

Technology Assessment as Support in the Decision-Making Process for Modernizing Critical Communication Technologies used By Public Safety Agencies in Brazil

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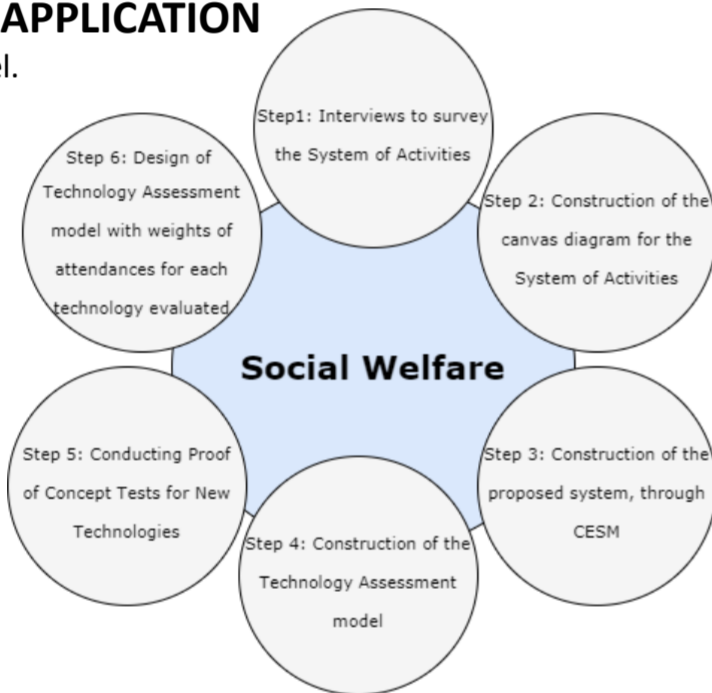
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ABSTRACT

Critical Communication (CC) systems are one of the main support tools for Public Safety (PS) agencies. This work is an exploratory and descriptive applied research with both quantitative and qualitative approaches. It focuses on user and expert requirements capture, based on understanding the activity system's context as a resource. The collected data were analyzed using Bunge's (2000) Systemism in order to propose a system with the logic of Composition-Environment-Structure-Mechanism (CESM). A theoretical framework was built, regarding resource information on Activity Theory (AT), to include the user's context in social, cultural and psychological aspects, and Usability, in order to identify methods of data collection. Secondary data were obtained through a Systematic Literature Review (SLR) and a bibliographical review. Primary data were obtained from interviews and data treatment based on AT, Mwanza's (2001) stages and Mello & Neves's (2018) contributions. Were also applied questions based on Usability methods and techniques, such as Jordan's (1998) concepts and System Usability Scale (SUS), 34 users and experts were consulted. This work aims to support the development or improvement of CC systems, based on the results from the Technology Assessment (TA). TA uses a variety of data sources to create a single information system, which aims to point out the best path of investments. The SLR disclosed several types of TA, but none applicable to CC systems. Therefore, it was necessary to develop a new methodology, proposed in this work as a series of steps to be followed. The "Six-step model" was created.

METHODOLOGY APPLICATION

Figure 1: Six-step model.



Step 1 – Interview

1. How would you describe CC activity? 2. What is the purpose of CC? 3. Who is involved in CC? 4. What resources are used for CC? 5. What are the social norms, rules or regulations that influence or govern the performance of CC? 6. What is the role of each individual in CC and how do they organize themselves? 7. What is the environment in which CC is carried out? 8. What is the desired result when performing CC? 9. If you could solve any aspect related to the activity, what would it be? In addition, we proposed other questions to the model, in order to assist in the elucidation of difficulties encountered in the activities system: 10. What are the main difficulties you identify in the current CC scenario in Brazil? 11. What opportunities do you perceive in the advancement of technologies for CC in Brazil and in the possibility of partnerships with other countries? 12. What legal, economic and social implications do you consider relevant for this decision to implement new technologies for CC? 13. What is your opinion on the possibility of interoperability between Public Safety organizations, using technologies in LMR and LTE? 14. In your opinion, which would be an ideal model for CC in Brazil, considering current and future technologies?

