



Deliverable 3.1

User handbook containing recommendations for deployment

Revision	0
Preparation date	2016-02-01 (m13)
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Lead contractor.....	AIT

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Description of the related task and the deliverable in the DoW	<p>This task will analyse and evaluate the applicability of the demo tool (developed in WP2) in different settings of decision making processes including input from citizens. To do so, a set of most relevant territorial, national and European decision making processes will be screened. Cities role here is important, since they have the expertise in policy making and how KPIs should guide most efficiently towards smart and sustainable solutions in cities decision making. The benefits of the demo tool within the selected decision making processes will be analysed and the potential impact evaluated. Finally, recommendations will be made for the use of the demo tool in policy decision making.</p>											
Planned resources PM	VTT	AIT	TNO	EUR	TAM	ROT	VIE	ZGZ	ZAG	Total		
		1,0		1,0	0,3	0,3	0,3	0,3	0,3	3,5		
Comments												
V	Date	Authors		Description								
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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015		1	2	3	4	5	6	7	8	9	10	11
2016	<u>12</u>	13	14	15	16	17	18	19	20	21	22	23
2017	<u>24</u>											

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1. PUBLISHABLE EXECUTIVE SUMMARY

The D3.1 handbook: ‘CITYkeys Experience. Recommendations from cities to cities‘ contains an evaluation of the applicability of the CITYkeys Performance Measurement Framework, including the demo tool. Cities play a central role in this deliverable.

The authors of this handbook applied a variety of methods for accessing and consolidating the required information. In this context, the cities’ different levels of involvement, exposure and familiarity with the CITYkeys project as well as their unique and divergent potentials and ambitions were considered. A variety of decision making processes on the city and European level have been taken into account and included in the survey and interviews conducted with city representatives.

Furthermore, the D3.1 handbook shares the experience of the CITYkeys cities and partners with the interested audience, aiming for a broad distribution of the knowledge and lessons learned in the project. Finally, based on the interview and survey outcomes, a set of recommendations for the application of the CITYkeys framework on the city and European levels are compiled and communicated in this deliverable.

2. INTRODUCTION

2.1 Purpose and target group

The handbook contains the evaluation outcomes of CITYkeys Performance Measurement Framework applicability, including the applicability of CITYkeys tool.

The handbook serves as a reference document, which looks at performance measurement through the eyes of cities. It aims to:

- Capture the experience, lessons learned and perspectives of the partner and follower cities involved in the CITYkeys project;
- Promote the sharing of the approaches, information and experience among cities and experts interested in performance measurement;
- Lay out key recommendations for the application of the Performance Measurement Framework;
- Identify the framework's strengths, shortcomings, as well as the steps needed to unlock the full potential of performance measurement;
- Chart out recommended paths for the development and integration of performance measurement tools and systems;
- Communicate the key messages from CITYkeys project in an easily understandable format.

The target groups that the handbook is addressing are as follows:

- Different levels of city administrations;
- City managers;
- Civil servants;
- European Commission;
- Stakeholders dealing with the topic of standardization;
- Academia and research community.

This deliverable communicates the added value of CITYkeys Performance Measurement Framework in an easily accessible and compact format, while targeting broad audience of city stakeholders.

2.2 Deviations from the DoW and their causes

The D3.1 deliverable contains following deviations from the DoW:

- The focus of the handbooks' content is placed on the entire CITYkeys Performance Measurement Framework and therefore not limited to the CITYkeys Tool. A detailed testing of the CITYkeys Tool has taken place in the Work Package 2. In order to avoid repetitive inputs, the task 3.1 contains only a compact summary of the Tool testing outcomes that are relevant in the context of decision making.
- The interest of cities, in terms of the applicability of CITYkeys outcomes, is not limited to the CITYkeys Tool. Depending on the state that a city finds itself in, in the context of Smart Cities development, different points of interest for accessing the results of CITYkeys project are relevant. In some cases the focus is the tool and in other the knowledge behind the entire CITYkeys Performance Measurement

Framework. Addressing the applicability of the entire CITYkeys Framework provides more options for interested urban stakeholders to access the project results.

- Cities are the targeted key users of the CITYkeys Framework and Tool. Based on this fact, the overall methodology used in this task has been focused on accessing the perceptions and feedback, concerning the realistic applicability of the framework, through the eyes of city representatives and stakeholders, who are most familiar with the local processes of decision and policy making. This approach has enabled the task team to limit the possible interpretations and distortions of empirical information to a minimum and ensured the authenticity of the content.

2.3 Contributions of partners

In order to access the perceptions and views of city representatives and to ‘pick up’ their feedback regarding the CITYkeys Performance Measurement Framework, an outline for interviews with the five CITYkeys partner cities was designed by AIT. Furthermore, a survey was set up jointly by AIT and EUROCITIES that enabled to access a broader audience of urban stakeholders, such as city administrations, planning associations, consultant and utilities from a range of cities across Europe.

The project partners from the cities of Rotterdam, Tampere, Vienna, Zagreb and Zaragoza have contributed to this deliverable by providing elaborate information along the interview outline. The interviews have been performed and recorded by AIT team members. Full interview texts can be accessed in the attached Annex. Key quotes from these interviews have been included in the handbook ‘CITYkeys Experience. Recommendations from cities to cities’. In addition to attending an interview, the city of Tampere has submitted supplementary comments on the handbook, which have been considered and integrated in the process of handbook finalization.

The cities of Tampere and Zaragoza have contributed examples that describe already existing as well intended specific applications of CITYkeys Framework in their local context.

EUROCITIES has worked closely with AIT on the questionnaire design. EUROCITIES ensured the availability and accessibility of the questionnaire in its network of cities. This effort has resulted in 38 detailed responses to the questionnaires from a broad range of urban stakeholders across Europe.

VTT has evaluated the potentials for the application of the CITYkeys Tool and contributed the description of these potentials as included in the given handbook; moreover VTT has reviewed the handbook and ensured its alignment with overall aims of the project.

EUROCITIES and AIT have jointly worked on the audience-friendly and easily accessible design of the handbook as well as editing of the text.

2.4 Baseline

Three key factors serve as baseline considerations for this deliverable:

- Currently, European cities are exposed to a great variety of already existing global, European and local performance measurement frameworks. The outcome of CITYkeys project has introduced a new framework, which stands in competition with the existing ones. In this context, this deliverable is communicating the empirical feedback from cities, exposing the perception of CITYkeys Performance Measurement Framework and setting out recommendations for most likely and useful applications of the framework.

- European cities find themselves at different stages of development in terms of strategic smart city goal setting, implementation of related measures and advancing local policy and process development. Starting with this baseline, the deliverable 3.1 is exposing different areas for potential CITYkeys Framework application in correspondence with the local challenges. This deliverable showcases a range of possibilities how the given framework can support different urban stakeholders across Europe.
- There is large number of monitoring and indicator systems related to urban development already. However, there is so far no indicator or monitoring system in place that specifically reflects the European Smart City approach. Especially for the monitoring and evaluation of the Smart City Light House projects and other European Smart City Light House projects, such a standardized indicator and monitoring framework is needed to make the monitoring and evaluation results comparable across cities.

2.5 Relations to other activities

The deliverable 3.1 rests on and links the outcomes of all previous CITYkeys Work Packages. This deliverable communicates the added value and the potential areas of application that CITYkeys Performance Measurement Framework is most suitable for.

The outcomes of WP2 are considered and integrated in the handbook on a more detailed level, pointing out the specific areas, where CITYkeys Tool application generates advantages for potential users.

3. CONCLUSIONS

The D3.1 conveys the flexibility of CITYkeys Performance Measurement Framework. Information enclosed in the handbook has been collected using empirical methods of interviews and surveys, which disclose original opinions and views of city representatives involved in the project.

3.1 Relation to continued developments

The recommendations provided by the partner cities of the CITYkeys project will facilitate the application of the CITYkeys indicator framework in the near future. One important field of application will be several Smart City Light House projects: Several of the indicators will be used in the Smart City Light House Project SMARTER TOGETHER, RUGGEDISED and MySmartLife. In addition to the Light House projects, the Smart City Information System project (SCIS) and the ESPRESSO project make reference to the CITYKEYS indicators.

4. ANNEXES

Further information is described in related background documents:

Annex 1: Interview documentation

Annex 2: Survey summary

Annex 3 City Hand Book

ANNEX 1 RECORDINGS OF THE INTERVIEWS

Recordings of the Interviews

Revision	2
Preparation date	2016-02-01 (m13)
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Lead contractor.....	AIT

Authors:

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Sanja Malnar Neralic	ZAG
Eva Pangerl	VIE
Daniel Sarasa Funes	ZGZ
Roland van der Heijden	ROT

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*Interview with Daniel Sarasa Funes
City of Zaragoza, Spain*

Daiva Jakutyte-Walangitang and Hans-Martin Neumann, AIT

Date: 2016.05.30

1. What decision making processes do you think CITYkeys PM Framework can support in your city at present?
 - a. On the city/strategic level
 - b. On the project/district/operational level

The CITYkeys PM Framework can support and serve as a reference framework in the operational management of different projects in Zaragoza. The main user of such a framework can be the Smart City Department. The Performance Measurement Framework can be used for the assessment of the level to which projects meet the goals set at the beginning.

The challenge in this context is that the number of projects running under CITYkeys and or Smart City umbrella is very limited. The majority of the Smart City projects are very much technology oriented. The city of Zaragoza does not intend to use the CITYkeys Framework on the strategic level. Thus, the link between the project and the city level will be established at a later stage.

2. The Performance Measurement Instruments can be used in a variety of purposes and roles, such as:
 - Communication
 - Control
 - Coordination
 - Motivation
 - Decision making

What purpose could the CITYkeys PM Framework fulfil in your city?

How could the framework be applied in the context of European activities / projects vs. city-internal processes?

Three main potential users of the CITYkeys Framework can be identified in Zaragoza:

- a) *“Ebropolis”, our metropolitan observatory, has shown interest in the outcomes of CITYkeys Project. This organisation is involved in shaping of the local policies, beyond observing what is happening and in this context the CITYkeys Framework can be useful.*
- b) *Smart City Manager can benefit from using the CITYkeys Framework*
- c) *CITYkeys Framework could also be used by the City Program Managers as well as Project Managers.*

However, in order to draw the full benefit from such a Framework clear targets need to be established. Having a clear vision and a strategy is essential. At this point a more general reflection on the topic of Smart City is necessary. For the time being, the Smart City branding is focused on the outside image, yet local multiple urgent social issues as well a challenging situation concerning

employment and energy poverty are pressing. In this context as well, CITYkeys Framework could support the open government strategy by providing information in the context of participatory activities. Within our 'Open Government Strategy' Smart City is just one element.

