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INSTITUTIONAL AND LOGISTIC CHALLENGES IN WASTE MANAGEMENT

1. Introduction

Human history is a history of increasing population, increasing production and increasing consumption. Production and consumption are accompanied by the creation of waste, and an important question is what has to be done with this waste. Technological advance makes it possible to reduce the amount of waste in the production process and to apply pre-cycling, the reduction of, for example, consumption and production waste by using new, less wasteful packaging materials. However, the continuing increase in consumption and the aspirations of countries in transition like Poland and many developing countries are creating many challenges in the field of waste management. Also many developed countries, like Norway, face an increase in the production of waste [Nagoda, this volume]. What is being done with this waste is important, for example whether it is dumped, or whether it is recycled and re-used, as is more and more the case in highly developed countries. As Nagoda shows, although waste creation has increased in Norway, the increase is being recycled, keeping the waste dumped per capita at the same level. This paper gives an overview of some institutional and logistic problems in waste management with reference to the Polish situation. Institutional factors mainly concern factors influencing human behaviour and the activities of governance structures (like firms, government agencies, non-governmental organisations, government bureaucracy, and all types of organisational structures), and in this way influencing the efficiency of waste management. Logistic problems are discussed in the framework of reverse logistics, which concerns the flow of waste products from the final user of the product back to the producer

who can re-use, re-cycle or combust them or to a waste dump. Finally, some practical problems in Poland are discussed with respect to law and social capital. The argument is that legislation is often insufficient and unclearly formulated, while a lack of social capital (trust and propensity to co-operate) makes it more difficult to introduce new forms of waste management and to create new structures to create sustainable waste management. Data are presented from a survey among 1,116 Polish firms carried out during the first half of 2001. The first question concerns whether these companies trust their employees, suppliers, customers, local government, central government and banks. The second question concerns whether they perceive the tax office, competitors, local government, central government and banks as co-operative.

2. Institutions influencing waste management

Economic activities by human beings, firms, organisations and other forms of governance are influenced by institutions, the rules of the game in society [North, 1990]. In fact the „play of the game” of economic activity is influenced by formal rules of the game (e.g. legal codes, the property rights order) and informal rules of the game (e.g. culture, mentality, ideology, norms of behaviour). However, human beings themselves may also be influenced by their genetic inheritance, other inborn and acquired human capabilities, and markets and other governance structures (the play of the game).

Of all factors influencing human behaviour, genetic factors change most slowly. An important question is to what extent our genes influence our behaviour. For example, is our behaviour concerning waste production and re-use and the “larger environment” based on genes developed at the time of the “gatherer-hunter” when the earth was “unlimited” and resources available for free from nature, due to the small human population? In this case we are rather likely to have a predisposition for increasing consumption without taking the consequences into consideration, making more sustainable waste management more difficult.

Inborn and acquired human capabilities are another factor influencing human behaviour. For example, people are not able to process all the information relevant to making decisions [Simon, 1950]. In such a case people are likely to use rules of thumb or routines [van de Mortel, 2000], thus people fall back on mental models, i.e. their cultural background, mentality, norms of behaviour, etc. In this context it can be argued that people are bounded rational, which means that their behaviour is intendedly rational but only limitedly so [Williamson, 1998]. People do not have perfect knowledge about the past, present and future. Thus, deci-

sions are based on available knowledge and information. Furthermore, skills are limited and people make mistakes. The effect of a decision may turn out to be sub-optimal. Another problem is opportunistic behaviour. In other words, people tend to lie and to cheat [Molho, 1997]. This is another factor that makes the introduction of sustainable waste management systems more difficult, and for this reason, technically superior solutions may in practice be inferior to other alternatives. When designing a system, it is important to take such factors into consideration.

