



**DECIPHERING THE UNDERSTANDINGS AND APPROPRIATION OF  
THE SMART CITY CONCEPT: A MULTILEVEL INQUIRY**

*PUBLIC DEFENSE 26/06/2019  
JONATHAN DESDEMOUSTIER*

Promotor: Nathalie Crutzen  
Thesis Committee: Jacques Teller & François Pichault  
Jury Members: Rudolf Giffinger & Pieter Ballon

**HEC LIÈGE**  
Management School - Liège Université

Smart City Institute, HEC-Liège, University of Liege, Liège, Belgium

**LIÈGE**  
université

## AGENDA OF THE THESIS DEFENSE



- 1 THESIS PRESENTATION BY JONATHAN DESDEMOUSTIER**
  - Introduction
  - Papers presentation
  - Conclusion
- 2 Q&A EXTERNAL JURY**
  - Pieter BALLON, Vrije Universiteit Brussel (VUB)
  - Rudolf GIFFINGER, Technische Universität Wien (TU Wien)
- 3 Q&A THESIS COMMITTEE**
  - François PICHULT, HEC Liège, ULiège
  - Jacques TELLER, ULiège
- 4 SPEECH FROM THE SUPERVISOR**
  - Nathalie Crutzen, HEC-Liège, ULiège
- 5 JURY DELIBERATION**
- 6 PROCLAMATION AND DRINK**

2



# THESIS PRESENTATION

Jonathan Desdemoustier



## AGENDA

### 1 GLOBAL INTRODUCTION

- Research Question
- Smart City – Governance – Stakeholders
- Lacks of scientific contributions on Smart Cities
- Stakeholders' understandings and appropriation of SC: quantitative and qualitative evidence in Belgium
- Structure of the thesis

### 2 PAPER 1:

- Governance of Smart Cities: A call for stronger theoretical foundation to tackle the complexity

### 3 PAPER 2:

- Municipalities' understanding of the Smart City concept: An exploratory analysis in Belgium

### 4 PAPER 3:

- Smart City appropriation by local actors: An instrument in the making

### 5 PAPER 4:

- Actors' centrality in the building of a Smart City: A critical analysis using the actor-network theory process of translation

## AGENDA



### 6 GENERAL DISCUSSION AND MAIN CONCLUSIONS

- Stakeholders' Smart City understanding: several approaches co-exist
- Smart City appropriation: In-between rejection and adoption
- Smart City understandings and appropriation related to territorial issues
- Paths for future research
- Practical recommendations

5



## 1. GLOBAL INTRODUCTION

- *Research Question*
- *Smart City – Governance – Stakeholders*
- *Lack of scientific contributions on Smart Cities*
- *Stakeholders' understanding and appropriation of SC: quantitative and qualitative evidence in Belgium*
- *Structure of the thesis*

# GLOBAL INTRODUCTION

## RESEARCH QUESTION



- **Thesis aim: Undertake a comprehensive inquiry of how the Smart City concept is perceived by its stakeholders.**
- Deciphering stakeholders' understandings and appropriation:
  - *Which are the different understandings of the Smart Cities?*
  - *How do the different actors of a territory appropriate the phenomenon?*
  - *Which elements of this polymorphic concept are assimilated and supported?*
  - *What do actors at different territorial level think of Smart City ?*
- A multilevel inquiry: *A qualitative and quantitative research in Belgium at different territorial and power levels*

7

# GLOBAL INTRODUCTION

## 1. SMART CITY- GOVERNANCE - STAKEHOLDERS



- The notion of Smart City is used in a prolific way: Lacks of consensus on how to define or conceptualise it.
- Caragliu et al. (2009) offers a presentation of the various orientations of the Smart City:
 

*"We believe a city to be smart when investments in human and social capital and traditional and modern communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance".*
- The concept of governance is a complex matter: Follows multiple trajectories and theories.
 

*"A processes of societal coordination and steering towards collective objectives"* (Pierre, 1999).

  - The lack of governance instruments for Smart Cities represents one of the most serious barrier to their successful implementation (Manville et al., 2014).
  - The statutes of Smart City governance varies between an input, an outcome, a block, or a process of the Smart City
  - There is no one-size-fits-all approach
- Stakeholders are considered as cornerstones of the Smart City governance:
  - The governance of the Smart City includes collaboration, cooperation, partnership, citizen engagement and participation.
  - A unexplored research on understandings and appropriation of stakeholders

*"The choice of the term that defines Smart City reflects the emphasis that each actor gives and suggest the best way to build it."*  
(Lara, Moreira Da Costa, Furlani, & Yigitcanlar, 2016).

