IAE
CLERMONT AUVERGNE
School of Management

ESC
CLERMONT
SCHOOL FOR LIFE
SINCE 1919

Smart city and m-health applications: test of an extended model of the determinants of technology acceptance by residents

CleRMa

Norbert LEBRUMENT - CleRMa EA 3849
Corinne ROCHETTE - CleRMa EA 3849
Cédrine ZUMBO-LEBRUMENT - CleRMa EA 3849 et Communication et Sociétés - EA 4647

5 et 6 mars 2019
Luxembourg

10e Symposium « Regards croisés sur les transformations de la gestion et des organisations publiques »

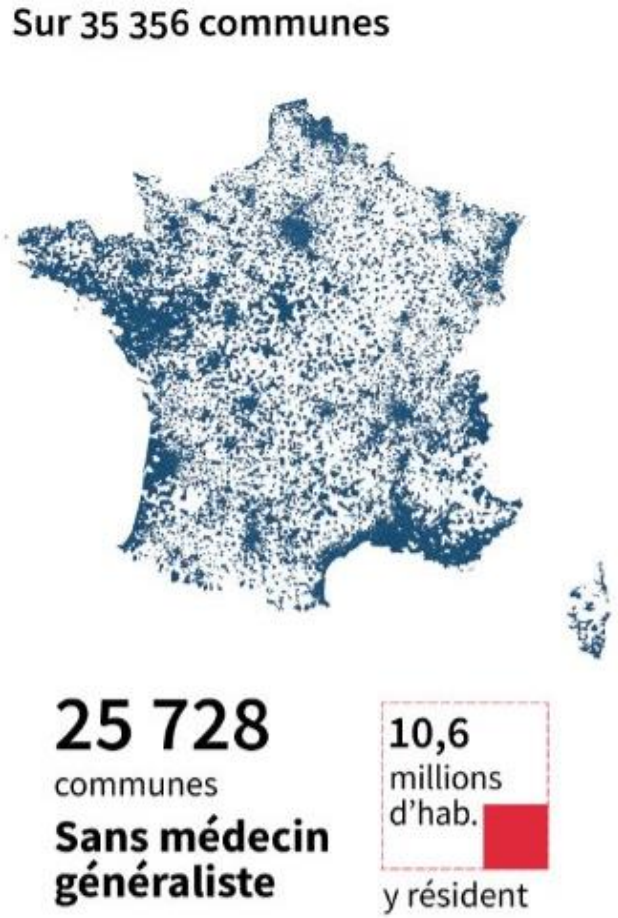
Presentation agenda

1. Context and origins of the research
2. Research question and conceptual framework
3. Methodology and research results
4. Research contributions, limitations and opportunities

Presentation agenda

1. Context and origins of the research
2. Research question and conceptual framework
3. Methodology and research results
4. Research contributions, limitations and opportunities