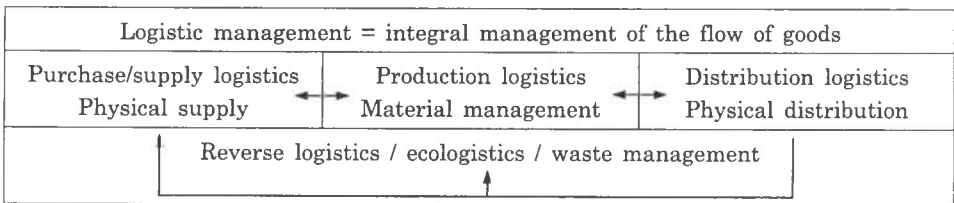
Another field of discussion is to what extent formal and informal institutions stimulate or hamper the development of waste management. For example, experiences from the past, which cumulated in what we call culture, mentality, norms of behaviour, etc., influence people's way of life, which in turn influences the „production“ and management of waste. For example, a culture that values (an increase in) consumption highly is not very likely to help reducing the problem of waste. Do we believe that nature has to serve man, or has man to live in harmony with nature? Is the “ever expanding consumption society” becoming a global phenomenon? In such a case the ever expanding waste creation is also likely to become a global phenomenon. These informal institutions, together with formal institutions, provide incentives for economic activity, and thus also for waste management. Experiences and incentives influence the degree of co-operation, co-ordinated social behaviour, and responsiveness to concerns about processes. In other words, they influence human behaviour [Ben-Ner and Putterman, 1998]. An example of incentives provided by formal institutions is the question what type of property rights are likely to create the least amount of waste. In the case of private property, the owner is more likely to take care of it than in the case of public or common property, because he/she is more directly affected by the consequences of his/her behaviour. However, when property rights are not completely established, for example due to holes in the law or difficulties with law enforcement, problems are likely to come into being. Furthermore, waste trade is a well-known phenomenon. For example, selling it to a foreign country where someone is willing to dump waste for financial gain, but negative the effects are borne by the rest of the population when they do not have enough opportunities to defend their rights.

Finally, markets and the governance structure in which waste management takes place are important. Waste management can take place in many different organisational forms, but in general co-operation between different economic actors is important. Market prices, together with incentives provided by, for example, government regulations, determine whether it pays to recycle dump waste. In the management of waste, logistic solutions are important, which are discussed in the next section.

3. Waste Management in the Logistic Chain

Generally speaking, production and consumption create waste. In the process of waste management, waste can be pre-cycled and re-cycled, and there is "unusable waste", which has to be stored or destroyed. When handling waste, it has to be taken into consideration that there are short-run costs of waste management (e.g. landfills, wastewater) and long-run threats (e.g. nuclear waste) with many unknowns. Future technological development is important for creating possibilities of using currently unusable waste. One factor making waste management more complicated is that when the availability of resources diminishes, there will be stronger incentives for re-cycling. Generally speaking, technical, organisational and human factors influence the sustainability of waste management. Table 1 gives a simple representation of waste management in the logistic chain. Logistics concerns the flow of goods from the producer of primary goods to the final customer. In the production process waste is produced, and during consumption waste is produced. This waste is „reversed” in the logistic chain (or not when it is illegally dumped, for example), and this process concerns waste management.

Table 1. The logistic chain



Source: Adapted from van Goor et al., 1998, 5.

The flows of goods are accompanied by flows of information (e.g. information connected with how waste has to be transported to which place and what has to be done with it, what problems are involved, who is responsible for what, organising the whole venture and so on). When information is distorted, problems appear with waste management. In the logistics of waste management two types of problems can be distinguished: „hard logistic” problems and „soft logistic” problems. “Hard logistic” problems concern infrastructure, information systems and available technology. “Soft logistics” problems concern the institutions discussed above, like problems with co-operation, consciousness, human behaviour, incentives given by institutions, etc. When, for example, “soft logistic” problems exist, the introduction of new technological solutions

is difficult. Solving "soft logistic" problems may have larger positive effects than introducing new technologies, especially given the limit on funds [See Boehme et al., 1998]. Furthermore, when we do not know how to make use of current technical opportunities, how can we expect to make use of more advanced technologies?

