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## Smartness, culture and local authority ICT awareness: an empirical enquiry for a province in Poland

The paper reports on a sequence of analyses of the local self-governmental authority website-related features in conjunction with the socio-economic characteristics of the respective administrative units (counties and municipalities). These analyses had two objectives: (a) assessment of the local authority websites, their content and functionality, also in a dynamic perspective, and (b) inquiry into the potential interrelations between the specific features of the websites and the nature of the local unit, with special emphasis on the local development in the rural areas and its forward path. The study has been carried out for the capital province of Mazowsze in Poland, but some hints as to a quasi-comparative international study are also provided. First of all, substantial progress between 2003 and 2008 in the quality of the local authority websites is shown. Further, the conclusions from the study imply a rather loose connection between the characteristics of these websites and the socio-economic profile of the unit, including the characterisation along the urban-rural dimension. At the same time, though, an important role becomes apparent, played by the broadly conceived local culture, including the 'smartness' aspect, as perceived by the present authors. This role of culture and 'smartness' is visible in the very clear divergences from the general regularities observed, and is partly also associated with the socio-economic function of the respective local unit, as distinguished from the, say, income and education level characteristics of the local population.

**Keywords:** ICT, local development, local authority website, website-based network, culture, smartness

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## Introduction

This article is devoted to the connection between local development and some information and communication technology (ICT) related characteristics, as seen in the perspective of culture in general, and 'smartness' in particular. 'Smartness', therefore, is considered here not in terms of some technological development (that might, for instance, in the rural circumstances, include 'precision farming'), but as a quality, belonging to the broadly conceived sphere of 'culture', allowing for effective and efficient ('sustainable') behaviour at the level of the community. Indeed, in the first decade of the 21st century the notion of 'smart communities' and 'smart cities' became quite popular and was supported through international programmes or commercial initiatives (see [ec.europa.eu/energy/technology/initiatives/smart\\_cities\\_en.htm](http://ec.europa.eu/energy/technology/initiatives/smart_cities_en.htm) or [www.intelligentcommunity.org](http://www.intelligentcommunity.org)). All of them, though, are heavily oriented at the technological underpinnings (ICT, energy, transport, waste processing etc.).

Regarding ICT we have been looking not so much at the technology but, instead, at the quality, functionality and content of the local authority websites in the capital province of Mazowsze in Poland, and at the local networks, formed by the links, originating from these websites. This was the main subject of our investigations over a period of more than ten years. The results were then considered jointly with the socio-economic characteristics of the respective units and an attempt was made to draw some intelligible conclusions therefrom. Both the course of analysis and the main conclusions from the study have been reported in a number of papers (e.g. Owiński and Pielak, 2011 and Owiński *et al.*, 2010).

Here, we would like to take a slightly broader perspective in which ICT and economic development are seen against the background of broadly conceived culture, where culture includes the societal 'smartness', as opposed to the purely technical meaning of the word. It is, namely, hypothesised

that culture, along with the available resources, form the proper basis for local development. Culture, in this sense, includes social and intellectual capital, but seen exactly from the point of view of quality and (largely informal) institutions, rather than from the formally quantitative one (e.g. share of adult people with university degrees).

Given the frames of this paper and its quite pragmatic orientation, we omit a more general discussion of 'culture', 'community' and 'smartness', concentrating on the operational notions that are used throughout. In this context, a good example for the opposition mentioned of the informal vs. formal is provided by the comparison of some regions in Poland: in southern and south-eastern Poland the *submontane* communities preserved to a high extent rural networking, collaboration, family cohesion and traditional values, while emphasising the necessity of being active ('enterprising') and making life one's own project. These communities had been very poor throughout history, but especially so in the 19th century and at the beginning of the 20th century. They are also characterised by a very positive and disciplined attitude towards education of children (high status of a teacher in the rural primary school). Men and women from this area were known to emigrate in high numbers but, at the same time, to form and maintain close links abroad and/or with the home location and family. Teams of *mountaineers* are known to build and repair houses across Poland and, indeed, outside of the country. For decades, though, and even until quite recently, this region (along with the entire eastern part of Poland) was opposed, as traditional, lagging and 'not promising', to the western parts of the country that formerly belonged to Germany, where the educational level of population has been distinctly higher and where fewer people have been directly employed in agriculture in the rural areas (Czapiewski and Janc, 2008). These western regions have been regarded as 'more advanced' and 'promising'.

