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Speaking "Green": A Worldwide Survey on Collaboration among Stakeholders in Urban Park Design and Management

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Abstract: Urban parks can provide a range of valuable benefits, including essential ecosystem services. Their successful management is often in the hands of government agencies, who rely on interaction with other stakeholders for specialized knowledge. In order to examine the attitudes of different actors toward professional collaboration and to identify ways of improving the effectiveness of knowledge transfer, a global survey was conducted among the members of the World Urban Parks (WUP) association. The results show that representatives of public agencies, due to their lower level of up-to-date knowledge, have a pressing need for collaboration with private practitioners, academic researchers, and community advocates. Interactive, face-to-face learning is most valued, especially if it includes practical as well as theoretical information. Most respondents indicated that 'personal contacts' are more important than professional affiliation for the initiation of new collaborations, and for many, the possibilities for joint creativity are the most highly prioritized benefits. Obstacles to be addressed include 'bureaucracy' and a 'divergence of interests or approaches among stakeholders', indicating the need for a "common language"—i.e., "speaking green"—which may accommodate diverse priorities and concerns. In accomplishing this, a special role is seen for international professional associations that can help to build bridges between countries and professions.

Keywords: ecosystem services; green infrastructure; knowledge transfer; professional associations; urban forestry

1. Introduction

Urban parks are important components of the green infrastructure of an urban area. They can play a pivotal role in supporting essential ecosystem services in cities, and can guarantee a better quality of life for citizens [1–4]. This contribution is even more pronounced when parks reach large dimensions, as their services are relied upon by large sectors of the urban population [5–8].

This prominent role of urban parks is evident in many geographical areas. A notable example in the European context is Parco Nord Milano (PNM), which has been shown to be an integral part of the complex urban green infrastructure of the metropolitan area of Milan [9]. Thanks to its large spatial extent and its rich concentration of trees and forested areas, a park positively influences: (a) the level of biodiversity in the urban area [10,11]; (b) the thermal environment of the city, due to its moderating effect on the urban heat island [12]; (c) the absorption of carbon from the urban atmosphere and its long-term storage in biomass [13]; and (d) the psycho-physical wellbeing of the local citizens [14,15].

Also, in other geographical contexts, such as parts of South America, urban parks are often the only options to guarantee urban green spaces and the presence of nature in built-up areas. This is especially the case in marginal socioeconomic contexts [16,17], where access to private green space is limited. Considering that in the coming decades two thirds of the World population will live in urban areas [18], urban parks will be more and more important for the communities, because the competition between buildings and parks will exacerbate and green infrastructure will likely become no more than a "topping" on buildings.

An important factor in the effective supply of ecosystem services in urban areas is the long-term process of park planning and ongoing maintenance. These activities are essential for addressing a broad range of requirements related to the park's physical structure and general ecological features (e.g., canopy cover, stem diameter structure, and other design features), as well as its usage by various types of visitor groups. However, the establishment and management of urban parks and other elements of green infrastructure (e.g., street trees, gardens, peri-urban forests etc.) requires complex and diverse knowledge, which often cannot be provided by municipalities or local authorities on their own. This complex of knowledge also refers to governance issues, which can include new forms of environmental policy and new configurations of processes that promote urban greening [19]. Therefore, in addition to ensuring the availability of green spaces within their urban area, municipalities must engage a range of stakeholders (e.g., agencies, private consultants, technicians, but also experts from the academic world etc.) and provide long-term learning activities for park staff at various levels. In addition, they should also give more consideration to citizens as direct stakeholders, capable of influencing not only politics but also park departments.

A first explorative research project made among European members of associations and orders of professionals, academicians and researchers, and civil servants in public institutions (e.g., policy makers, managers, technicians) dealing with urban green areas indicated that positive attitudes prevail among stakeholders toward inter-sectoral collaboration, particularly when such collaboration fulfils their need to achieve common aims [20]. It was seen that particular features of collaboration such as encouraging innovation, identifying practical problem solutions, and accessing sources of funding are supported by a large consensus of actors involved in the design of urban parks and the management of their many functions (which include both organized and informal activities for multiple sectors of the local population, as well as tourists). In addition, this research suggested that stakeholders need a better understanding of the importance of forming cohesive teams, of optimizing financial resources, and of finding a common language to bridge their diverse disciplinary backgrounds. Thus, the facilitation of knowledge transfer between actors is critical to success in designing and managing urban parks. This finding also reflects the societal need to face global challenges in a transdisciplinary way, including subjects outside science [21] and fosters the need of a common language and definition of roles and responsibilities [22] to make the results useful to the involved groups (in both science and practice).

In the previous study [19], the authors identified the fundamental role that organizations such as professional associations play in this knowledge transfer. The international dimension of such associations can guarantee information flows not only between different geographical areas of the world, but also between the academic and scientific research world and the world of practice. For this reason, following the initial exploratory research which was mainly focused at the European level, the present study was initiated in order to extend the examination of knowledge transfer among urban park stakeholders to a global level. This extension was implemented thanks to the support of the World Urban Parks (WUP) association, whose European Chapter annual congress in 2016 provided the impetus to investigate the strengths and weaknesses in current management practices of urban forests and public green spaces—and how these practices may be improved through access to scientific knowledge at a global level.

The objective of the study is thus to better understand the attitudes of different stakeholders from around the world toward issues related to urban park design and management, and to identify

ways of improving the effectiveness of knowledge transfer. To achieve this objective, we conducted an international survey among the global membership of WUP inquiring about their attitudes toward knowledge transfer, collaboration with other actors, and professional training.

2. Materials and Methods

A survey addressed to actors with a role in the urban parks, forests, and public green spaces was conducted in order to gauge their attitudes toward the status of current practice, and to identify pressing problems and opportunities for improvement. For this purpose, a questionnaire was developed in 2016, targeting the membership of the WUP.

World Urban Parks was funded in 2015 by the merge of two organizations, IFPRA (International Federation of Park and Recreation Administration) and Parks for Life. It includes about 300 members all over the world from different sectors (e.g., government, universities, professionals, community groups, NGOs) and dealing with different aspects related to urban parks (e.g., policy makers, managers, operative experts and volunteers etc.). WUP is not only an association at the global level representing different stakeholders involved in the management of Urban Parks, but also a community advocating for access to urban parks, open space, and recreation. It promotes conservation and effective management of natural and cultural values to create healthy, liveable, and sustainable communities, and a healthy planet, providing global research and experience demonstrating the health and social benefits of urban parks. An additional priority is making the case for more funding, forming a strategic international 'think-tank' or group of respected individuals to credibly advance and advocate for the cause of urban parks and partnering with like-minded global bodies and sectors to speak with a unified voice to advance common agendas and ensure that parks are recognized as an essential city-building tool. For all these reasons, the WUP provides a sound sample for our research aims (http://www.worldurbanparks.org/en/about-us/benefits).

2.1. The Survey

A pilot test was conducted in a preliminary phase, to better focus the content and the clarity of the questions and ensure the quality of the survey. The questionnaire was sent to three experts in social studies and urban parks. They answered the preliminary version of the questionnaire and gave their personal opinion and suggestions for improving it, and based on their input, the final questionnaire was refined.

After the revision, the questionnaire was submitted in English as the official language of the WUP organisation and membership. The survey started on the 29th of May 2016 and ended on the 20th of June 2017. Responses to the questionnaire (Questionnaire S1) were solicited by publicizing the link to an online Google module (http://goo.gl/forms/vzrcgjPYtY5lM5i62) and the word file attached in an invitation e-mail sent by the executive officers and leading members of the Association in each of its macro-regions (i.e., East Asia, Middle Asia, South Asia, Oceania, North America, South America, and Europe) as referent persons and committee members. These were active members in each of the macro-regions, well placed to organize the administering of the questionnaire to their associates. The survey was also publicized at the annual conference of the organisation and posted to the WUP mailing list multiple times, to be completed voluntarily.