4. Selected problems in Poland – law and social capital

4.1. Law

A proper legal framework with clear rules, which are enforced, stimulates efficiently functioning waste management. However, when looking at the creation of laws, it seems that they often are created based on a vision of an "Idealtyp" [Wyrzykowski, 1995] and shaped by interest groups. When creating new legal acts, their practical implications (e.g. reaction of individuals, practical problems with information dispersion, lack of skills of people who have to enforce the law, lack of logistic structures for implementation) do not often seem to be taken into consideration. Furthermore, for example when approximating EU laws, there exists a danger that laws are created simply because they have to be created. As a result, problems can be expected with their implementation and enforcement. Such a situation certainly does not support the creation of efficient waste management, but will rather lead to higher transaction costs (the costs of making an exchange [Barzel, 1989] consisting of information, negotiation and control costs) and adverse incentives when the newly developed legal system is unclear, contains contradictions and is difficult to enforce.

Another problem is a lack of physical and human capital, incompetence, unfriendliness and corruption in public administration, which increases costs for economic actors involved, complex and unclear tax law, as well as a customer unfriendly tax collector, and an inefficient judiciary.

4.2. Social Capital

Although many definitions exist, the emphasis is on trust as a factor determining social capital. Trust can be defined at the individual and the social level. At the individual level, trust is important in an economic transaction, as it concerns the "mutual confidence among parties to an economic transaction" [Raiser, 1999, 3; see also Paldom and Tinggaard Svendsen, 2000, 342]. On the social level trust can be defined as "social capital facilitating the provision of collective goods" [Raiser, 1999, 3]. In

other words, it is "the capability that arises from the prevalence of trust in a society or in certain parts of it" [Fukuyama, 1996, 26].

Zucker [1986, discussed in Raiser, 1999, 4–5] and Raiser et al. [2001, 2–3] distinguish three types of trust, ascribed trust, process-based trust and extended (generalised) trust, presented in Table 2. Following Raiser, social capital in the form of trust can be formal and informal. Informal social capital concerns ascribed trust and process-based trust. Ascribed trust concerns transactions between individuals having family ties or close friends. Process-based trust is trust which is built-up in repeated transactions, and is a form of transaction-specific investment. Trust helps to build up a reputation, which has a signalling function. Informal social capital is rather a private good, but also has features of a public good. It is a private good in the sense that it is an investment in social networks by individuals [Bordieu, 1993]. In such a case transaction costs are lower. For example, as the characteristics of the contract partner are known, information costs are very low, and know-how transfer is easier. Furthermore, when there is trust that the partner will not lie or cheat (no opportunistic behaviour), no special contractual safeguards are required. Monitoring costs in case of trust are low, as contracts are rather "self-enforcing", for example because of the fear of loss of reputation, which is a business-asset. Trust in workers can be motivation enhancing, while the organisation can be organised more flexibly and responsibilities can be transferred to lower levels in the hierarchy, due to the reduction of the agency problem. A lack of trust creates barriers to co-operation. This has an influence at all levels of social and economic life. Not only transaction costs of using the market increase and adaptive efficiency deteriorates, but within organisations agency problems may increase (increasing managerial transaction costs) and political coalitions may become more difficult (increasing transaction costs in the political process), making it more difficult for the government to step in where the market fails (e.g. when there are high transaction costs of using the market).

However, ascribed and process-based trust can lead to the exclusion of individuals who are not a "member of the club", in other words, a low propensity to co-operate. This can hamper innovation, adaptive efficiency (the ability to change governance structures when (relative) transaction costs change as a consequence of technological and/or institutional development) and expansion of governance structures.¹ For example, family firms are not likely to be open to non-family members. As a consequence, small firms are to prevail. In other words, there is a lack

¹ In such a case markets may fail more often, making bureaucratic solutions (e.g. government), with its lower-powered incentives, more attractive.

of spontaneous sociability, "the capacity to form new associations and to cooperate with them within the terms of reference they establish" [Fukuyama, 1996, 27]. In former socialist countries, for example, many people relied on family and close friends, as participating in broader networks was risky because of the suppressive system. At the "top of society" there was a closed nomenclatura network. These networks are not open to outsiders, while often being non-transparent. As Raiser et al. [2001] argue, when such "connections" exist with public officials, this can lead to corruption and clientelism, and undermine trust in public institutions. As Rose-Ackerman argues, "otherwise admirable norms of behaviour can, under some conditions, prove costly for economic efficiency and development" [1998, 303]. This also may lead to situations where people in certain positions assign positions to people they trust (e.g. friends). Trust is important here, because people rather cover each other in connection with corrupt deals [Ibid., 305]. Informal social capital also has public good features, as at the local level it may facilitate collective action and the provision of public goods in small communities [Coleman, 1998]. All in all, informal social capital can have positive and negative effects on economic performance, making the effect uncertain.