Yet, it has been finally noticed that even in purely economic terms these traditional areas in the south of Poland

fare distinctly better than the previously favoured 'more advanced' western regions (for analysis of the false statistical basis of the previous opinions see Owiński, 2008a,b, and Owiński and Andrzejewski, 2010). This opposition is to a large extent explained by the fact that while in south-eastern Poland family farming persisted during the communist period, even though the farms there hardly provided decent subsistence, the western parts were dominated by large state and cooperative farms in which people were employed as farmhands and which, following communism, collapsed under economic pressures. This particular opposition is also very similar to that analysed in Morita and Chen (2010) for two Chinese provinces and their rural populations with differing historical and socio-economic backgrounds.

To conclude: it is information exchange, collaboration and networking that make (at least some) of the Polish *submontane* communities the truly 'smart' ones. Technology, with ICT, comes next – it is just an instrument, taken up and applied within the culture that is capable of securing its effective use.

So, the notion of culture used here includes *attitude toward educational investment* as well as *social learning, trust, cooperation*, and also *risk-taking*. This leads directly to the issue of *local networks*, as being important for the way a given community behaves and develops. These aspects are not only important for the general dynamics of development or growth, as opposed to stagnation, passivity or withdrawal, they are crucial for securing the resistance of a community and its sustainability under the impact of negative impulses ('smartness' being another way of putting this).

In this paper, we shall firstly review the results from the consecutive stages of the website-oriented study, to then comment on the potential and actual relationships to the socio-economic characteristics of the respective administrative units. On this basis some hypotheses will be formulated. Finally, we shall try to infer some further-reaching statements related to the culture and 'smartness' of the local communities.

## The background to the local authority website analysis

E-government and e-administration have made great progress in recent years. Given the spread and ample functionality of e-administration, it is the completeness of the web-provided public service, its provision for the handicapped etc. that became of importance, linked with the efforts to bridge the 'digital divide' separating the ICT-rich from the ICT-poor.

Several methodologies have been used to evaluate e-administration. Vintar *et al.* (2003), Decman *et al.* (2003), Peters *et al.* (2004), Hu *et al.* (2005) and St-Amant (2005) adopt or extend the European Union (EU) 'four stage model' defined, for example, in Capgemini (2005) and Wauters *et al.* (2007). In stage one, the *information phase*, the government creates a website with online information on procedures and services. In stage two, a *one-way communication phase*, the public website provides downloadable forms. In stage three,

the *two-way communication phase*, users are able to complete forms, upon which they receive a confirmation. In stage four, the *transaction phase*, the service is processed entirely online, including decision, delivery and, if necessary, payment.

Lee (2003) proposes, instead, a 'five stage model': attracting, informing, creating a community (online forum, events, e-Magazine, domain identity and community services), delivery, and innovation (transformation of existing services and introduction of new innovative services).

Hence, we have come to the point where the *networks*, especially as effectively related to local development, have come into view. *Networks* have long been seen as an important factor in local development (Landabaso, 2000). The primary examples usually refer to small-scale (family) businesses in rural Italy after the Second World War. The importance of *networks as a factor* was noted particularly for the peripheral and rural areas, where agglomeration factors are nonexistent, and networks somehow substitute.

There is, though, yet another dimension to the existence and functioning of networks, especially informal ones. They reflect the *degree of trust*, the crucial component of *social capital*, necessary for sustainable local development (Helliwell and Barrington-Leigh, 2010). So, networks appear as a fundamental factor in local development; the local authority, and its websites, playing an important role in creating, maintaining and strengthening them (see, in particular, Smith, 2009).

