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Investigation and comparison of building permit processes in different sized municipalities at national level: the Italian case

Kavita Raj[a*], Judith Fauth [b], Silvia Mastrolembo Ventura[a], Sara Comai[a] and Angelo Luigi Camillo Ciribini [a]

[a] *Dept. of Civil, Architectural, Environmental Engineering and Mathematics, University of Brescia, Brescia, Italy*
[b] *TU Wien, Research Unit Digital Building Process, Karlsplatz 13/E235-03, 1040 Vienna, Austria*
*Correspondence: kavita.raj@unibs.it

The importance of digitalizing building permits internationally plays a key role in breaking down the barriers that characterize its time-consuming and human error-prone process as being based on manual controls. The standardization and digitalization of building permit procedures brings several benefits that can positively impact both the competent authorities and applicants. Benefits include achieving greater efficiency through automation of control processes that can further speed up approval times. These aspects are complemented by the achievement of a more transparent and accessible process that ensures the correct application of regulations, thereby reducing the risk of human errors. Additionally, there is an improvement in the quality of decisions and a reduction in errors in planning, design, and construction, which also benefits the context of environmental sustainability.
The European Network of Digital Building Permit (EUnet4DBP) has identified three pillars covering three issues that need to be addressed for building permit: (1) the analysis of the process, (2) building permit regulations and relevant requirements, and (3) technologies to run the process digitally. Regarding these objectives, there arises the necessity to understand the processes as carried out by public authorities in order to develop a solution that is scalable and adaptable on an international scale. This is crucial to avoid the implementation of a solution that, by not taking into account the needs of end-users, may prove ineffective once applied [1]. It is critical to address current problems, to evaluate and compare each scenario to study a better process, and with the awareness that tailored solutions are needed to overcome known obstacles [2].
Several studies can be identified in the literature on the analysis of the building permit process and the comparison of different processes at the international level. Pedro [3], in their study, analyse and compare the construction permit processes in 27 European nations, providing an overview that, at a general level, reveals many similarities but, in detail, highlights various specificities. In Rückert's report (2011) [4], processes in Germany, Denmark, Poland, and Lithuania were also compared, identifying similarities and divergences with the aim of supporting standardization and transparency. Similarly, the study conducted by Refvik [5] compared and analysed processes in selected nations across Europe, America, Asia, and Australia, identifying significant differences in the of the construction sector, considering national procedures for permit issuance. An in-depth investigation is exemplified by the comparative analysis of the procedural methodologies employed in Croatia and Slovenia [6]. This examination unveiled shared procedural patterns, thereby presenting certain prospective implementations that remain subject to further consideration. The conclusions highlight the potential of implementing each process with the best practices analysed, leading to benefits especially for the legal aspects, stages and stakeholders involved. Noardo [7] elaborate a comparison and harmonization of processes in the United Kingdom, the Netherlands, Sweden, and Slovenia based on an investigation of current processes. The harmonized workflow is high-level but is outlined to provide a foundation for the implementation of Building Information Modelling (BIM) and

Geographic Information System (GIS), known as GeoBIM. Fauth and Soibelman [8], considering the United States and Germany, have outlined a scalable framework, starting from a systematic mapping of as-is processes, aimed at international standardization. Within the context of the EU-funded CHEK© project [9], a study was carried out to compare and harmonize the processes of four European municipalities - of different scales - in Italy, Portugal and the Czech Republic [10]. The as-is processes were investigated, mapped and harmonized into a final workflow that is the input for the adoption within it of BIM and GIS. Regarding the building permit process in Italy, Fauth [11] investigated the case of South Tyrol. This study highlights what information and digital needs, on the organizational level, by presenting the knowledge acquired through the comparison with other processes for building permits.

These studies assess differences among various national models, aiming to identify best practices and areas for improvement to pursue the goals of efficiency and transparency in processes. However, such solutions risk not adapting to the procedural diversity that characterizes some countries resulting from different realities such as the size or number of inhabitants of municipalities. In the context of such diversity on a national territory, different ways and timescales might be identified so that any solutions harmonized on an international scale may risk not being functional for the most local realities.
The analysis of the process at the national level, in order to compare it with the equivalent result in other countries, runs the risk of not delving into the specificity of the national context itself. The mapping of the national process, which is generally valid because it is based on normative references or interviews with individual realities, risks missing typical nuances of how the same process is applied in different forms, for example in small, medium and large realities. This is even more evident in countries like Italy, where seventy percent of the municipalities have less than 5,000 inhabitants.
Within the EUnet4DBP research context, for the Italian case, three municipalities were selected based on population size to identify a compared process that considers possible diversity and best-practices. Have been selected a large-sized (more than 500,000 inhabitants) a medium-sized (between 500,000 and 50,000), and a small-sized municipality (less than 50,000 inhabitants). The methodology used for data collection and analysis involves the use of a semi-structured interview guideline from the research of Fauth [12]. The guide helps the interviewer touch on all the key points of the building permit process. In addition, using the same interview structure makes it possible to collect data in a systematic and comparable way. The methodology required to involve people working within the municipalities for managing the building permit process (table 1). The interviews were recorded and transcribed to be analysed. The transcript allowed for qualitative content analysis to be conducted on the text following a coding scheme that mainly reflects the structure of the interview guideline. The qualitative analysis of the text made it possible to identify some common patterns within the processes investigated for each municipality for subsequent rendering in visual form. The Business Process Model and Notation (BPMN) standard was used for process mapping, which allows the responsibilities and roles of the stakeholders involved to be related as well as providing a chronological dimension of the flow.