Formal social capital concerns extended trust and confidence and trust in the property rights order, government institutions, etc. This type of trust reduces uncertainty, questioning of contracts, rules, etc. (leading to court cases), and in turn lowers transaction costs. Social capital can, for example, reduce the problem of rent-seeking. When there is a strong value of mine and thine, you do not have to care so much about leaving the door of your house or car open, as can still be observed in small some villages. Furthermore, equity may be promoted, which may tighten social cohesion and reduce the cost of social antagonism. Extended trust lowers control costs, as it facilitates the enforcement task of "institutional governance" like the judiciary or government agencies. Relying only on formal procedures for contract enforcement can be very costly. On the other hand, as Raiser et al. [2001] argue, efficient "institutional governance" supports the building of extended trust. Process-based trust is a necessary, but not sufficient condition for extended trust to develop. Experience with "institutional governance" and credibility is in fact also a process, thus the creation of trust in public institutions is to a certain extent also "process-based". When "institutional enforcement" is efficient and credible, this lowers the incentives for opportunistic behaviour, and in turn the related transaction costs. Extended trust and propensity to co-operate can improve adaptive efficiency, as networks are more open to outsiders. Governance structures can react faster to technological and institutional changes, and new transaction cost minimising solutions may be intro-

Table 2. Different types of trust

Type of trust	Definition	Influence on transaction costs and adaptive efficiency
Informal social capital – Ascribed trust	Trust with both private and public good characteristics. Between family members (kinship), close friends.	Lowers costs of transactions between individuals. Relational capital – inefficient when restricting outside options, because these would hamper one's reputation. Can lead to corruption, etc.
Informal social capital – Process-based trust	Trust with both private and public good characteristics. Between individuals who have repeatedly concluded transactions with each other, not being loyal to a specific group	Unclear effect on economic performance.
Formal social capital – Generalised or extended trust; confidence and trust in formal institutions and “institutional governance”; etc.	Trust as a public good, facilitating transactions with unknown or little known individuals or organisations. This type of trust can be enforced by religious values, belonging to the same social/cultural group, etc.	Extended trust facilitates efficient third-party enforcement. Lowers transaction costs. Efficient third-party enforcement stimulates extended trust. Supports institutional equilibrium. Positive effect on economic performance.

Source: adapted from Raiser [1999] and Raiser et al. [2001].

duced faster [for the economic importance of social capital, see Casson, 1993; Putnam, 1993; Fukuyama, 1996; Raiser, 1997; Raiser, 1999; Paldom and Tinggaard Svendsen, 2000; Raiser et al. 2001]. Overall, formal social capital positively influences economic performance.

Summarising, a high level of trust facilitates the introduction of new solutions for solving problems. For example, when people trust each other, they do not have to control whether others do their job or to spend resources in order to prevent cheating. A high propensity to co-operate, for example, facilitates the creation of new governance structures and logistic frameworks for solving problems or introducing new solutions (e.g. techniques, laws). When there is low trust and a low propensity to co-operate, problems can be expected in this field because of the higher (transaction) costs of developing and implementing, for example, new systems of waste management.

4.3. The survey

Between January and July 2001, a survey was carried out among 1,116 Polish companies. Firms from different places were approached.

Wrocław (408 questionnaires), Opole (289 questionnaires), Wieluń (216 questionnaires), Upper Silesia (86 questionnaires), a rural region in Great Poland (101 questionnaires); and other (16 questionnaires). The questionnaires were filled out by owners (75.5%), managers (15.4%) and others (6.4%). About 2.7% of the respondents did not report their status in the company.