We do not refer to any kind of networks that may exist, especially in 'cyberspace'. Numerous networks, for example established through social portals, have little bearing on facilitation of local socio-economic development, even if they can be effectively used to, say, set up a demonstration. What we primarily mean are the networks that offer (a) useful information and (b) business opportunity. We propose that the networks we mean refer to *knowledge* in several ways: (a) enhance the knowledge of the web user; (b) are themselves a kind of data – or knowledge base, and (c) imply exchange of information between the nodes – participants to the network. 'Knowledge' is important here, for the gist of the matter is in effective use, and infrastructure availability is just a necessary condition. Worse even, just trying to get the ICT infrastructures available to everybody must not necessarily yield expected positive effects (see Vigdor and Ladd (2010) for scholarly achievements, Michaels *et al.* (2010) for effects on skill demand and Bhuller *et al.* (2012) for connection with criminal behaviour). For broader accounts on factors of local development and success, with emphasis on rural areas see Bański and Czapiewski (2008) and Owiński (2008a,b).

Although our perspective encompasses also the potential formal ('organised') networking – see e.g. Krebs and Holler (2002) for the connection between community smartness and formal networking – we insist on the informal dimension, an inherent component of culture.

Yet, we are not suggesting that networking and connectivity are absolute safeguards in the sense that their growth leads always to better and safer development. A careful hypothesis is that there is an *optimum*, both in terms of quantity and the nature of structure, beyond which additional risk

may arise (see Butler *et al.* (2010) for trust in general and Battiston *et al.* (2009) for networking and the financial crisis). This risk relates, on the one hand, to the sheer excessive connectivity that may lead to systemic collapse (McLean *et al.*, 1978) and, on the other, to the way in which connectivity within the network is ensured, or enforced (the case of mob-lites).

Actually, a broader hypothesis would imply a cultural connection, involving trust, networking, education and knowledge (see also Czapiewski and Janc, 2008; Guiso *et al.*, 2010; and Smith, 2009). The respective connection is not only visible and pertinent, but also surprisingly persistent (Chitu *et al.*, 2012).

## The past investigations on local authority websites

The research on local authority websites (see Owsiski and Pielak, 2011) aimed to assess the progress in their quality and functionality, and the connection with the socio-economic character of the respective units. Several assessment systems were developed and applied to functionality and information content, the latter in both administrative and in broader terms (information on the area). The results were then compared with the corresponding data on *economic situation, degree of urbanisation, function of the area and its peripherality*.

Investigations were carried out for Mazowsze, the capital province of Poland, the agglomeration of Warszawa being its core. This is the largest of the 16 provinces of Poland, with 41 *counties* (5 'urban' and 36 'landed') and 314 *municipalities*. A very high degree of differentiation of the municipalities and of counties causes that the choice of the sample from this province does not introduce a bias. It can safely be said that virtually all types of Polish counties or municipalities are represented, except for those with very special natural conditions (seaside, mountains etc.), implying the broader validity of empirical observations and conclusions therefrom.

Tables 1 and 2 present the summary of results of the early stage of investigations that were devoted to the assessment of the quality and functionality of the county authority websites with the WAES methodology. WAES is composed of 40 binary criteria (YES-NO), split into two almost equal

**Table 1:** The average WAES scores of the counties of Mazowsze province, Poland in the years 2003-2008.

Year	2003	2004	2005	2006	2007	2008
Average score	14.6	22.2	27.9	28.3	30.9	33.2
Annual increase %		52.3	25.5	1.5	9.2	7.5
Average for:						
-- Clarity	8.6	13.6	16.3	16.4	17.7	18.3
-- Interactivity	5.9	8.6	11.6	11.9	13.1	15.0
-- Clarity-Interactivity	2.7	5.1	4.7	4.6	4.6	3.3
-- Interactivity / Clarity	0.7	0.6	0.7	0.7	0.7	0.8
Some other statistics:						
Minimum value	0	0	9	0	22	23
Maximum value	35	35	36	36	37	38
Standard deviations of scores	9.9	7.5	5.3	5.9	3.5	3.2

