

A Smart Urbanism Management Platform: Case of Amenagement Regulations

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ABSTRACT

We all aspire to urbanism that recognizes the social, economic, political, cultural, and physical-spatial dimensions of cities: urbanism, which, based on working tools (SDAU, planning regulations, etc.), based on a quality model, will allow good practice and good translation of these systems on the territory (neighborhood, city, rural environment, etc.). Due to that, the authors propose and develop an automated urban planning amenagement platform for the generation of updates proposed by urban planning experts in order to improve the quality of amenagement regulations.

KEYWORDS

COVID-19, Dematerialization, MDA, Regulation, Urban Management, Urban Management Plan, Urban Platform, Urbanism

INTRODUCTION

Morocco has experienced a remarkable departure towards the dematerialization of instructions commissions for construction projects, housing estates, etc. And since the whole world has been living under the shock of the COVID 19 Pandemic, which has made the process of dematerialization absolute evidence. The authors opted to follow and go in the same aforementioned perspectives, to give proposals for a Generic Model of the amenagement plan and its regulations, which will improve the context of the amanagement of the city (Carine Henriot et al.,2018) (Konstantinos Chatzis et al.,2018) and the rational realization of projects, by obviously based on a set of criteria previously detected and well studied. Thus, our goal is to provide decision-makers with a configurable system giving rise to several scenarios for implementing the amenagement plan and its regulations (AUST et al.,2015) In the only hope of making the regulation of the development plan flexible, adapted to the current circumstances and also to catch up as for the possible errors which can be made during the development of the regulations of the development plans, which have been approved, thus generating a deadlock at the project and economic levels.

To achieve this, the authors closely examined the planning regulations of certain municipalities in order to identify a set of criteria, which directly and irrevocably influence the application of these regulations, whether on projects or on the planning of the city (Table 1).

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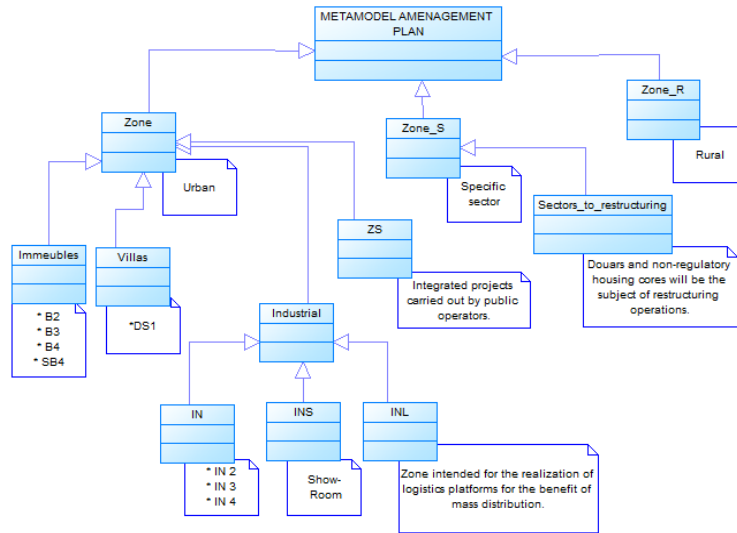
Table 1. Synthetic study of some articles of regulations of a multitude of development plans in Morocco

	Municipality of Ain Attig (AUSF, 2015)	Municipality of Harhoura (AUST, 2015)	Municipality of Fez and Ain Beida (AUSF, 2015)	Municipality of Séfrou (AUSF, 2015)
Plantations (Green area)	Sectors B2, B3 and B4: 5% of the area of the net subdivision reserved for green spaces and car parks which must not result from falling space. They must be grouped and usable. Sector SB4: 10% of net lot area.	5% of the net lot area.	10% of the area of the net subdivision.	Sector B4: 10% of the area of the net subdivision. Sector B3: 9% of the area of the net subdivision.
Proximity equipment	- Sectors B2, B3 and B4: 5% of reserved net lot area proximity equipment. - SB4 sector: 10% of the reserved net lot area proximity equipment.	In the case of a subdivision 5% of the net lot area reserved for one or more local facilities. In the case of construction 5% of the floor area with one or more equipment proximity to be carried out by the contracting authority.	-	-
Vocation of the commune	Nul	Nul	Nul	Nul
Implementation of social housing projects	+++	+	++	(under research)
Density evolution Population	+++	+	+	+
Margin of errors in planning regulations	20%	15%	3%	2%

DISCUSSION

The authors note through the reading of several regulations of amenagement plans that the divergence and the difference are present, while the user is the same, the human being (promoter, architect, petitioner, etc.). To this end, each by-law proposes a different nomenclature for the same zoning. The authors have also note that the percentage of local facilities and green space is calculated differently for each planning regulation for municipalities, despite the fact that the zoning is the same. It should also be mentioned that the regulations of the development plans never specify the vocation of the municipality concerned. Likewise, for the indicator of the implementation of social housing projects at 250,000DHS, which is never evaluated to quantify the density and balance between the population and facilities. Without forgetting the indicator of the margin of error in the regulations of the development plans, which can alter the understanding and thus the execution of the projects on the land. To say that the development plans and their regulations do not completely satisfy the users

Figure 1. PSM model of zone and sector development plan



of the space, nor the project manager, nor even the project manager who is in certain cases harmed by the aménagement regulations.