The majority of the sample consists of companies employing between 0 and 5 employees (746–66.8%). A total of 153 firms (13.7%) employed between 6 and 10 employees, 84 (7.5%) between 11 and 20 employees, 36 (3.2%) between 21 and 50 employees, 26 (2.3%) between 51 and 100 employees, 21 (1.9%) between 101 and 200 employees, 9 (0.8%) between 201 and 500 employees, 4 (0.4%) between 501 and 1000 employees, and 10 (0.9%) more than 1000 employees. The question was left unanswered by 27 firms (2.4%).

In order to find out whether low- or high process-based trust and trust in government prevails among entrepreneurs, influencing transaction costs the opportunities for developing new governance structures, questions were asked regarding who is trusted (their own employees, suppliers, customers, local government, central government, competitors, banks) and, in the experience of the firms, how co-operative the tax office, competitors, the local government, the central government and banks are. With respect to trust, a scale from 1 to 7 was used, 1 expressing complete distrust, 7 meaning complete trust. A 4 can be interpreted as not trusting, but also not distrusting. Table 3 presents all the answers, while Table 4 presents the mode (the value that occurs most often), the median (the middle value) [Crawshaw and Chambers, 1994] and the mean with respect to trust. Using the chi-square goodness-of-fit test, a dependency between the type of "player" in the economy and the level of trust was observed at a 1% level of significance.

It has been suggested earlier that former socialist countries inherited a relatively poor state of social capital. Based on data from World Values Survey 1990 and 1995, Raiser et al. [2001, 4–7] argue that the degree of trust is significantly lower than is the case in OECD countries. Extended trust in the sense of the percentage of the population that think that people in general can be trusted declined between 1990 and 1995 in both transition and market economies. Poland saw the percentage decline from 34.5 to 17.9. Economic performance is not an explanatory variable, as Poland at that time was booming, while Russia showed a similar decline while its economy stagnated. Raiser [1997, 23] shows with data that most people neither trust, nor distrust political institutions like government, parliament, civil servants and the police. Based on data from World Values Survey 1995, New Democratic

Table 3. Who is trusted

	1	2	3	4	5	6	7	Total	NA
Employees	19 (1.8%)	23 (2.2%)	52 (4.9%)	142 (13.5%)	180 (17.1%)	206 (19.6%)	431 (40.9%)	1,053 (100%)	63
Suppliers	25 (2.4%)	41 (3.9%)	129 (12.2%)	245 (23.1%)	295 (27.8%)	183 (17.3%)	142 (13.4%)	1,060 (100%)	56
Customers	18 (1.7%)	48 (4.5%)	153 (14.4%)	277 (26.0%)	290 (27.3%)	173 (16.3%)	105 (9.9%)	1,064 (100%)	52
Local Govt.	255 (24.1%)	202 (19.1%)	232 (22.0%)	199 (18.8%)	93 (8.8%)	37 (3.5%)	38 (3.6%)	1,056 (100%)	60
Central Govt.	353 (33.6%)	245 (23.3%)	210 (20.0%)	127 (12.1%)	68 (6.5%)	23 (2.2%)	25 (2.4%)	1,051 (100%)	65
Competitors	326 (30.8%)	195 (18.4%)	228 (21.5%)	188 (17.8%)	78 (7.4%)	22 (2.1%)	22 (2.1%)	1,059 (100%)	57
Banks	57 (5.4%)	56 (5.3%)	97 (9.1%)	173 (16.3%)	271 (25.5%)	234 (22.0%)	175 (16.5%)	1,063 (100%)	53

NA = no answer; 1 = complete distrust; 7 = complete trust

Table 4. Who is trusted – mode, median and mean

	Mode	Median	Mean
Employees (n = 1053)	7	6	5.64
Suppliers (n = 1060)	5	5	4.76
Customers (n = 1064)	5	5	4.52
Local Government (n = 1056)	1	2	2.94
Central Government (n = 1051)	1	2	2.51
Competitors (n = 1059)	1	3	2.67
Banks (n = 1063)	5	5	4.83