The form included 20 questions, divided into four parts (Table 1), including personal details and the work sector they belong to, reflecting those of WUP members. The questionnaire surveyed the level of their up-to-date professional knowledge with respect to the newest scientific findings, including the utilization of and attitudes toward different means of knowledge transfer, but also their experience in transdisciplinary collaborations. Respondents were asked about the benefits and current weak points in such collaboration, the key factors in successfully initiating it, and the role of professional organisations like WUP. The fourth and final part concerned the respondents' previous experience with professional training, as well as an evaluation of the benefits and aspects that should be improved. The questionnaire guaranteed the complete anonymity of respondents.

Table 1. Structure of the questionnaire administered to all respondents (adapted from [20]).

Section	Content
Part 1. Personal details	Country Gender Education Organization Work sector
Part 2. Knowledge transfer	Current level of up-to-date on new scientific findings Usefulness of scientific knowledge Usage of various means of knowledge transfer Effectiveness of suggested means of knowledge transfer Prioritization of work sectors for investment in knowledge
	Use of scientific findings
Part 3. Collaboration between stakeholders (agencies, scientific institutions, policy makers, politicians, community groups)	Benefits from collaboration Weak points of collaboration The key factors to start a collaboration The role of professional organizations
Part 4. Training in green infrastructure and urban forestry	Participation in specialized training courses Type of training provider Type of learning delivery Expectations from training
	Sector in need of more in-depth knowledge

All questions were mandatory, and had a rating scale response modality using a four- or five-point Likert scale (or a three-point scale for those questions addressing levels of priority). The last question of the questionnaire was a selection within an interest inventory of the thematic need for more in depth knowledge.

Data quality was assessed in terms of completeness and accuracy, identifying bias within the country, gender, and age range. Only one case was removed because the same score was given for all options and thus the result was not considered reliable. Moreover, two individuals belonging to community groups were included in the category of Non-Governmental Organization (NGO).

Responses were analyzed with Excel (Microsoft Corporation, Redmond, WA, USA) and *Statistica* (StatSoft. 64 v12, Statsoft Inc., Tulsa, OK, USA). Percentages of selections (e.g., for each point of the Likert scale) were calculated and then the Fisher exact test by 2 × 2 table was applied to find statistical differences between the categories (e.g., stakeholders, geographical areas). One-way ANOVA was also applied for comparing average scores between different categories or geographical areas.

2.2. Characteristics of the Sample

The overall sample consisted of 138 respondents from 29 countries out of a total membership of 363 from 41 countries. In general, the respondents were distributed in geographical macro-areas consistent with the distribution of the WUP members (Table S1), with slight under-representation in Eastern Asia and over-representation in Africa (which includes only South Africa) and South America.

In terms of personal details, the majority of respondents were over 40 years old, with the highest proportion between 51 and 65 in all macro-regions (Table S2). In Europe, likely due to a better representative sample with a higher number of respondents, the class 41–50 was also numerous. This distribution reflects the fact that the organisations responsible for or engaged in urban parks are not represented by those under 40 [23].

The gender balance of the sample was largely skewed, with males comprising 73% of the total, reflecting the total gender balance of the membership (Table S3). The distribution of female respondents in the geographical areas according to the work organisation is shown in Table S4. The female respondents were not present in all work organisations (e.g., in business), but also in some geographical

areas (Asia), likely due to the small sample of respondents in some areas, but also to the traditionally male-oriented field. Although there are women in Europe and North America in the government organisations, also thanks to countries like Canada and France where traditionally female employment is institutionally supported [24], in general, women in the field are mainly to fulfil the quota system requirements or when there are no men available (e.g., Asia) [23].

On average, the educational level was high (Table S5), with 87% of respondents holding academic graduate degrees, and 76.5% in academic/research institutions holding a PhD.

The distribution of respondents according to work organisation (Table S6) is representative of the overall membership of WUP, though some bias is observed within the geographical areas. Most of the regions had a high proportion from government agencies (over two-thirds in Oceania, Europe, North America, and Africa), while East Asia was represented more by academic researchers (~60%).

In terms of work-sector (Table S7), the respondents belonging to government organisations mainly have a management role (57.5%), or a position in policy planning (19.5%) and governance (11.5%). Academicians work mainly on education, and the respondents from the business sector have roles such as management, policy planning, and operations, similar to respondents of NGOs (except for policy planning), though their main commitment is in management and operations.

3. Results

3.1. Professional Knowledge

In Part 2 of the survey, the respondents were asked about the usefulness of current scientific knowledge for their own work. A preliminary question asked about their being up to date in their field of work with respect to the newest scientific findings—which means assessing the personal activity associated with or attitude to searching for the newest information (e.g., reading publications, participating in workshops or conferences etc.) about a certain aspect or topic in their own work.

Respondents from all organisations indicated a certain level of remaining up to date on the newest scientific findings (from 53% in business companies to about 70% in government agencies and research institutions, selected 'Yes, somewhat') (Figure 1), though researchers were the ones without negative responses and with the highest percentage of "Yes a lot" answers (41%), especially compared to respondents from the government agencies (11%) (Fisher exact: $p = 0.000$, $n = 13$) and NGOs (17%); (Fisher exact: $p = 0.001$, $n = 12$).

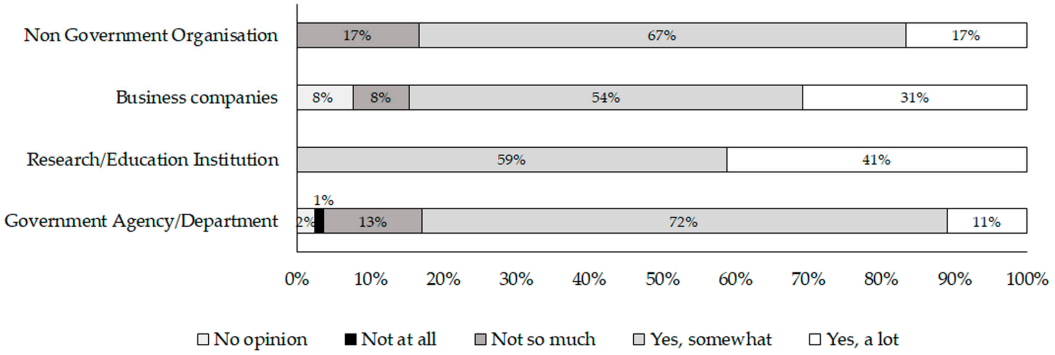


Figure 1. Percentage of respondents for each Likert scale point (No opinion, Not at all, Not so much, Yes, somewhat, Yes a lot) regarding the feeling of being up to date on the newest scientific findings ($n = 137$). Statistical differences are reported within the text.

New knowledge is acquired thanks to a variety of tools and opportunities that were assessed by respondents. All groups consider highly effective those means of learning which allow for physical presence, such as technical meetings, seminars/workshops, and conferences—where it is possible to access new information and ideas, and also exchange opinions in an interactive manner. Among these,

technical meetings are highly appreciated, especially by government agencies. Many in this category selected "highly effective", especially compared to research institutions (Fisher exact: $p = 0.0053$; $n = 60$) and business representatives (Fisher exact: $p = 0.023$, $n = 59$). Seminars and workshops are very much appreciated by government agencies compared to business companies (Fisher exact: $p = 0.001$, $n = 70$) and research organisations (Fisher exact: $p = 0.026$, $n = 74$), and by NGOs compared to the business sector (Fisher exact: $p = 0.005$, $n = 20$). Scientific publications are somewhat effective for all groups, with half of all researchers considering them very effective, but with some professionals considering them not effective. Regarding new methodologies such as e-learning, a significant percentage of respondents faced difficulty in assessing the tool and they did not give an opinion. However, the rest of the respondents showed a shy positive attitude without statistical differences (Figure 2).