8

# GLOBAL INTRODUCTION

## 2. LACKS OF SCIENTIFIC CONTRIBUTIONS IN SMART CITIES



- Smart City thematic is still largely under exploration and needs theoretical frame:
  - *A literature insufficiently framed in theories reinforcing a fragmentation.*
  - *A need of sophisticated theories of socio-technical change* (Mejer and Bolivar, 2016).
- ⇒ **Sociology of sciences: Smart City as an instrument for cities and territories**
- ⇒ **Science and technology studies (Sociology of translation ANT): Smart Cities as a process of translation**
- Smart City literature lacks of empirical research based on quantitative and qualitative in-depth methodologies:
  - *Few rigorous statistical analyses are performed*
  - *Empirical proof are insufficiently mobilized to study the Smart City governance*
- ⇒ **Empirical research lead in Belgium based on two quantitative papers and one qualitative article.**

9

# GLOBAL INTRODUCTION

## 3. STAKEHOLDERS' UNDERSTANDINGS AND APPROPRIATION OF SMART CITY: QUANTITATIVE AND QUALITATIVE EVIDENCES IN BELGIUM



- To answer to the lacks of scientific contributions, the thesis analyses in an innovative way the stakeholders 'understanding and appropriation of the Smart City based on 4 scientific articles.
- A logical progression defines the thesis development :
  - **Article 1:** *A literature review identifying the gaps in the Smart City literature and offers development paths*
  - **Article 2:** *An exploratory quantitative study highlighting the different understandings of the Smart City by a single actor (municipalities) throughout the Belgian territory using in-house framing out of the Smart City literature*
  - **Article 3:** *A quantitative analysis of several actors opinions using the Instrument Theory to frame their Smart City appropriations. It mobilizes statistics to highlight the differences and similarities between 'appropriations.*
  - **Article 4:** *A qualitative analysis based on a case study (Alphaville in Belgium) in order to deeply work on the stakeholder's appropriation, framed by the ANT as theoretical structure and methodological tool.*
- **A major assumption:** *The Smart City concept is able to transform Belgian territories into Smart Territories.*
  - *Smart City is relevant to apply through the diverse Belgian institutional layers and environments with their own characteristics*

10

# GLOBAL INTRODUCTION

## 4. PAPER STATUS



Paper	Status	Journal	Ranking	HEC-Liege
Governance and stakeholders of Smart Cities: A call for a stronger theoretical foundation to tackle complexity	Under Submission	Informatics  Special Issue "Impact of Emerging Technologies on Smart Governance Systems in Smart Cities"	/	/
Municipalities' understanding of the Smart City concept: An exploratory analysis in Belgium	Accepted, Published May 2019 Volume 14,2 Pages 129-141	Technological Forecasting and Social Change  Special Issue Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges	HI 86 Q1 Management of Technology and Innovation <a href="https://www.scimagojr.com/">https://www.scimagojr.com/</a>	B
Smart City appropriation by local actors: an instrument in the making	Accepted Available Online September 2019, Volume 92 Pages 175-186	Cities  <a href="https://www.sciencedirect.com/science/article/pii/S0264275118314069">https://www.sciencedirect.com/science/article/pii/S0264275118314069</a>	HI 62 Q1: Urban Studies, Sociology and Political Sciences <a href="https://www.scimagojr.com/">https://www.scimagojr.com/</a>	OPRA
Actors' centrality in the building of a Smart City: A critical analysis using the actor-network theory process of translation	Under Submission	M@n@gement	Rank 1 ABS (Association of Business Schools, UK)	B

11



## **PAPER 1:**

Governance of Smart Cities: A call for stronger theoretical foundation to tackle the complexity

# 1. INTRODUCTION AND METHODOLOGY



## *What do we know about the governance and stakeholders in the Smart City in 2016 ?*

- The literature review critically analyses the state of development of the literature on governance of Smart Cities.
- An analysis framework (theoretical foundations, methodology, content) is mobilised.
- A presentation and an exploration of meta-theoretical debates and related theories are realised:
  - *The “normative-positive” debate*
  - *The “structure and agent” debate*
  - *Institutional Theory, Actor Network Theory, Stakeholder Theory*
- *An advance search query with the keywords “Smart City”, “Stakeholders” and “Governance” are launched:*
  - *Four databases (January 2017): Ebsco Host, Scopus, ScienceDirect, and ProQuest*
  - *222 articles remain after deleting duplication*
- *Selection criteria:*
  - *Papers which contain stakeholders’ approaches or governance considerations as central thematic or subject*
  - *Papers on conceptual cousins of Smart City are not taken into consideration*
- ***The result offers a corpus of 61 papers***

13

# 2. ANALYSIS FRAMEWORK



- The documents are analysed according to three dimensions: theoretical foundations, methodology and content (Crutzen and Herzog, 2013).

<i>General Information</i>	<i>Theoretical foundation</i>		<i>Methodology</i>	<i>Content</i>
Year of publications	Theories mentioned		Research method (Quantitative, qualitative and review of literature)	Stakeholder’s types (Leydesdorff and Deakin 2011)
Type of document (book chapter, article)	Epistemological positioning		Models and frameworks developed Empirical method used (Subject studied)	Governance focus (Albert Meijer and Bolívar 2016)
First author’s department	Normative/ positive	Structure/ agent	Location and scale (Countries, scales)	

14

### 3. RESULTS & CONCLUSIONS



What do we know about governance and stakeholders in the Smart City ?

- The research is fragmented and lacks cohesion, numerous frameworks and models -empirical or conceptual- are elaborated.

*It is necessary to develop in-depth theoretical analysis and reach global explanatory frameworks.*

- The literature lacks of research with qualitative and quantitative methodologies based on statistical treatments which deeply analyse the stakeholders in the Smart City.

*Scientific articles need to deeply study how one or several actors understand, appropriate, influence and/or impact the creation and implementation of a Smart City.*

- There is a lack of national and regional Smart City analysis and a lack of studies on local level with a national and/or regional scope.