Thus, the CITYkeys Framework can be used for comparative purpose and as a support in communication between different stakeholders.

3. What would you need in order to use the CITYkeys PM Framework in your city after the project is completed?

First of all we do need to establish a clear overall vision on what we want to achieve.

Secondly, obtaining most important and uncontroversial indicators is a key for successful application of the CITYkeys Framework. At present the framework contains complex indicators and concepts, which are not straightforward to integrate in the daily routines of project management. The priority should be given to mind shift first, before a complicated instrument like CITY keys Framework can expose its benefits.

4. Do you have any ideas for 'adjustments' of the framework to make it more suitable for locally specific needs of your city?

For the start, a provision of simple - easy to use – tools would be much more effective. Narrowing down the complex set of indicators to key indicators would be the first step. The overall aim is to promote a mind-set change.

5. Some critical points have been communicated throughout the project by a variety of city representatives concerning the usability of Performance Measurement Frameworks.

E-mail from James Arnott/Glasgow:

- *Do people use information to confirm and justify existing decisions and structures, or to support the need to change these decisions and structures;
Yes, I agree that information can be interpreted and used in different agenda settings*
- *Are people comfortable to promote change with using statistical data or do they want corroboration by personal experience;*
- *Has generating more and new types of information taken precedence over an ability to generalise, analyse and understand this data towards concrete policy implications;*
- *Where do skills in data management and analysis stand in terms of occupational prestige, compared to others like the financial and legal professions.*

What are your views on this? Are there any risks that you see in terms of potential 'misuse'?

In the daily life of a program or project manager in a city, there is very limited time available to analyse information. Information 'flood' grows continuously, arriving to us from multiple sources. At the same time, the way of work nowadays has changed. I rarely spend entire day in the office and have to 'catch' the information 'on the go', devoting very little time for one task. It is not useful to saturate people with information. In this context, the culture and the nature of indicators requires humble, easily understandable tools, providing simple means for understanding of information.

6. Many cities promise increased transparency of current decision processes and information flow. Could CITYkeys framework serve in this context?

No input

7. Would you like to do the assessment, based on the CITYkeys indicators yourself or should an independent expert do the evaluation?

The city of Zaragoza would apply CITYkeys Performance Measurement Framework in the form of a self-assessment. I see the CITYkeys Framework as a flexible mechanism, for instance, capable to interface with my smartphone, maybe even linked to LinkedIn or other social networks.

8. What was the added value of being a part in CITYkeys project to you?

Being able to share our experiences and approaches with other cities is of a great value to me/us. Exchanging our approach to Smart City and being part of a strategic movement allowed me/us to encounter other approaches as well. Through the involvement in CITYkeys Project Zaragoza is now better positioned for becoming a light house city.

*Interview with Sanja Malnar Neralic
City of Zagreb, Croatia*

Daiva Jakutyte-Walangitang and Hans-Martin Neumann, AIT

Date: 2016.05.30

1. What decision making processes do you think CITYkeys PM Framework can support in your city at present?
 - a. On the city/strategic level
 - b. On the project/district/operational level

Several city offices work on Smart City topic in Zagreb, including Mayor's office, which is interested in strategic indicators. However, a global definition of Smart City does not exist yet. This is an ongoing process of definition.

Current situation in Zagreb is challenging due to the fact that data is scattered across the organisation. There are numerous data sources, which are not yet useful for CITYkeys. For instance, the energy and environment department owns only the data on energy consumption. Multiple other departments work with other data sets. In this context, there is an urgent need for establishing one coordinating location, which would coordinate the collection of city wide data and information.

In addition, currently many data sets are available in PDF Format, meaning it is not 'machine readable'. Considering all of these challenges the CITYkeys Performance Measurement Framework is much more likely to be used and tested on the project level in one (or possibly several) refurbishment projects. One example of such a project includes 87 buildings for renovation.

2. The Performance Measurement Instruments can be used in a variety of purposes and roles, such as:
 - Communication
 - Control
 - Coordination
 - Motivation
 - Decision making

What purpose could the CITYkeys PM Framework fulfil in your city?

How could the framework be applied in the context of European activities / projects vs. city-internal processes?

The Performance Measurement Framework is useful for comparison purpose. For instance our Ministry of Economy has a monitoring system already, which could be connected with the CITYkeys Framework.

CITYkeys Framework could be used for ex-ante and ex-post evaluations.

On the project level information before and after construction can be derived by using CITYkeys Indicators, providing useful insights on the aimed and achieved energy savings.

3. What would you need in order to use the CITYkeys PM Framework in your city after the project is completed?

As mentioned, we do need a better coordination between different offices and certainly a central point for the IT system, in order to ensure the availability of information in the same format.

Most importantly we do need political will and support, enabling a true capacity building concerning joint work on cross-sectoral challenges and sets of information. Who does have the power to install a central IT system? Maybe the Mayor, but even then it requires a lot of collaboration effort between different systems.

The information available on the national level needs to be broken down to city level in order to ensure consistency. The start has been made, continuous effort, time and focus is needed now. In order to operationalize the aims we do require national and local funding and resources, budgetary decisions, public procurement procedures and alignment between different interests.

Although we have some good quality information portals, such as Geoportal executed by the Energy and Environment office, we need to establish a better link between the strategic planning (Zagreb Plan) and executive levels, concerning diverse sectors.

4. Do you have any ideas for 'adjustments' of the framework to make it more suitable for locally specific needs of your city?

No input

5. Some critical points have been communicated throughout the project by a variety of city representatives concerning the usability of Performance Measurement Frameworks.

E-mail from James Arnott/Glasgow:

- *Do people use information to confirm and justify existing decisions and structures, or to support the need to change these decisions and structures;*
- *Are people comfortable to promote change with using statistical data or do they want corroboration by personal experience;*
- *Has generating more and new types of information taken precedence over an ability to generalise, analyse and understand this data towards concrete policy implications;*
- *Where do skills in data management and analysis stand in terms of occupational prestige, compared to others like the financial and legal professions.*

What are your views on this? Are there any risks that you see in terms of potential 'misuse'?

No input

6. Many cities promise increased transparency of current decision processes and information flow. Could CITYkeys framework serve in this context?

No input

7. Would you like to do the assessment, based on the CITYkeys indicators yourself or should an independent expert do the evaluation?

Zagreb would use the CITYkeys Performance Measurement Framework in the form of self-assessment.

In this context, however the municipal capacity and time have to be taken into account. Most likely, we would consider only the main indicators as found in the CITYkeys project. I think this collaboration is a good starting point for the future. Although, it will not be an easy path, since numerous barriers do still exist. We should see this undertaking as a learning process and also remember that the starting points of tackling the existing challenges are different in each city!

*Interview with Roland van der Heijden
City of Rotterdam, the Netherlands*

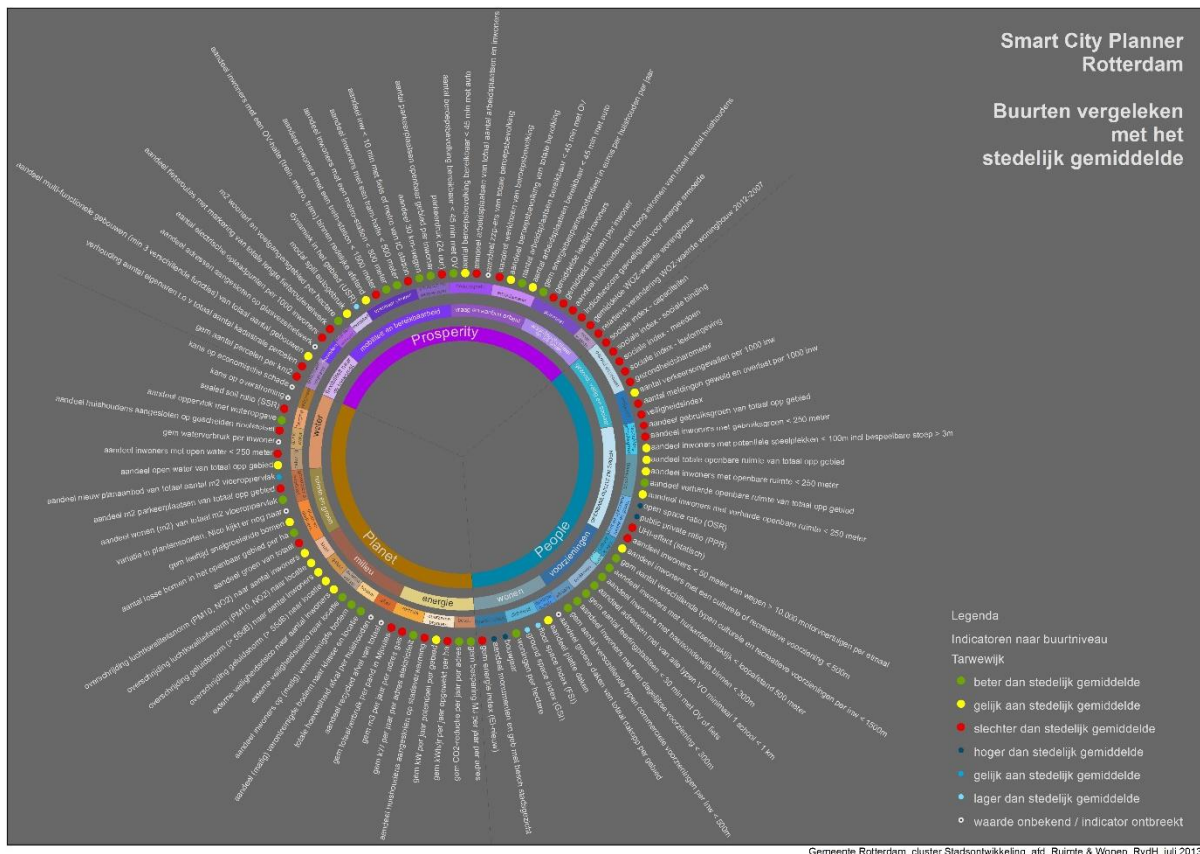
Daiva Jakutyte-Walangitang

Date: 2016.06.01

1. What decision making processes do you think CITYkeys PM Framework can support in your city at present?
 - a. On the city/strategic level
 - b. On the project/district/operational level

Rotterdam is a project management based organisation, in which all projects need to be described in SMART terms (Specific, Measurable, Acceptable, Realistic, Time bounded). In this context, the CITYkeys Framework can have relevance on the operational level of district development. In our case, the city wide goals are usually considered already in the development of a vision for a district. On this level we have a series of area plans, which together form the bases for a cyclical process of planning. Following this logic the city goals are usually broken down to district level. On this level they should be considered in relation to the add-up of our project results portfolio (Project + Project + Project+ Project). This is not been done yet. Our Smart City Planner is currently one of the most relevant instruments for translating city targets to area changes, tasks and possibilities. The Smart City Planner has at this moment no possibilities for benchmarking Rotterdam with other cities. Also the relation between area (district) level and project results isn't very strong. For this the CITYkeys Framework can be a solution.