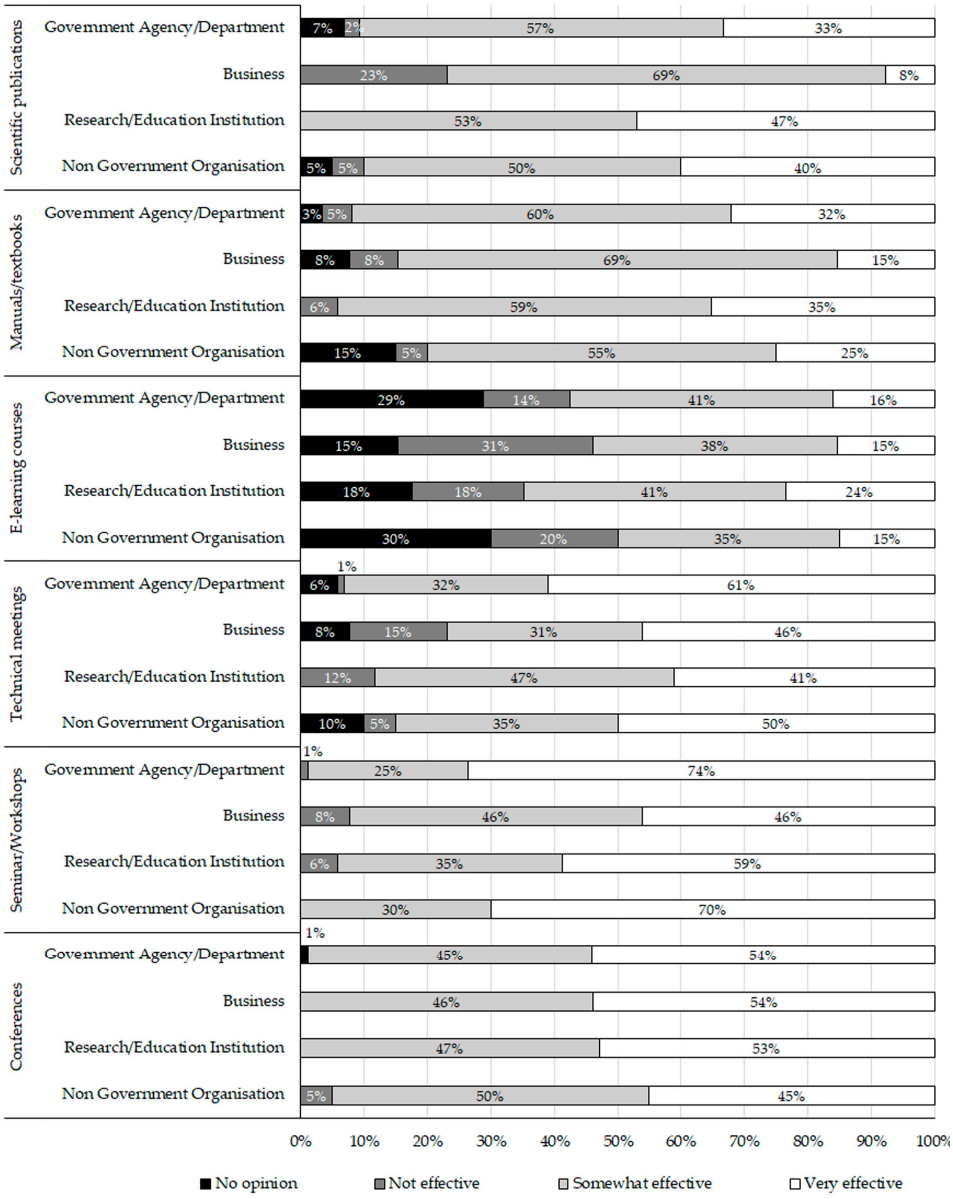


Figure 2. Evaluation of the effectiveness of different means of knowledge acquisition among categories of respondents with the percentages (%) of responses for each assessment scale point.

For all categories, the scientific information should be more easily accessible, especially for 92% of respondents of business companies, especially with availability on the internet, which is a high priority

for the large majority of respondents in all categories. Another important aspect is the connection to real problems, which is especially of high priority for 80% of NGOs and of rather high priority for all others. Translations of materials into mother tongue and cost of information seem to have medium priority (Figure 3).

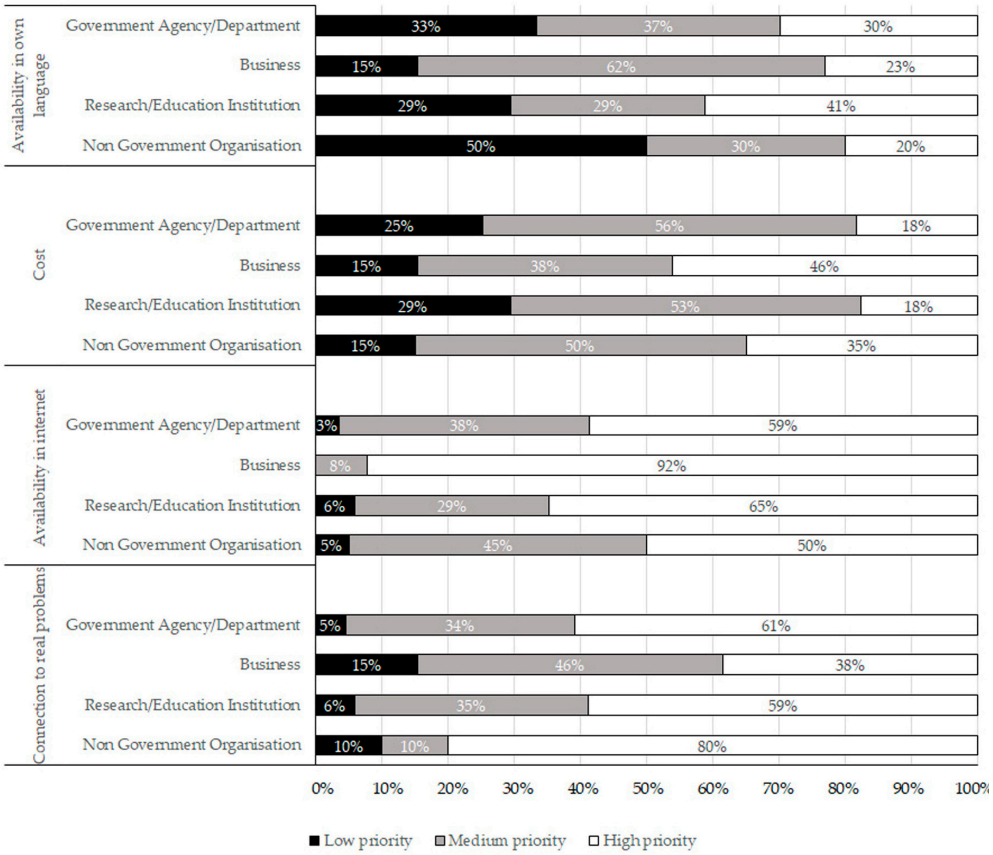


Figure 3. Level of priority given by the respondents from different organisations to aspects of knowledge transfer that should be improved. % of respondents for each level of priority are reported (n = 137).

Looking at the distribution of priorities according to geographical areas (Figure S1), the results show how translation into one's own language does not have high priority in countries where English is the official language, such as in North America, especially compared to Europe (p = 0.01) and East Asia (p = 0.002). Then, Europeans and respondents from Oceania give higher priority to accessibility of resources with respect to respondents from North America (p = 0.0004 and p = 0.001, respectively) and also for their availability on the internet (p = 0.002 and p = 0.0027, respectively, with respect to North Americans).