*The literature should consider the vertical integration of actors and the multilevel analysis in the governance of Smart City.*

15



## **PAPER 2:**

Municipalities' understanding of the Smart City concept: An exploratory analysis in Belgium

# 1. INTRODUCTION

## *How do Belgian municipalities understand the Smart City phenomenon?*

- Which orientation of the concept of Smart City -sustainable, technological, creative, human- do Belgian municipalities apprehend?
- A typology based on 5 categories of orientation is used:

Technological	Human & Creative	Institutional	Sustainable
Holistic			

- Aim of the paper: **Construction of a typology of municipalities' understanding of the Smart City**
  - Comparison with some intrinsic characteristics of Belgian municipalities
  - Comparison of the typology with the acceptance and level of difficulty to implement the Smart City

17

# 2. METHODOLOGY

- **Population**
  - 589 municipalities of Belgium
- **Data collection:**
  - Online survey: SurveyMonkey/French and Dutch
  - Period: May to October 2016 (5 months)
- **Sample**
  - **113 municipalities (19%)**
  - Representativeness:
    - Rural /urban municipalities
    - Flemish / Walloon/ Brussels' municipalities
  - Not representative for the size of municipalities
- **Respondents:**
  - General directors and heads of departments (55%)

Three questions used for the typology creation:

Importance of the Smart City components	
<b>Question 1:</b> In a Smart City, which importance do you give to these factors?  Assess each proposition from 1 to 5	<ul style="list-style-type: none"> <li>• Institutional</li> <li>• Human</li> <li>• Technological</li> </ul>
Representation of the Smart City phenomenon	
<b>Question 2:</b> What does the Smart City phenomenon represent for you?  Assess each proposition from 1 to 5	<ul style="list-style-type: none"> <li>• An urban fashion phenomenon</li> <li>• Some city branding (a communication tool)</li> <li>• The future of cities and towns</li> <li>• A way to govern</li> <li>• A privatisation of public spaces and public powers</li> <li>• A technological challenge</li> <li>• Opportunities for cities</li> </ul>
Means of a Smart City project	
<b>Question 3:</b> What is a Smart City project?  Select one to several proposition(s)	<ul style="list-style-type: none"> <li>• A project that includes new technologies</li> <li>• A sustainable project</li> <li>• A structuring project carried out by local authorities</li> <li>• A project that implies different actors of the city</li> <li>• A creative project</li> </ul>

More detailed questions

18

## 2. METHODOLOGY

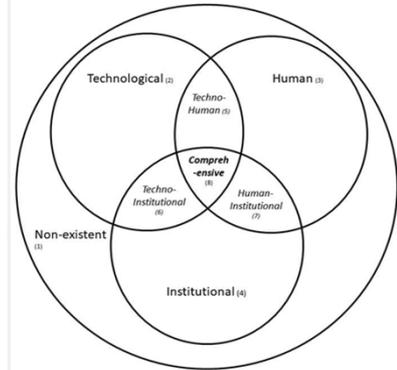
- **Establishment of discriminating characteristics to create a typology of understandings**

- 4 orientations
- Technological / Human / Institutional / Absence
- Five subgroups and eight categories of understanding

Subgroups	Technological	Human	Institutional	Categories	
ABSENCE	-	-	-	Non-existent	1
EXCLUSIVE	X	-	-	Technological	2
	-	X	-	Human	3
	-	-	X	Institutional	4
DUAL	X	X	-	Techno-Human	5
	X	-	X	Techno-Institutional	6
	-	X	X	Human-Institutional	7
HOLISTIC	X	X	X	Comprehensive	8

Typology of understandings

↔



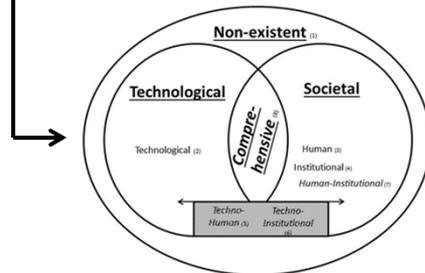
- **Application to Belgian municipalities**

Subgroups	NB	%	Categories	Nb	%
ABSENCE	26	23	Non-existent	26	23
EXCLUSIVE	37	33	Technological	21	19
			Human	8	7
			Institutional	8	7
DUAL	30	26	Techno-Human	16	14
			Techno-Institutional	7	6
			Human-Institutional	7	6
			Comprehensive	7	6
HOLISTIC	20	18	Comprehensive	20	18

## 3. RESULTS

- **Adaptation of the typology to Belgium**

- The Belgian typology comprises four understandings:
- **Technological & Societal** understandings exemplify the divergence debated in the literature for the place and importance of technological and non-technological factors,
- **Comprehensive** understanding transcends this technological and non-technological debate with a holistic approach.
- **Non-existent** represents municipalities which have not developed a clear understanding of the Smart City



Subgroups	Categories	Nb	Belgian typology of understanding	
ABSENCE 26	Non-existent	26	Non-existent (26)	
			Technological	Societal
EXCLUSIVE 37	Technological	21	21	/
	Human	8	/	8
	Institutional	8	/	8
DUAL 30	Techno-Human	16	4	12
	Techno-Institutional	7	4	3
	Human-Institutional	7	/	7
	Comprehensive	7	/	7
HOLISTIC 20	Comprehensive	20	(29)	(98)
			Comprehensive (20)	

