

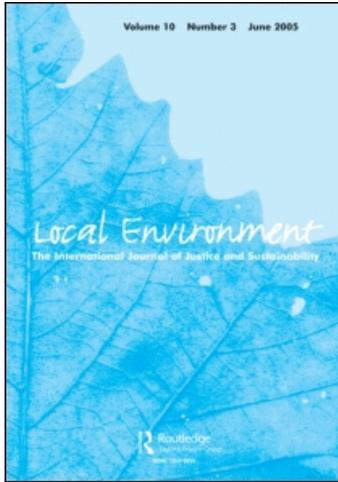
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Local Environment

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713394137>

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Online publication date: 29 April 2011

To cite this Article Hoppe, Thomas and Coenen, Frans(2011) 'Creating an analytical framework for local sustainability performance: a Dutch Case Study', *Local Environment*, 16: 3, 229 – 250

To link to this Article: DOI: 10.1080/13549839.2011.565466

URL: <http://dx.doi.org/10.1080/13549839.2011.565466>

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Creating an analytical framework for local sustainability performance: a Dutch Case Study

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Local governments play a key role in the implementation of sustainable development. Here, we investigate the factors that influence local sustainability performance. Sustainability performance is defined as a combination of both policy output and policy outcome. We then investigate how it has developed in the Netherlands and the factors that influence it. We use theoretical insights from Public Management and Policy Networks to derive an analytical model. Data are taken from a nation-wide monitoring tool to explore local sustainability performance. The study demonstrates that municipality size and network membership positively correlate with local sustainability performance. Furthermore, it turns out that the sustainability field does not attract equal attention in all areas, and that “frontrunner” local authorities are distinguished by the additional attention they pay to issues related to corporate social responsibility. Finally, methodological pitfalls were identified in the practice of local sustainability monitoring, which could help improve future research.

Keywords: local sustainability performance; Local Agenda 21; self-reporting; monitoring

1. Introduction

If sustainable development is to be achieved, government must pursue its policy at all levels and scales and through all tiers of the administration. Governments will also have to acknowledge their responsibility at all levels: international, national and local. The local authority plays a special role: it is at the local level that many sustainability problems are manifested. Global issues, like climate change and biodiversity loss, lead to problems at the local level, such as flooding and poor agricultural yields.

In this paper, we are interested in measuring differences in the sustainability performances of municipalities and the underlying causes. Here, we consider the sustainability performance of municipalities as a combination of policy outputs and policy outcomes. The implementation of local sustainability could eventually exert positive effects on all dimensions of sustainable development. It is difficult to measure policy performance only in terms of actual policy outcomes, though. We have to be able to establish the chain of cause–effect relations between policy outputs and policy outcomes. This is a difficult process due to intervening factors and the typical long-term effects of most sustainability policies. Performance therefore also needs to be measured in terms of actual local activities and policies.

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This institutionalisation of sustainable development activities and policies in a municipality does not guarantee that the municipality will be more sustainable than other municipalities in the future, but the level of institutionalisation and activities shows which municipalities can be viewed as early adopters or frontrunners, as compared with other municipalities.

The data used here are drawn from a Dutch data set on local authorities' sustainability performance. As there are great differences in the ways local authorities deal with sustainability issues – some authorities may be viewed as frontrunners while others lag behind – we introduce a categorisation of the intensity with which local authorities adopt sustainability policy measures. The categorisation is used to analyse differences between local authorities.

We use self-reported data on local sustainability in the Netherlands to explain the differences in the sustainability performance of Dutch municipalities. This paper addresses a number of questions. The main question is: which factors influence the variation in local sustainability performance? In order to answer the main question a number of sub-questions are addressed. First, which factors influence the variation in local sustainability performance? Our starting point is the data set provided by a Dutch sustainable performance tool, called the Local Sustainability Meter (“Duurzaamheidsmeter”), for which we construct a specific categorisation to compare and analyse sustainability performance between local authorities. Next, we use two sets of theoretical explanations on local governance performance. The first set is taken from the public management theoretical approach and addresses intra-organisational factors. The second set focuses on policy networks and multiple actor theories and concerns inter-organisational factors. Answering this question supplies us with an explanatory analytical model (Section 3), which allows us to derive a number of propositions. Section 4 introduces the research design and methodology. The second research question we address concerns how local sustainability performance can be measured, categorised and compared by using indicators and what can be learnt from it. Experiences gained from using the Dutch tool in practice are described (also Section 4). Our third research question relates to how the propositions from the analytical model are supported by empirical evidence from the data set on local sustainability performance. The concluding section presents a summary of the main findings, as well as suggestions for future research. We start our paper with a general review of the development and practice of implementing local sustainability policies in the Dutch context. This retrospective survey helps us conceptualise an analytical model to explain local sustainability performance.

2. Local authorities, the environment and sustainability in the Netherlands

When traditional environmental policy was first being developed, the problems initially became manifest at the local level, and it was local government that went into action (Coenen 1999). The activities of citizens and businesses, such as slaughterhouses and leather tanneries, posed a threat to environmental hygiene and caused a nuisance to other citizens. The city fathers started to act as a mediator between the citizens and as representative curator of the public interest.

2.1 Development of local sustainability in the Netherlands

During the industrial revolution, certain citizens started to develop significant industrial activities, leading to negative externalities, such as noise, soil pollution and air pollution. Right up to the 1950s, environmental problems were largely defined in terms of nuisance, with local authorities taking a leading role in implementing the Nuisance Act (which had

already been passed in 1875); this act embraced a permit system that imposed the obligation on enterprises to reduce nuisance to their local environments. Starting in the 1960s, international attention and a growing awareness that environmental problems posed a threat to our ecosystems changed thinking about the scale and interrelatedness of environmental problems. In 1971, the Ministry of the Environment was established, which catalysed environmental policy in the Netherlands. A consequence was that environmental permit systems became part of other, non-environmental policy domains, such as construction and housing. As complexity increased, necessitating greater levels of expertise, the role of local government was limited to the execution of tasks imposed by higher levels of government. Moreover, many responsibilities for environmental policies were passed to other, de-central governments than municipalities, although the municipalities remained responsible for the implementation of most environmental policy. This predominantly concerned legislation (granting permits, compliance and enforcement) on small-sized installations with direct, short-term effects on environmental hygiene.