Regarding the scientific fields that deserve more funding because of a deeper knowledge need, no differences were observed between geographical areas. In relation to the categories of stakeholders (Figure 4), all groups—and in particular researchers and civil servants, emphasized the importance of the social aspects of green areas, especially compared to professionals (p = 0.0013 for researchers and p = 0.0003 for civil servants, n = 138) and NGOs (p = 0.0013 for researchers and p = 0.003 for civil servants, n = 138). Difference between stakeholders was also found for 'selection of appropriate species with respect to atmospheric interactions and resilience to climate change', especially between the business professionals and other respondents ($p < 0.05$ with NGOs, researchers and p = 0.004 with civil servants, n = 138). Though without statistical differences between categories, economic aspects also have a certain priority. This represents a broad awareness that urban parks have a vital role to fill in

providing recreational, health-related, and other benefits to the city's residents, as well as visitors (e.g., moderating the local climate at the micro-scale level of an individual urban space, and in terms of the larger urban heat island, sequestering carbon, being spaces for socializing and wellbeing benefits [25]). Other topics were found to be important as well, such as those related to tree management and training, meaning that knowledge is needed to ensure that these benefits are made available to those who need them. On the other hand, aspects with low priority are those related to ecology (e.g., tree physiology) and nursery technical information (plant provision).

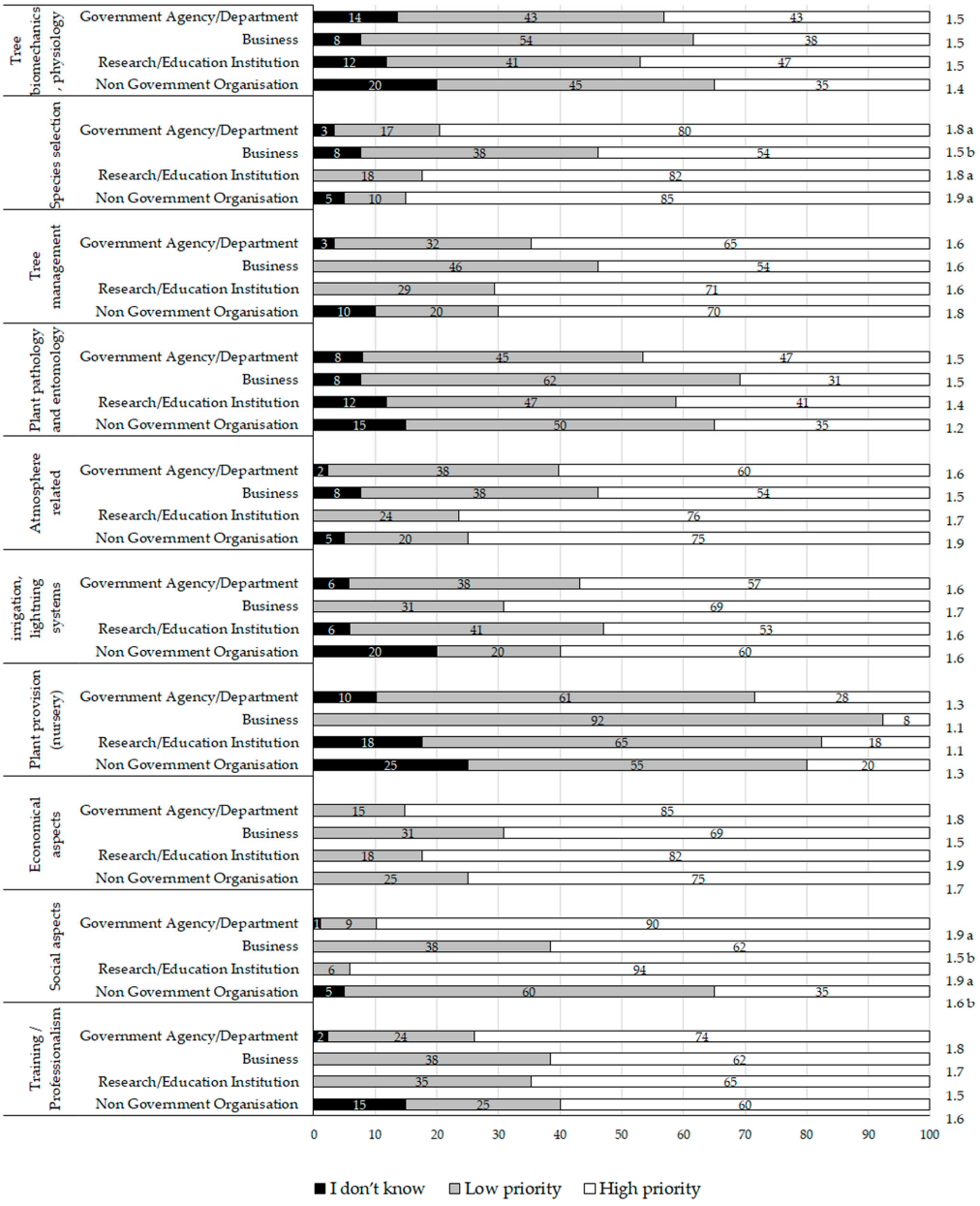


Figure 4. Level of priority given by respondents from different categories to different fields of investigation related to urban green areas. Percentages of responses in each level of priority are reported. Statistical differences between percentages have been identified by the Fisher exact test. Mean values of the level of priority have been calculated by assigning 2 to high priority, 1 to low priority, and 0 to I don't know. Mean values are shown on the right side of the bars. Statistical differences between mean values of different categories (indicated by small letters next to the mean values) have been identified by the ANOVA test, followed by the LSD test at $p < 0.05$ ($n = 137$).

3.2. Collaboration between Stakeholders

The collaboration between stakeholders brings important benefits, but according to the survey responses, also faces difficulties. Respondents were asked several questions regarding their experience in collaborating with other stakeholders. Firstly, all groups of stakeholders have collaborated at least once with members of other categories (Table S8), though only government departments and other NGOs indicated politicians as partners. The most active groups were non-government organisations with an average of 70% collaborations with other organisations (though especially with policy makers −82%- and NGOs −94%) and government departments with an average of ~64% collaborations.

For all groups, the most important factor in starting a collaboration is having a network of direct contacts (Figure 5). Being part of an organisation that may help in building contacts is seen as advantageous for professionals, especially compared to NGOs (Fisher exact: $p = 0.0005$, $n = 7$) and government agencies/departments (Fisher exact: $p = 0.0055$, $n = 24$).

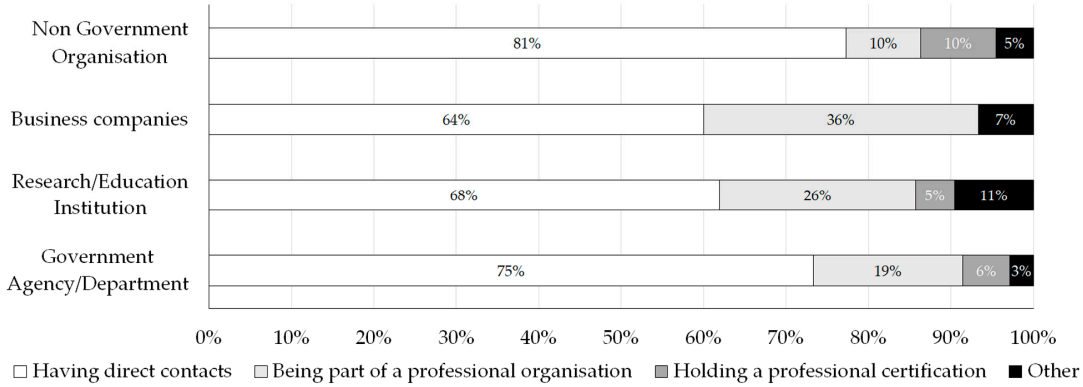


Figure 5. Selected factors needed to start a collaboration with other stakeholders. Percentages of respondents of each category are shown for the suggested items.

Different benefits may be achieved by collaborating with one category of stakeholders or another, according to the responses of various stakeholders when asked to evaluate a series of seven potential benefits (Figure 6).

Identification of a strategy is a benefit, especially for government agencies in collaboration with colleagues of other agencies (27%) and for NGOs in collaboration with policy makers (35%). For all stakeholders, policy setting is associated exclusively with policy makers. For business companies and NGOs, this benefit is also linked to politicians, especially compared to government agencies (Fisher exact: $p = 0.034$, $n = 32$; $p = 0.000$, $n = 37$, respectively). Opinion exchange is largely selected by all categories within collaborations that include community groups, which also bring problem solutions, especially for professionals and researchers rather than for government departments (Fisher exact: $p = 0.000$, $n = 21$; $n = 22$, respectively). Funding is the most selected achievement by NGOs and scientific respondents when the business sector is involved.