Municipalities' size	N° of municipality's workers involved in each interview	Length of audio recording (min)
Small	1	40
Medium	2	90
Large	1	90

Tab. 5: Number of interviewees and length of audio recording.

The application of the methodology to the Italian case, using a guide for conducting interviews in data collection and implementing a coding scheme for mapping, allowed for a comparison of processes on a national scale. Indeed, based on the coding scheme, common phases were identified: (1) submission, (2) assignment, (3) administrative check, (4) content check, (5) participation of external/internal parties, (6) Issuance of the permit. A final map (figure 1,2) was generated through the comparative analysis of processes in each municipality. These steps are identifiable in all three processes, and this aspect derived from the national regulations framework. The applied method is suitable for comparing processes across municipalities of different scales, revealing common patterns but also highlighting specific organizational and task division distinctions instructed by local needs.

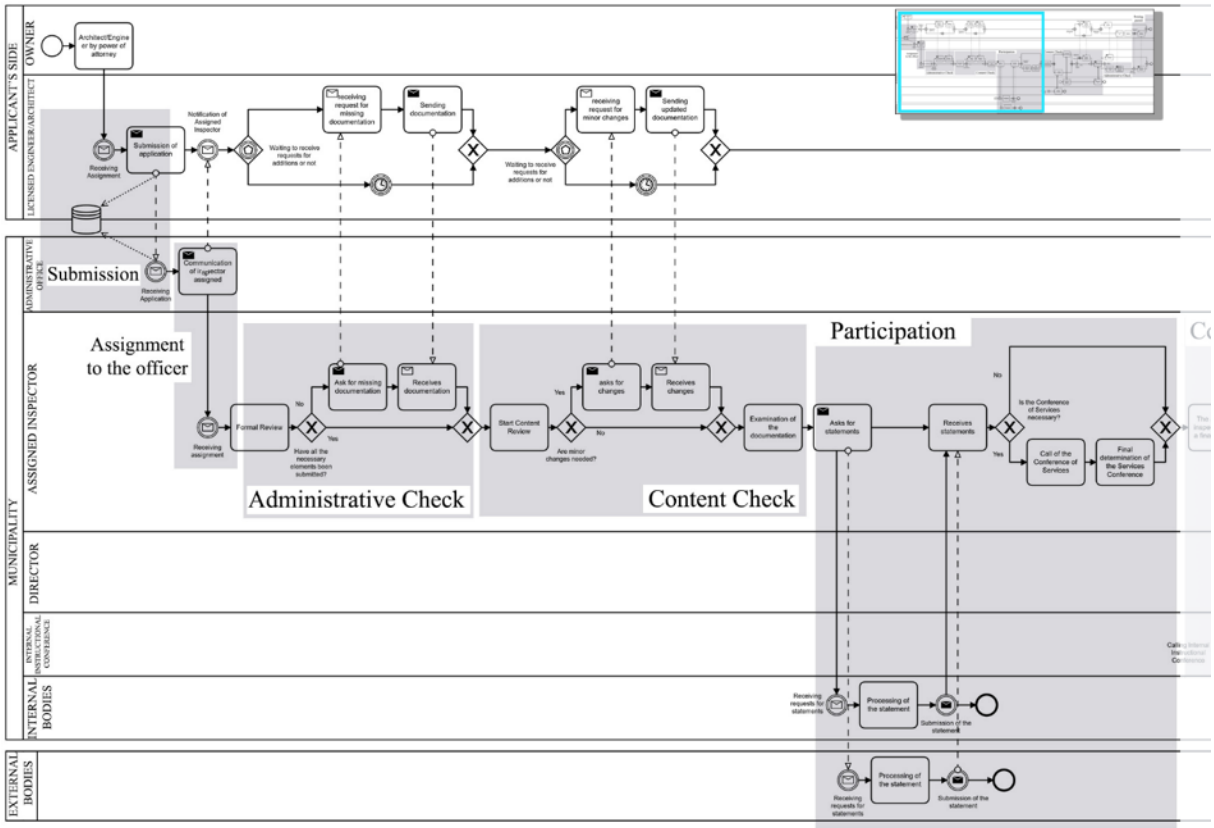

Fig.1: Italy's compared building permit process map (BPMN 2.0 standard representation) (PART 1).