In the late 1970s, local environmental policy implementation encountered serious problems, as funding was cut, leading to a lack of personnel and a consequent lack of compliance and enforcement of legal standards. As a result, national government introduced an intergovernmental subsidy scheme (BUGM) in 1986 to enable municipalities to formulate integrated plans for implementing legal environmental policy (the Nuisance Act permit system) in order to improve its feasibility. Local governments were to follow guidelines and meet policy output indicators set by national government, such as the number of permits granted, control of legal compliance and handling of complaints made by citizens. Furthermore, the BUGM scheme introduced cooperation between municipalities to reach a scale of more than 70,000 inhabitants. Like previous environmental policies, the scheme emphasised narrow-issue, short-term environmental hygiene topics (Menkveld *et al.* 2001).

In 1987, the Brundtland Report was published (WCED 1987), which put sustainable development on the political agenda. The Netherlands was one of the first countries to take up the sustainable development themes from the Brundtland Report, devoting a great deal of political attention to them (OECD 1995a, 1995b). The report “Care for tomorrow” (“Zorgen voor morgen”; RIVM 1988) presented a picture of the consequences for the sustainability of Dutch ecosystems. This report formed the foundation for the first National Environmental Policy Plan (VROM, Ministerie van, 1989), which emphasised the importance of getting local governments involved as it stated that it would be impossible to conduct national policy without a contribution from the local authorities. The tasks of local governments were set down in implementation plans under the umbrella of the National Environmental Policy Plans (Coenen 2008). The package of tasks involved went further than the traditional environmental tasks undertaken by the local authorities, also embracing many tasks in other policy areas, such as mobility and local planning. Extra money was made available by national government to support municipalities in meeting the expectations based on the efforts that they needed to make under the NMP (FUN subsidy scheme, 1990). The FUN subsidy enabled municipalities to meet performance standards on environmental management systems, support for the implementation of energy efficiency policies, formulation of energy efficiency plans and communicating with citizens on energy efficiency. Like the BUGM scheme, the FUN scheme also aimed at improving local capacity.

International documents paid increasing attention to the importance of local authorities in achieving sustainable development goals. Chapter 28 of Agenda 21 (UNCED 1992), the sustainability agenda signed in Rio de Janeiro in 1992 by all countries, stated the important argument that the local authority’s role is so significant thanks to its direct relationship with

the citizenry. Agenda 21 thus stated that the local authority's task in relation to its approach to sustainability is a relative one, depending on ecological, political, geographic and economic conditions (Lafferty 1999).

In 1993, the BUGM and FUN schemes were evaluated. It was considered that the implementation of both instruments had not been very effective. As a consequence, the national government decided to embark on a new, specially hypothecated intergovernmental subsidy scheme, VOGM. Although the goals and tasks (environmental performance indicators) remained the same, a further task was added: implementation of Agenda 21 in local government output. Furthermore, the VOGM scheme embraced checks and inspections of the municipality councils' performance, and encouraged collaboration between local governments (Coenen 2000). It also gave more discretionary authority to municipalities. In comparison with other Western-European countries, the diffusion of Local Agenda 21 to local authorities in the Netherlands was successful as principles were adopted relatively early and by relatively many local authorities. The Netherlands was considered a "pioneer country" (Lafferty and Coenen 2000).

After the VOGM scheme ended in 1998, no further, broad-issue subsidy scheme on environmental policy was implemented. Moreover, local environmental policy was to be financed by the municipalities by general local means ("Gemeentefonds"). In the meantime, the topics that could be considered under the umbrella of sustainability policies had expanded. This was in line with a general tendency in Dutch public administration: decentralisation, local independence, co-regulation and monitoring. This meant that municipalities gained even more discretionary authority, which enabled them independently to prioritise environmental policy targets (which no longer depended on performance indicators based on the hypothecated subsidy schemes; Menkveld *et al.* 2001). Some inter-governmental subsidy schemes were again implemented to encourage municipalities to formulate their own sectoral policy plans, creating specialised local capacity with the aim of achieving a sufficient level of policy output over the long term. For example, one such subsidy scheme on local climate policy was introduced in 2004 (BANS) and continued in 2008 (SLOK). Unlike previous subsidy schemes, these require local authorities to make additional investments, as they require co-financing. This had led to a vast number of municipalities not participating, especially those with few inhabitants.

Local authority environmental policy has changed over the years. In the first place, the narrow focus on environmental hygiene has broadened to embrace sustainable development. Second, the instruments that are used by local authorities have changed as conventional permitting/licensing has been accompanied by other instruments such as information provision, covenanting, environmental management and subsidy schemes. Third, the discretionary power of local authorities has changed as they now have wider discretion to determine what environmental goals to pursue and how to do so. Fourth, local authorities are no longer the sole executors of environmental policy, as other de-central and functional governments have also become involved. Moreover, a tendency of national government in the 1980s was to accommodate environmental policy implementation in regional administrative bodies, the so-called city regions. As a matter of fact, a recent discussion concerns the issue of whether local authorities should actually continue to implement environmental policy, or whether responsibilities should be shifted to regional governments.

Another problematic issue of importance to local governments relates to external integration of environmental policy in other policy domains. Only "windows of opportunity" – such as a new national environmental policy plan or international attention, e.g. EU guidelines or UN conferences – may focus attention on this problem, as there is an

evident lack of environmental policy integration, and local administrators often do not have the means to keep sustainability issues on the policy agenda. This is a major concern, as environmental policy integration requires careful orchestration and coordination, since environmental goals have to compete with other – mostly economic – policy goals. In order to achieve local sustainability goals, it is important to penetrate the walls between policy domains (Knudsen 2009). Furthermore, although municipalities now have to formulate local environmental policy plans, this does not always relate to sustainability issues as yet. This is partly due to a lack of incentives to assist local authorities to formulate their own sustainability policy plans, let alone complying with these plans.

3. Theoretical insights to explain variation in local sustainability performance

In this section, we discuss theoretical arguments relating to local governments' sustainability performance. First, we introduce a categorisation of sustainability performance. We distinguish here between "frontrunner" and other categories of sustainability performance. Secondly, we introduce two sets of theoretical explanations to account for variations in local government sustainability performance; the dependent variable concerns both "outcome" (policy results as "effectiveness") and "output" (local government policy approach or "set of instruments"). The first theoretical approach is drawn from the field of public management, which addresses intra-organisational governmental factors enabling policy performance. The second theoretical approach concerns inter-organisational factors. This approach is better known as policy networks of multiple actors, each with their own interests and mutually independent in their aim of achieving public goals.