On the more strategic level Smart City Manager could decide how to proceed with the CITYkeys Performance Measurement Framework.



Gemeente Rotterdam, cluster Stadsontwikkeling, afd. Ruimte & Wonen, RvdH, juli 2013

2. The Performance Measurement Instruments can be used in a variety of purposes and roles, such as:

- Communication
- Control
- Coordination
- Motivation
- Decision making
- democratisation (basing the discussion on relevant data makes it more equal: people with 'a big mouth' need to explain why they say something else than the data, people with less specific knowledge of the theme or area can still ask smart questions about what the data is telling them)

What purpose could the CITYkeys PM Framework fulfil in your city?

How could the framework be applied in the context of European activities / projects vs. city-internal processes?

Firstly, CITYkeys could support the process of agenda setting and raising (a better focused) discussion. However, this process is very much depending on the existing ability and the perspective from which the available information is being interpreted. Before generating more and more information, we do need to focus on the process innovation. Smart city is more than a 100 implemented smart meters.

Much rather it is the making of connections through the silos: this is the essence of smart cities: where and how you make clever connections between processes, projects and activities: 1+1 = 3. In that sense, a smart project is really something else than what a smart city is.

Secondly, we could use CITYkeys indicators for smart city benchmarking purpose in order to recognize differences and similarities between different cities.

3. What would you need in order to use the CITYkeys PM Framework in your city after the project is completed?

In order for CITYkeys Framework to be used, we would need a structural process to be going on. In other words, we need to make sure that the 'back ends' are organised in the first place. We already have several existing tools and it has to be seen, how far an additional instrument can have added value and be used.

It is also necessary to look at the availability of the data.

4. Do you have any ideas for 'adjustments' of the framework to make it more suitable for locally specific needs of your city?

I think that a selection of a small group of really useful indicators would have more chance to be really applied on a larger scale with more/a lot of cities. This allows cities to benchmark, at first at a limited scale, but this can be extended.

Further we have to consider how we can go about the existing competition between the tools already in place and the new instruments such as CITYkeys Performance Measurement Framework.

The key questions here are if the municipality is able to organise that and what the added value can the new tool bring?

5. Some critical points have been communicated throughout the project by a variety of city representatives concerning the usability of Performance Measurement Frameworks.

E-mail from James Arnott/Glasgow:

- *Do people use information to confirm and justify existing decisions and structures, or to support the need to change these decisions and structures;*
- *Are people comfortable to promote change with using statistical data or do they want corroboration by personal experience;*
- *Has generating more and new types of information taken precedence over an ability to generalise, analyse and understand this data towards concrete policy implications;*
- *Where do skills in data management and analysis stand in terms of occupational prestige, compared to others like the financial and legal professions.*

What are your views on this? Are there any risks that you see in terms of potential 'misuse'?

The first thing is to recognize the difference between data and (useful) information. Data is most of the time supply driven and information mainly demand driven. As long the data supply meets the information demand it's all fine. But reality is that there is an information overload (need for selecting useful information) and data sources are not known, not accessible, qualitatively poor and actuality and reliability are not guaranteed. The question we should ask is if there are people in current situation who have the knowledge concerning the domains we are talking about. Most importantly, we should consider the current mindset and how already existing indicators are being used? How to transform data into information? This is determined by our ability to interpret and to address the growing stream of data. Thus, at the front end the focus should be placed on the development of our

ability to 'translate' data into useful information, on the 'backend' the focus should be on organizing the data flows.

Another critical point for the successful use of a tool or a framework is the ownership of the solution from the start on, in other words the co-creation. The CITYkeys should build the indicators on already existing indicators. The complexity of the model needs to grow together with the understanding of the model, step by step. I think that the CITYkeys Framework can be adjusted to our situation, but the better solution would be to build the tools together.

6. Many cities promise increased transparency of current decision processes and information flow. Could CITYkeys framework serve in this context?

The CITYkeys indicators can give us the insight what we can do better.

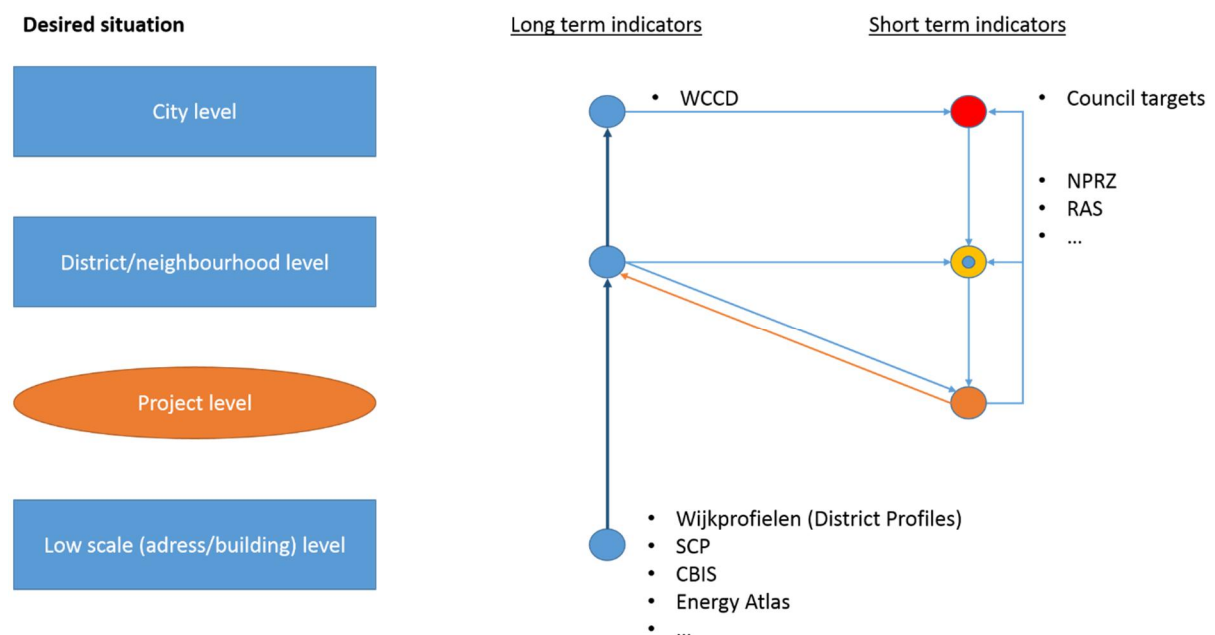
We do work towards a shared data place where different layers, such as district heating and energy savings, can be integrated and 'picked up'. In such case energy companies, an entire network of housing companies dealing with building regeneration could obtain access to this valuable information.

7. Would you like to do the assessment, based on the CITYkeys indicators yourself or should an independent expert do the evaluation?

Rotterdam usually performs self-assessment. Independent evaluation can be a surplus (quality and independence are more guaranteed), but costs money and is not always necessary. Especially ranking cities is something that is politically very sensitive, and not always wanted.

8. The added value from participation in CITYkeys project:

I hope to use CITYkeys outcomes to help us to create a better connection between the two systems on several connected levels: city-district-neighbourhood and project-programme-(neighbourhood)-district (or city, depending on the programme). See figure below (and ppt I sent with email)



Replicability can only exist once the first cities are enthusiastic on what is there and the 'back ends' concerning the process of implementation of such framework are organized. The key message towards EU is that an open mind-set and understanding about underlying local process is required, if we are to achieve outcomes that have any impact. 'Being in control' suggests being able to deliver what was promised.

'Reality is a process', including the projects that you did not expect happen, we have to remain flexible. Being smart is giving yourself some freedom in why, what, how and when do you want to achieve something'.

*Interview with Elli Kotakorpi, Johanna Ahlgrén-Holappa, Mia Lumio, Jouko Järnefelt, Analyst
City of Tampere, Finland*

Daiva Jakutyte-Walangitang

Date: 2016.06.06

1. What decision making processes do you think CITYkeys PM Framework can support in your city at present?
 - a. On the city/strategic level
 - b. On the project/district/operational level

In Tampere the potential use of CITYkeys Performance Measurement Framework lies predominantly on the strategic level. The city wants to follow its progress in smart city themes, at the strategic level. Very recently, the City of Tampere has established a Knowledge Management Unit, which has been entrusted with the role of developing knowledge management and data collection issues.

Incorporating smart city issues in the City Strategy is an important step in this relation, which requires the definition of most useful indicators (concentrating on strategic level). The development of a proper project portfolio is still ongoing in our city.

CITYkeys project had started before the establishment of Knowledge Management Unit in Tampere. Being a partner in this project has provided us with an opportunity to go through our own development process while at the same time being involved in the broader discussion among the project partners.

2. The Performance Measurement Instruments can be used in a variety of purposes and roles, such as:
 - Communication
 - Control
 - Coordination
 - Motivation
 - Decision making

What purpose could the CITYkeys PM Framework fulfil in your city?

How could the framework be applied in the context of European activities / projects vs. city-internal processes?

Our intention in Tampere is to support and enable a multi-professional analysis of strategic data and information and to organize the data and decision management accordingly. It is also important to collect information in addition to what is already being collected. In this context, cross-sectoral and interdisciplinary work is absolutely necessary. The prerequisite for this is the ability to link the indicators from different fields and domains. Coordination of these activities in the case of Tampere is performed by the Knowledge Management Department/Unit.

From our point of view the Performance Measurement Frameworks support primarily the decision making processes. There is an element of motivational role in it, however, it is secondary. Translating the implementation into the operational level is challenging and under continuous development.

3. What would you need in order to use the CITYkeys PM Framework in your city after the project is completed?

A modification of the CITYkeys Framework to the specific needs of Tampere is important. In order for the CITYkeys Framework to be used, it has to be developed /adjusted in a close contact with the city. The quality of the CITYkeys Framework has to be ensured at the same time. (Data)

Analysis of such complex sets of information requires a good combination of different points of view. Thus, we need to ensure that collective meetings are organized, providing space for discussion and mutual learning from the process itself. Furthermore, an adequate flow of information and data have to be ensured. Data analysis should take place in a network.

