulfil the criteria for being included in the refereed conference proceedings or are written in Czech will be published on a CD with ISBN.

All papers, in order to be published, must comply with the requirements specified in the conference template available at http://ap.pef.czu.cz.

Some conference papers may be invited for publication in the Agris Online Papers in Economics and Informatics, a fully refereed academic Journal.

The Dean of the

FACULTY OF ECONOMICS AND MANAGEMENT
The Czech University of Life Sciences Prague

Faculty of Economics and Management

prof. Ing. Jan Hron, DrSc., dr. h. c.

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