3.1 *A categorisation of sustainability adopter groups among municipalities*

In order to discuss "frontrunner" local authorities in sustainability issues, we need to distinguish between Dutch local authorities according to a theoretical rationale. To be able to explain differences in local sustainability performances, we introduce a categorisation of performance in terms of moment of adoption. There are local authorities which we may regard as frontrunners, a broad mainstream and those that lag behind (Lafferty and Eckerberg 1998). Frontrunners are local authorities that have succeeded in adopting a broad array of sustainability policy measures. This especially requires a sufficient degree of local capacity and the ability to carry out a plan to enable local sustainability. If adoption of sustainability measures is looked at from an innovation–diffusion perspective, it may be stated that "frontrunner" local authorities are perceived as innovators or early adopters, e.g. "early market" adopters (Rogers 1962, Moore 1991).

Our approach to the frontrunner local authorities is analogous to a classification used by the sociologist Rogers (1962) for the acceptance of innovative ideas, based on theoretical insights. In our case, what is accepted are sustainability measures in the local authority's policy package. Rogers assumes that a group of social units is normally distributed according to the way they accept innovative ideas over time. The frontrunners – Rogers calls them the innovators and early adopters – are one standard deviation above the statistical mean. In relation to the total group of Dutch local authorities, this group is the fastest to incorporate and implement sustainability in their local policy. If one assumes a normal distribution, the "frontrunner" group comprises 16% of the group as a whole. Similarly, of course, we can also distinguish a group of "tail enders" (laggards), one standard deviation below the mean. The group between these laggards and the forerunners is classed as mainstream, in analogy with the term "mainstream market" as used by the innovation expert Moore (1991). (Here

Rogers mentions the “early majority” and “late majority”.) This group comprises 68% of the units in the target population – Dutch local authorities in our case. Figure 1 is a graphical representation of the classification according to the speed with which sustainability measures are accepted.

When compared with mainstream local authorities, frontrunners may be distinguished in different ways: for instance, by their membership in one or more international networks (such as ICLEI or the Climate Treaty), or their having formulated outstanding, long-term policy ambitions (e.g. having all municipality-owned buildings “climate neutral” by 2020), and only using eco-certified consumable goods.

3.2 Public management, intra-organisational factors

From the theoretical propositions on sustainability performance, we first focus on the impact of the local governmental organisation, and improvement in its public management, on local policy performances. This issue has a background in the government’s quest for ways to improve public service provision, especially by managerial effort. The argument that the organisational characteristics of organisations – such as local governments – contribute to the achievement of (environmental) policy goals in the local context is based on the literature on the effectiveness of public service provision and public management (Taylor 1912, Gullick and Urwick 1937, Steers 1975, Lynn 2007).

We consider the models that aim at explaining policy effectiveness through the devotion and commitment of autonomous public (and semi-public) organisations. Boyne (2003) conducted a literature review of quantitative studies published in key international peer-reviewed public administration journals in which evidence was collected that tested propositions on the improvement of public service performance. The propositions covered many explanatory factors, such as: resources (budget, personal capacity, knowledge), regulation, market structure (degree of competition), organisation (size, dependency on formal rules, culture, external contracts, contacts with other organisations/ego-network) and management (leadership and expertise, culture, human resource management, strategy–planning, strategy–content). Boyne found that variations in the explanation of public service improvement were not simply random or beyond scientific explanation. Moreover, he found that the results were systematic. Two out of five sets of the explanatory factors emerged as consistent influences on public service improvement. These are: (1)

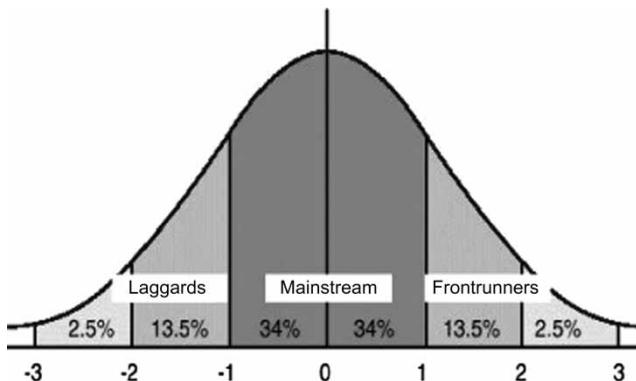


Figure 1. Classification of units in a social group according to the speed with which an innovative idea is accepted.

organisational resources and (2) management. No systematic evidence was found to validate a significant influence of the other three explanatory factors (degree of competition, regulation and market structure).

As applied to local sustainability performance, some intra-organisational local government propositions have been elaborated in previous studies. These propositions include items such as: municipality size, the role played by the regional government, regional collaboration, a complex knowledge mix, international contacts and partnerships, a full-time expert and the presence of a clear, “local catalyst” (a “local firebrand”). This last is an active public official, such as a mayor or alderman, who safeguards the place of sustainable development on the local political and policy agenda (Coenen *et al.* 1999, Kern *et al.* 2004, Evans *et al.* 2005, 2006, Barrutia *et al.* 2007). What are also regarded as essential to the creation of the “right conditions” for frontrunner status on local sustainability are important resources such as human capital and funding (grants), the latter being provided through intergovernmental channels (Hoppe *et al.* 2011).

The way in which policy instruments are implemented, their magnitude and the mix used depend on a number of preconditions found within the local authorities, related to the resources local authorities have at their disposal. Many of them relate to organisational personnel capacity, which is assumed to be related to the number of inhabitants in a given municipality. For instance, a study in Germany (Kern *et al.* 2004) supports the proposition that the adoption of LA21 policy was predominantly influenced by “municipality size”. The larger the size of the local government, the greater the personnel capacity and the more likely that resources are made available to formulate and implement policy measures on sustainable development. Although *municipality size* gives an explanation to some degree (as an explanation at a high level of abstraction), it is not an explanation in itself, as other, more specific explanatory factors apply (Barrutia *et al.* 2007). Local authorities also depend on having a high level, comprehensive *knowledge mix* at their disposal. All things considered, the more one knows the more one is capable of understanding the complexity with which sustainability problems occur and how they can be solved. Due to frequent personnel turnover, the possession of a sufficient knowledge mix is an issue in many Dutch municipalities. Furthermore, the presence of a *full-time expert* is important, as staff members need to focus on sustainability issues while not being drawn into other (traditional) policy domain issues, running the risk that sustainable development issues will get low priority when decisions are taken. The full-time expert may have a coordinating function and is capable of coping with the broad, comprehensive mix of sustainability issues, while monitoring their progress in several parallel local projects. Continuity of the full-time expert’s tenure is an important requirement. Finally, the achievement of sustainable development goals needs clear attention in the decision-making process, which means that political and administrative powers must be involved. Therefore, the presence of a *local catalyst* is a pre-requisite. This may either be a political official (a mayor or “green alderman”) or a senior civil servant who is personally motivated, experienced, knowledgeable and with sufficient authority to keep sustainable development goal achievement on the political, policy and local project agendas (preferably, both an official and a civil servant). In terms of adoption–diffusion, we may compare this with “opinion leadership” (Rogers 1962).