1 = complete distrust; 7 = complete trust

Barometer 1996 and Environment and Enterprise performance survey 1999, Raiser et al. [2001, 16] conclude that trust in public institutions in former socialist countries is not significantly lower than in OECD countries. Studies from 1995 and 1999 on trust in the Belgian parliament, the Belgian government and the Flemish government suggest a situation of neither trust nor distrust [Kampen et al., 2001; Kampen and Molenberghs, 2002]. On the scale from 1 to 7, the level of trust would be around 4. In a survey carried out in 9 former STEs on trust in formal institutions among 10,087 individuals in 1993 the mean for all those countries is 3.4 (standard deviation 1.8) on a scale of 1 (maximum distrust) to 7 (maximum trust) as used here. Mean for Poland was 3.5 (standard deviation 1.6). Concerning civil servants, the mean for all countries was 3.5 (standard deviation 1.6), and for Poland also 3.5 (standard deviation 1.4).²

The data of the survey presented here suggest that in 2001 trust in the government (local and central) was lower among entrepreneurs than was in general the case in 1993, with a mean of 2.9 for trust in local government and a mean of 2.5 for trust in the central government. Although the sample in this study is different, it may be that the lower level of trust is connected with disappointment with government policy. At the time the survey was conducted, for example, the media reported a lot on huge problems with the government budget (it was made publicly that it would be twice as big as assumed, while regularly reports on corruption were published).

Employees were trusted the most of all, which is not so surprising because they are the closest to the employer/manager. The mode is 7,

²Data from Paul Lazarsfeld Society, Vienna, New Democracies Barometer III, 1994 and Rose et al., 1997, 17. Presented in Raiser et al., 1997, 24.

which means that the largest proportion of the firms in the survey have complete trust in their personnel. The median is 6, which can be interpreted as a reasonable, but not very high level of trust. The trust in own employees is higher than for the other categories.

Banks and suppliers were second, with a mode and median of 5. Although the means for banks and suppliers are similar, there is difference in the distribution of trust. Firms tend to give more extreme marks to banks. Banks more often received 1 and 2 (very low trust) and 6 and 7 (rather high trust), while suppliers more often received 3, 4 and 5. An explanation may be that the experience with banks may differ greatly from bank to bank. Another possible explanation is connected with the result of a survey among 1037 Poles held in March 2002 by the OBOP (Centre for Public Opinion Research) [OBOP, 2002]. According to this survey more than two third of the Poles trust public banks. Only 38% trust private banks, while 39% distrust private banks. The difference between private and public banks was not taken into consideration in this survey. The data imply that some trust in banks and suppliers exist.

Trust in customers is on a similar level when looking at the mode and the median. However, when comparing trust in customers with trust in banks, a similar observation is made as for the comparison between suppliers and banks. More firms assess banks with very low trust (1 or 2) or high trust (6 or 7), while customers receive more 3, 4 and 5. Clients seem to be a little bit less trusted than suppliers, as suppliers receive more 5, 6 and 7, while customers tend to be assessed with lower values.

There is a tendency that the "farther away" a market party or institutions from the firm (implying less repeated dealing), the lower the reported trust. While trust in customers is on a rather low level, local government, competitors and central government are distrusted. The mode for the three last categories is 1, implying that a large proportion of all companies completely distrusts those parties. Both local and central government have a median of 2, while competitors have a median of 3. The largest amount of firms has absolutely no trust in the central government, followed by competitors and the local government.

Summarising, some process-based and personal trust in economic partners seems to exist, creating room for development and co-operation. However, a question remains how open networks are. If networks are closed and not transparent, this may hamper the development of new governance structures. Low trust in competitors has positive and negative aspects. The positive aspect is that this hampers co-operative behaviour in the form of collusion, price agreements, creating barriers to en-

