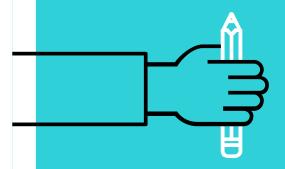


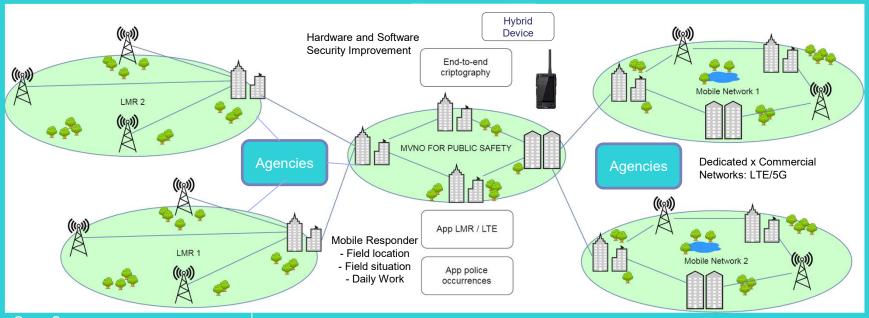
Technological Risks and Opportunities in the use of LTE and 5G private networks by public agencies in smart city scenarios

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Open Sources information:

- Social networks
- Forums
- Blogosphere
- WEB / WWW
- pictures / Photos
- Audio / Video...

Data Base information

- Cameras
- Police
- Traffic
- Energy...

Analyze large amounts of data and extract information



On-scene handling

- Real time recognition through comparison between targeted data bases and videos / images from cameras (faces and vehicles).
- Audio recognizing from the collection of sounds as guns shooting.

Problem to Solve

Government needs to use mobile broadband service to increase efficiency of public safety services

Narrow band networks (P25, Tetra and Tetrapol) and inefficient investments in multiple networks need to be replaced by a convergent and unique new mobile broadband infrastructure dedicated to public safety.

Commercial networks are not fit for purposes due to the lack of security and availability for critical mission applications.

Deployment of a new and dedicated mobile network is costly and takes long time.



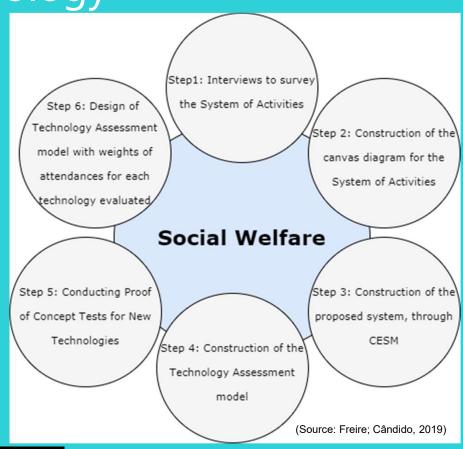


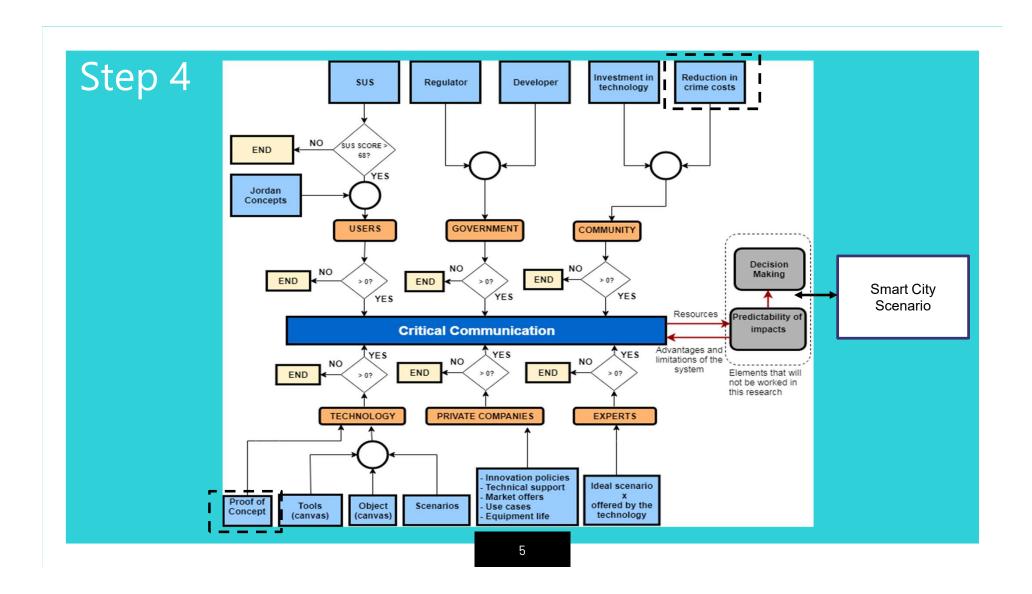
in Brazil, U\$ 600 million dollars, in more than 30 different critical communication networks.

Six Step Model Methodology

Methodology developed in the master thesis: Proposal for Technology Assessment Methodology for Critical Communications: practical application as a support for decision making process.

Broaden the discussion to Public Agencies in Smart Cities Scenario.





Step 2

Activity System Critical Communication

Activity System: Smart City?