Source: research of the authors, here and further on

domains: *Clarity* (information provided on the website on the local authority and its chapters) and *Interactivity* (what can be done over the web by a citizen?). Thus, for each criterion either a point could be scored or not (is this information/function available? YES = 1, NO = 0). During the period 2003-2008 an important advance in the quality and functionality of the websites took place, along with the decrease of the range of scores (Table 1). The latter is due, on the one hand, to the overall advance of the county websites and, on the other, to the existence of the upper limit of 40 score points, so that there has been less and less room for differentiation. In view of the latter phenomenon, the verifications of WAES scores for the counties were stopped after 2008.

Table 2 illustrates the degree of association of the WAES scores with the character of the counties in terms of some general aspects (L in the last column is a function, aggregating the four variables from the preceding columns). The shift in the correlation values in 2007 lasted for just one year (they returned to the previous levels in 2008) and was mainly caused by a significant improvement in 2007 of the websites of the five urban counties.

**Table 2:** Correlation coefficients between WAES scores and selected indicators for the counties of Mazowsze province, Poland in the years 2003-2007.

Year	Population density	Share of urban population	Share of agricultural land	Share of forest area	L
2003	0.183	0.086	-0.194	-0.100	0.180
2004	0.233	0.172	-0.194	0.068	0.216
2005	0.195	0.110	-0.239	0.080	0.188
2006	0.149	0.089	-0.211	0.074	0.150
2007	0.467	0.429	-0.430	-0.038	0.470

General statistical data used to form the Tables come from BDR GUS (Polish Central Statistical Office local database)

Given the wide disparity of characters of the Masovian counties (e.g. their populations ranging by two orders of magnitude and the population densities by three orders of magnitude), the results in Table 2 are very telling: the domination of the 'highly urban' areas is only marginal with the respect considered. This effect, of course, might be attributed to the fact that, with time, most, if not all, of the WAES criteria became a formal 'must', even if there were important delays in actual implementation across the population of administrative units.

Thus, we have then looked at the aspect that has not been included in the formal requirements, set on the local authority websites, namely broader information on the area – its assets, resources, opportunities, services etc. in a broad sense. In this manner the WSOSI system of criteria was developed, encompassing 14 domains x 5 aspects in each domain = 70 items, again treated in a binary way (e.g. does the website provide information on the local medical public dispensaries? YES = 1, NO = 0, or does the website provide information on hospitality industry facilities? YES = 1, NO = 0). The 14 domains included health service, education, sports and recreation, public transport, other public service, history and sightseeing, etc. Because the verification had to be done 'by hand' and so represented a laborious task, the exercise was performed for a sample of representative municipalities,

**Table 3:** WSOSI scores for representative municipalities of Mazowsze province, Poland and corresponding counties (max=70).

Commune	Commune WSOSI scores	County	County WSOSI scores	Difference: county-commune	Ratio: commune/county
Jabłonna	44	<u>Legionowo</u>	57	13	0.77
<b>Nieporeł</b>	54	<u>Legionowo</u>	57	3	0.95
Stara Biała	16	Płock	33	17	0.48
Zakrzew	24	Radom	42	18	0.57
Łąck	10	Płock	33	23	0.30
<b>Łochów</b>	<b>55</b>	<b>Węgrów</b>	<b>42</b>	<b>-13</b>	<b>1.31</b>
Leoncin	13	Nowy Dwór	34	21	0.38
Rzekuń	6	Ostrołęka	56	50	0.11
Grudusk	23	Ciechanów	48	25	0.48
Belsk Duży	46	Grójec	49	3	0.94
Sanniki	3	Gostynin	22	19	0.14
Korczew	25	Siedlce	26	1	0.96
Ceranów	0	Sokołów	40	40	0.00
<b>Korczew</b>	<b>57</b>	<b>Otwock</b>	<b>51</b>	<b>-6</b>	<b>1.12</b>
Average	27	-	42	15	0.65