4. Do you have any ideas for 'adjustments' of the framework to make it more suitable for locally specific needs of your city?

The CITYkeys Performance Measurement Framework could be more user friendly. Simplifying the complexity of the information would help in this case. On the more detailed level, there are some issues with individual indicators. The proposed indicator system attempts to grasp a wide phenomenon, but when you look at the indicators in detail, the inter-relations between different aspects and indicators are much more complicated. It is difficult to choose the right indicators.

5. Some critical points have been communicated throughout the project by a variety of city representatives concerning the usability of Performance Measurement Frameworks.

E-mail from James Arnott/Glasgow:

- *Do people use information to confirm and justify existing decisions and structures, or to support the need to change these decisions and structures;*
- *Are people comfortable to promote change with using statistical data or do they want corroboration by personal experience;*
- *Has generating more and new types of information taken precedence over an ability to generalise, analyse and understand this data towards concrete policy implications;*
- *Where do skills in data management and analysis stand in terms of occupational prestige, compared to others like the financial and legal professions.*

What are your views on this? Are there any risks that you see in terms of potential 'misuse'?

It is a learning experience and a process, which has just been started. The required information is not served ready and it may not be just one figure! It is too early to make conclusions. We do firstly need to collect, analyse and understand the information. Data collection and visualisation play a key role in this relation, posing the question: how to visualise and publish the data while addressing different target groups.

6. Many cities promise increased transparency of current decision processes and information flow. Could CITYkeys framework serve in this context?

No input

7. Would you like to do the assessment, based on the CITYkeys indicators yourself or should an independent expert do the evaluation?

The City of Tampere would potentially use a Performance Measurement Framework for self-assessment in order to increase our own understanding. This process still requires a lot of synchronisation.

8. What was the added value of participating in CITYkeys project?

The timing of CITYkeys project was excellent. The project work took place in parallel with our own process of developing our data collection and analysing ecosystem. There are still many opportunities however, to work with the findings of the project and their interpretation. For instance, we can continue to look at the logic how the topics are built up? What are the key themes? From the more technical perspective we can develop new approaches to city services in terms of making different data useable. Answer the question: how can data stream be opened? There is still a lot to do in the development of an efficient progress for providing our partners with a deeper data access. Some information cannot be accessible to everyone and we have to think how to streamline the different operational processes in an easy and logical way.

Parallel to the progress concerning our work with data and information we do need to continue a wider discussion on the Smart City topic itself. It has been very valuable and interesting to hear different perspectives on this topic throughout the project duration. We do need to continue the dialogue and discussions between the cities and to have more of it. This is a very valuable exchange. Explaining to each other what we are doing and why brings a better understanding of our contexts and approaches. Our strategic leaders are interested in benchmarking between the cities. Knowing where we stand in comparison to other cities can be of a good value too.

In CITYkeys project, one of the indicators to be tested (automatic data reading), is water consumption. The data for water consumption is collected by the local water company. When working with them, we can test the process of opening the data together with our subsidiaries and public utilities.

It might be a good idea to share the collected data with the data experts in other cities, and let them analyse it, and see what their conclusions are. . Maybe this could be an idea for another project of a CITYkeys network?

*Interview with Ina Homeier and Eva Pangerl
City of Vienna, Austria*

Daiva Jakutyte-Walangitang

2016.06.23

1. What decision making processes do you think CITYkeys PM Framework can support in your city at present?
 - a. On the city/strategic level
 - b. On the project/district/operational level

Certainly, on the city level appropriate indicators are required in order to measure the implementation of the Smart City Vienna Framework Strategy. However the set-up of CITYkeys PM Framework does not suit this purpose since it is extremely complex and generic and not adjusted to the targets of the Smart City Vienna Framework Strategy. A monitoring system for the Smart City Wien Framework Strategy would require the bottom-up development of indicators and monitoring processes with numerous necessary representatives of the city of Vienna; therefore it cannot capture the specific requirements of Vienna.

Moreover, CITYkeys PM Framework lacks a workflow or process description for the monitoring process and it isn't linked to the real- city internal processes. It isn't based on the real sequence of steps that a monitoring process would contain in Vienna. A Performance Measurement framework should take into account the existing processes, structures and data, as well as consider the present financial and legal framework conditions of a specific city. It is also necessary to examine the best practice examples in more detail in each of the partner cities. The overall complexity of a city has to be taken into account seriously in order to achieve useful outcomes.

The initial survey results - as delivered at the project start – would need to ask the right questions (formulated by cities), would need to be sent to the right representatives of the city (the representatives dealing with smart city or monitoring, not the contact person for city networks) and the needs of the cities would need to be taken into account throughout the entire project, if we are to produce practical instead of theoretical outcomes.

It is essential to raise the question: 'Who is able to represent the interests and needs of a city'? Cities have to be placed in the centre of attention!

2. The Performance Measurement Instruments can be used in a variety of purposes and roles, such as:
 - Communication
 - Control
 - Coordination
 - Motivation
 - Decision making

What purpose could the CITYkeys PM Framework fulfil in your city?

How could the framework be applied in the context of European activities / projects vs. city-internal processes?

The present CITYkeys Framework isn't focused enough to be applied in the City of Vienna – it serves too many purposes and wants to please too many target groups (city level, project level, mobility projects, retrofitting projects, IT projects; politicians, city planners, companies for certification). It may serve the purpose of 'inspiration' and benchmarking of cities. Potentially it could be applied in a more focused manner for performance measurement in the context of lighthouse projects. In order that this takes place however, we do need to prioritize reaching the right actors within the city in the first place.

CITYkeys PM Framework could potentially be used in the process of project initiation, supporting local movement in the context of Smart City development and implementation. It is, from our point of view a self-learning instrument, which also could be used for communication purposes.

There are many potential purposes and target groups, but the purpose and the target groups need to be defined at the beginning of the project and then pursued throughout the project.

It seems though, that we have a number of disparities concerning the meaning of Smart City development. This meaning requires a lot of alignment efforts between different stakeholders in the first place: placing the cities into the core of attention is the key in this context.

Cities know exactly what they want and need. Therefore it is crucial that all systems intending to support the processes of decision making in cities are also being - from the very beginning – developed in a very close cooperation with cities.

3. What would you need in order to use the CITYkeys PM Framework in your city after the project is completed?

The present CITYkeys Performance Measurement Framework hasn't been worked out in a close and joint collaboration with the multiple city actors (although this was requested already in the proposal phase), thus it is most unlikely that it can be applied in Vienna. It is essential to link a Performance Measurement Framework with ongoing city internal monitoring processes, in order for it to be applicable. The indicators themselves are of intermediate interest to us, the process of arranging the workflow, responsibilities and the flow of information are much more relevant. Most of all, building on top of already existing capacities in the context of running activities is crucial for a city administration.

4. Do you have any ideas for 'adjustments' of the framework to make it more suitable for locally specific needs of your city?

The Performance Measurement Framework needs to be adjusted and focused /'reduced' to a set of key indicators, which can serve the purpose of a quick assessment. We lack support instruments that would allow us to have a quick evaluation if we are working in the right direction, before going into detail.

5. Some critical points have been communicated throughout the project by a variety of city representatives concerning the usability of Performance Measurement Frameworks.

E-mail from James Arnott/Glasgow:

- *Do people use information to confirm and justify existing decisions and structures, or to support the need to change these decisions and structures;*
- *Are people comfortable to promote change with using statistical data or do they want corroboration by personal experience;*
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What are your views on this? Are there any risks that you see in terms of potential 'misuse'?

6. Many cities promise increased transparency of current decision processes and information flow. Could CITYkeys framework serve in this context?

No input

7. Would you like to do the assessment, based on the CITYkeys indicators yourself or should an independent expert do the evaluation?

If we'd use a Performance Measurement System, we'd use it for the purpose of self-assessment. In some situations potentially both: self-assessment and external commissioning.

8. What was the added value of being a part in CITYkeys project to you?

The lessons that we have learned during the project are valuable to us. We have recognized the potentials that haven't been used yet.

ANNEX 2 SURVEY CONTENT

ANNEX 3 CITY HANDBOOK

CITYkeys Experience

Recommendations
from cities to cities



Foreword

The aim of this task is to highlight and share with city representatives the benefits of the developed framework; share the insights gained during the project; draw attention to the potential areas for the framework's application; and identify the strengths and present shortcomings, while sharing the knowledge of city representatives.

The CITYkeys Performance Measurement Framework is a holistic framework for monitoring, measuring and comparing the performance and implementation of smart city solutions and projects in European cities. It aims to support the cities in their decision making processes and to promote the exchange of knowledge and experiences.

The final stage of the project has been dedicated to collecting the cities' experience, views and recommendations, derived from their participation in the project. This information has been used to draft this handbook for city representatives, along with recommendations for the deployment of the Performance Measurement Framework. The aim is to highlight and share with city representatives (among them CITYkeys partners and follower cities) the benefits of the developed framework; share the insights gained during the project; draw attention to the potential areas the framework's application; and identify the strengths and shortcomings.

FOCUS AND PURPOSE

This handbook is meant to serve as a reference document, which looks at performance measurement through the eyes of cities. It aims to:

- Capture the experience, lessons learned and perspectives of the partner and follower cities involved in the CITYkeys project;
- Promote the sharing of the approaches, information and experience among cities and experts interested in performance measurement;
- Lay out key recommendations for the application of the Performance Measurement Framework;
- Identify the framework's strengths, shortcomings, as well as the steps needed to unlock the full potential of performance measurement;
- Chart out recommended paths for the development and integration of performance measurement tools and systems.



Methodology: Survey and interviews

One of the key requirements for the CITYkeys Performance Measurement Framework was that it had to be applicable in different urban contexts

One of the key requirements for the CITYkeys Performance Measurement Framework was that it had to be applicable in different urban contexts. The intended users of the framework are cities. Accordingly, a survey and a series of interviews were designed and conducted in order to collect and process the cities' relevant expectations and concerns and to identify the framework's most likely users and possible areas of application.

Since the participating cities have had different levels of exposure to the project, the representatives of partner cities Rotterdam, Tampere, Vienna, Zagreb and Zaragoza were interviewed more thoroughly than those of the follower cities. The latter have received a less detailed survey, which elicited 38 responses. In addition to the survey and the interviews, a half-day workshop was held in Vienna to facilitate a focused and detailed discussion of the role performance measurement systems play in smart city projects.