- Pearson Chi-Square test for the typology : **RELEVANT**

- Three territorial factors: Urban / Rural + Flanders / Brussels / Wallonia + Size of municipalities
- Municipal perception of difficulty to implement Smart City projects: Low (notation 1-2/5), Neutral (3/5) and High (4-5/5)
- Relevance of the concept Smart City for the territory: Dummy variable: Agree or disagree

## 4. DISCUSSION & CONCLUSION



- **Cleavage of understandings between urban and rural municipalities and between municipalities in the three Belgian regions**
- **Peripheral municipalities:** Mainly technological understanding and Non-existence of understanding:
  - Comprise less populated cities (small size)
  - Include rural municipalities
  - Mainly in Wallonia
  - Rejection of concept Smart City
  - Perception of high level of difficulty to set up projects
- **Central Municipalities:** Mainly societal understanding and Comprehensive understanding:
  - Comprise municipalities of medium and large sizes
  - Include urban municipalities
  - Mainly in Brussels (Holistic) and Flanders (Societal)
  - Relevance of the concept Smart City
  - Perception of medium level of difficulty
- **Understandings and territorial characteristics are statistically related:**
  - Generation of a vicious or a virtuous circle
  - Necessity to take into account territorial scales

21



## **PAPER 3:**

Smart City appropriation by local actors: an instrument in the making

# 1. INTRODUCTION AND THEORETICAL FRAMEWORK



- How different actors of a territory appropriate the Smart City and its orientations ?
- How the Smart City is encompassed by actors who composed it ?

**The paper uses the Instrument theory developed by Lascoumes & Le Gales (2007) as framework of analysis.**

- The Smart City is considered an instrument that could be appropriated by actors as either:

**A public policy instrument:** Not neutral, provoking debates, influencing policies, affecting actors resources

- *Political issue questioning the future of cities and towns*
- *An ideological construction*
- *A policy question*
- *An improvement of local knowledge production*
- *A soft direction*
- *A promotion of actors discussions and arguments*
- *A political assemblage*
- *A participative, collaborative, or self-governing model*

**A functional instrument:** An evidence, a denaturalized technical object, a pragmatic solution at disposal

- *A device utilized to transform the territory*
- *A management and regulation tool*
- *A technocratic model of urban governance.*
- *An instrumental rationality or solutionism*
- *A hard direction*
- *A city measured, monitored, treated as a technical problem*
- *A solution against the sick'city*
- *A neoliberal development (PPP)*

The distinction between both instruments offers a comprehensive appropriation of the multi-faceted Smart City:

- *It allows an identification of actors' interests and actors' common and opposite visions on the Smart City development.*
- *An instrument may favour certain actors and exclude others.*

23

# 2. METHODOLOGY



## • Population

- Belgian stakeholders: practitioners at the forefront of the Smart City dynamic
  - *Five categories: Elected politician (1), administrations and public organizations (2), private companies (3), research centres & universities (4), and associations (5).*
  - *Actors already involved in the Smart City in Belgium: able to express their opinions and possess a sufficient knowledge of the topic.*
  - *Selection through their participation in Smart City events, programmes, studies, or competitions.*

## • Data collection:

- Anonymous online survey: Qualtrics / French and Dutch
- February to April 2018 / Sent by e-mail (722)
- Questionnaire:
  - **31 statements** representing transversal subjects considered as determinants for the actors' appropriation
  - *Four sections: General considerations, Technology, Governance, and Territorial Aspects.*
  - *Likert scale: from 1 totally disagree to 5 totally agree (Positioning Pro/Contra)*

## • Sample and respondents

- 193 responses
- Equilibrium of respondents across:
  - *Belgian Regions & Federal level*
  - *Five actors' categories*

24

## 3, RESULTS



**Three statistical treatments** are operated to dissect the actors' appropriation:

- **Conducted independently**
- Aim to study the similarities and differences within and between the five categories of actors and classify the 31 statements depending on the actors' positioning

**1. First treatment:** Classical sorting and cross sorting by actors' categories reinforced by ANOVA tests.

- Provide a global overview of the actors' positioning on the 31 statements and allow identifying the preference of each actor

**Crosstabs + ANOVA**

- Means show that actors on average develop similar points of view on some statements, for others, disagreements exist between actors.
- On the 31 statements the values stay high (between min 1.83 and max 4.38).
- Different categories of actors have, on average, a harmonious vision on several topics

**2. Second treatment:** Factor Analysis

- PCA offers a logical grouping of proposals according to the actors' perception of the Smart City.