Figure 2: Step 2 – Canvas diagram

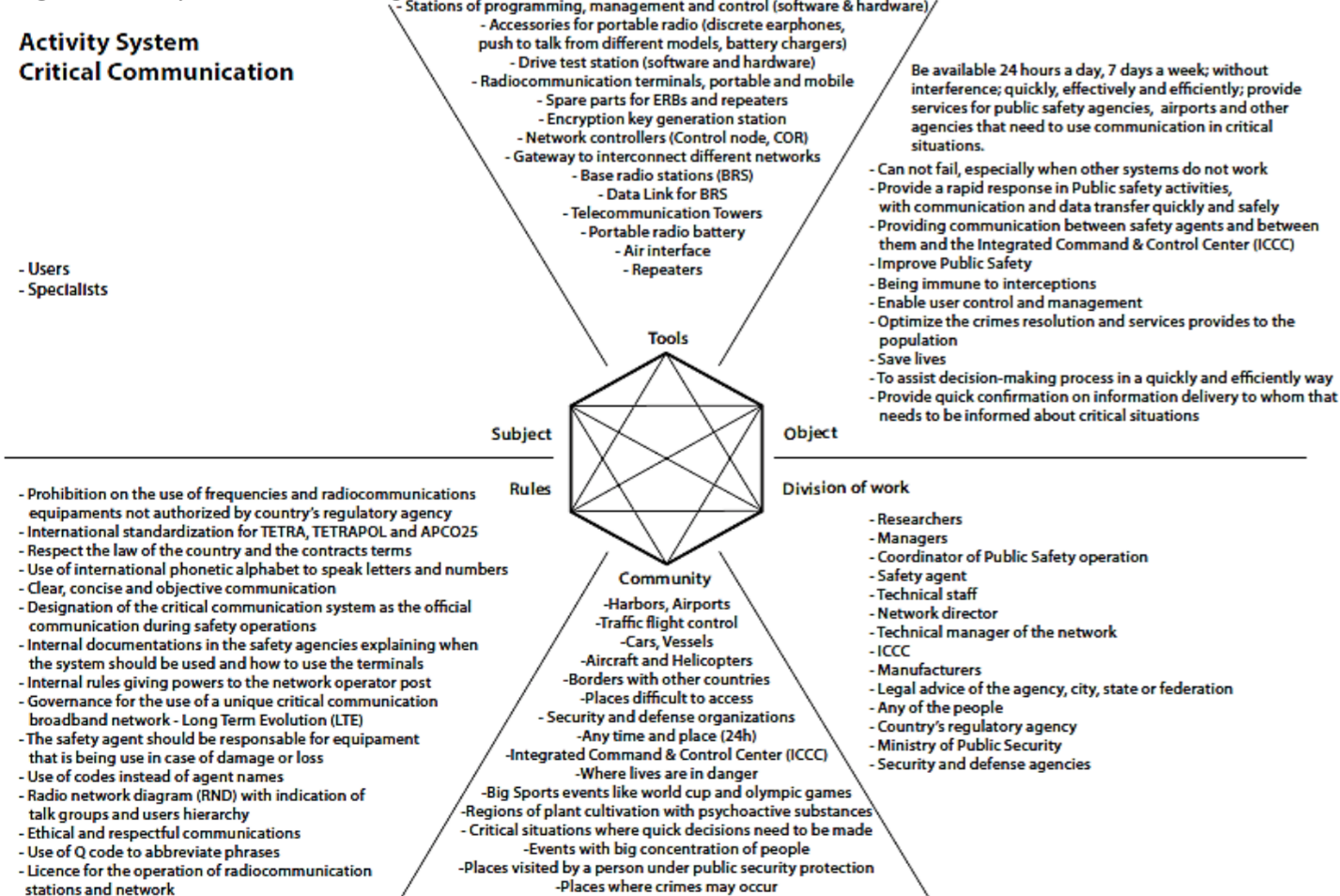


Figure 3: Step 3 – CESM System

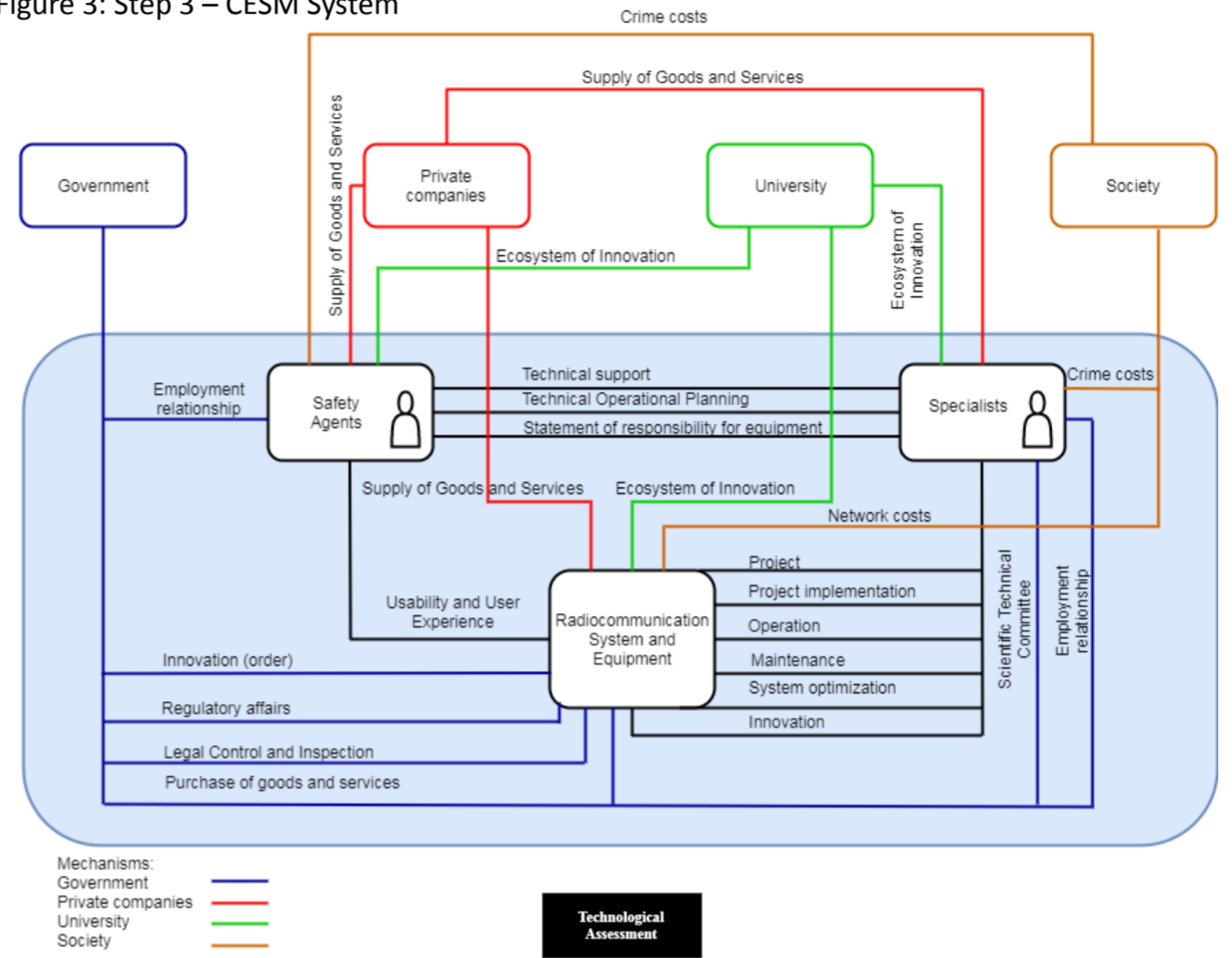


Figure 4: Step 4

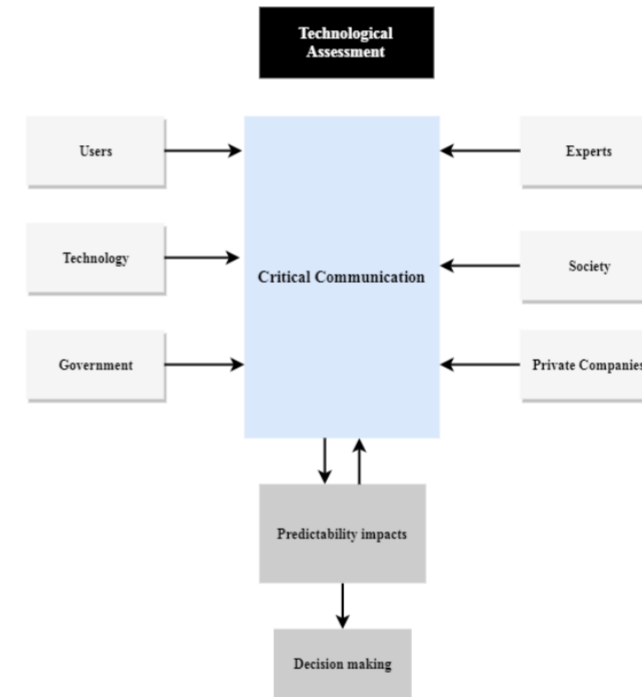
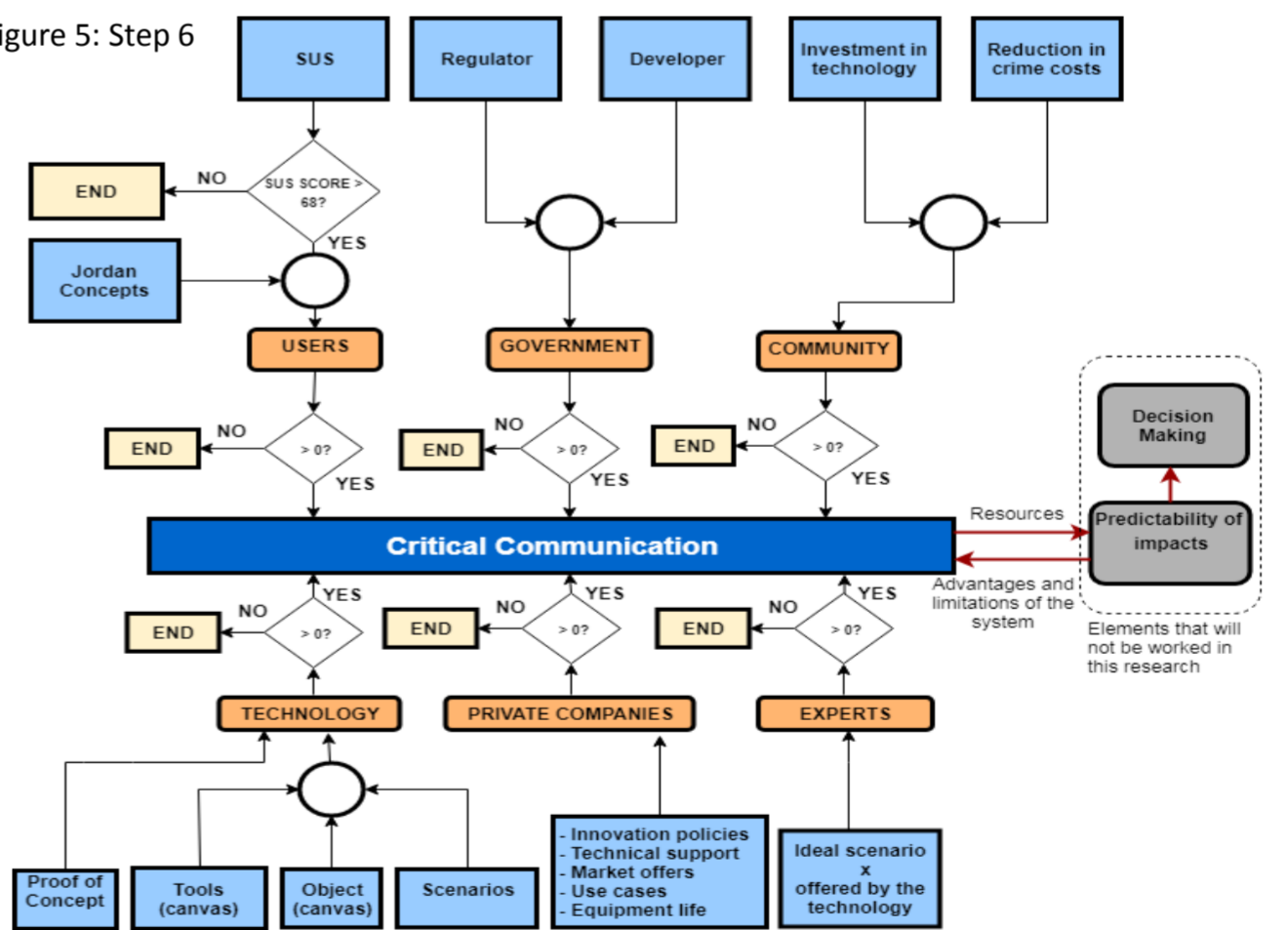


Figure 5: Step 6



REFERENCES

BUNGE, M., 2000. Systemism: the alternative to individualism and holism. *Journal of Socio-Economics*, v.29, n.2, p.147-157.
 JORDAN, P. W., 1998. *An Introduction to Usability*. London: Taylor & Francis.
 MELLO, A. C. B. de; NEVES, A. M. M. das, 2018. Eliciting Requirements for Digital Systems Using Activity and Task Analysis. In: (IADIS), I. A. for Development of the I. S. (Ed.). *MCCSIS*. Madrid: IADIS Press, p.329-333.
 MWANZA, D., 2001. Where Theory meets Practice: A Case for an Activity Theory based Methodology to guide Computer System Design. In: HIROSE, M. (Ed.). *Proceedings of INTERACT'2001*. Oxford: IOS Press