The authors of this handbook took a diversified approach to accessing and consolidating the required information. They took into consideration the cities' different levels of involvement, exposure and familiarity with the CITYkeys project, as well as their unique and divergent potentials and ambitions.

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2

Key questions and answers

Based on the responses of the city representatives, the following section sums up the recommendations for the potential application of the performance framework



Who can benefit from using the CITYkeys Performance Measurement Framework?

The survey and the interviews have identified the following potential beneficiaries:

- mayors' offices
- high-level city managers
- organisations supporting and consulting cities in shaping local policies
- municipal departments in charge of smart city management
- smart city managers
- municipal programme managers
- knowledge management departments and units
- civil servants and experts working for a project or developing projects
- managers of public buildings and institutions
- project managers

Which decision making processes can be supported by the CITYkeys Performance Measurement Framework?



Most respondents identified decision making processes at project level as being the most likely to benefit from the application of this framework. However, some cities, among them Tampere, considered support for strategic decision making a priority. The survey respondents and interviewees identified the following decision making processes:

- strategic decisions
- performance-based budgeting
- translating strategic goals into actionable initiatives
- checking the performance of individual projects against district-level development plans
- linking sectoral 'silos'

What purpose can the CITYkeys Performance Measurement Framework serve?

The framework could be used for a variety of purposes. It can be used:

- as a support system during the agenda setting process and to focus discussion
- for comparison and motivation purposes
- for identifying tasks that could be performed better and more efficiently
- for benchmarking differences and similarities
- for sharing the information and data between the cities in order to learn from each other
- as a reference framework during the operational management of different projects
- for measuring performance during ex ante and ex post evaluations
- at operational level, in the context of district development
- for establishing a stronger connection between district development and individual projects
- for the assessment of the level to which projects meet the goals set at the beginning
- to support stakeholder collaboration
- to facilitate and inspire the learning process
- for city internal self-assessment
- for an independent (external) assessment/evaluation
- as a flexible tool on social networks such as LinkedIn, even via smartphones
- to promote a change in mind-set
- to support the development of new approaches to city services by making data accessible and usable

What does your city need to be able to use the CITYkeys Performance Measurement System?

In order to unlock the full potential and benefits of performance measurement, your city must meet the following conditions/have the following measures and procedures in place:

- strong political support to enable true capacity-building and cross-sectoral collaboration
- a clear overall vision on what we want to achieve
- decision by the smart city manager(s) to employ the framework
- determination to work together on interdisciplinary, cross-sectoral issues
- presence of organised 'back-ends' that ensure efficient communication and information flow

- availability and accessibility of data
- narrowing down complex sets of indicators to key indicators, which can be easily integrated and used in daily life
- good coordination between the different offices and presence of a central IT hub
- sorting out the competition between the tools that are already in place and new tools
- the ability to interpret and to address the growing flows of data
- ability to translate data into 'useful' information
- ownership of the CITYkeys Performance Measurement Framework from day one
- willingness and ability to co-create

The findings of the survey show that different city representatives have varied perceptions of the potential usability of the CITYkeys framework. This indicates that depending on the different stages of development that cities are in, different entry points for the use of CITYkeys framework are possible. These findings expose the flexibility of CITYkeys framework and the great range of areas that it can be applied in.

SUMMARY OF SURVEY RESULTS

The survey elicited 38 responses. Most of these came from public (city) stakeholders, representing a broad range of departments and positions within city and metropolitan administrations, ranging from public innovation and technical and environmental assistance to European project office. Responses were also sent by research and technology institutions and consulting firms, as well as by European organisations, such as the Brussels Regional Informatics Centre.

The survey questions, addressed to potential users of the CITYkeys Performance Measurement Framework, aimed to investigate the extent to which the framework is already being considered for application.

It is important to note that the respondents differed in their levels of exposure to, and familiarity with, the framework, having less detailed knowledge than others.

The following section sums up the survey's findings.

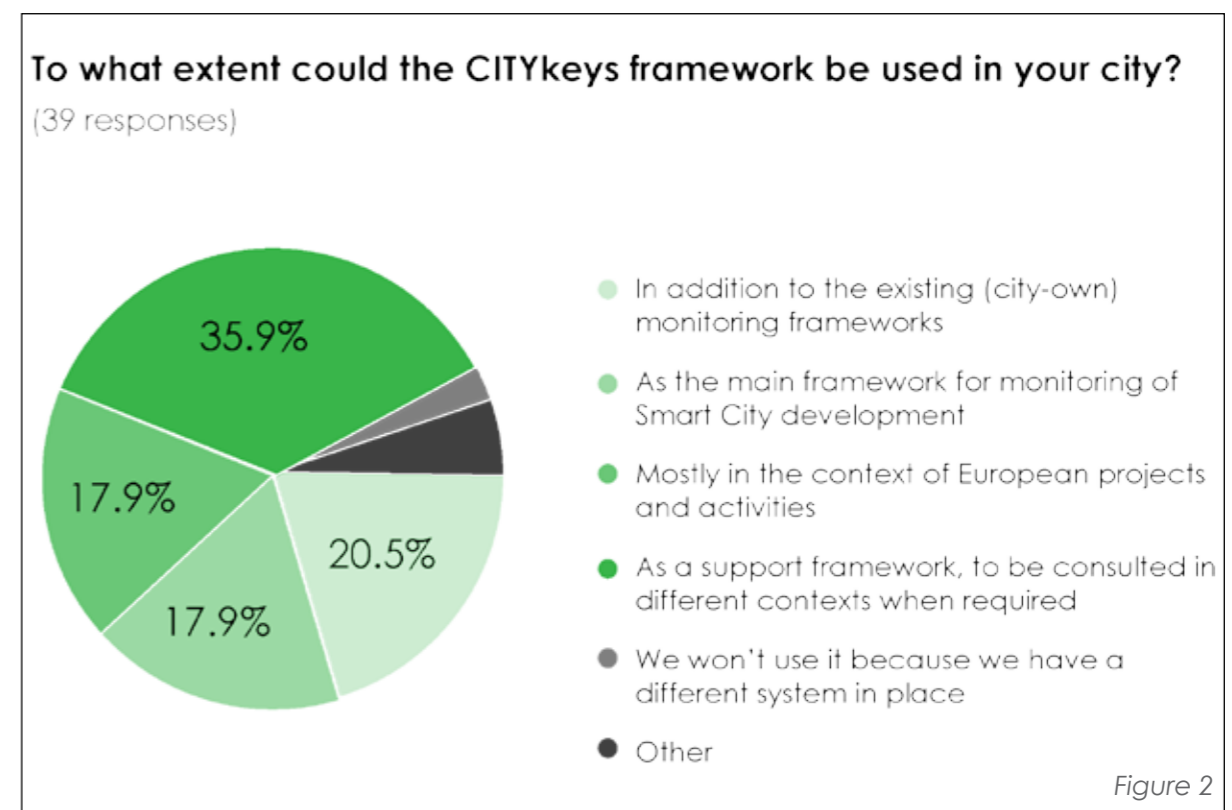
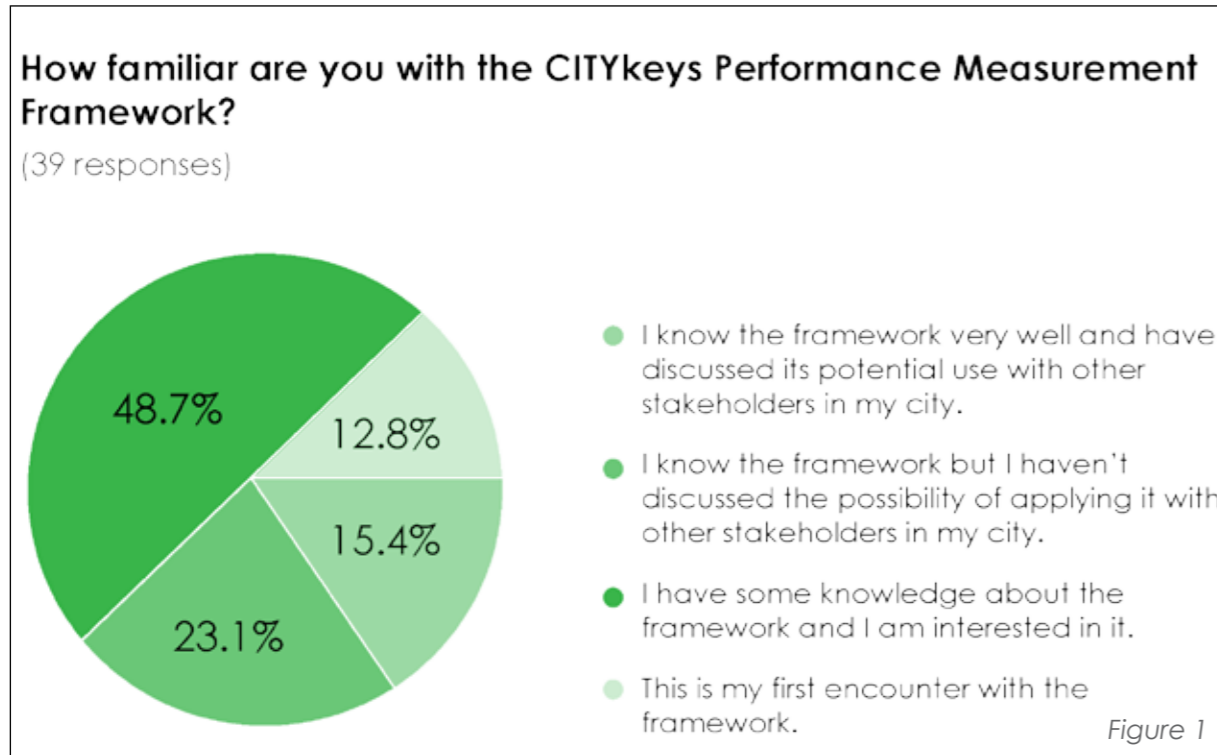
Most of the survey questions were multiple choice, and space was provided for additional comments at the end of the survey.