- Users
- Specialists

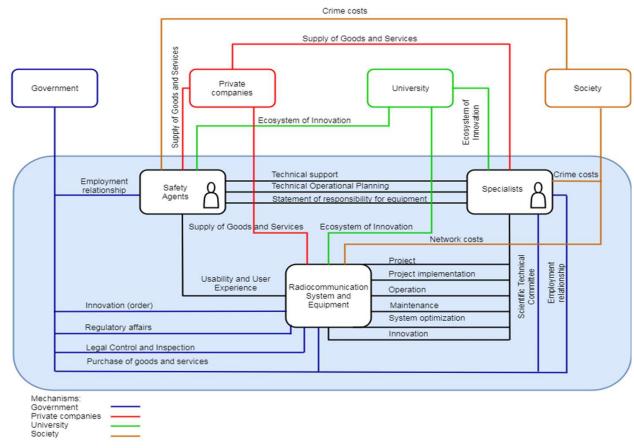
Public agencies using communication networks in smart cities scenarios

 Stations of programming, management and control (software & hardware)/ Accessories for portable radio (discrete earphones, push to talk from different models, battery chargers) - Drive test station (software and hardware) Be available 24 hours a day, 7 days a week; without Radiocommunication terminals, portable and mobile interference; quickly, effectively and efficiently; provide - Spare parts for ERBs and repeaters services for public safety agencies, airports and other - Encryption key generation station agencies that need to use communication in critical Network controllers (Control node, COR) Gateway to interconnect different networks - Can not fail, especially when other systems do not work - Base radio stations (BRS) - Provide a rapid response in Public safety activities. - Data Link for BRS with communication and data transfer quickly and safely - Telecommunication Towers Providing communication between safety agents and between - Portable radio battery them and the Integrated Command & Control Center (ICCC) - Air interface - Improve Public Safety - Repeaters - Being immune to interceptions - Enable user control and management - Optimize the crimes resolution and services provides to the Tools population Save lives - To assist decision-making process in a quickly and efficiently way - Provide quick confirmation on information delivery to whom that needs to be informed about critical situations Subject Object Rules Division of work - Researchers Managers - Coordinator of Public Safety operation - Safety agent Community - Technical staff -Harbors, Airports - Network director -Traffic flight control -Technical manager of the network -Cars, Vessels -Aircraft and Helicopters - Manufacturers -Borders with other countries - Legal advice of the agency, city, state or federation -Places difficult to access - Any of the people - Security and defense organizations - Country's regulatory agency -Any time and place (24h) - Ministry of Public Security -Integrated Command & Control Center (ICCC) - Security and defense agencies -Where lives are in danger -Big Sports events like world cup and olympic games Regions of plant cultivation with psychoactive substances - Critical situations where quick decisions need to be made -Events with big concentration of people

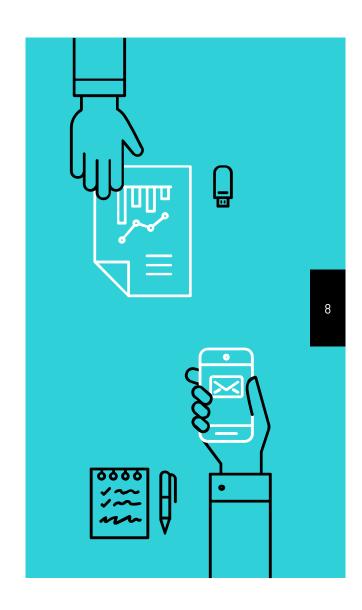
- Prohibition on the use of frequencies and radiocommunications equipaments not authorized by country's regulatory agency
- International standardization for TETRA, TETRAPOL and APCO25
- Respect the law of the country and the contracts terms
- Use of international phonetic alphabet to speak letters and numbers
- Clear, concise and objective communication
- Designation of the critical communication system as the official communication during safety operations
- Internal documentations in the safety agencies explaining when the system should be used and how to use the terminals
- Internal rules giving powers to the network operator post
- Governance for the use of a unique critical communication broadband network Long Term Evolution (LTE)
- The safety agent should be responsable for equipament that is being use in case of damage or loss
- Use of codes instead of agent names
- Radio network diagram (RND) with indication of talk groups and users hierarchy
- Ethical and respectful communications
- Use of Q code to abbreviate phrases
- Licence for the operation of radiocommunication stations and network
- -Places visited by a person under public security protection
 -Places where crimes may occur
 - 6

Step 3 – Ecosystem innovation and key metrics

Smart City Scenario?



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Goals	Research Techniques and Methods
Study risks and opportunities for public agencies to use resources in an integrated and intelligent platform available at smartphones and hybrid radios (LMR / LTE / 5G).	Modelling the situation: Systematic Literature Review, Bibliographic review; Data collection through interviews with users and specialists (User Experience; Activity Theory; Task Analysis; systemism). Steps 1; 2; 3 and 4
Support the discussion on how the ethical issue can be integrated into the analysis (Data Protection Analysis, regulations, laws and ethical issues).	Systematic Literature Review, Bibliographic review; Data collection through interviews with specialists; Focus Group
Studies predictability methods to estimate how the benefit of public agencies using efficient and integrated communications systems in a smart city context.	Systematic Literature Review, Bibliographic review; Delphi
Analysis of LTE and 5G networks for Critical Communications use case	Systematic Literature Review, Bibliographic review; Data collection through interviews with specialists; step 5
Results Presentation in a system view	step 6



Validation of The Methodology

Master Thesis

FREIRE, D.V.C. Proposal for Technology Assessment Methodology for Critical Communications: practical application as a support for decision making process. Master Thesis in Information Science at Federal University of de Santa Catarina, Brazil (2019). 10.13140/RG.2.2.16296.93442.

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FREIRE, D.V.C; CANDIDO, A. C. **O Aspecto Informacional no Levantamento de Cenários para Comunicações Críticas em Segurança Pública no Brasil.** Revista Conhecimento em Ação, Rio de Janeiro, v. 5, n. 2, Jul/Dez. 2020. P. 76-97. ISSN: 2525-7935. https://doi.org/10.47681/rca.v5i2.34167.

Any questions?

Thank you!

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