3.3 Policy networks, inter-organisational factors

The second theoretical approach concerns inter-organisational factors. It is anticipated that the presence of an actor network that supports the conduct of environmental policy provides

a stimulus to local sustainability performance, since it provides a support platform, close contacts and trust with local actors, such as local business and NGOs. Thus, organisational factors are not the only factors that may influence policy effectiveness in the local sustainability field. Local governments also depend on collaboration and resource exchange with other actors. In contrast to the public managerialist, (intra-)organisational paradigm, the analytical emphasis here is not primarily focused on the bilateral relation between the local government and one homogeneous target group, but a multitude of actors with pluriform interests. The literature that covers this approach is devoted to “policy networks” (Marsh and Rhodes 1992, Bressers, 1993, Dowding 1995, Smith 1997, Börzel 1998, Bressers and O’Toole 1998) and its normative equivalent, “network management” (de Bruijn and ten Heuvelhof 1995, Kickert *et al.* 1997, Klijn 1996). The main analytical focus concerns the hypothesis that management of collaborative ties between mutually dependent actors who exchange resources improves the outcome of public service provision (where policy implementation is concerned). Moreover, the chance that policy goals will be met effectively will be positively influenced if the multitude of actors involved share normative opinions and have a high frequency of interaction (Bressers and O’Toole 1998). In an era of “governance” rather than “government”, it becomes more important to manage (complex) networks to achieve public goals, such as sustainable development (Kickert *et al.* 1997). During the 1990s, government became less hierarchical; hence, ties between actors in local decision-making arenas have become more equal, especially after the introduction of such policy instruments as covenants, which emphasise horizontal (non-hierarchical) ties among participating actors. In local settings, decision-making typically occurs in sets of games in which actors negotiate about how to achieve collective goals, given their interests, strategies and interactions (Allison 1971, March 1978, Ostrom 1992). Here, actor-specific characteristics are important, such as motivation, cognition, resource usage, power relations as well as actor interaction and contextual parameters, all of which influence game outcomes (Bressers 2004, 2009). Not surprisingly, given the importance of controlling scarce resources, networks often cluster around regulatory systems and budgetary streams, especially subsidy grants (Klijn 2007). As many actors participate, and in view of the equal ties between them, networks require membership rules to entitle network members to use the network’s resources. If managed properly, added value is created. In this sense, social capital is built up as connections within and between social networks improve. In turn, network membership may improve the productivity of individual network members. In this sense, network memberships may improve organisational performance (Putnam 2000).

Networks can be operationalised as *memberships of regional or international social networks*. They may enable a local authority to raise awareness, share experiences and tacit knowledge and improve knowledge bases with local authorities from other countries or regions. This may trigger knowledge spillover and the diffusion of sustainability beliefs, which helps a local authority to implement certain policy measures or elevate its sustainability policy ambitions. Membership of international networks may involve a display of commitment to achieve international goals (e.g. supporting the Climate Treaty by aiming to become “climate neutral” by 2020). Being a member of a network enables members to contact international frontrunner local authorities and collaborate with them (and exchange resources). This may even work beneficially in achieving favourable conditions for landing a cash subsidy.

In this regard, connections with *regional governmental* bodies provide opportunities to affect local sustainability performance positively. The provinces in the Netherlands conduct a major part of all current nature and environmental policy and these are areas that impact

substantially on sustainability policy. Many environmental and nature issues require supra-local alignment. In relation to other policy domains (spatial planning policy, water, nature), regional governmental bodies facilitate local communities in decision-making, especially on inter-municipality issues. Involvement in task groups at the regional level gives municipalities opportunities to influence decision making. Furthermore, regional government may have sustainability policies of its own, often focusing on a few issues that can be assigned to sustainable development policies, such as climate policy or nature conservation schemes. Regional governments may support municipalities by various means: through consultation, facilitation of inter-municipal information exchange discussions, but also by providing subsidies to local projects (in which the local authority takes a prominent role). In the Netherlands, regional governments have some latitude to design their own sustainability policies, which leads to variations in regional policy output.

3.4 Overview of propositions on variations in local sustainability performance

Following the discussion in the previous sections, an attempt is made here to derive an analytical model to explain the variation in local sustainability performance. Due to the limitations of our data set, we adduce three propositions (Figure 2), one on the basis of the intra-organisational set of propositions (municipality size) and two on the basis of the network proposition (regional government policy, and membership of networks).

Our propositions based on the analytical model are as follows.

1. The larger the municipality, the better its local sustainability performance. We operationalise by stating that there is a positive correlation between size and being a frontrunner.
2. The local sustainability performance depends on the regional government (province) in which the municipality is situated. We operationalise this in terms of a distribution skewed towards more frontrunners in a specific province.
3. Membership of regional and international networks influences the local sustainability outcome positively. We operationalise this by stating that there are more frontrunners among municipalities as they have more network memberships.

4. Research design and methodology

In this section, we discuss the research design and its methodological aspects in relation to the data set and the analysis. Here the units of observation are local authorities, the dependent variable concerns local sustainability performance and the research domain is the Netherlands. We use data provided by Local Sustainability Meter (LSM), editions 2007 and 2009.

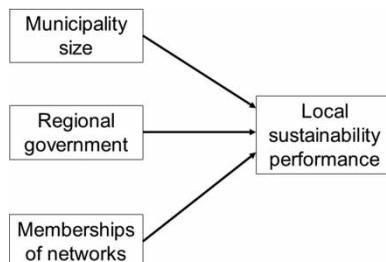


Figure 2. Analytical model; three propositions on local sustainability performance.