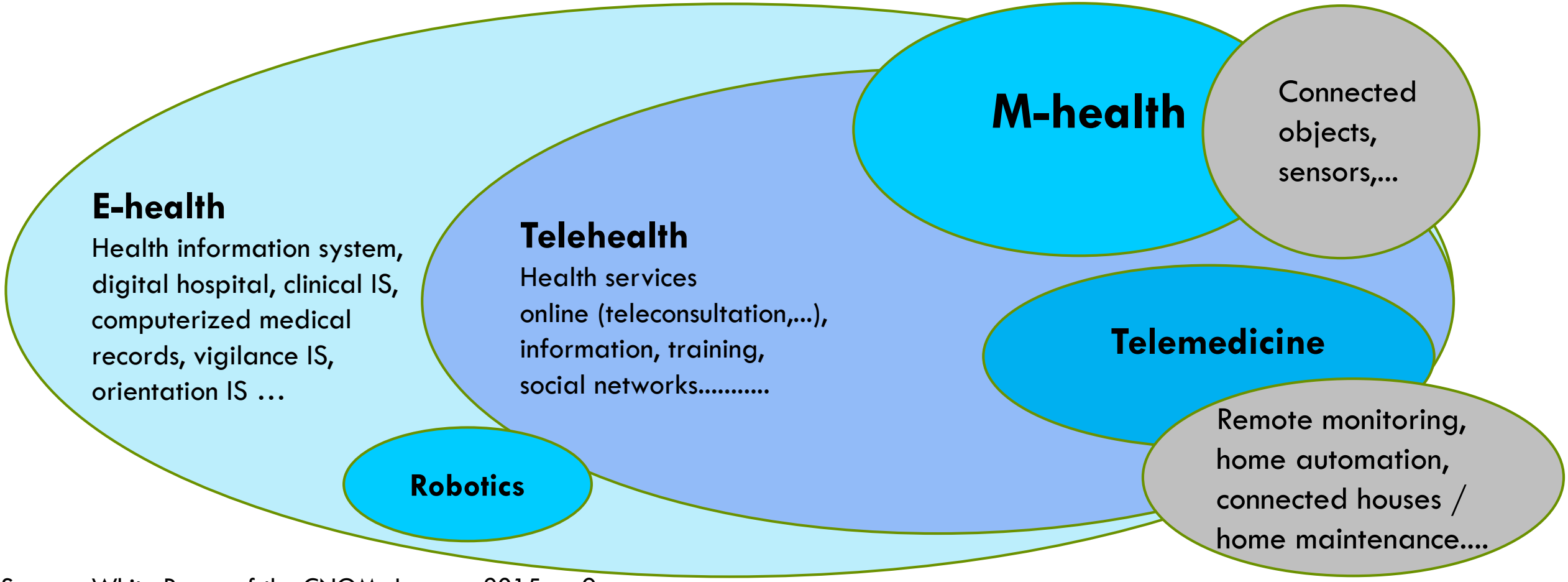
In France, a clear priority for access to digital health and digital care…



- An observation : a poor access to care for 5.3 million French people
- A plan to strengthen territorial access to care (My Health 2022)
- To Reinvest the proximity and to facilitate the city-hospital cooperation
- A priority: to develop digital health and care territories

e-Health and m-Health as a solution?

M-health : an e-health component to invest in....



Source : White Paper of the CNOM, January 2015, p. 9

French people's expectations of e-health

72% to book a médical appointment online

70% to access and to manage their file online

61% to communicate with their doctor online

For more convenience and safety 50% do not bring their complete file to the consultation

80% prefer to be followed at home rather than in hospital

59% have a connected object for better daily tracking

M-health as a lever to respond to preventive, personalized and predictive health issues, to the desire autonomy and remote monitoring... ?

Source : opinionway, La Poste december, 2017

...while the French use of mobile phones underlines the potential of m-health

- **34 million French people** (up by 3.7 million) **use their mobile phones daily to surf online,** compared to only 23.1 million on computers (down by 700,000 people) and 12.9 million on tablets (down by 600,000 people) (Source: Médiamétrie, February 2019).

- **Switch from a "mobile first" use to "mobile only" use:**
- Every day, 31% of French people connect only using their smartphone.
- Every day, 59% of French people aged 15-24 connect only using their smartphone.
- On their smartphone(s), the French spend their time on applications: 41 minutes on a average of 45 minutes spent on applications but only 4 minutes on websites. The time spent on using applications has increased by 32% over the past year (Source: Médiamétrie, February 2019).

The analysis of the literature on the acceptance of m-health shows non studied aspects in academic research

1) There are few researches on models of acceptance of m-health (Dwivedi et al., 2016; Guo, Zhang and Sun, 2016; Hoque and Sorwar, 2017);

2) The researches cover other countries than France (Dwivedi et al., 2016; Guo, Zhang and Sun, 2016; Hoque and Sorwar, 2017; Hsieh, 2016; Schnall et al., 2015; Sun et al., 2013; Zhang et al., 2014);

3) They do not integrate trust in technology as a determinant of intent to use (Alalwan et al., 2017; Gefen, 2004; Pavlou, 2003).