Underlined are the municipalities and counties associated with the agglomeration of Warsaw; **bold** are those where the score for municipality is higher than for the respective county

**Table 4:** Some characteristics of selected communes of Mazowsze province, Poland and their WAES+WSOSI website scores.

Commune	Population density (persons km <sup>-2</sup> )	Businesses per 1000 inhabitants	Weighted distance (km)	WAES+ WSOSI score
Nieporeł	127	131	20.2	82
Łochów	89	67	51.7	78
Belsk Duży	63	61	33.6	74
Jabłonna	198	128	12.6	72
Grudusk	40	66	61.1	38
Stara Biała	90	48	15.0	37
Zakrzew	115	62	30.6	35
Korczew	29	11	83.2	35
Rzekuń	67	60	34.5	28
Łąck	52	61	40.0	27
Leoncin	32	73	37.3	24
Sanniki	69	56	70.1	14
Ceranów	22	9	97.4	3

the level of municipality being considered more appropriate for it (the scope of potential information being appropriately narrow). The results from the basic exercise done in 2009 are shown in Table 3.

The municipalities selected for this exercise were representative in the sense that the dominating functions of the respective areas could be classified into (a) service and industry, (b) housing (residential), these being largely associated with suburban areas of larger agglomerations, first of all Warsaw, (c) nature and recreation, (d) (productive) agriculture and (e) periphery, the latter meaning primarily subsistence farming. There were at least two municipalities from each of these, some of them representing mixed functions. Table 4 subsumes the results from the WAES and WSOSI studies for the sample of municipalities.

The ‘weighted distance’ in the fourth column is the harmonic mean of distances to the county seat and to Warsaw (in some cases to yet a third local centre), taken as a proxy for peripherality. As the maximum scores for WAES and

**Table 5:** WSOPi scores of communal websites of Mazowsze province, Poland for information on other entities (as of November 2009).

Commune	Score	Commune	Score
<i>Jabłonna</i>	53	Nowe Miasto	11
<i>Nieporeł</i>	50	Sanniki	10
<i>Nadarzyn</i>	49	<i>Raszyń</i>	8
<i>Łochów</i>	44	Leoncin	7
<i>Żabia Wola</i>	44	Grudusk	4
<i>Korczew</i>	40	Stara Biała	4
<i>Lesznowola</i>	35	Jedlnia Letnisko	0
<i>Belsk Duży</i>	28	Przyłęk	-4
<i>Korczew</i>	24	Rzekuń	-5
<i>Klembów</i>	23	Zakrzew	-7
<i>Klwów</i>	22	Rościszewo	-8
<i>Michałowice</i>	15	Szulborze Wielkie	-15
<i>Olszanka</i>	15	Kuczbork Osada	-16
<i>Ceranów</i>	14	<i>Izabelin</i>	-19
<i>Łąck</i>	14	Wiecznia Kościelna	-23

*italics* denote communes located within/next to Warsaw agglomeration or closely connected with it

WSOSI are, respectively, 40 and 70, the overall maximum is 110. It can be noted that values of all variables are highly differentiated, by about an order of magnitude. Based on the data collected it can be stated that the quality and content of the local authority websites only slightly decreased along the urban-rural axis, but peripherality, especially in conjunction with other aspects (e.g. economic entrepreneurship), has a clear influence on the respective scores (see Ceranów, the bottom line municipality in Table 4).

The next stage of the investigations was to assess the place and role of the local authority websites as a (core) node of a local community network. Firstly we checked the presence and accuracy of information on the local authority website concerning local institutions, services, businesses etc., whether of public or of private character (e.g. transport, health care, education, sports and culture), a kind of extension of WSOSI. For each item, for which address data were provided a point score was attributed. In the case of wrong (e.g. outdated and changed) information negative scores could be assigned. Thus, there were no lower or upper bounds on the WSOPi scores for individual municipalities. Table 5 summarises the results (the WSOPi scores) from this step of our investigations.