All organisations agree that the main benefits of the collaboration with scientific institutions are 'innovation' (ranging from 25% NGOs to 37% government agencies) and 'transferability of results'.

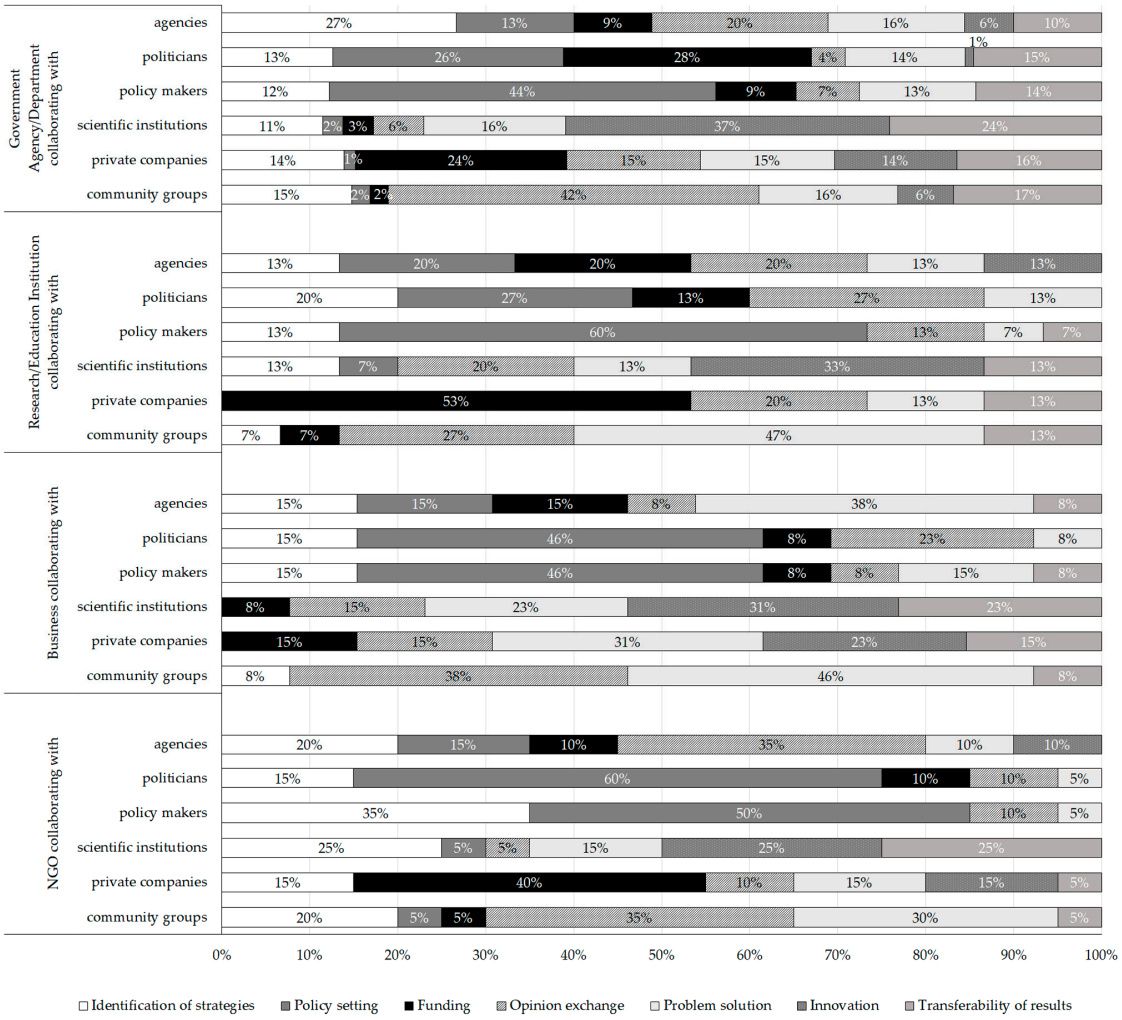


Figure 6. Benefits from collaborations with other categories. Percentages of selection of the suggested benefit given by each category of respondent (n = 137).

In addition, respondents evaluated the common shortcomings of collaborations (Figure 7). The main constraints seen are bureaucracy and diverse interests or approaches and scarcity of resources. Bureaucracy is in absolute terms the weakest point indicated by all groups when the collaboration includes policy makers and government agencies. The diversity of approaches/interests is the most selected by all groups when they collaborate with community groups and for NGOs and government agencies in collaboration with private businesses. Also, scarcity of resources is especially indicated by the different groups in collaboration with community groups. Strict project schedules also represent a constraint to a certain extent, but only for members of scientific institutions when collaborating with one another.

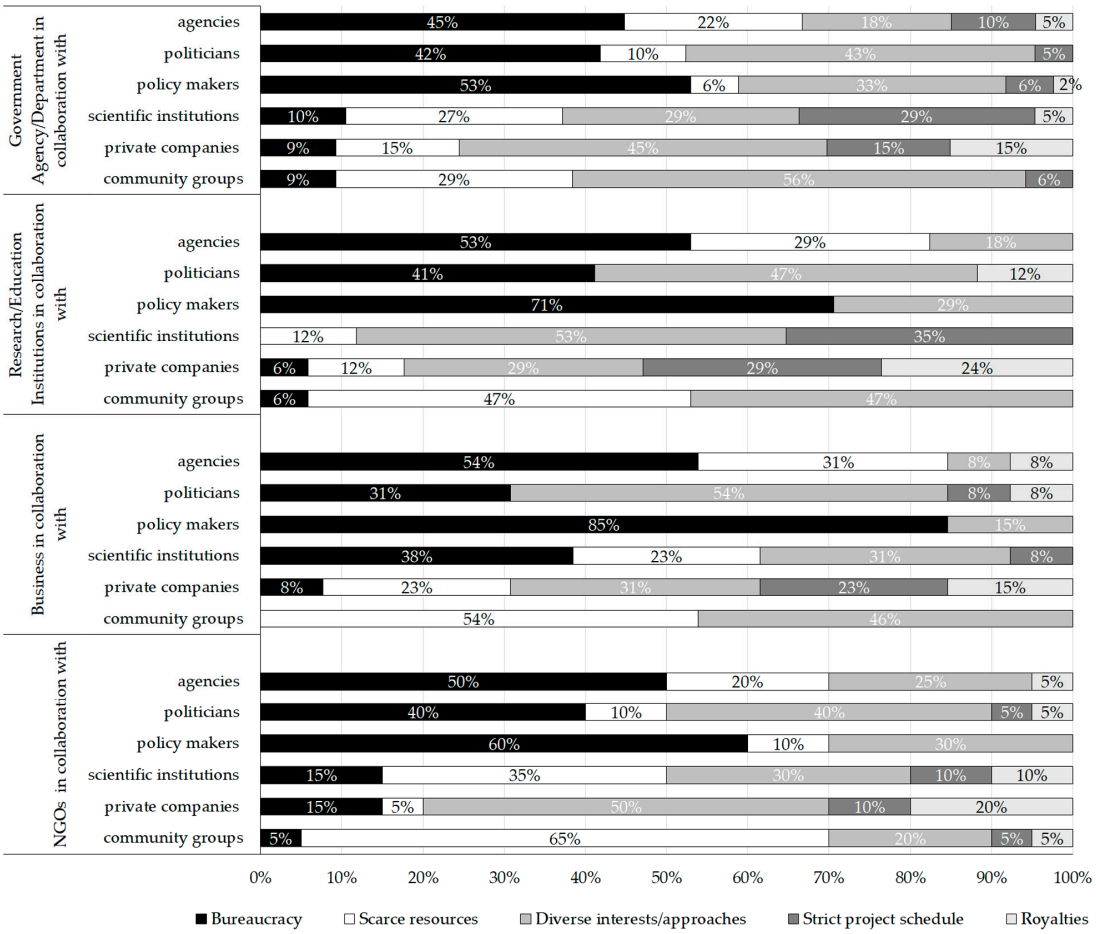


Figure 7. Perceived shortcomings from collaborations with other categories. Percentages of selection of the suggested shortcoming given by each category of respondent (n = 137).