4.1 *Research design*

First, we analyse and discuss whether differences exist between topical policy group performances. The LSM data set distinguishes several topical groups on sustainability. We investigate the following categories: (a) social and global, (b) sustainable entrepreneurship, (c) climate and water and (d) total score. Each category features a relative scale where the amount of measures taken is divided by the maximum number of measures that could have been taken, leading to a score between “0” (no measures taken) to “1” (all measures taken). By using descriptive statistics (statistical means), we analyse whether differences exist between groups. Having data from 2007 and 2009 allows us to measure difference between these 2 years.

Second, we investigate distinctive measures taken by the frontrunners. We performed an analysis of variance (χ^2) to determine whether there are any significant differences between the mainstream and the frontrunner groups in 2009. “Laggards” were not considered. We used a 99% confidence interval to maintain a strict selection criterion.

Third, we investigate the propositions addressed in Section 3.3. We use data from the 2007 and 2009 editions. This has the advantage that we can study whether identified statistical relations differ between years. If significant statistical results are found in both 2007 and 2009, there is at least reason to believe that the results are robust across these two years. We use crosstabulation and analysis of variance (χ^2) to study significant statistical relationships between categorical variables at a 0.01 level of significance. Next, the scales were qualited into three categories (transforming quantitative data into qualitative data by distributing quantitative data into classes on a categorical scale). In two out of three propositions (municipal size and network memberships) the demands for such an analysis are met (expected count per cell). In the case of the proposition concerning provincial policy, these demands are not met and hence we only provide descriptive statistics on distributions to explore patterns in that regard, analysing whether differences exists between provinces and between years.

4.2 *Sample*

We looked at possibly significant differences between local authorities in the various adoption classes in each area of performance. Therefore, we used the most recent LSM data set. In 2009, 137 local authorities responded which, in respect of the total of 431 local authorities, gives a response rate of 31.8%. For part of the analysis, we also used data from the 2007 data set. In 2007, 161 local authorities responded. Given the total of 457 local authorities that were contacted, this gives a response rate of 35.2%. In both cases, the responses are too small to permit generalisation to all local authorities in the country. However, we do not consider this a problem, because the study is explorative in nature and concerns applied research. We excluded the cities of Amsterdam (from the 2009 data set) and Rotterdam (from the 2007 data set) due to the large number of residents (extremes with regard to the distributions on municipality size). We take account of selection bias, as we assume that ambitious municipalities on sustainability policies were more likely to participate than those that were less ambitious.

4.3 *Operationalisation*

The dependent variable concerns “local sustainability performance”. In essence, we operationalise it in the same manner as is done in the official annual editions of the LSM.

The establishment of the scores-per-municipality follows a basically normal approach. The more positive the responses that are accumulated, the higher the score. Moreover, the questions are weighted, with a measure receiving greater weight for its ambition and/or the way it is established. A municipality's total score is calculated as the actual score divided by the maximum number of points available. After the scores-per-municipality are calculated, a ranking is assigned. The municipality with the highest score wins the Local Sustainability Meter's annual prize. To prevent measuring "network membership" in both independent and dependent variables, items indicating network membership were removed from the sustainability performance scale. In order to enhance insights and comprehensibility, we reduce the ratio-scaled performance index into three qualitative categories, based on the typology introduced in Section 3.1 (in ascending order: laggards, mainstream, frontrunners).

The study encompasses three independent variables: (1) municipal size, (2) provincial sustainability policy and (3) network memberships.

Municipal size is operationalised as the number of inhabitants per municipality. In order to permit a variation analysis (χ^2 test), we needed to transform ratio-scale data into categorical data. Three categories were distinguished: small, middle-sized and large. Small municipalities are those with 25,000 inhabitants or fewer. This cut-off point was selected because Dutch national government uses it to determine which municipalities are small (and need to be combined with other municipalities for reasons of administrative integration). Middle-sized municipalities vary between 25,000 inhabitants and 60,000 inhabitants. Large municipalities have 60,000 inhabitants or more. This cut off-point is used by national government to identify large municipalities, and is used as a necessary condition if a municipality is to apply for the urban renewal subsidy scheme (ISV-2).

Provincial government was not operationalised on the basis of specific provincial data on policy (due to insufficient observations per province). The data provide information on municipalities in 12 provinces in the Netherlands. The numbers of respondents (local authorities) vary across provinces between 1 and 30. Hence, we were only able to analyse differences between provinces and similarity in patterns between 2007 and 2009. If patterns were to be identified, we would analyse them on the basis of spurious relationships.

Network membership is operationalised as a construct featuring multiple items. In order to test the network membership proposition scale, indices were constructed (Cronbach's alpha reliability test). The necessities from the reliability test were met (the scale items have to correlate significantly and positively with local sustainability performance, and the Cronbach's alpha reliability test needs to meet a minimum of at least 0.5). The 2007 scale ($\alpha = 0.723$) and the 2009 scale ($\alpha = 0.661$) both meet the reliability test standard (see Appendix 1 for more information on the items).

Next, the scales were qualitised (transforming qualitative data into quantitative data by assigning numerical values to qualitative data on an interval or ratio scale). Following the distribution of the observations, three categories were distinguished: few memberships, an average number of memberships and many memberships.

4.4 The practice of measuring Dutch local sustainability performance

One of the key elements of achieving sustainable development requires measuring its progress. Therefore, monitoring sustainable development on many of its sectoral, topical elements is a (policy) instrument that should be implemented. In the Netherlands, a monitoring system was designed in the late 1990s to measure local sustainable development in the municipalities. Currently, data have been collected for over a decade. In this section, we

report our experiences with the instrument. In the late 1990s, the National Committee for International Co-operation and Sustainable Development (“Nationale Commissie voor internationale samenwerking en duurzame ontwikkeling”, NCDO) designed a monitoring instrument to measure the degree of sustainability displayed by local authorities, with financial support from the VROM Ministry. The instrument was actually deployed by the Centre for International Co-operation (“Centrum voor internationale samenwerking”, COS), an NGO that supports sustainable development and development aid to the Third World (de la Court and Aalst 2002). Besides an indicator function, the instrument also had a clear, competitive element that allowed local authorities to gain an insight into their own sustainability score and to compare it with others. The underlying idea was that local authorities would be able to measure themselves against each other and would try to match their own ambitions against the frontrunners”. A prize was introduced to reinforce the competitive element, the Sustainability Shield. The prize was to be presented annually to the local authority with the highest sustainability score, as determined by the points accumulated after completing a questionnaire on policy measures and local government organisational capacity. Most editions reported monitoring results (de la Court and Aalst 2002, de la Court 2003, 2005, COS 2009). Although all Dutch municipalities are addressed, there is likely a selection bias in the respondents participating in Local Sustainability Monitor as the motivated, well-equipped municipalities are expected to respond more readily.