The municipalities listed in Table 5 constituted the proper sample of this investigation. The 30 communes were selected on the basis of three criteria: (a) function (roughly analogously as before); (b) association with an urban centre (primarily Warsaw) vs. peripherality; and (c) general socio-economic characteristics (population density, businesses per 1,000 inhabitants etc.). One of the reasons for the WSOPi study was to test the differentiation of the results that could be telling for the investigation of the links between local websites, forming networks. From this point of view the study turned out to be fully successful – the differentiation of scores, shown in Table 5 is quite formidable.

For each municipality listed in Table 5, all live links appearing on its website were checked. The links were classified according to the website they led to, into:

- *Global* or *continental* (e.g. Google, Yahoo, European Commission etc.);

- *National* (e.g. ministries, but also companies and platforms of national reach);
- *Regional* (e.g. provincial authorities, provincial chapters of national services etc.);
- *Local* (e.g. organisations located in and pertaining to the given municipality, to neighbouring municipalities, the county, in which the municipality is located, the neighbouring counties);
- *Internal* (referring to various locations within the same website and/or different bodies associated with the local authority); and
- *Undefined* (the case of some corporate websites, which could hardly be assigned to any of the above classes. None of these, though, seemed to belong among the local links).

We were interested in the *local* links. For each link that led to a functioning website of a *local* organisation we also checked the links appearing there, according to exactly the same classification as above. We thus obtained for each municipality a depth-two graph of local web-based connections. Regarding the graphs obtained for each municipality, we were interested in their *dimensions* (number of nodes), *density* (number of edges compared to the number of nodes), the presence of *feedbacks*, as well as the *role of the local authority website and perhaps other important nodes*.

Altogether some 4,000 websites were encountered (only those that were ‘live’ and correct were accounted for). Yet, only close to 1,800 were singular websites and not repeated references to the same addresses, and of those 780 were classified as *local*, and therefore included in the analysis (which was performed for 29 out of 30 selected municipalities, as in one case the website changed significantly during the observations). A specially developed software application supported the search for the links, but its results had to be checked by an analyst.

We found the results surprising, alas, not in a positive sense, but also very telling. We start with the overview of dimensions of the graphs obtained. Table 6 shows that

**Table 6:** Numbers of websites observed in the study for particular municipalities of Mazowsze province, Poland.

Commune	Number of websites included in the network	Commune	Number of websites included in the network
Jabłonna	3	Nowe Miasto	10
Nieporęt	7	Sanniki	3
Nadarzyn	50	Raszyn	0
Łochów	20	Leoncin	2
Żabia Wola	37	Grudusk	7
Karczew	15	Stara Biala	7
Lesznowola	9	Jedlnia Letnisko	11
Belsk Duży	18	Przyłęk	3
Korczew	3	Rzekuń	2
Klembów	2	Zakrzew	4
Klwów	6	Szulborze Wielkie	2
Michałowice	48	Kuczbork Osada	1
Olszanka	8	Izabelin	7
Ceranów	0	Wieczfnia Kościelna	1
Łack	4		

the ‘local networks’ differed dramatically. Already at the simplest level the range of the number of (local) websites involved is between 0 and 50! This reminds us very much of the results from Table 5 (municipalities in Table 6 are ordered in the same sequence as in Table 5).

We can see the domination of the municipalities associated with Warszawa agglomeration (such as Nadarzyn and Michałowice) or situated on large transport routes (Żabia Wola). At the same time, though, clear exceptions can be observed (e.g. Raszyn on the one hand and Belsk Duży, as well as Nowe Miasto and Jedlnia Letnisko, on the other). These cases might be explained with the factor of culture / smartness, referred to in this paper. It appears also quite justified to note that side by side with a sort of general tendency, explained above (and confirmed also by, say, Ceranów and Wieczfnia Kościelna), there is a broad room for a specific approach or attitude of a given local administration, both in terms of positive and negative divergence from the tendency.

It was, however, also obvious that, generally, the *networks were much smaller than expected*, and there were *many cases of only marginal local networks and of complete lack of them* – so that in such cases one could hardly speak of networks at all.