Survey results in short

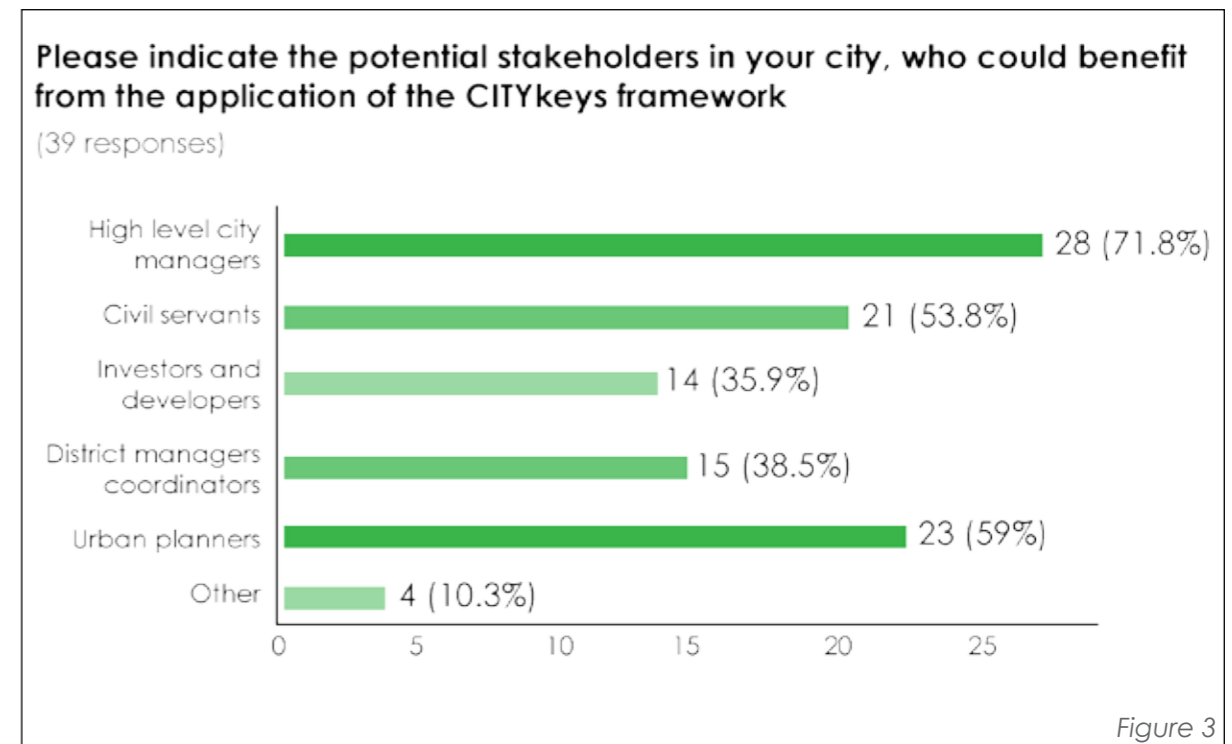
Level of familiarity with the CITYkeys Performance Measurement Framework

Most respondents (Figure 1) had medium level familiarity with the CITYkeys Performance Measurement Framework, but were interested in receiving more information about it.



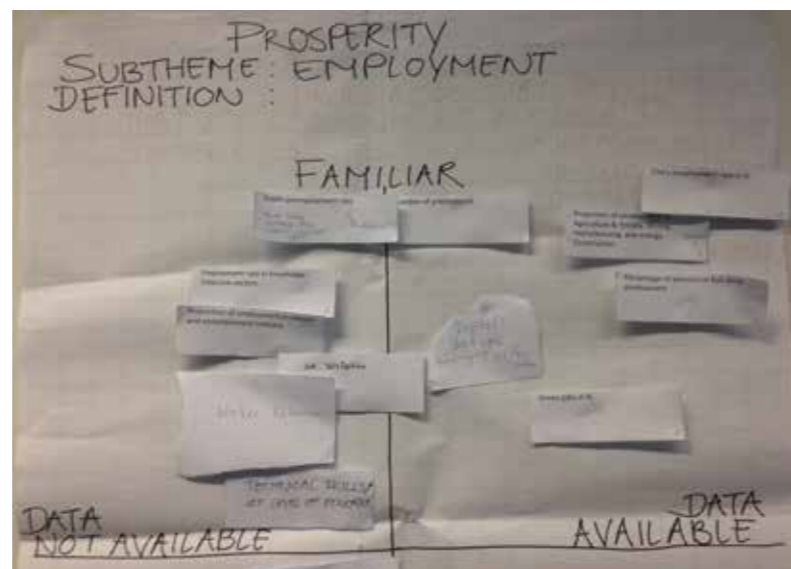
Potential beneficiaries of the application of the CITYkeys framework

High-level city managers were identified as the most likely users and beneficiaries, followed by urban planners, civil servants, and district managers and development coordinators. (Figure 3)



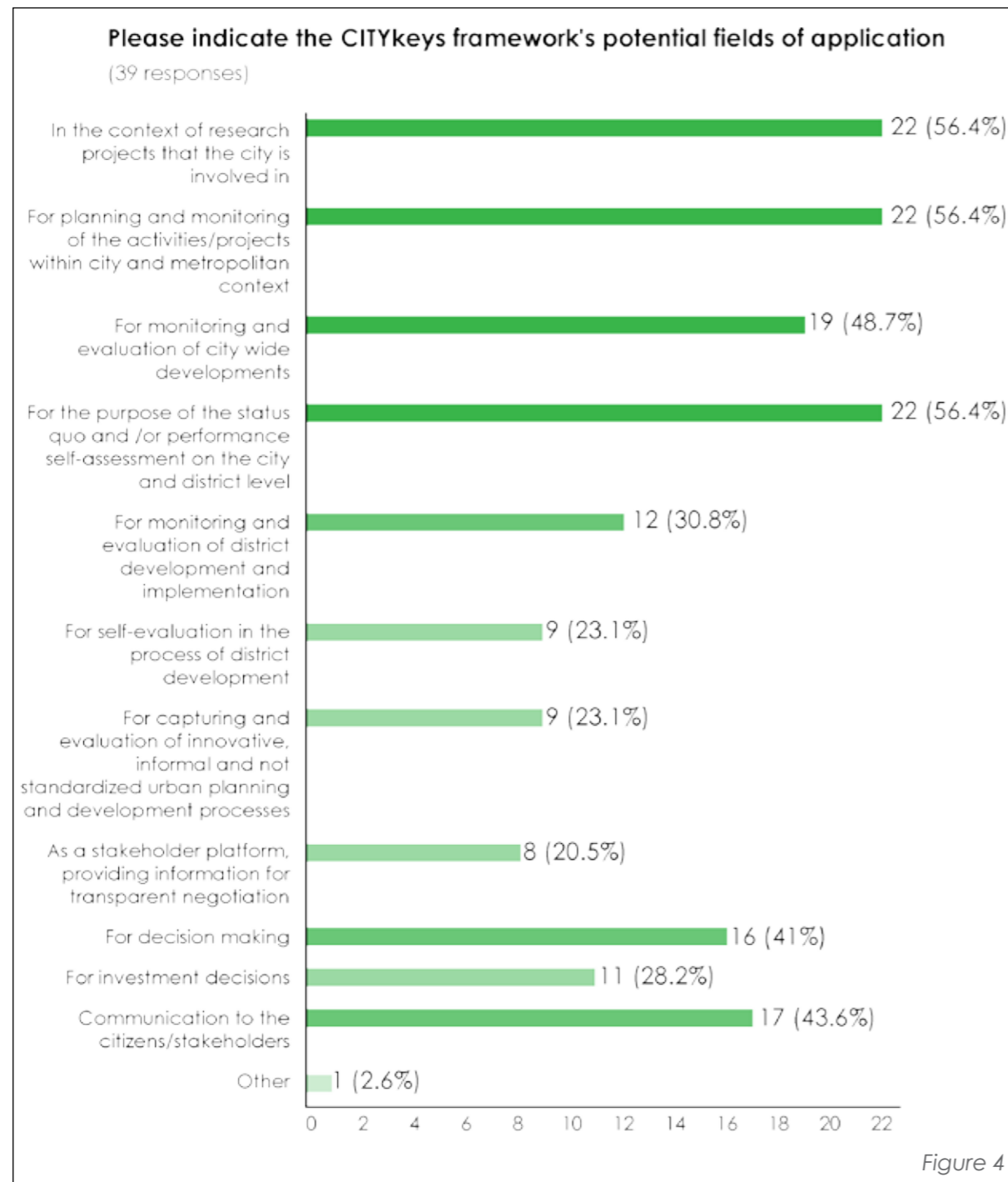
Extent to which the framework can be applied

According to most of the respondents, the CITYkeys framework is most likely to be applied as a support framework to be consulted in different contexts when required. As a second preference, two options were selected equally often: a) the application of the framework in the context of European projects and activities, and b) as a main framework for monitoring smart city development activities. (Figure 2)



Potential fields of application of the CITYkeys framework

Three fields were named most often: a) in the context of research projects that the city is involved in; b) for planning and monitoring municipal and metropolitan activities; and c) for self-assessment of the status quo and/or the performance of the city and its districts. (Figure 4)



What City-level decision making processes could be supported by the information generated with the CITYkeys framework?

The respondents identified a wide range of options. These included:

High level decision making processes and smart city development

- The processes of strategic measure setting based on data and information
- High level decision making
- Smart city planning decisions
- City-level decision making concerning future smart city projects
- In the context of city strategy framework development
- In order to define and prioritise smart projects and budget allocations
- Decision making in the fields of planning, mobility and energy
- Decision making in the context of implementation of the new city vision
- Supporting informed decisions on strategic development and urban improvement
- Decision making in urban planning processes
- Ensuring that urban regeneration embraces the advantages of smart city thinking and technological applications
- Strategic decision making in the field of waste management

Public policy

- Public policy decision making
- Social policy decision making

Budgetary and human resource related decisions

- Decisions concerning budget planning
- Decisions and measurement of HR effort per undertaken project
- Decisions about future Investments

Processes of negotiation, communication and participation

- In the process of negotiation and communication with different stakeholders, also serving as an instrument of persuasion
- Supporting the management process of citizen participation in public consultations
- Supporting decision making in urban planning and participation processes
- In the process of awareness raising in relation to sustainable development



Specific sectoral and measure related decision making processes

- The application of the CITYkeys framework can enable the measurement of the effects that certain measures would have (e.g. policy, technological investments). This pre-assessment could enable a timely taking into account of the effects on the market (supply) while considering further procurement procedures
- In selection processes of the adapted projects / considering technological solutions that ensure alignment with the key performance indicators (KPIs) chosen by the city / region
- Decisions on energy consumption (e.g. electricity and waste fleet fuels)
- The framework can be supportive as a general background for decisions and serve as a tool for comparison purposes

What district-level decision making processes can be supported by the application of CITYkeys framework?