4.5 Items in the Local Sustainability Meter data set

All the questions on the sustainability questionnaire have yes/no answers. The LSM is made up of three components: “People”, “planet” and “profit”. The “people” component takes in citizen participation, social policy and international co-operation. The “planet” part consists of climate, water and nature and the environment. “Profit” embraces sustainable entrepreneurship, sustainable mobility and socially responsible business. Indicators have been set up for each area, which have been operationalised in terms of questions.

Although the monitor emphasises “policy output” indicators, some questions also address policy outcome, such as installed capacity solar PV panels in town. In the 2007 edition, 12 items indicated policy outcome (out of a total of 102 questions). These exclude special edition features on “the sustainable canteen” (23 items) and “sustainable purchasing” (78 items). In the 2009 edition, six items indicated policy outcome (out of a total of 94 questions). The questionnaire is drafted under the supervision of an assessment committee composed of local authority representatives and research institute personnel. Each edition of the questionnaire is different because the questions focus closely on the mix of policies and measures offered to the local authorities by central government, which varies over time. Nevertheless, closer inspection of the questionnaire reveals that many items have resurfaced in more recent editions, often under a different name or even in another area of policy. For that reason, and in terms of relative scores for sustainability measures, we assume that local sustainability scores may be used in a comparative longitudinal research approach across years.

Data are collected from local governmental civil servants responsible for local sustainability policy (policies). A commercial research institute carries out the data collection on commission from COS. For large municipalities, there will likely be a central coordinator who is responsible for answering the questions. For smaller ones, this is more difficult as sustainable development issues are divided across departments and among the civil servants appointed. Moreover, data collection involves a lot of effort involving many civil servants from different departments. Due to the involvement of different persons per municipality

and little transparency on how the questionnaires are filled in and returned to the monitoring agency, the reliability of the data is difficult to assess.

Although there are validity and reliability deficiencies with the sustainability monitor we are of the opinion that the data provides “added value” in terms of useful insights into dynamics in local sustainability in the Netherlands. Because many questions require either a “yes” or a “no” answer, the data are clear and represent the respondent’s meaning. To give an example: the face validity of whether or not a municipality requested an intergovernmental subsidy from national government to enable local climate policy formulation can hardly be misunderstood. Although issues remain on the phrasing of the questions which gives cause for multiple interpretations, we are of the opinion that the majority of the issues represent concerns that are clear to understand, and are of use in monitoring the practice of how local authorities in the Netherlands cope with local sustainability. Furthermore, the large number of items on which data are collected, following the comprehensive sustainable development (LA21) rationale, provides many valuable items of data that are useful to different audiences: government, professionals and academics.

5. Which local authorities are the frontrunners and why?

In this section, we discuss differences between adopter categories in two ways. First, we analyse whether differences exist between topical policy groups’ performance and discuss differences between them. Second, we investigate distinctive measures taken by frontrunners. Third, we investigate whether “frontrunner status” correlates with one or more of the three propositions adduced in our analytical model.

5.1 Differences between efforts in alternative topics

First, we analysed the relative scores per thematic item (social and global, sustainable entrepreneurship, climate and water and total scores). It turns out that there were positive differences in all areas between 2007 and 2009. This also holds for the total score. This is perhaps not very surprising, as it might be expected between the start of a period of office and its end. What is more relevant is the variation in progress that was found between the different themes. For example, there appeared to be more progress in the “climate and water” area than in “sustainable entrepreneurship”. Figure 3 shows the differences in statistical means in these areas, as measured between the observations in 2007 and 2009.

5.2 Distinctive measures taken by frontrunners

We looked at the detailed differences between the two groups – the indicators (i.e. the specific questions in the LSM). It turns out that the greatest frequency of indicators with significant differences occurred in the “sustainable entrepreneurship” field (12 times). Seven indicators were involved in the “social and global” theme and six in “climate and water”. This permits the cautious conclusion to be drawn that the future challenges to the mainstream local authorities lie in the “sustainable entrepreneurship” area. The following specific measures may be considered:

- formulate and maintain criteria for sustainable consumption of goods and services;
- pursue a policy to encourage cycling;
- “clean” official local governmental vehicles (that meet strict environmental standards);

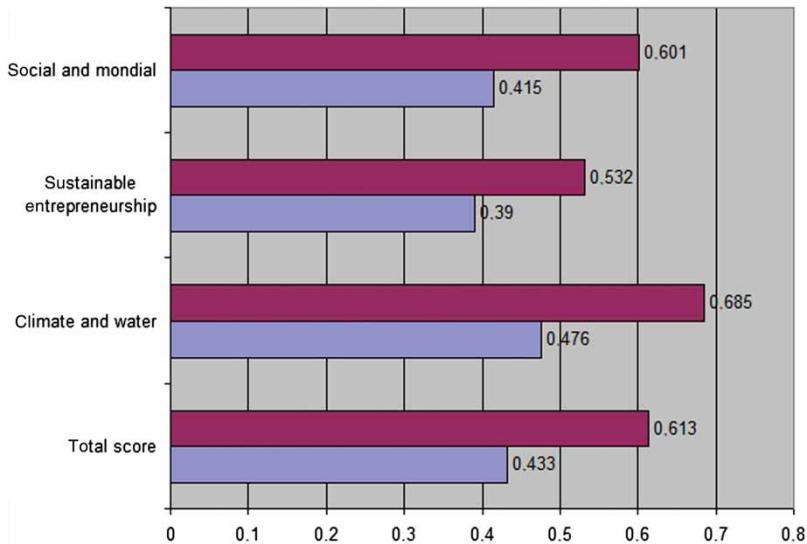


Figure 3. Differences in means of four indicators between 2007 and 2009 (2009 = dark; 2007 = light).

- sustainable products in the canteen;
- official encouragement of car sharing;
- official encouragement of CO₂ emission reduction from traffic;
- participation in the “Progress Week” (an event to promote sustainable mobility);
- participate in the “socially responsible business practice” platform;
- consider sustainability first when planning industrial estates;
- lay down measurable sustainability goals for new buildings;
- budget for the implementation of sustainable construction.

5.3 Examining the influence of municipality size

Our first proposition taken from the analytical model and literature is the expectation that the larger the municipality, the better the local sustainability performance. We operationalised this as a correlation between size and being a frontrunner.