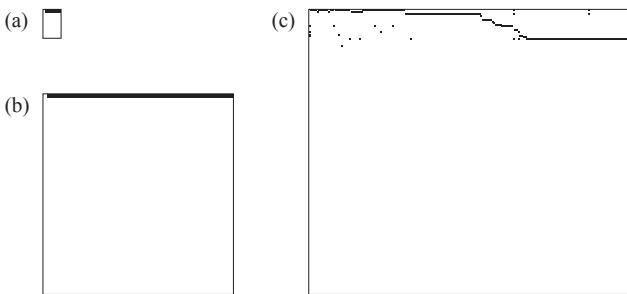
The graphs obtained could be visualised through the incidence matrices, i.e. the square matrices, in which both columns and rows correspond to respective nodes (websites) appearing in the graph and a link between two nodes is a black dot in a specific row and column. Figure 1 illustrates the differentiation of results, i.e. three images of the incidence matrices corresponding roughly to three kinds of such matrices obtained. The three examples were obtained for Nieporęt, Michałowice and Nadarzyn. They provide the flair of the other, essential dimension of differentiation: the complexity of the local networks. Thus, although the list of websites for Michałowice (Figure 1b) is quite long (48), there is, in fact, no network within the scope of analysis undertaken (the two-links depth), just the list of these 48 links from the central node to other entities (the horizontal upper bar corresponding to the links from the municipal website to the other local ones). From this point of view the difference with Nieporęt (Figure 1a) is quantitative, not qualitative (also only links from the municipality website to several other websites).

The case of Nadarzyn (Figure 1c), the most complex network identified, is quite different: there are several ‘returning nodes’ (more than one horizontal line and quite a lot of isolated ‘nodes’ beyond the upper bar) and a kind of sub-network. The role of the municipal node goes here beyond the simple ‘indication of links’. There are only few municipalities for which such networks of links were identified in the sample: Belsk Duży, Łochów and Nadarzyn, and, to a lesser extent, Lesznowola and Żabia Wola. Naturally, the number of websites involved in such cases is well above the average, although even for a small number of websites the ‘returning links’ might occur.

Another interesting group is constituted by municipalities such as Michałowice: those with considerable numbers of websites involved, but completely ‘flat’ structures, namely, for instance, Karczew, Nowe Miasto and Jedlnia. What is the cause? Lack of an adequately enterprising local

community, which would reciprocate the links, at least to a certain extent? Lack of interest for reasons of ignorance, or for justified reasons – that is, a sort of experience that such an activity does not bring tangible results? i.e. ‘culture’?

In this context, the extremely broad differentiation of the municipalities closely associated with the agglomeration of Warszawa, echoing some of the results reported above, seems very telling. The more intricate analyses that were carried out, referring to graph-like structures, only complement the image already provided.



**Figure 1:** Adjacency matrices obtained for the websites of three municipalities in Mazowsze province in Poland: (a) Nieporek (7 websites), a municipality neighbouring upon Warszawa; (b) Michałowice (48 websites), also neighbouring upon Warszawa; and (c) Nadarzyn (50 websites) on a transport axis to/from Warszawa.

## An international comparison

In the course of work reported, a shorthand international comparison was performed involving Romania (Tulcea, Braila and Galati, i.e. three units), Spain (Andalusia, Extremadura and Asturias, altogether 1238 units, some of them, however, very small indeed), the Netherlands (North Holland, 61 communes), and the United Kingdom (North Yorkshire, eleven units). Altogether, close to two thousand basic local administrative units have been checked as to their websites and, wherever applicable, WAES methodology was applied (and some hints and the potential WSOSI study also were gathered). Owiński and Pielak (2011) give more detailed results of this study. Here, we shall only quote one of the conclusions from this study, namely that the websites of the local administrative units in Mazowsze are quite on a par with the European average, as inferred from this study, actually, most of them distinctly exceeding this average as to the content and functionality of the municipality websites. Another conclusion, quite trivial, though, was that the smallest units displayed either a lack of a website altogether, or the minimum standard content and functionality.