Presentation agenda

1. Context and origins of the research
2. Research question and conceptual framework
3. Methodology and research results
4. Research contributions, limitations and opportunities

Research question

The factors of technology acceptance defined by Davis' Technology Acceptance Model (TAM) (1985; 1989) and trust in technology (Lee and Turban, 2001; Gefen et al., 2003; Belanche et al., 2012) are intra-individual determinants of technology acceptance. Do are they valid determinants in the case of m-health ? And if so, do they are valid for the inhabitants of French cities ?

Research object :

Estimate the intra-individual determinants that determine the intention of residents of French cities to use mobile health applications.

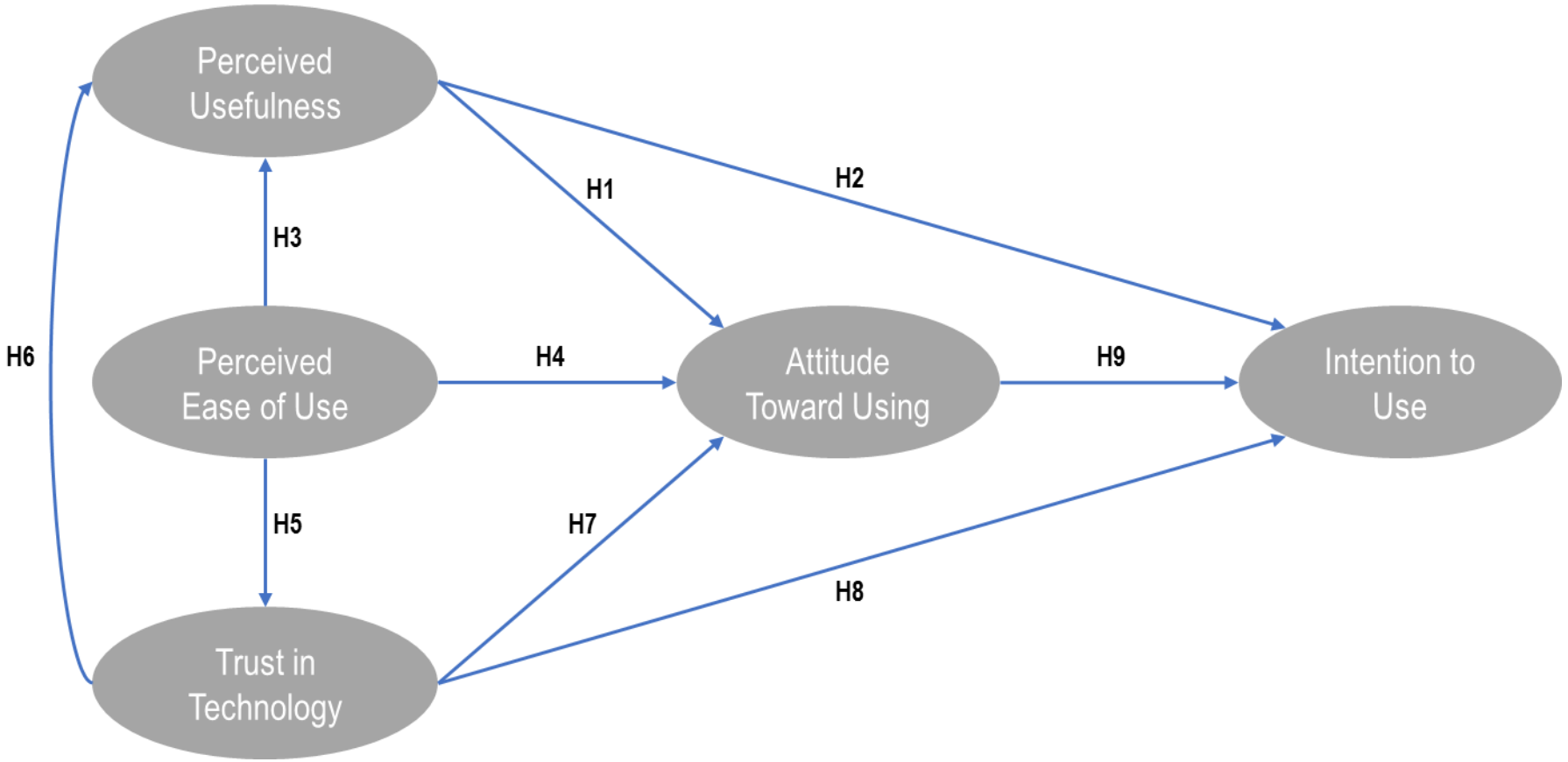
Conceptual framework used

The Davis' (1985; 1989) Technology Acceptance Model (TAM) with 4 variables:

- the perceived ease of use;
- the perceived usefulness;
- the attitude toward using;
- the intention of use.