3.3. Professional Training

Among all respondents, just over half reported having participated at least once in a training course in the three years before the survey. Of these, the various training courses described were conducted by a range of different providers. In all categories, most respondents selected 'professional organisations' as the main type of learning provider, though researchers and professionals also indicated other certified training providers and research institutes (Figure S2A, Table S9).

Most of the training experiences involved face-to-face learning courses with classroom presentations (Figure S2B, Table S10). Alternative teaching methods using advanced technologies were encountered less frequently, though respondents from the business sector expressed openness to these new means of knowledge transfer—either combined with traditional methods or solely by remote presentation (i.e., "e-learning").

A large majority of respondents highlighted the need for improving training through a higher quality of learning delivery. Additionally, networking gets much attention, especially by researchers and NGOs. 'Providing practical activities' is also considered an important aspect to consider (Figure 8), with a special emphasis by government respondents (89% agree) and researchers (82% agree) compared to the business sector (Fisher exact: p = 0.0004, n = 86; p = 0.0239, n = 23, respectively) and NGOs (70%) (Fisher exact: p = 0.0007; n = 92; p = 0.034, n = 28, respectively). Among other items, 'delivery of a recognized certification' seems to be relevant for representatives of the scientific institutions (89%) compared to the business sector (Fisher exact: p = 0.000, n = 21), NGOs (Fisher exact: p = 0.000, n = 27),

and government agencies (Fisher exact: $p = 0.0001$, $p = 0.002$, $n = 78$). The use of e-technologies seems to be rather appreciated by respondents, especially by government agencies and researchers.

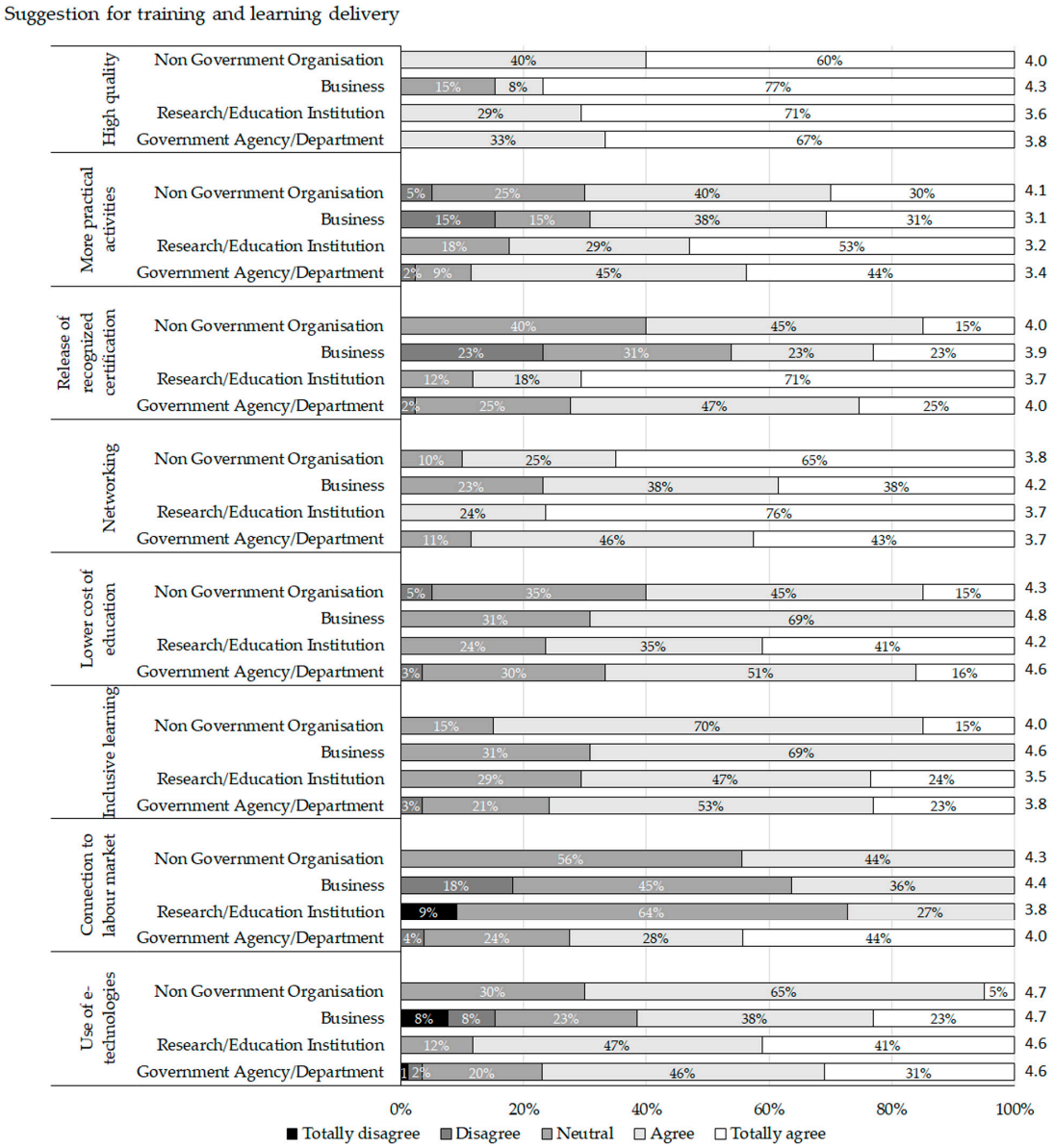


Figure 8. Level of agreement on suggested recommendations for improved training provision. The percentages of selections for each level of agreement are reported in the bars. Statistical differences between percentages have been identified by the Fisher exact test. Mean values of agreement have been calculated by assigning 5 to Totally agree, 4 to Agree, 3 to Neutral, 2 to Disagree, and 1 to Totally disagree. Mean values are shown on the right side of the bars. Statistical differences between mean values of different categories (in cases indicated by small letters next to the mean values) have been identified by the ANOVA test, followed by the LSD test at $p < 0.05$ ($n = 137$).

The respondents selected a wide range of themes that they would recommend that training companies focus on, mostly related to tangible pursuits such as 'urban planning' and 'green areas/tree management'—but also in the realm of public engagement, such as 'healthy parks/healthy people programme' (Table 2). Significant differences between categories were only found for the management

of green elements for which NGOs were the main supporter compared to business representatives (Fisher exact: $p = 0.037$, $n = 17$).

Table 2. Subjects that deserve more attention in training programmes.

	Non Government Organisation	Research/Education Institution	Business Companies	Government Agency/Department
Urban/landscape planning or design	12.3%	11.5%	14.3%	12.9%
Trees/green areas management	16.0% [a]	9.2% [a,b]	7.1% [b]	10.1% [a,b]
Atmosphere related topics (climate, air quality etc.)	7.4%	10.3%	5.4%	7.1%
Pathology and entomology	4.9%	3.4%	3.6%	3.9%
Species selection for CO_2 and pollution capture	9.9%	6.9%	7.1%	5.3%
Species selection for water stress, climate change	7.4%	9.2%	5.4%	6.9%
Tree biomechanics	2.5%	3.4%	3.6%	3.4%
Tree physiology	2.5%	3.4%	3.6%	3.4%
Efficient lighting systems	1.2%	1.1%	5.4%	1.1%
Water saving irrigation systems	3.7%	4.6%	3.6%	4.6%
Marketing and communications	2.5%	1.1%	5.4%	4.1%
New technologies for tree assessment	4.9%	5.7%	7.1%	7.8%
Environmental education	4.9%	11.5%	7.1%	6.2%
Programs and Events	3.7%	3.4%	5.4%	3.9%
Facility/Asset management	3.7%	2.3%	7.1%	5.7%
Healthy Parks Healthy People	12.3%	12.6%	8.9%	13.3%
	100.0%	100.0%	100.0%	100.0%

Percentage of respondents in each category selecting subjects that deserve more attention in training programmes. Significant differences between the stakeholders' categories identified by the Fisher exact test are indicated with small letters.

