Technical Report - Investigating Challenges and Success Factors in Deploying Government Information Systems in the Domain of Smart Cities

1. Protocol of systematic mapping study

The research question expresses the objectives of a systematic mapping study (SMS). It tends to be more generic to gather the publications into subareas or subtopics (Kitchenham et al., 2011). The question formulated for this SMS considered the structure defined in Kitchenham and Charters (2007), PICOC (*Population, Intervention, Comparison, Outcomes, Context*). Because it is an SMS that aims to characterize a phenomenon, the comparison criterion needed to be considered; only the criteria of population, intervention, results, and context were used (Table 1).

Table 1: PICOC criteria.

Population	Smart cities
Intervention	Information systems
Comparison	Not applicable
Outcomes	Systems Information Implementation from Smart Cities
Context	Governmental

From the framework presented earlier, this SMS main research question (QP) was defined as: **"How has the government deployed information systems in the domain of smart cities."** The objective of this study was formalized based on the GQM method, proposed by Basili and Rombach [Basili & Rombach, 1988] and defined as follows: **analyze** SC **with the purpose of** identifying IS, challenges and success factors **with respect to** its implementation **from the point of view of** researchers **in the context of** governmental. Kitchenham and Charters (2007) propose the following phases for secondary studies: planning, conduction, and results.

The research strategy involved searches in 6 digital libraries: ACM Digital Library, Engineering Village, IEEE Xplore, ScienceDirect, Scopus, and Web of Science. The search terms have been gathered into a search *string* presented below.

("smart cities" OR "smart city") AND ("information system" OR "information systems") AND ("government" OR "public administration")

To assess the quality and comprehensiveness of the *search string*, two control studies were defined: Kontokosta & Hong (2021) and Saptadi et al. (2020). After performing the search *string* in the digital libraries, it was verified that the control studies were present among the

returned studies. It is important to note that no search filter was inserted in the databases about the period restriction and/or the area or subarea of interest.

According to Kitchenham and Charters (2007), for the selection of studies returned in the research, inclusion criteria (CIN) and exclusion criteria (CEX) should be defined and applied in the born studies; these criteria are presented in Tables 1 and 2, respectively.

Table 1: Inclusion Criteria.

Id.	Inclusion Criteria.
CIN	The study presents governmental IS for IC.
CIN	The study cites or evaluates the implementation of governmental IS in the IC domain.

Table 2: Exclusion Criteria.

Id.	Exclusion Criteria
CEX1	The study needs to meet at least one inclusion criterion.
CEX2	The study has similar results. In this case, only the most complete study was considered.
CEX3	The study is not available for download openly or through the researchers' institutional IP.
CEX4	The study is framed as a thesis, preface, book, abstract, poster, lecture, keynotes, tutorials, or demonstration.
CEX5	The study needs to be written in English.

The study selection process was systematized following six steps: (i) search execution; (ii) removal of duplicates; (iii) reading titles, abstracts, and keywords; (iv) reading the introduction and conclusion; (v) complete reading of the studies; and (vi) data extraction and synthesis of results.

Three researchers performed the selection of studies. 2 researchers initially evaluated each study, and, in case of divergence, the third researcher evaluated the survey to define whether the article would be included or excluded. The fourth researcher (more experienced in the

execution of secondary studies) reviewed the results of the selection of studies and the other stages of the MSL. For each included study, the details that allow answering the research question were observed. Initially, the data that make it possible to identify governmental IS in the context of IC were analyzed. From then on, the sub-questions of this research were answered, and the extraction process was systematically carried out through electronic spreadsheets to record the information.

Table 3: Application of Strings in Search Sources

Search Source	String	Publications Returned
ACM Digital Library	[[Abstract: "smart city"] OR [Abstract: "smart cities"]] AND [[Abstract: "information system"] OR [Abstract: "information systems"]] AND [[Abstract: "government"] OR [Abstract: "public administration"]]	4
Engineering Village	((("smart city" OR "smart cities") AND ("information system" OR "information systems") AND ("government" OR "public administration")) WN KY)	129
IEEE Xplore	("smart city" OR "smart cities") AND ("information system" OR "information systems") AND ("government" OR "public administration")	98
ScienceDirect	("smart city" OR "smart cities") AND ("information system" OR "information systems") AND ("government" OR "public administration")	12
Scopus	TITLE-ABS-KEY (("smart city" OR "smart cities") AND ("information system" OR "information systems") AND ("government" OR "public administration"))	169
Web of Science.	("smart city" OR "smart cities") AND ("information system" OR "information systems") AND ("government" OR "public administration")	45
TOTAL		**457**

References

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