**Principal Component Analysis**

- Reduction to 11 factors shows there is little association between the statements and illustrates an certain independence.
- The 11 factors obtained can be classified into the two types of instruments discussed in the theoretical framework.
  - Three factors correspond to the technical and functionalist Instrument: A, I, K.
  - Four factors match with a public policy instrument approach B, C, E, H.
  - Four factors (D, F, G, J) are not yet clearly associated with an instrument

N	Factors
A	Smart City as a tool
B	Smart City as a threat
C	Smart City as a set of actors
D	Smart City as a concept for cities
E	Smart City as based on open governance
F	Smart City as a structure at a regional level
G	Smart City as an administrative procedure
H	Smart City as a potential threat (Too expensive, concurrence and top-down)
I	Smart City as a capture by multinationals
J	Smart City as an implementation by the administration
K	Smart City as driven by techno and start-ups

25

## 3. RESULTS

**3. Third treatment: K-sort**

- Offers a classification of actors as a function of their common positions on specific proposals allowing an identification of groups of actors sharing the same perceptions

**K-sort**

- **Emergence of two clusters**
- **Respondents are almost equally distributed across the two clusters**
  - **Pearson Chi-Square tests**
  - **Not statistically significant : For genders & For the three regions.**
  - **Statistically significant for the categories of actors**

Clusters	Elected politicians	Admin & public	Privates	Research & Uni	Civil Society	Total
1	12	21	35	10	13	91
	46.2%	40.4%	67.3%	33.3%	41.9%	47.6%
2	14	31	17	20	18	100
	53.8%	59.6%	32.7%	66.7%	58.1%	52.4%
Total	26	52	52	30	31	191
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

- **The 2 clusters of actors have a different appropriation on 20 statements**
  - **Group 1 comprised 13 statements: Functionalist Instrument**
  - **Group 2 comprises 7 statements: Public Policy Instrument**
- **The classification between functional and public policy instrumental appears relevant.**

### Group 1 : Functionalist Instrument

N	Statements
1	Smart City is an essential tool for branding towns, cities and territories
3	Smart City is an essential tool for the future of cities and towns in Belgium
5	Smart City is an essential tool to enhance the sustainability of cities and territories
7	Smart City is an essential tool to improve the quality of life of inhabitants
10	Smart City is a key technological challenge for cities and towns
11	Smart City is mainly based on the use of ICT, Big and Open Data
12	Smart City is a tool to enhance transparency in decision making
13	Green technologies are part of Smart Cities solutions
15	Smart City improves governance principles (Decision making, actors' coop, ...)
18	Smart City construction can not start without the set-up of a strategic plan
26	To accelerate the development of the Smart City, it is important to lighten the administrative procedures
29	Smart City can be adapted to any territory, including rural areas
31	Smart City has to be elaborated at the regional level within the framework of a Smart Region

### Group 2 : Public Policy Instrument

N	Statements
2	Smart City is a fashionable concept that may soon be outdated
4	Smart City is related to the threat of privatization of public spaces and public services
6	Smart City may further increase marginalisation of some inhabitants and social failures
8	Smart City menaces regulation and rules of law
14	Smart City is a threat: it menaces privacy protection, facilitates hacking...
28	Smart City is directly related to an increased competition between cities and territories
30	Smart City will mainly benefitting to large cities in Belgium

26

## 4. DISCUSSION & CONCLUSION



- **The research allows an identification of actors' appropriation of the Smart City through an instrumental approach theorized by Lascoumes & Le Gales (2007).**
  - The statistical results validate that the instrumental approach is pertinent to consider the concept of Smart City.
- **Belgian actors' appropriation of the Smart City supports the partition between two types of instrument**
- **These results show that the actors' appropriation of the Smart City does not follow a homogeneous trend**
  - Nuances are needed in the Belgian actors' appropriation.
  - The association/division of actor's is **not following a homogeneous trend**.
  - There are differences of appropriation inside the categories of actors.
  - Smart City actors do **not fit into** one or the other category of instrument **in a monolithic way**.
  - In some cases **actors oppose certain conceptualization** of the Smart City and in others **form coalitions of opinions**.
- **Actor follows its own logic**

27



## **PAPER 4:**

Actors' centrality in the set-up of a Smart City: a critical analysis using Actor Network Theory process of translation

# 1. INTRODUCTION & THEORETICAL FRAMEWORK



## *How an actors' network around the Smart City dynamic is founded, (dys)function and evolve in Alphaville (Belgium)?*

- The article explores the transition of the city of Alphaville (Belgium) into a Smart City through the Actor Network Theory (ANT) and proposes some recommendations for the local dynamic
- ANT uses the **translation process** to better understand institutional innovation and change in the network of actors.
  - It allows actors a representation by a single entity or network (Latour & Callon, 1981).
  - As a methodology ANT helps to better analyse how disparate actors mobilise, juxtapose and hold together for the same purposes (Law, 1992).
- The four-stages model of Callon (1986) is applied to identify how an actors' network is created and functions:
  - **Iterative process of translation is described in four logical steps:**
    - **1. Problematization:** Emergence of a common problematic accepted by actors  
**Obligatory Passage Point (OPP):** Elements of different nature encouraging a convergence and a resolution of problems
    - **2. Intersement:** Aim making the project appealing within the focal field to attract support, actors must be convinced of its benefits.
    - **3. Enrollment:** Defining and allocating roles is necessary to embody actors through some devices  
**Spokespersons:** Individuals who are brought to represent the participants.
    - **4. Mobilization of allies:** Mobilization of the involved actors by making effective coordination with the other ones, expansion of the network to new actors and transformation of the network as a macro-actor.