3.4. The Role of Professional Associations

As one should expect in this case, there was a consensus among respondents from all work sectors (without statistical differences) that being part of a professional association (such as WUP) provides a range of benefits—from facilitating the acquisition of personal knowledge and direct contact with other members and stakeholders, to promoting credibility, enhancing trust, and engendering a better understanding of the needs of the market (Figure 9).

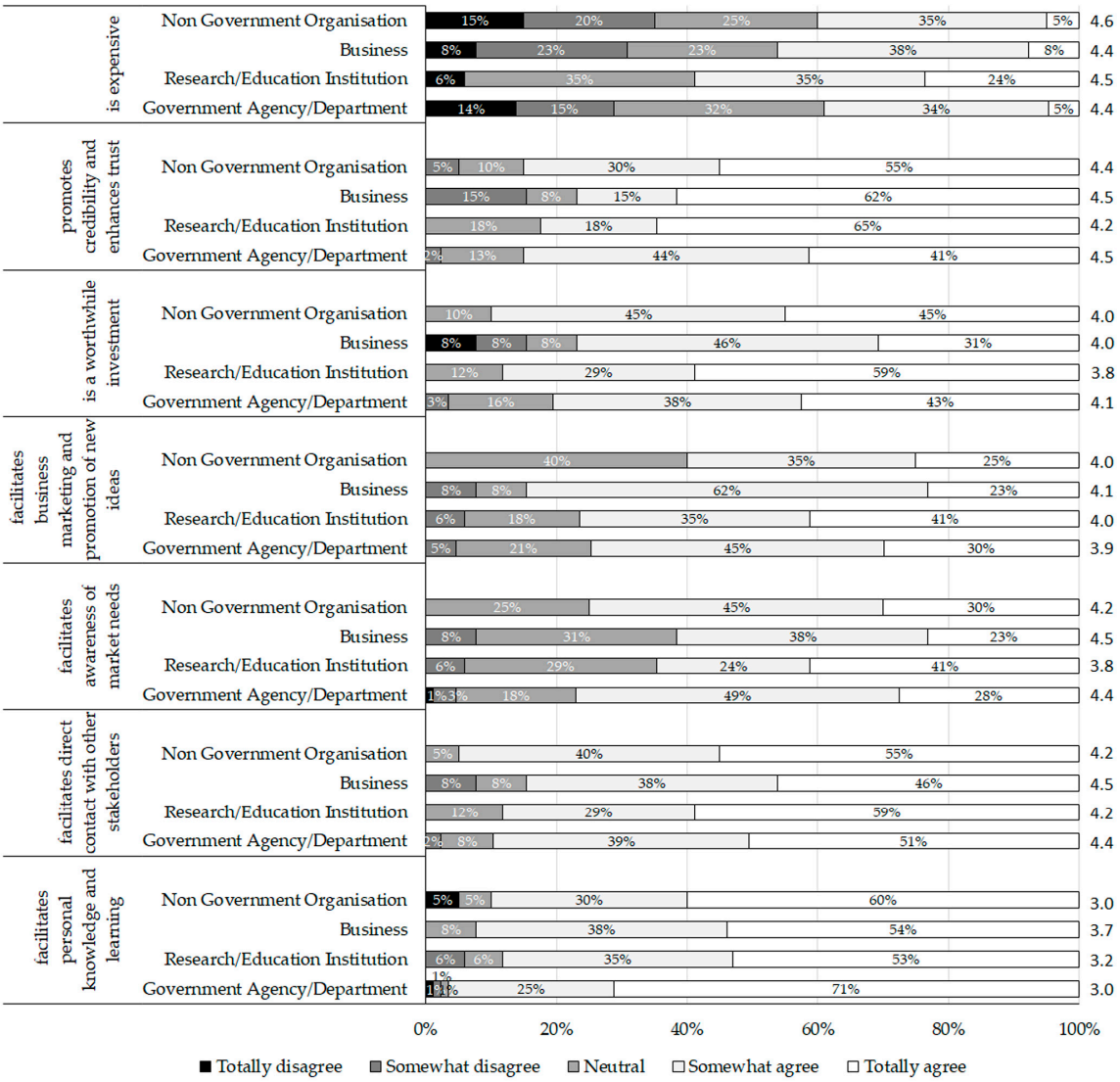


Figure 9. Perceived benefits for the different stakeholders of being part of a professional association. The percentages of selections for each level of agreement are reported in the bars. Mean values of agreement have been calculated by assigning 5 to Totally agree, 4 to Agree, 3 to Neutral, 2 to Disagree, and 1 to Totally disagree (n = 137).

4. Discussion

The survey of urban park stakeholders was based on the underlying assumption that the planning and management of urban parks and related green infrastructure is a complex undertaking, and the successful delivery of ecosystem services can only be achieved when a diverse array of actors see city greening as a common task and share their expertise on a multitude of ecological factors.

Sharing of such knowledge and values can be achieved by organisations that gather together representatives of urban green sectors and allow the members not only to access new knowledge and contacts in their own country, but also to share their experience at a wider level. WUP plays a role in forwarding this agenda, and the intents and objectives of such an organisation undoubtedly influence its members' distribution. In fact, most WUP members are managers of public parks and green infrastructures who, according to a previous study [19], are underrepresented by younger age groups or women, explaining the low number of such people sampled in the current survey. Although there are women in Canada or France (based on the history) working in the management and maintenance

of urban green areas, in general, women in the field are mainly to fulfil the quota system requirements or when there are no men available (e.g., Asia) [23].

However, the sample distribution in terms of work-sector also reflects a worldwide change in the management of public parks and green infrastructure. At least in many European countries, the traditional park departments have faced an organisational transition as the management and maintenance of urban green areas have increasingly become the task of departments for roads or waste management, or newly designed private organisations—while previously prominent positions such as the general "City Gardener" are becoming less common [26]. This is probably connected to the increasing phenomenon of outsourcing, an increasingly widespread practice, especially for specific tasks such as green space maintenance [26,27]. It is possible that this trend could reduce the need, or impair the willingness, of the involved actors to collaborate.

We anticipated that municipal authorities would place a high value on collaboration with outside professionals and have a pressing need for the type of current information which may be provided by researchers in the field. Results from the questionnaire indicate that representatives of public agencies, such as from city park departments, do indeed have the lowest self-reported level of up-to-date knowledge, and thus stand to benefit from effective cooperation with other actors. Relative to other stakeholder groups, they in fact emerge as the most active collaborators and place an especially high priority on improved training and professional knowledge.

A crucial and timely question, then, is how such knowledge can be best conveyed. A consensus was observed in the survey results that learning is most effective when it is interactive, which for most respondents means a preference for 'face-to-face contact' in the framework of classroom-type discussions. In non-English speaking countries, the importance of this direct contact was reinforced by a priority among respondents for access to learning in their own language. The ability to receive answers to questions in 'real time' is perceived to be highly valuable, and in fact, very few respondents reported positive experiences with the 'remote' transmission of information through means such as 'e-learning'—a medium whose level of interactivity is perceived as low but which has improved dramatically [28]. This reinforces at an international level the findings of a previous study [20], which indicated that such technological means have yet to become widely accepted in Europe.

At the same time, it was seen that respondents are in fact receptive to the use of alternative teaching methods using these new technologies. As indicated previously at a European level [19], the problem in general with remote learning is more a lack of familiarity with the tools themselves than a lack of potential for implementing them—since they are considered quite effective by those who have experienced them first hand. It may be anticipated that as the technological solutions mature, and the means of remote interaction become more intuitive, their adoption will follow accordingly.