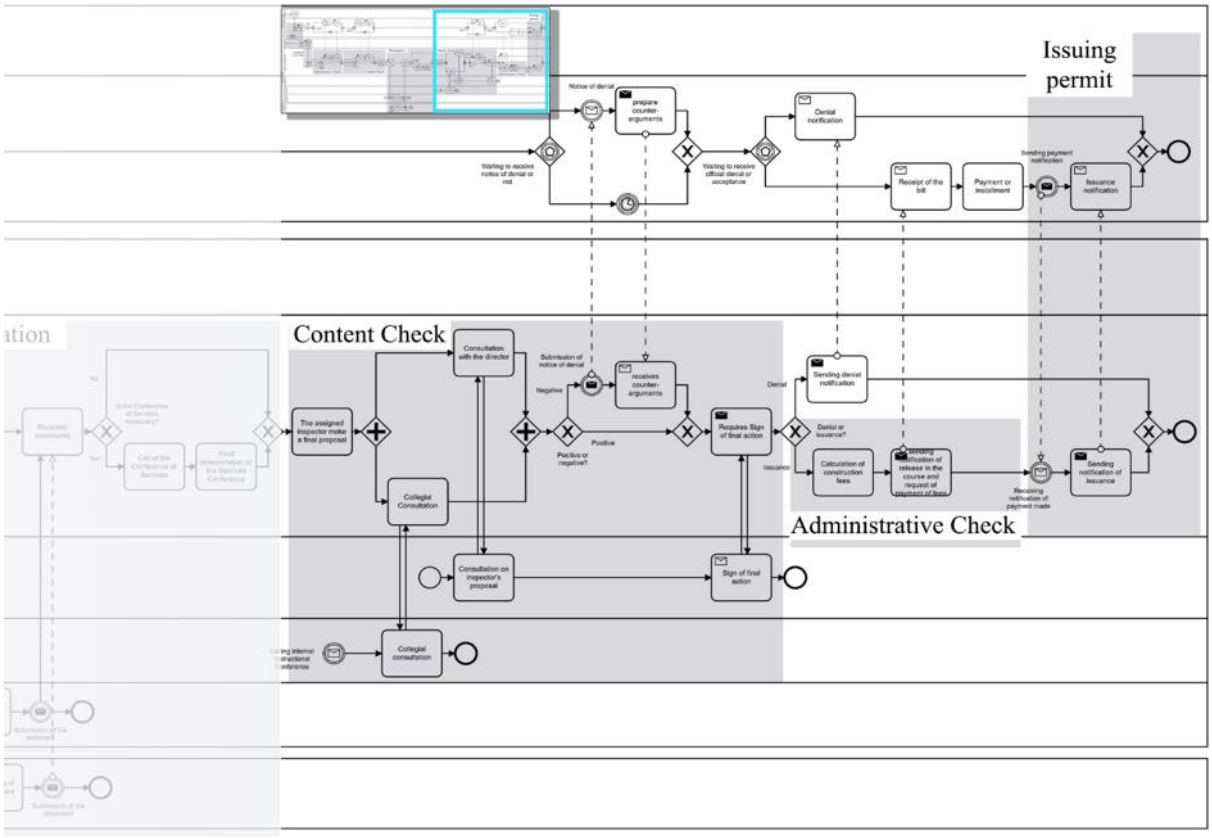

Fig. 2: Italy's compared building permit process map (BPMN 2.0 standard representation) (PART 2).

The analysis and comparison of processes according to the number of inhabitants of municipalities brings to light aspects that cannot be omitted in order to ensure that international solutions do not lead to adoption barriers. In fact, although many aspects are largely driven by the national regulatory framework, -and are well identifiable in each process- the organizational and procedural set-up for issuing building permits can differ significantly at the national level depending on the size of municipalities. Aspects such as staff size should not be overlooked, which lead to upskilling needs and training programs. In detail, in small municipalities the same officers may be involved in different stages of the process while in large municipalities there may be a specialized staff with distinct roles for processing the applications. Other factors to consider and compare are technology and automation aspects, which in small municipalities may be limited compared to larger municipalities that are equipped with advanced information systems and automation to expedite the bureaucracy.

The method applied to Italian municipalities makes it possible to bring to light the characteristics that result from their size and organizational assets, which allow a comparison to be made at the national level before making a comparison and standardization of processes at the international level. The obtained results, also, can be refined by increasing the number of interviews, allowing for the development of three comparative processes for each level of dimension before developing a single comparative process. Although the approach employed does not solely rely on data quantity, considering in the future a larger number of data derived from a larger number of interviews, may impact the analysis process and the obtained results, leading to a more detailed understanding of the studied phenomenon and enhancing the validity of the conclusions.

The approach applied, supports the definition of solutions that are adapted to local realities ensuring a higher compliance of the result. While this study represents a first systematic

approach to comparing building permit processes, it is important for future developments to investigate them further, based on the goals that want to be pursued with digitalization and the introduction of new technologies for their automation. In addition, it is crucial to investigate the sub-processes in more detail by identifying which steps are the most critical in order to align any divergence more effectively.

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