29

# 2. METHODOLOGY



## Case Study : Alphaville

- Anonymization of the case study:
  - Respect and protect the privacy of the respondents
  - Protect promote an internationalization of the case study.
- The city of Alphaville has been selected for its intrinsic characteristics:
  - *Medium size (+/-100 000 inhabitants in 2018)*
  - *Mixing urban and rural territories.*
  - *Welcoming numerous public offices and several headquarters of companies.*
- The selection of actors relies on the criteria of the quadruple helix model (Leydesdorff & Deakin, 2011)

## Collection of data

- Qualitative empirical materials composed of primary sources:
  - *22 semi-structured interviews (Between May & June 2018).*
  - *Open grid based on the four-steps model of translation*
- Series of secondary data: Public and private documents: strategic plans, ERDF descriptive files, press articles, websites and folders

## Data Analysis

- *Thematic content analysis through the frame of the Actor Network Theory.*
  - *In-depth horizontal (inter-case) analysis based on four steps:*
  - *Comparison of interviewees' perceptions about the Smart City projects and the dynamics of actors.*

30

## 3. RESULTS



### 1. Uncompleted problematization:

- Problematization includes three themes:
  - Territoriality of Smart City (1)
  - Communication (2)
  - Utility & added value of the concept (3)
- Problematization does not capitalize on the absence of Smart City territorial vision for Alphaville: not enough reflection nor interaction

### 2. Partial Interesement :

- Interesement does not affect actors on the same way: mayor leads, administration commits, college follows, and associations wait.
- Interesement mainly based on the establishment of Smart City projects on the territory of the municipality.
- **Three main limitations:**
  - *A lack of adequate communication: an object of promotion and a political discourse (1)*
  - *A missing Smart City strategy (2)*
  - *The problematic nature of the ongoing Smart City projects (3)*

### 3. Enrollment in isolation:

- **The number of actors enrolled in the Smart City dynamic of Alphaville is small:**
  - *Inhabitants, SME, craftsmen, shop owners, associations, and research centres are missing*
  - *They do not beneficiate of any role or mission*
- **Explanatory elements:**
  - *Top-down process / lack of debate and involvement / projects unilaterally launched / validation role.*
  - *Spokespersons fully fulfilling their roles are missing, they are not able to mobilize and federate actors.*
  - *Several Smart City projects are managed in small committees. Lack of willingness to enroll.*

### 4. Mobilization awaited:

- **Three development paths** are identified in the current dynamic:
  - *A capitalization on the ongoing project*
  - *A transformation of the discourse on Smart Cities*
  - *A change in the form of governance*

31

## 4. DISCUSSION & CONCLUSION



- The Smart City dynamic of Alphaville lacks consistency, the translation process are not carried out properly.
- **The discussion opens debates on some suggestions for corrective actions and recommendations inspired by the literature on Smart City on the four phases:**
- **Problematization: Working on a territorial dynamic of integration:**
  - Need to pay attention to the local context concerns for fully reaping the benefits of Smart City investments and solutions (Caragliu et al., 2011).
  - Public authorities should pay attention to the different districts, clusters or even on smaller areas (Kominos & Sefertzi, 2009).
- **Interesement: Formulate a global and open strategic vision and building a compelling narrative:**
  - A strong vision is fundamental to the success of Smart Cities a strategy should be redacted in an inclusive way
  - A compelling narrative based on specific and agile communication tools should cover concrete actions to become an involvement device in order to change the perception of Smart City as a meaningless branding.
- **Enrollment: Open governance, increase spokespersons' visibility and adopt an adaptive and open leadership:**
  - The multi-stakeholder collaboration for smarter policies consists in opening to actors directly and indirectly implicated (Llacuna & Wood-Hill, 2017).
  - Smart City needs spokespersons able to strengthen the network through a participative and inclusive dynamic.
  - An open and adaptive leadership is necessary to implement effective Smart City projects (Boitvar, 2018; Washburn & Sindhu, 2009).
- **Mobilization: Actively involve citizen, private and research centre and articulate local projects with them:**
  - A local dynamic could not be considered "Smart" without a real engagement and the willingness to collaborate (Nam & Pardo, 2011).
  - To improve the Smart City dynamic of Alphaville, it is necessary to open the circle to actors.

32



# MAIN CONCLUSIONS PATHS FOR FUTURE RESEARCH PRACTICAL RECOMMENDATIONS

## 1. MAIN CONCLUSIONS

### Stakeholder's Smart City understandings:

Stakeholders' Smart City understandings: Several approaches co-exist

#### 1. Four understandings:

- A Belgian typology of perceptions emerged with four types of understanding, they represent the Belgian municipal conception
- Technological / Societal / Comprehensive / Non-existent

#### 2. Between a functional and a public policy instrument:

- Statistical results validate the instrumental approach is pertinent to consider the concept of Smart City.
  - *Belgian stakeholders support a partition between two types of instrument*
  - *Actors do not fit into one or the other category in a monolithic way: differences of appropriation/each actor follows its own logic*

#### 3. Between a "Toolbox" and "Branding tool":

- Actors do not agree on a common signification of the Smart City concept, opinions differs greatly:
  - *Public actors and privates consider the Smart City as a useful development tool, a "toolbox" of solutions.*
  - *Smart City allows good decision-making, and economic and urban development..*
  - *Associations are more doubtful on the utility of the Smart City and ask if it meets the needs of citizens.*
  - *Smart City represents political branding, a communication tool, and a political object used by authorities.*

# 1. MAIN CONCLUSIONS



## Smart City appropriation: rejection and adoption

Understandings and perceptions presented in the previous section have an impact on the appropriation of the Smart City by the territorial actors.