The potential value of alternative learning mechanisms may be seen in the light of questionnaire responses regarding scientific publications, which unsurprisingly are seen to be less effective for private consultants than they are for academics. The need for practical as well as theoretical information was further reflected in responses concerning the aspects of knowledge transfer that should be improved, with most stakeholders emphasizing the importance of knowledge that is 'connected to actual problems'. According to another study using Rotterdam and Berlin as examples [29], methods such as 'citizen science' and 'participatory research' can help to bridge these gaps by bringing resource managers, decision makers, and the public into the forestry-related research process—potentially making the results of research more relevant and accessible to non-academic actors. For connecting knowledge transfer to the actual problems of stakeholders, it can be useful to adopt a process architecture of knowledge co-production between the different stakeholders (i.e., planners, scientists, civil society representatives, and non-governmental organizations) [30,31].

When asked about the most important factors for initiating collaboration with other stakeholders, a clear preference was expressed among all groups for 'personal contacts' rather than professional affiliation in terms of organizational membership or academic accreditation. This suggests that informal, and even random, meetings are the main drivers in launching such collaborations, though

such an interpretation masks the fact that 'personal contacts' are often made through conferences, meetings, and other encounters (such as gatherings of the European Forum on Urban Forestry—EFUF), which do in fact come about because of involvement in professional associations and work-related activities. Therefore, the organization of such events should be undertaken with an eye toward stimulating 'networking' and the cultivation of personal relationships, in addition to their more straightforward function of education and conventional information sharing.

Indeed, the role of professional collaboration goes beyond the transmission of facts and figures, and for most respondents, its main value lies in the realm of joint creativity—with the 'identification of strategies', 'exchange of opinions', and finding 'solutions to problems' emerging as the most highly prioritized benefits. This echoes Mauser et al. [32] regarding the need for the scientific community to be integrated into society to address global change challenges. Similarly, Scholz and Steiner [33] emphasize the reciprocal benefits of collaborations between representatives from public institutions, industry, and scientists in terms of the identification of new knowledge. On a more pragmatic level, collaboration with those from other sectors is seen as an important way of accessing new sources of funding. Because these benefits are tangible, it is important to also recognize the obstacles to achieving them.

Among the main shortcomings noted, the first were problems related to bureaucracy. Particularly at the local level, where the benefits of urban park-related collaboration accrue, government agencies thus have a vested interest in reducing bureaucratic entanglement—and often they also have the capacity to do so, if it is considered to be a high enough political priority. The second obstacle is the divergence of interests or approaches among different stakeholders. Here it is of the utmost importance that these varied actors—from technocrats and consultants to landscape designers and community advocates—strive to develop a "common green-planning language", as also emphasized by Scholz and Steiner [33], which can accommodate their diverse priorities and concerns, without sublimating any of them.

An illustration of the need for such inter-disciplinary communication is the diversity of views among different stakeholders regarding the most important subjects to focus on in professional training. It is natural that some professionals (in this case representatives of NGOs) would be most concerned with practical matters of tree management, while others (in this case academic researchers) would place the highest priority on broader environmental concerns such as climate change adaption. At the same time, there is a unifying concern that a high quality of learning be delivered to all participants. These educational opportunities can also involve actual park users, as a way of legitimating their active role in the governance of green spaces—as outlined by Gulsrud et al. [34], in their consideration of the City of Melbourne's Urban Forest Strategy.

Finally, it should be noted that the survey of stakeholders was worldwide in scope and all of the respondents are affiliated with the World Urban Parks (WUP) association. Many of the improvements that are needed in collaboration and knowledge transfer—whether they relate to interactivity and accessibility, relevance to user needs, or inter-disciplinary communication—become more challenging in an increasing globalized and interconnected world. Despite the current unfamiliarity with advanced e-learning systems, web-based learning solutions are now proliferating [35], and will become increasingly important for reaching urban park stakeholders in geographically remote areas. Therefore, a framework such as the WUP has a special role to play in cultivating the values and skills that are necessary to develop better and more appropriate tools for improved urban park management. These tools will have to be both more comprehensive and more flexible, ideally taking the form of smart systems, which can help all of those involved to be more effective in thinking globally and acting locally.

5. Conclusions

In urban areas, parks are highly valued amenities that can provide multiple ecosystem services when ecological factors are considered in a holistic way—and these services are especially critical in

certain geographical contexts, such as densely-built city centres. For instance, biodiversity protection is becoming more and more important. Success in supplying these services depends on the long-term process of city planning, park planning, and ongoing management, which requires complex and diverse knowledge. Often, this cannot be accomplished by municipalities or local authorities on their own, so that the engagement of a range of stakeholders and life-long learning activities for park staff at various levels becomes necessary.

This worldwide survey of urban park stakeholders has found that public agencies, such as city park departments, have both a need and a desire for collaboration with private practitioners, academic researchers, and community advocates: representatives of the public sector report have a lower level of up-to-date knowledge than other actors, but they maintain an active cooperation with other stakeholder groups to continuously improve their professional knowledge. Interactive face-to-face contacts are the most highly valued type of learning for most of the survey's respondents, but those in private enterprise are especially receptive to the use of alternative teaching methods—indicating that as they become more intuitive and familiar to users, tools based on advanced information and communication technologies will serve an important role in the dissemination of knowledge to an increasingly globalized world.

The study highlighted the need for practical as well as theoretical information: stakeholders are hungry for knowledge that is 'connected to actual problems'. Most indicated that 'personal contacts' are more important than professional affiliation for the initiation of new collaborations, which suggests that even formal meetings should facilitate networking along with structured learning. For many, professional collaboration means not just information transfer, but the possibility for joint creativity, with the 'identification of strategies', 'exchange of opinions', and finding 'solutions to problems' emerging as the most highly prioritized benefits—along with the possibility of accessing new sources of funding.

Improved collaboration between stakeholders will have to address distinct obstacles: 'bureaucracy' is seen as the main problem, which means that local government agencies, which benefit most from effective collaboration, have a special interest in streamlining the means of collaborative interaction—and should make this a high political priority. By also emphasizing the 'divergence of interests or approaches among different stakeholders' as a barrier for effective collaboration, stakeholders are sending a clear signal that there is a need for the development of a "common language"—i.e., speaking in "green"—which may accommodate their diverse priorities and concerns. In accomplishing this, a special role is seen for international professional associations like the WUP, whose global reach and varied constituency can help to build bridges between countries and professions, so that the potential of urban parks can be more fully realized.

Finally, the collaboration between stakeholders must also include citizens. We would argue that it is crucial for the managers of an urban park to maintain an ongoing dialog with the park's users, and to engage them in creative discussions at all levels. In fact, the inclusion of volunteers in an organization such as WUP is a reflection of this need and is emblematic of recent upsurges in volunteerism, citizen science, and participatory research as means to cultivate the bonds between specialists and the citizenry at large.

Supplementary Materials: The following are available online at http://www.mdpi.com/1999-4907/9/8/458/s1, Figure S1: Level of priority given by respondents from different geographical areas to aspects of knowledge transfer that should be improved, Figure S2: Training. (A) Types of professional training providers described by the respondents, and (B) Type of courses attended by the respondents, Table S1: Distribution of respondents in sample with respect to the actual percentage of WUP members in each geographical macro-area, Table S2: Age distribution of respondents, Table S3: Distribution of the female and male percentages according the work category within the geographical areas with respect to the total WUP membership (source: WUP, 2016), Table S4: Distribution of female respondents (n = 37) in each work organisation in the geographical areas, Table S5: Educational level of the respondents according their work organisation (n = 137), Table S6: Distribution of WUP respondents (n = 137) according work organisation with percentages in the geographical areas, Table S7: Distribution of WUP respondents (n = 137) according work sector with percentages in the work organisation, Table S8: Percentage of collaborations between work categories, Table S9: Type of training providers, Table S10: Types of learning

delivery, Questionnaire S1: Knowledge and collaboration needs of managers of Urban Parks, Green Infrastructure and Urban Forestry.

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