Table 5. Perceived co-operativeness of institutions

	1	2	3	4	5	6	7	Total	NA
Tax Office	182 (17.4%)	119 (11.4%)	184 (17.6%)	235 (22.4%)	164 (15.6%)	107 (10.2%)	57 (5.4%)	1,048 (100%)	68
Competitors	362 (34.7%)	197 (18.9%)	201 (19.3%)	159 (15.2%)	88 (8.4%)	24 (2.3%)	13 (1.2%)	1,044 (100%)	72
Local Govt.	417 (40.4%)	231 (22.4%)	180 (17.4%)	110 (10.6%)	60 (5.8%)	21 (2.0%)	14 (1.4%)	1,033 (100%)	83
Central Govt.	550 (53.8%)	195 (19.1%)	137 (13.4%)	79 (7.7%)	36 (3.5%)	19 (1.9%)	7 (0.7%)	1,023 (100%)	93
Banks	120 (11.4%)	62 (5.9%)	137 (13.0%)	206 (19.6%)	205 (19.5%)	205 (19.5%)	117 (11.1%)	1,052 (100%)	64

NA = no answer; 1 = totally not co-operative; 7 = very co-operative

try, etc. However, as many firms are small, they may have difficulties in facing the challenges of increasing regulation and increasing competition in the process of EU accession. The very low trust in the different levels of government is worrying, as it hampers third-party enforcement of contacts, negatively influencing economic performance.

The general tendency concerning low trust in the government is confirmed when looking at the results on the question about how co-operative, in the experience of the company, are the tax office, competitors, local government, central government and banks (Table 5 and 6). Respondents had the possibility to choose on a scale from 1 (totally non-co-operative) to 7 (very co-operative), with 4 implying neither being non-co-operative nor co-operative. Using the chi-square goodness-of-fit test, dependency between the type of institution and co-operativeness has been observed at a 1% level of significance.

Table 6. Perceived co-operativeness of institutions – mode, median and mean

	Mode	Median	Mean
Tax office	4	4	3.6
Competitors	1	2	2.55
Local government	1	2	2.31
Central government	1	1	1.96
Banks	4	5	4.27

1 = totally non-co-operative; 7 = very co-operative

Banks were reported to be most co-operative. However, a mode of 4 and a median of 5 imply co-operativeness on a relatively low level. Tax offices are rather on the level of being neither co-operative nor non-co-operative, although almost 17% of the respondents perceive the tax office to be totally non-co-operative. Tax offices are considered to be less co-operative than banks. Competitors, local government and central government are considered to be non-co-operative, with competitors scoring the highest of the three, followed by local government and central government with very low perceived co-operativeness. More than 53% considers the central government to be completely non-co-operative, while this percentage for local government is 40% and for competitors almost 35%. These low averages may suggest a low level of co-operativeness when those stakeholders are involved in eventual new economic initiatives, hampering economic development and possibilities for creating a sustainable system of waste management.

5. Concluding remarks

This paper presented institutional and logistic challenges in waste management. Many problems were identified which may hamper the introduction of efficient sustainable waste management, connected with human behaviour, problems of gaining information, institutional factors, logistic problems, and so on. Problems with the creation of adequate laws and a lack of trust and propensity to co-operate regarding the introduction of new solutions in waste management in Poland were identified. The aim of this paper is not to sketch a negative picture with the conclusion that everything will fail. It is important to identify existing and potential problems when trying to improve the management of waste so that one can attempt to avoid or reduce those problems. For example, a positive sign is that some process-based trust exists. This creates opportunities for developing larger networks needed for developing a sustainable system of waste management.

Trust in local and central government and competitors is on a very low level. Banks are considered to be a little bit co-operative, tax offices rather neither co-operative nor non-cooperative, while competitors, local and central government are valued very low. The data for the tax office, local and central government may suggest a (perceived) inefficient public administration more interested in maximising their budget than supporting entrepreneurship. With such a poor state of social capital it is likely that more resources are spent on contractual safeguards and negotiation costs when dealing with different levels of government as well as with unknown trade partners, or with establishing private-public partnerships. But also problems may arise with competitors when co-operation for a larger venture is needed as low trust in the government may imply difficulties with third-party enforcement. Trust is needed for developing a sustainable and efficient system of waste management on the local level. The government may have an important task in stimulating co-operative solutions within networks and promoting trust by information provision, participating in organising fairs, etc.³

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