We analysed the relationship between municipality size and local sustainability performance for both 2007 and 2009. The results of the variation analysis (χ^2 test) are presented in Appendix 2. For both years, we found significant evidence that supports the proposition; this indicates a statistical correlation between the degree of network memberships and local sustainability performance. The statistical correlation in 2007 ($\chi^2 = 47.00$; $df = 4$; $p = 0.000$) is nearly as strong as the correlation in 2009 ($\chi^2 = 47.95$; $df = 4$; $p = 0.000$).

5.4 Examining differences between regional governments

Our second proposition derived from the analytical model is that the local sustainability performance depends on the regional government (province) where the municipality is situated. We operationalised this as more frontrunners in a specific province. Hence, we aimed to identify provinces that have distributions skewed towards more frontrunners (when compared with laggards at the other extreme of the dimension). Investigation of

the distributions between the provinces leads to two results. First, there is a large variation in the number of municipalities participating per province. Whereas some provinces are over-represented (with at least 20 municipalities in both 2007 and 2009), others have only a few participants (e.g. Flevoland: 3 in 2007 and 1 in 2009). Second, only one province (North Brabant) was identified as having a distribution skewed towards “frontrunner” status in both 2007 and 2009. On the other side of the coin, only one province had a distribution skewed towards “laggard” status in both 2007 and 2009. Data on local sustainability performance per province are presented in Table 1 for 2007 and Table 2 for 2009.

Because the results give the impression that they are biased (pre-selection) towards large provinces with many municipalities participating in the LSM (e.g. North Brabant, South Holland, North Holland) further analysis was needed. Following this analysis, we believe there is reason to suppose that the average population size per participating local authority and the number of municipalities that participate are indeed related to the province’s sustainability score. This gives provinces with many participating municipalities including large cities (e.g. North Brabant, South Holland) an advantage compared with provinces in rural areas, which have predominantly small municipalities (e.g. Flevoland, Drenthe).

5.5 The influence of network memberships

Our third proposition taken from the analytical model is that membership of international networks influences the local sustainability outcome positively. We operationalised this as expecting more frontrunners among municipalities which have relatively many network memberships. We conducted a variation analysis (χ^2 test) for both 2007 and 2009. The results of the analysis are presented in Appendix 3. For both years, we found significant evidence to support the proposition; this indicates a statistical correlation between the number of network memberships and local sustainability performance. The statistical correlation in 2007 ($\chi^2 = 33.53$; $df = 4$; $p = 0.000$) is a little stronger than the correlation in 2009 ($\chi^2 = 16.69$; $df = 4$; $p = 0.002$). Nonetheless, both are significant at the 99% confidence level.

Table 1. Distribution of municipalities according to sustainability performance per province (2007; $N = 160$).

	Local sustainability performance category			Total
	Laggard	Mainstream	Frontrunner	
<i>Province</i>				
Drenthe	0	4	1	5
Flevoland	0	2	1	3
Friesland	4	7	2	13
Gelderland	4	12	4	20
Groningen	0	3	0	3
Limburg	3	9	0	12
North Brabant	4	12	7	23
North Holland	5	22	3	30
Overijssel	0	6	1	7
Utrecht	0	8	2	10
Zeeland	0	4	0	4
South Holland	5	21	4	30
Total	25	110	25	160

Table 2. Distribution of municipalities according to sustainability performance per province (2009; $N = 136$).

	Local sustainability performance category			Total
	Laggard	Mainstream	Frontrunner	
<i>Province</i>				
Drenthe	0	5	1	6
Flevoland	0	0	1	1
Friesland	2	3	2	7
Gelderland	2	10	4	16
Groningen	0	4	1	5
Limburg	5	7	1	13
North Brabant	2	14	6	22
North Holland	2	16	2	20
Overijssel	1	3	1	5
Utrecht	1	7	1	9
Zeeland	0	5	0	5
South Holland	5	18	4	27
Total	20	92	24	136

6. Conclusions

This paper has addressed a number of questions. The main question is: which factors influence variations in local sustainability policy performance and its measurement? In order to answer this question, three sub-questions were raised. First, which factors according to the literature influence variation in local sustainability policy performance? On the basis of a literature review, and a retrospective review of the development of local sustainability in the Netherlands, we identified a range of factors, mainly concerning (intra-)organisational issues (e.g. size, capacity, presence of a complex knowledge mix, contacts and partnerships, presence of a full-time expert and a local catalyst). In order to derive an analytical model we used both empirical studies and theoretical insights from the disciplines of public management and policy networks. We argue that municipality size and network memberships positively influence local sustainability performance, and that differences in local sustainability performance exist between regional governments.

Second, we wanted to know how local sustainability performance can be measured, categorised and compared using local sustainability performance indicators and what we can learn from it. We used self-reported data on local sustainability in the Netherlands to answer this question and ran statistical analyses to identify tendencies and patterns. The analyses show that few policy outcome items are measured in practice. The emphasis in data collection is on policy output indicators. To be able to study variation in local sustainability performance over the years, we developed a categorisation to distinguish adopter categories. In descending order of willingness to adopt sustainability measures, we distinguished frontrunners from the mainstream group and laggards.

We analysed the relative progress per thematic item (social and global, sustainable entrepreneurship, climate and water and total scores). It turns out that there were positive differences in all areas between 2007 and 2009. What is more relevant is the variation in progress that was found between the different themes: there appeared to be more progress in the “climate and water” area than in “sustainable entrepreneurship”. Currently, many local authorities associate sustainability with the climate and reducing CO₂ emissions. This has received a great deal of attention in recent years and most local authorities have

made considerable progress in this area. It is fair to state that policy performance varies across topical areas within sustainability; there is no “fair” distribution.

We analysed items that distinguish frontrunners from the rest. It turns out that these measures mainly concern items related to sustainable entrepreneurship. Furthermore, frontrunners also distinguish themselves as a little more active in the area of “social and global” policy issues.

Third, we wanted to know how the propositions from our analytical model are supported by empirical evidence from the dataset on local sustainability performance. Community size and network memberships correlate positively with local sustainability performance, both in 2007 and 2009. However, one may wonder if these factors actually make cities more sustainable in terms of policy outcome. For instance, a large municipality like Amsterdam has many network memberships and a large sustainability policy output, but it is doubtful if this actually correlates with a high degree of sustainability outcomes, as large cities like Amsterdam have to deal with large numbers of inhabitants, enterprises, industry and hence a high degree of complexity to successfully implement sustainability policy measures. We also analysed influence by regional governance and found variation and some similarities between the 2007 and 2009 data sets. Whereas some provinces are over-represented (with at least 20 municipalities participating), others have only a few participants. Only one province (North Brabant) had a distribution skewed towards “frontrunner status”. The results of the inter-provincial analysis are of limited validity, though, as a spurious correlation was identified related to community size and the number of participating municipalities.