The decision making processes at district level contain a variety of views that overlap with the city-level decision making processes (e.g. support of budgetary planning, mobility and energy-related decision making processes):

Budgetary and human resource-related decisions

- Budgetary planning processes
- For the timely and accurate involvement of the suitable personnel in project management, and for the quantification of the expected results in smart city projects
- For decisions on individual policies and investments
- Identification of new opportunities (business, energy transition, etc)

Impact assessment

- Measuring the impact of different scenarios
- Measuring the quality of the results in energy efficiency, environment, etc.

Communication and engagement

- Supporting the awareness raising process for citizen engagement
- Supporting interventions in social programmes

Policy and urban planning-related decisions

- Setting (policy) boundary conditions - minimum sustainability performance - for area/real estate development overarching building scale
- Evaluation of aspects not yet integrated in planning processes
- All district development projects/processes that require accountability
- District planning processes for energy efficiency and environmental sustainability
- In the process of urban district development
- Informed decision making processes on service delivery and development

Selection and comparison of the smart city projects

- Decisions about future smart city projects at district level

Sectoral and technological decision making processes

- Selection of technologies and implementation plans
- Supporting the processes of mobility and energy-related district planning
- Supporting the process of validation of district heating KPIs

Usefulness of the CITYkeys framework in a local context

Over half of the respondents considered the CITYkeys Performance Measurement Framework useful in certain cases only, adding that the framework is generally useful and relevant in their local context. (Figure 5)

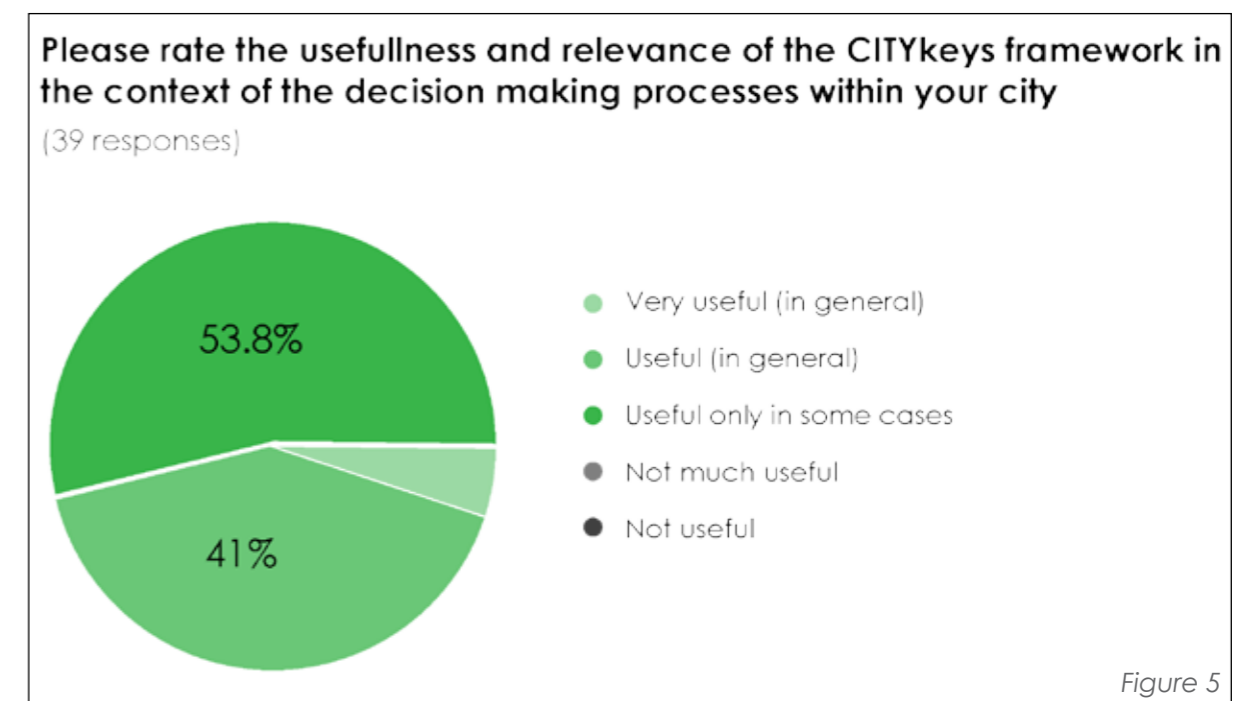


Figure 5

Main barriers to the framework's application

The respondents identified the following barriers to the application of the CITYkeys Performance Measurement Framework:

Complexity and time

- Complex and time-consuming to use
- The framework is too 'heavy' to be applied in full. It offers a sufficient set of KPIs, but contains too many checkboxes. Useful as a planning support tool and for stimulating dialogue (and decision making) between stakeholders
- The length of decision making processes and time needed for data updates
- Complexity of the framework (and its presentation) can complicate alignment processes

Local contextual and cultural resistance

- Knowledge of it, internal cultural resistance
- Adoption by stakeholders of a single methodology
- Resistance to change and to acceptance of the framework
- Lack of awareness
- Not a priority for local councils to implement it

Organisational

- Lack of coordination
- Cross-sectoral input required (from different departments)

Data availability

- Lack of complete sets of data in certain cases
- Provision of resources to collect data
- Availability of data

Competing frameworks

- One of many KPI systems, but the first for smart cities
- Knowing and understanding the framework in light of the existence of several similar frameworks
- Ongoing use of other types of indicators.



Motivation, funding and human resources

- Access for funding of such applications
- Political decisions driven by other motives
- Resources, especially human resources

Conflicting interests and views

- Different viewpoint of various stakeholders

Perception

- It is not my city. It is an EU project. Some of its parameters pertain to industrial issues (waste, heat), which do not appear in the CITYkeys project

Key opportunities are seen in the following areas

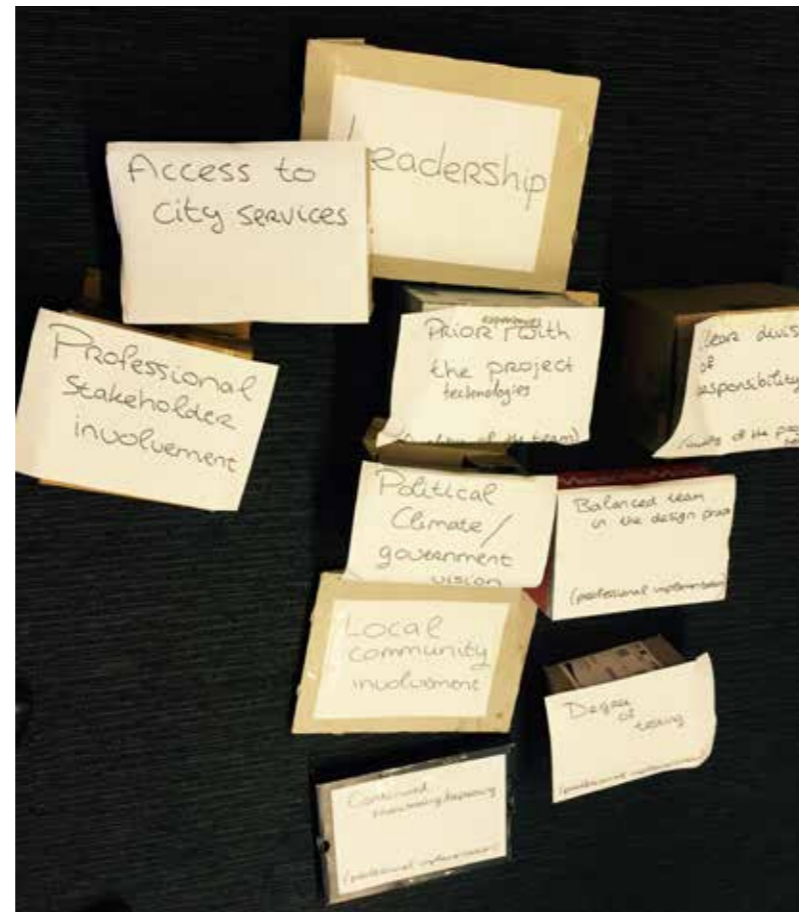
- Enabling interaction with other tools such as sustainability indicators, to find the right - accurate and up to date - information, needed to communicate about smart city projects and to project results. Keeping the focus on what we really want to achieve
- It is a great opportunity for co-analysing CITYkeys data in a network of cities
- Framework application can provide visibility to smart projects
- Application of the CITYkeys framework can help stakeholders to close knowledge gaps and to receive informed support
- This framework could add value to the delivery of the regional City Deal programme (Edinburgh), providing insight and analysis to aid decision making and monitoring
- This framework could increase the quality of already existing indicators used for measuring city projects and urban pilots



Main drivers of the framework's application

Cities' needs

- Need for strategic management
- Need for a standardized approach
- High ambitions (healthy urban living / sustainable redevelopment / CO2 targets)
- Required investments - someone needs to take responsibility for investing in key infrastructure required in the city
- Need for cost benefit analyses of smart city projects
- Comparing KPI-based measurements across cities
- Communication and (city) marketing
- Possibility to learn from other cities
- Demand for replication of projects



Needs and interests of relevant stakeholder groups

- The Agenda 21 Local Forum, the two departments of ICT and Environment, the local university
- Need for government and industry engagement
- Interest by ICT developers, innovation and research institutions and the municipality
- Need for stakeholders with different backgrounds to 'speak the same language' regarding timelines, potential benefits etc.: cross-sectoral cooperation
- Presence of political will

Features of the CITYkeys framework itself

- Enabling practical application
- Making the framework simple
- Simplicity and ease of application are keys to the framework's wide acceptance
- Being a ready-made and easy to use tool that defines critical problems

Delivering added value through the application of the CITYkeys framework

The respondent identified the following added values:

Performance measurement and impact assessment

- A new holistic tool for the assessment of the city's performance (provided data is available)
- It serves the purpose of inspiration and overview
- It enables a better understanding of the city's needs and performance
- The framework application can enable evidence-based policy setting and policies assessment
- It can be as a structured performance management tool to increase public understanding and encourage participation
- It enables the measurement of the impact that specific policies and projects have
- It enables the monitoring and measurement of the success of smart city strategic plans
- A tool that allows the comparison of already existing strategies
- It enhances stakeholder support and improves planning due to provision of information
- It supports evidence-based policy development and the evaluation of processes and projects
- The framework provides KPIs that can be shared
- It enables better planning, and facilitates the assessment of the status quo for different purposes. It opens up a new understanding of urban problems, new ways to coordinate urban technologies, supporting new forms of urban governance and organisation

Learning from other cities

- Keeping track of own performance while benchmarking with other cities
- If standardised, it could be used for benchmarking
- Enables comparison with other major cities
- Supports the learning from other cities and enables the setting of priorities for new initiatives
- Enables comparison with other evaluation frameworks

Support to develop new business models

- It could provide a key tool for identifying and agreeing upon new (potential) business models
- It helps to identify potential business opportunities, and supports the ongoing development of smart cities programmes
- It supports the development of data for use

Based on sound methodology

- The CITYkeys framework is a complete and precise tool based on sound methodology. It is flexible and allows stakeholders to choose diverse indicators based on individual city specifications and data availability
- The framework can be applied in order to adopt rules and measurements that have proven their validity across European cities, which can result in comparable values and identification of measures that need improvement

Potential application of CITYkeys framework at city level

A few cases for specific application of the framework have been identified by the CITYkeys partner cities Tampere and Zaragoza, which are described in the following section.