### 1. Vicious and virtuous circles

- Peripheral municipalities mainly reject the application of Smart City for their territories
  - *Vicious circle*
- Central municipalities mainly adhere to the Smart City phenomenon
  - *Virtuous circle*

### 2. Desirable and undesirable effects

- Actors supporting a functionalist instrumental approach consider the Smart City as a useful tool
  - *They are highly convinced the Smart City is a solution for the territories / Acceptation and promotion of Smart City*
- Actors recognizing the Smart City as a public policy instrument considered the phenomenon with its potential (negative) value
  - *They question the formation of Smart City and stress some dangers in its implementation.*
  - *Smart City construction produces undesirable effects on the society / Doubtful on the phenomenon*

### 3. Circle In and Circle Out

- Problem of acceptance of the Smart City dynamic by local actors
  - *Non-understanding of what a Smart City means + Smart City project not sufficiently presented and described.*
  - *Rejection of the concept because Smart City is assimilated to a political branding and communication tool.*
  - *Absence of shared vision & strategy, no willingness to engage stakeholders / absence of adaptive leadership*
  - *Insufficient open and inclusive governance, limited circle of actors working in isolation (Actors out of the dynamic)*

35

# 2. PATHS FOR FUTURE RESEARCH



## Two main elements for further academic research:

### 1. Explore factors of stakeholders' understandings and appropriation :

- The Smart City may be considered as a political object with a multitude of nuances: they are the subject of branding, debates and positioning
- It involves a political questioning of how to manage cities and territories with priorities and implementation.
- These factors provoke discussions and controversies between the Belgian stakeholders on the desired Smart City outcome and its concrete construction.
  - This raises several research questions about the interactions between the Smart City development, the political process, and the stakeholders' appropriation:
    - *Should the Smart City be considered as a neutral political axiom or as an influencing political factor ?*
    - *How does the role of stakeholders in the decision-making process or their ideological background affect their appropriation?*
    - *How do political Belgian actors envision and elaborate the Smart City?*
    - *Which actors integrate the Smart City into their political agenda and how do they defend it?*
    - *What political processes are developed to launch a Smart City transformation in the territory?*
    - *How is the Smart City promoted, defended, and discussed as an object of public policy?*
    - *How important is the political process in the Smart City governance?*
- The heterogeneous Belgian appropriation of the Smart City does not present a homogenous approach between factors, in the thesis there is no in-depth analysis of a structuration of interactions between these factors.
- The socio-technical construction of the Smart City may be a possible development path to consider.
  - The Smart City should be considered as an assemblage composed of technologies, networks, actors, and institutions which tend to stabilise and produce policies and projects through non-linear co-evolutionary processes.
  - Analyses offer the occasion to efficiently adapt the Smart City concept to the stakeholders' context, environment, and behaviour
    - *Which general and specific factors influence the stakeholders' understandings and appropriation of Smart City?*
    - *How does the stakeholders' context and environment support their Smart City perceptions?*
    - *How do the actors' background, position, and behaviour impact their Smart City assimilation?*

36

## 2. PATHS FOR FUTURE RESEARCH



### 2. Call for territorial considerations:

- The territorial characteristics seem to be either conducive or limiting to the Smart City appropriation and development in Belgium.
  - The question remains unanswered of how to adapt the Smart City concept as an efficient territorial and social instrument that is suitable for the intrinsic characteristics of every territory.
    - *How do the complexity of the territorial conditions influence the evolution of the Smart City concept ?*
    - *How to integrate the degree of urbanisation and the socio-economic structure of the territory ?*
    - *How to study the Smart City beyond the dichotomy of urban versus rural ?*
    - *How to consider the peripheral and peri-urban areas in Belgium ?*
- The Belgian institutional level seems to influence stakeholders' understandings.
  - Regions impact the municipal understanding of the Smart City (Paper Two)
  - Regional differences seem not to impact stakeholders' appropriation across the country (Paper Three).
- These opposite results require deeper study into how the numerous Belgian institutional levels (regions, communities, and provinces) shape stakeholders' understandings, appropriation, and behaviour.
  - *How do Smart City regional strategies and projects impact the local implementation?*
  - *To what extent are stakeholders' understanding and appropriations of the Smart City influenced by regional or supra-local programmes?*
- These questions concern issues related to the multilevel governance and vertical integration of actors.
  - *How the vertical integration of actors and multilevel governance operates or may operate in Belgium throughout the Smart City policies developed ?*
  - *How "multilevel governance" performs or should perform in Smart Cities ?*