The LSM data set mainly gives an impression of developments in “local capacity”. It hardly tells us much about a series of factors that may well also exercise a powerful influence on local environmental performance (“outcome variables”). It is therefore important that further analyses should look at a number of case-specific factors that cannot be investigated with the data sets we used for this study. The most appropriate instrument for future investigation here is detailed, qualitative research into underlying factors. Furthermore, we should look further to other EU and OECD countries, such as Norway. A comparative analysis might well provide interesting results. A challenge lies in the investigation of causal patterns that may explain differences in local sustainability performance between these countries. We believe it would be sensible for future research to look for progress across the board in:

- Factors that have not been measured by the LSM, such as political support, the makeup of the governing coalition, the presence of “green aldermen” and supporters of sustainability in the local authority. Investigating this would require a qualitative approach to dig deeply into the issues.
- Development of indicators to measure the “policy outcomes” in the local sustainability area. The LSM currently offers few avenues in this respect. There is an impression that the LSM contains mainly indicators of preconditions, which represent an extension of policy ambitions. Research has shown that policy ambitions in the local sustainability area do not always predict that the ambitions will actually be achieved (Hoppe 2009, Hoppe *et al.* 2010).
- Municipalities with medium and relatively small populations.
- Research into self-reporting on sustainability policy in other tiers of government – especially regional governments – and on methodological issues.
- International comparative research into local sustainability developments in other countries in the EU and OECD.

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Appendix 1. Information on network membership scales

Table A1. Correlations of network memberships on local sustainability performance.

Item	R
2007 ^a , N = 160	
ICLEI	0.290**
International Manifest on Sustainable Development	0.187**
Eastern Europe	0.249**
Third World	0.455**
Sustainable Development in City network	0.388**
Climate Change in City network	0.351**
Climate Treaty	0.397**
Reciprocity in City Network	0.392**

(Continued)

Table A1. Continued.

Item	<i>R</i>
2009 ^b , <i>N</i> = 136	
Millennium Goals Municipality	0.361**
Civil Servant International relations	0.301**
Budget International relations	0.246**
ICLEI	0.392**
Collaboration with other municipalities	0.307**
Climate Treaty	0.439**

^aCronbach's α = 0.723; standardised = 0.746; *N* = 8.

^bCronbach's α = 0.661; standardised = 0.697; *N* = 6.

**Correlation is significant at the 0.01 level (one-tailed).

Appendix 2. Results of crosstabulation on municipality size \times local sustainability performance

Table A2. Crosstab on municipality size \times local sustainability performance class (2007, *N* = 160).

		Local sustainability performance category			Total
		Laggards	Mainstream	Frontrunners	
Size class					
Small: <25.000	Count	18	53	1	72
	Expected count	11.3	49.5	11.3	72.0
Medium-sized: 25.000–60.000	Count	6	39	6	51
	Expected count	8.0	35.1	8.0	51.0
Large: >60.000	Count	1	18	18	37
	Expected count	5.8	25.4	5.8	37.0
Total	Count	25	110	25	160
	Expected count	25.0	110.0	25.0	160.0

Chi-square tests.

	Value	df	Asymp. sig. (two-sided)
Pearson chi-square	47.005 ^a	4	0.000
Likelihood ratio	45.739	4	0.000
Linear-by-linear association	36.273	1	0.000
Number of valid cases	160		

^a0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.78.

Table A3. Crosstab on municipality size \times local sustainability performance class (2009, *N* = 136).

		Local sustainability performance category			Total
		Laggards	Mainstream	Frontrunners	
Size class					
Small: <25.000	Count	14	30	0	44

(Continued)

Table A3. Continued.

		Local sustainability performance category			Total
		Laggards	Mainstream	Frontrunners	
Medium-sized: 25.000–60.000	Expected count	6.5	29.8	7.8	44.0
	Count	6	44	6	56
Large: >60.000	Expected count	8.2	37.9	9.9	56.0
	Count	0	18	18	36
Total	Expected count	5.3	24.4	6.4	36.0
	Count	20	92	24	136
	Expected count	20.0	92.0	24.0	136.0

Chi-square tests.

	Value	df	Asymp. sig. (two-sided)
Pearson chi-square	47.952 ^a	4	0.000
Likelihood ratio	52.079	4	0.000
Linear-by-linear association	40.196	1	0.000
Number of valid cases	136		

^a0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.29.

Appendix 3. Results of crosstabulation on network membership × local sustainability performance

Table A4. Crosstab on network membership × local sustainability performance class (2007, $N = 160$).

		Local sustainability performance category			Total	
		Laggards	Mainstream	Frontrunners		
Membership class	Few memberships	Count	22	53	4	79
		Expected count	12.3	54.3	12.3	79.0
Average amount of memberships	Count	2	35	7	44	
		Expected count	6.9	30.3	6.9	44.0
Many memberships	Count	1	22	14	37	
		Expected count	5.8	25.4	5.8	37.0
Total	Count	25	110	25	160	
		Expected count	25.0	110.0	25.0	160.0

Chi-square tests.

	Value	df	Asymp. sig. (two-sided)
Pearson chi-square	33.533 ^a	4	0.000
Likelihood ratio	34.209	4	0.000
Linear-by-linear association	29.112	1	0.000
Number of valid cases	160		

^a0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.78.

Table A5. Crosstab on network membership × local sustainability performance class (2009, *N* = 136).

		Local sustainability performance category			Total	
		Laggards	Mainstream	Frontrunners		
Membership class	Few memberships	Count	12	25	4	41
		Expected count	6.0	27.7	7.2	41.0
Average amount of memberships		Count	6	32	5	43
		Expected count	6.3	29.1	7.6	43.0
Many memberships		Count	2	35	15	52
		Expected count	7.6	35.2	9.2	52.0
Total		Count	20	92	24	136
		Expected count	20.0	92.0	24.0	136.0

Chi-square tests.

	Value	df	Asymp. sig. (two-sided)
Pearson chi-square	16.686 ^a	4	0.002
Likelihood ratio	16.915	4	0.002
Linear-by-linear association	14.279	1	0.000
Number of valid cases	136		

^a0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.03.