The trust in technology (Lee and Turban, 2001; Gefen et al., 2003; Belanche et al., 2012) is a behavioural belief that influences an individual's acceptance of a technology.

Conceptual model and hypothesises associated



Presentation agenda

1. Context and origins of the research
2. Research question and conceptual framework
3. Methodology and research results
4. Research contributions, limitations and opportunities

Construction of the variables of the model

- Operationalization of concepts based on the literature on technology adoption :

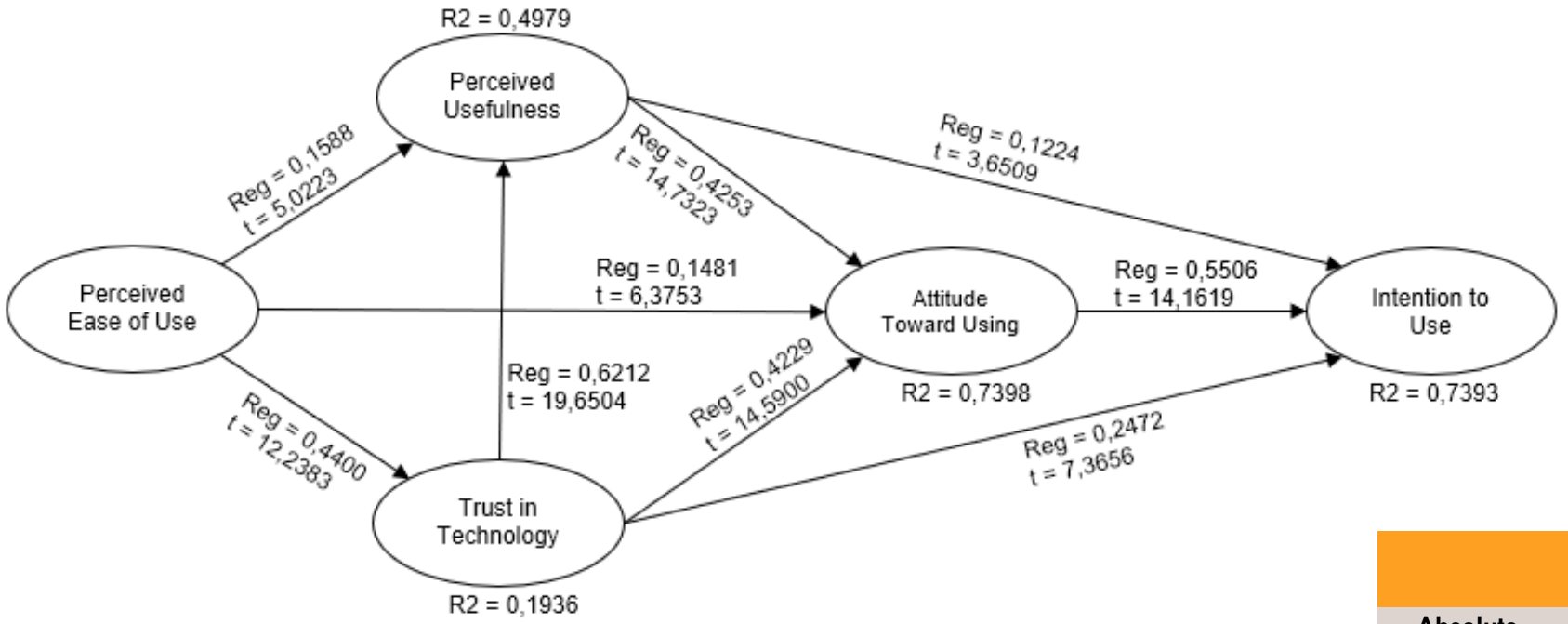
Built	Sources
Perceived usefulness of mobile health applications	Davis, 1989 ; Venkatesh et al., 2003 ; Venkatesh et Bala, 2008; Ayeh et al., 2013 ; Yen et Wu, 2016.
Perceived ease of use of mobile health applications	Davis, 1989 ; Venkatesh et al., 2003 ; Venkatesh et Bala, 2008; Ayeh et al., 2013 ; Yen et Wu, 2016.
Trust in mobile health applications	Lee et Turban, 2001 ; Gefen et al., 2003 ; Belanche et al., 2012.
Attitude toward using mobile health applications	Ajzen, 1991 ; Ajzen et Fishbein, 1980 ; Bhattacherjee, 2000 ; Wu et Chen, 2005.
Intention to use mobile health applications	Davis, 1989; Venkatesh et al., 2012.