Over the last six years, the Mobility Department of the City Hall has pursued an ambitious plan to foster green mobility through a new axial tramway that has significantly reduced the number of vehicles entering the city centre. The city has also planned and built several kilometres of new bike lanes.

Attaining a healthy mobility mix requires the presence of a truly intermodal network. CITYkeys gave the Smart City Department of Zaragoza a good opportunity to start a dialogue with the Mobility Department about mobility indicators. According to CITYkeys data, the combined use of bicycles and tramways is still rare, and a particular indicator reveals the reason: the 'Access to vehicle sharing solutions for city travel' KPI, which demonstrates the accessibility of the public bike system in a city, is relatively low, especially along certain parts of the tramway network, and the business model of the public bike network does not support new extensions.

As a result, the city's Mobility and Smart City Departments have launched a public contest targeting entrepreneurs and cooperatives active in the bicycle sector. As part of this process, they were invited to participate in the co-creation of a new service, BiciSur, which aims to provide secure parking facilities for bikes at certain tramway stops (starting in the southern neighbourhoods).

The city has received numerous proposals to address the BiciSur Challenge. Since one key requirement was the creation of a physical co-creation workshop, complete with the data-based identification of a gap in the city's mobility policy, many of these proposals came from the local innovation ecosystem. The contest has contributed to the city's efforts to align its actions with the citizens' needs.

Tampere uses the CITYkeys performance measurement framework predominantly at strategic level. The city's aim is to track the progress of its smart city projects at municipal level. Incorporating smart city issues in the Tampere's municipal development strategy is an important step in this process. The next strategy will be drafted following the scheduled 2017 municipal elections. The results gained through the CITYkeys framework will feed into that process.

The analysis of the indicators collected is even more important than that of the data themselves. Working with such complex sets of information requires the reconciliation of different points of view. The related project meetings must be properly organised to enable the participants to discuss the issues and learn from each other. The relevant data should be analysed within the network.

Potential application of CITYkeys framework at EU level

The CITYkeys framework is a valuable tool for cities interested in networking and exchanging best practices across national borders. Our experience shows that the availability of an open and transparent framework significantly increases the efficiency of urban decision making processes across Europe.

Knowledge sharing: A performance measurement framework can provide a snapshot of a city: it can highlight the areas where it is doing better than the average, and can equally flag the unsolved problems. Such a snapshot can help municipal leaders identify other cities in a similar boat. The CITYkeys framework is an efficient enhancer for knowledge sharing.

Replication of projects: A holistic framework of key performance indicators (KPIs) can provide a quick, visual overview of the project results and can help identify the areas where the project will be most beneficial for the city (environment, mobility, economic development, etc.). KPIs are a great tool for presenting and comparing projects across borders. The CITYkeys framework enables the replication of projects, as well as the comparison of approaches and results.

Project finance: In an era of increasingly complex when 'integrated' projects that have an impact on multiple functions of a city, project financing needs new tools to compare and select the best-suited solutions. This is true both in the local context – when a single city has to choose from a number of alternatives– and in the European context – when an international organisation or financing institution has to select projects that meet its objectives or match its potential.

Joint procurement: Based on the European Commission's and the member states' legislative efforts, many cities are experimenting with 'joint procurement' or participating in joint innovation procurement schemes. CITYkeys can offer valuable help when a common solution or product that might have different results in each participating city is selected and procured.

Smart city index: The CITYkeys proposals for building a smart city index can help cities across Europe identify other cities that are close to their level of smart development or focus on the same areas of development. Decisions on collaboration, participation in project consortia and experimentation can be greatly enhanced if such tools are made available to cities.

Potential application of CITYkeys tool

The KPI tool developed within the CITYkeys framework encourages and supports cities in their daily indicator-based target setting and monitoring activities. By providing a platform with a common set of quantifiable indicators, it is also expected to help cities improve their data collection practices and stimulate cross-departmental collaboration. All this will make city-level data management and reporting easier. The tool's automatic dataset reading functionality should also encourage cities to store performance data in machine readable formats and as open data, which in the future would help them automate their data collection processes and analyses.

During the planning phase, the project targets can be evaluated using CITYkeys KPIs, and the decision on whether to start a project can be made based on the projected benefits. During the implementation phase, the results can be monitored using the same KPIs, which can assist city managers in steering their project portfolio. Different city departments can also store and assess their data using the same set of KPIs, which will make it easier for city managers to evaluate and report on their projects' progress. The tool makes it easier to collect, store and report on data. Data visualisation enables better tracking of performance.

Cities can use this tool in the following decision making situations:

- comparing, evaluating and deciding on project proposals
- annual monitoring and assessment of progress of ongoing projects
- post-project evaluation
- annual city level target setting and monitoring
- defining quantifiable targets for smart city strategies and monitoring annual progress
- reporting on project and city level targets and achievements with quantified performance measures and visualisations

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Conclusions

The interviewees and the survey respondents perceived the framework as useful in diverse fields of urban activities. Its flexibility has been recognised as an added value

The entire process of development of such frameworks is about learning that should be continued in the cities and throughout Europe, e.g. in the European Innovation Partnership on Smart Cities and Communities (EIP SCC)

The CITYkeys project to develop a performance measurement framework has been successful in that:

- a prototype of the framework is available and accessible for all interested users
- it has been developed and tested jointly by municipalities and city network representatives, i.e. the scientific partners in the project
- a prototype tool has also been developed to demonstrate the possibility of 'transforming' the framework into an IT application
- potential business cases and models for smart city performance measurement have been assessed by researchers, city representatives and local SMEs. The first set of business models has been developed.

The framework is now available and ready for deployment in cities and at EU level. The project partners would like to share the following recommendations.

RECOMMENDATIONS FROM CITIES TO CITIES

- Embrace flexibility and change the mindset
- Establish clear targets, vision and strategy first, in order to fully exploit the framework's benefits
- Adjust the framework to your local context, requirements and conditions
- Link performance measurement with the existing processes and information/data streams as well as with the interests of the local stakeholders
- Involve and engage the local actors and establish synergetic relationships among them
- Create cross-sectoral links and communication
- Consider using the framework for benchmarking, to learn from each other, and to understand what we can do better, rather than for ranking cities

Drawbacks and potentials

- The complexity of the systems/models needs to grow together with the understanding of the model: step by step
- Taking into account the very different starting points that cities are at. Many cities already have a system in place, which only lacks a few linking elements, while other cities are at the very start of the entire performance measurement process. Individual cities are rooted in different local framework conditions and undergoing different stages of development that require more specific and tailored performance measurement systems.
- To work jointly towards a shared data 'place', where different layers, such as district heating and energy savings, can be integrated.
- Using such a framework for infusion of new impulses and inspirations: there is not only one single way and approach to the application of performance measurement systems, but much rather many optional routes that can be taken.

Most importantly we do need a lot of cooperation, communication and collaboration effort between different systems and political will and support, enabling a true capacity building concerning joint work on cross-sectoral challenges and sets of information.

In this context however, the municipal capacity as well as time have to be taken into account. Most likely, we would consider only the main indicators as found in the CITYkeys project. I think this collaboration is a good starting point for the future. Although, it will not be an easy path, since numerous barriers do still exist. We should see this undertaking as a learning process and also remember that the starting points of tackling the existing challenges are different in each city!

Sanja Majnar Neralic, Zagreb, Croatia

CITYkeys could support the process of agenda setting and raising (a better focused) discussion. However, this process is very much depending on the existing ability and the perspective from which the available information is being interpreted. Before generating more and more information, we do need to focus on the process innovation. Smart city is more than a 100 implemented smart meters.

Much rather it is the making of connections through the silos: this is the essence of smart cities: where and how you make clever connections between processes, projects and activities: $1+1 = 3$. In that sense, a smart project is really something else than what a smart city is.

Replicability can only exist once the first cities are enthusiastic on what is there and the 'back ends' concerning the process of implementation of such framework are organized. The key message towards EU is that an open mind-set and understanding about underlying local process is required, if we are to achieve outcomes that have any impact. 'Being in control' suggests being able to deliver what was promised.

'Reality is a process', including the projects that you did not expect happen, we have to remain flexible. Being smart is giving yourself some freedom in why, what, how and when do you want to achieve something.

Roland van der Heijden, Rotterdam, The Netherlands

In order to draw the full benefit from such a Framework clear targets need to be established. Having a clear vision and a strategy is essential. At this point a more general reflection on the topic of Smart City is necessary. For the time being, the Smart City branding is focused on the outside image, yet local multiple urgent social issues as well a challenging situation concerning employment and energy poverty are pressing. In this context as well, CITYkeys Framework could support the open government strategy by providing information in the context of participatory activities. Within our 'Open Government Strategy' Smart City is just one element.

Daniel Sarasa Funes, Zaragoza, Spain

Smart city performance measurement frameworks could be used for various purposes, for instance, during the process of project initiation, for communication purposes or to evaluate projects in order to benefit from the lessons learnt. To ensure a useful measurement framework, it is essential to define its purpose and target group at the beginning. At the same time the measurement framework needs to be applicable to the practices of the cities and therefore the cities' structures and processes need to be taken into account.

In the European context this is rather challenging since the understanding of smart city and the cities' requirements regarding performance measurement vary. It requires a lot of alignment efforts between different stakeholders in the first place: in order to achieve useful results, placing the cities and its citizens into the core of attention is the key in this context.

Ina Homeier and Eva Pangerl, Vienna, Austria

Our intention in Tampere is to support and enable a multi-professional analysis of data and information and to organize the data and decision management accordingly. It is also important to collect information in addition to what is already being collected. In this context, cross-sectoral and interdisciplinary work is absolutely necessary. The prerequisite for this is the ability to link the indicators from different fields and domains. Coordination of these activities in the case of Tampere is performed by the Knowledge Management Department/Unit.

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Project partners