## Discussion

The results obtained in the entire study reported imply the following statements, which might be interpreted to an extent as propositions:

- The quality and functionality of the local authority websites, reflecting the effort put into their development and maintenance, is only slightly better for the urban areas than for the rural ones, but peripherality

certainly plays a role;

- There is a very pronounced differentiation of the qualities, associated with the local authority websites, including the networks they might form, for the administrative units featuring very similar location and – to a lesser extent – also functionality conditions;
- The developments, related to urban sprawl, rural ageing, industrial fluctuations and overall business climate, exert a visible influence on the way ICT is perceived and used (as significantly correlated with, on the one hand, closeness to large agglomerations, and, on the other – degree of peripherality), but
- Local, highly persistent community structures, having their own profiles, exert an influence that might even be more tangible;
- There is an impact of the local resources on the website-related qualities, these resources being understood in a broad manner, including natural resources that can be exploited, location rent (again: suburban municipalities), as well as features of the population themselves.

If we wish to check the results obtained, summarised in the propositions above, against the landscape of local cultures, we should try to reconstruct the cultural dimensions from the stage of investigation here reported. Thus, in the sequence of the studies and results reported, we have:

- High urban (Warszawa agglomeration) and urban (e.g. Radom or Płock) culture against the rural varieties (counties such as Sokółka, Ostrołęka or Gostynin);
- Suburban (residential, and service and industrial), recreational and holidaymaking, intensive farming, and subsistence farming, or peripheral; as well as
- Additional location-rent situations, such as related to the main transport routes, or simultaneous closeness to urban areas and natural amenities (forests, lakes etc.).

In relation to Figure 1 the above distinctions of culture ought to be necessarily regarded in the perspective of local broadly conceived resources. Location, in particular, is a very definite resource, with either a positive or negative impact on the development capacities. This is particularly true of the suburban locations with the naturally associated residential, service and petty business functions. Such differentiation explains, in particular, the very pronounced variety of the website-related assessments in both of the extreme here considered spatial positions – the suburban ones and the peripheral ones. If the suburban location is perceived as the sufficient source of advantages, then no other undertaking is worth endeavouring than those directly related to the location (e.g. housing development and planning, associated with them, along with the commercial surfaces). Similarly, in the peripheral situation, nothing shall bring positive effects and the effort spent on advertising, information provision and promotion would appear to be wasted.

The variety and persistence of results, registered and shown here for comparable socio-economic and spatial circumstances, constitute the evidence that local culture, includ-

ing ‘smartness’, exerts a very pronounced impact on the way the local communities function, even if, on the observable surface, little is seen in terms of economic (income and employment) effects, which might be perceived later on or in a broader (spatial) perspective.

Two stories support the above conclusion. Two municipalities, neighbouring upon Warszawa on two geographically opposing sides – one considered until quite recently the richest municipality in Poland, under communism populated largely by inventive and enterprising people, growing flowers and vegetables under glass for the Warszawa market and for exports (yes: these private producers would export their products to GDR, Russia, Czechoslovakia etc through the state-run intermediary). After 1989, with increasing energy costs and opening borders, they turned to different kinds of activities, with a portion of the population still clinging to flower and vegetable growing. They are still considered among the richest communities in Poland, and their municipal website is among the best and quite intensively networking. At the other (geographical) end is a municipality that features extremely low infrastructure indicators (Owsiński, 2008b), a very high number of businesses per population number, and one of the ugliest suburban landscapes. Its municipal authority website is among the weakest and most inactive. The same applies to the suburban municipalities that are (by choice?) the ‘bedroom’ quarters.

Similarly, among the spatially peripheral municipalities, some authorities renounce ICT entirely while others try to use this medium as much as possible, in close correlation with the nature of activities taken up among the population (e.g. leisure and recreation and diversified farming). The attitude thus identified tends to persist, and it definitely applies to a much broader domain.

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