- Determination of the nature of constructs based on the decision criteria of Jarvis, MacKenzie and Podsakoff (2003) : reflexive constructs.

Data collection and model validation

- Data collected using a **questionnaire diffused to residents of French municipalities.**
- A final sample of **626 respondents.**
- The model **is validated through a structural equation model** (Wold, 1982, 1985; MacKenzie and Podsakoff, 2003; Esposito Vinzi et al., 2010; Bollen, 2011; Lacroux, 2011; Fernandes, 2012). It has been tested by the PLS approach, distinguishing three types of estimation :
  - Estimation of the quality of the measure model : the reliability (internal consistency), the convergent validity (unidimensionality) and the discriminant validity
  - The estimation of the quality of the structural model is done by the analysises of : the determination coefficient (R^2) of each dependent latent variable and the level of significance of the coefficients of the causal relationships evaluated by a bootstrap procedure
  - The estimation of the overall fit quality of the model is done by the Goodness of Fit (GoF): the GoF represents the geometric average of the average of the communality and the average R^2 (quality of the measure and of the structure of models (Tenenhaus et al., 2004)).

Results of the empirical test of the model



	GoF	GoF (Bootstrap)	Standard Error
Absolute	0,67980	0,67983	0,0211
Relative	0,97399	0,96552	0,0188
Outer Model	0,99915	0,99756	0,0174
Inner Model	0,97482	0,96787	0,0079

Presentation agenda

1. Context and origins of the research
2. Research question and conceptual framework
3. Methodology and research results
4. Research contributions, limitations and opportunities

Research contributions

Theorical contributions

- Validation of the TAM to the m-health in an intelligent city context
- Validation of trust in technology as a determinant of acceptance of the m-health applications
- Validation of an extended version of the TAM that incorporate trust

Methodological contributions

- A consistent sample : 626 individuals
- An empirical test of the model proposed by the PLS approach

Managerial contributions

- A model that can be mobilized by public actors to understand the intention of use of mobile health applications by residents of French cities
- Identification of the different levers for the adoption of mobile health applications

Limitations of the research

Theoritical limitations

- The conceptual framework used only integrates intra-individual determinants: no determinants related to the respondent's social context
- Further work will be needed to investigate some of the social factors that can influence the acceptance of mobile health applications

Méthodological limitations

- The singularity of the field of study limits the external validity of the results obtained in France
- A test of the model by the PLS approach that would be more robust if it were coupled with a test by the LISREL approach for a contribution of the adjustment indices of the tested model to the empirical data

Research perspectives

To increase internal and external validity	The extension of the search	Next research
• Use of the LISREL method to evaluate the quality of fit of the model • Further development of the quantitative study by a qualitative study • Application of the tested model to other countries than France	•The integration of social factors to explain the adoption of mobile health applications	• The measure of he influence of culture on the adoption of mobile health applications

Thank you for your attention

IAE CLERMONT AUVERGNE School of Management

ESC CLERMONT SCHOOL FOR LIFE SINCE 1919

Norbert LEBRUMENT - CleRMa EA 3849
Corinne ROCHETTE - CleRMa EA 3849
Cédrine ZUMBO-LEBRUMENT - CleRMa EA 3849 et Communication et Sociétés - EA 4647

CleRMa