37

## 3. PRACTICAL RECOMMENDATIONS



### *Three main elements of recommendations for practitioners:*

#### 1. Capitalise on Smart City understandings for Smart City implementation :

- The different Smart City understandings which coexist amongst Belgian stakeholders impact the appropriation of the phenomenon.
  - Belgian stakeholders might capitalise on the "acceptance" process to gain social acceptability to ensure Smart City project adoption and success (Ben Letaifa, 2015).
    - One way to manage this is to set up a common and shared Smart City conception between actors.
    - The construction of the territory is elaborated between actors in adapting the individual behaviors.
    - Stakeholders meet and collaborate with each other.
    - Academics may act as a facilitator and/or disruptor in this dynamic.
    - Capitalising on a network of stakeholders who defend the Smart City conception has the potential to interest reluctant actors.
- Other styles of Smart City implementation emerge out of the results of this thesis, such as the functional instrumental approach.
  - This Smart City construction implies different objectives, priorities, and set-ups.
    - It supports another place for stakeholders (less central).
    - Actors are interested in the city's development through Smart City services and structures.
- Through the stakeholders' understanding and way of appropriating the Smart City, actors develop a whole panel of implementation methods.
  - A methodology that collects and capitalises stakeholders' opinions and idealised constructions of the Smart City should be a useful tool for practitioners.
  - It provides knowledge on which stakeholders develop similar or different opinions.

38

## 3. PRACTICAL RECOMMENDATIONS



### 2. Improving the Smart City thanks to new forms of management :

- Open governance raises the question of a new form of management, new decision-making, and new roles for leaders.
  - The challenge primarily concerns the establishment of a partnership dynamic
- The (new) role of public authorities should weave, manage, and arbitrate the modes of partnerships.
  - Governments should remain involved, but their roles must change.
  - This innovative way of functioning requires new skills (both for politicians and civil servants) and changes in the practice of public management.
  - Public authorities and the administration should develop a balanced bottom-up approach with some targeted top-down actions based and a new mediating role that encourages the diverse societal actors to share a common agenda.
- These suggestions raise questions for practitioners to investigate in their Smart City implementation:
  - *How can the construction of a local strategy connect actors of the territory?*
  - *How can communication with the different stakeholders be made more efficient?*
  - *How should leaders act and react to improve the collaborative and inclusive Smart City dynamics?*
  - *Which tools should be mobilised to launch long term and efficient PPPPartnerships?*
  - *Which interestment and involvement processes can smooth the collaboration between actors to reach the strategic goals?*

39

## 3. PRACTICAL RECOMMENDATIONS



### 3. Take advantage of territorial characteristics to develop Smart City policies

- The Smart City appeared as a possible process of transforming territories.
  - The question remains unanswered on how to adapt the Smart City concept as an efficient territorial and social instrument that is suitable for every territory.
    - *Practitioners should check the "territorial-readiness" before starting a Smart City transformation.*
    - *Analysing which territorial characteristics influence the Smart City construction in its political, institutional, societal, economic, and cultural context is required.*
    - *There is no "one-size-fits-all" or "ready to go" Smart City solution.*
    - *Public authorities should focus on and pay attention to the districts and areas with their intrinsic features.*
    - *Every Smart City solution should be adapted to the territory where it will be implemented.*
- A spatially-determined perspective must be acknowledged by practitioners to organise and support an effective Smart City policy.
  - A multilevel analysis across the country may be beneficial to consider the provincial or regional levels.
    - *An upper spatial level may allow a broader view, a coordination of resource pooling, and provide a stronger point of reference for Smart City implementation across the local levels (Angelidou, 2014).*
    - *Regional planning may have a significant impact on Smart City development to harmonise and coordinate top-level policies with low-level policies.*
    - *Considering the "multilevel governance" in Belgium is important for Smart City development.*
    - *Smart City plans and strategy should find a way to be aligned with the complex web of policy agendas already operating at the other territorial levels*

40

## AGENDA OF THE THESIS DEFENSE



### 1 THESIS PRESENTATION BY JONATHAN DESDEMOUSTIER

- Introduction
- Papers presentation
- Conclusion

### 2 Q&A EXTERNAL JURY

- Pieter BALLON, Vrije Universiteit Brussel (VUB)
- Rudolf GIFFINGER, Technische Universität Wien (TU Wien)

### 3 Q&A THESIS COMMITTEE

- François PICHULT, HEC Liège, ULiège
- Jacques TELLER, ULiège

### 4 SPEECH FROM THE SUPERVISOR

- Nathalie Crutzen, HEC-Liège, ULiège

### 5 JURY DELIBERATION

### 6 PROCLAMATION AND DRINK

41



## Q&A EXTERNAL JURY

Rudolf Giffinger  
Vienna University of Technology (TU Wien)



Pieter Ballon  
Vrije Universiteit Brussel (VUB)



# Q&A THESIS COMMITTEE

Jacques Teller, ULiege



Francois Pichault, HEC-Liège



# Q&A THESIS COMMITTEE

Jacques Teller, ULiege



Francois Pichault, HEC-Liège



# SUPERVISOR'S SPEECH

Nathalie Crutzen  
HEC-Liège, ULiège  
Director of the Smart City Institute



# JURY DELIBERATION

Prof. Francois Pichault (President), HEC Liège – ULiège  
Prof. Nathalie Crutzen (Supervisor), HEC Liège – ULiège  
Prof. Pieter Ballon, Vrije Universiteit Brussel (VUB)  
Prof. Rudolf Giffinger, Vienna University of Technology (TU Wien)  
Prof. Jacques Teller, ULiège



# PROCLAMATION & DRINK

First Floor  
Cafeteria