URBANISM AND AMENAGEMENT PLAN

Urban planning is a complex discipline, which calls on a wide variety of sciences and a multidisciplinary team (architects, engineers, economists, geographers, sociologists, etc.). This discipline has not stopped evolving over time, to say that its development has been accelerated by the appearance of several factors such as new construction materials, modes of transport, population growth, economic development and technological and geopolitical change, etc. As for the development plan, it is the regulatory urban planning document, which defines the right to use the land inside the territories to which it applies, it is the instrument, which transforms the orientations of the master plan. urban planning, where it exists, in legal prescriptions enforceable against the administration and third parties.

Meta Model For Each Plan Article And Aménagement Regulation

Based on (AUSF, 2015), the authors have established several sub-models associated with each component of a Development Plan - case of the municipality of Ain Attig:

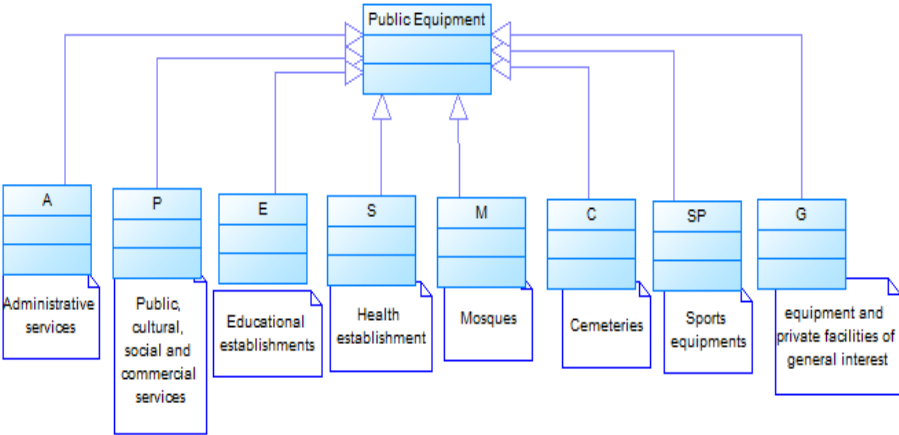
Zone and Sector of an Aménagement Plan and its Regulations

Meta Model for Zone and Sector of an Aménagement Plan

Figure 1 illustrates the layout plan model and its zones, the model corresponds to a class diagram (L. G. Olivier, 2014) (T. Pierre, 2016), in which each fundamental concept is represented by a class and each existing relationship between the concepts contains three main meta classes Urban zone, rural area and Specific area.

a.

Figure 2. PSM model of public facilities amenagement plan



Zone and Sector Regulations

Each zone of an amenagement plan is governed by its own regulations, which is composed of several articles to be observed to the letter.

Public Equipment of an Amenagement Plan and its Regulations

Meta Model for Public Equipment of an Amenagement Plan

Figure 2 illustrates the specific model of an amenagement plan - public facilities - which are located and frozen on the amenagement plan when it is drawn up. The model includes a single meta class, called category, which itself contains 8 sub meta class.

Figure 3. PSM model of public facilities planning regulations

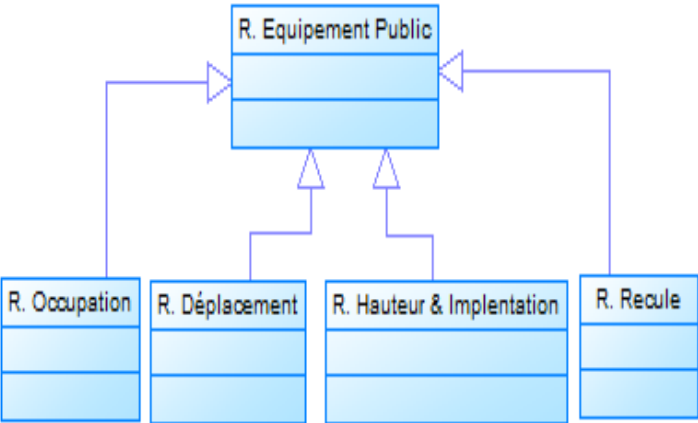


Figure 4. Meta model of generic amenagement plan

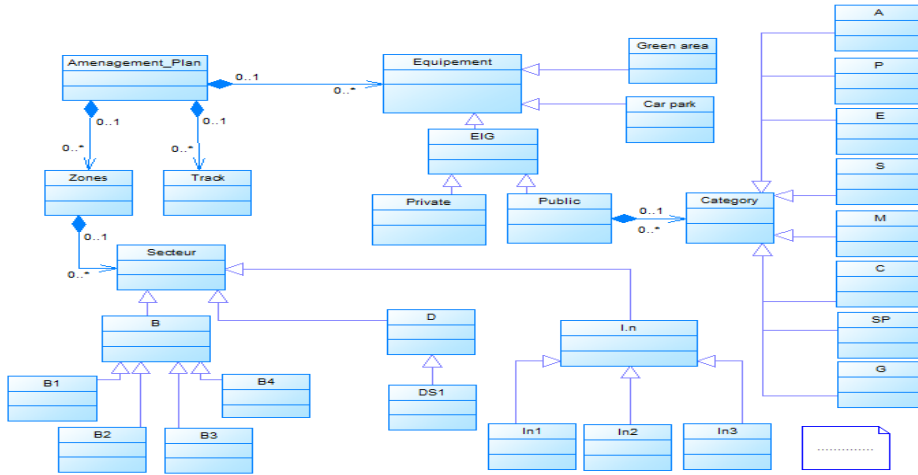


Figure 5. Meta model of general design regulations

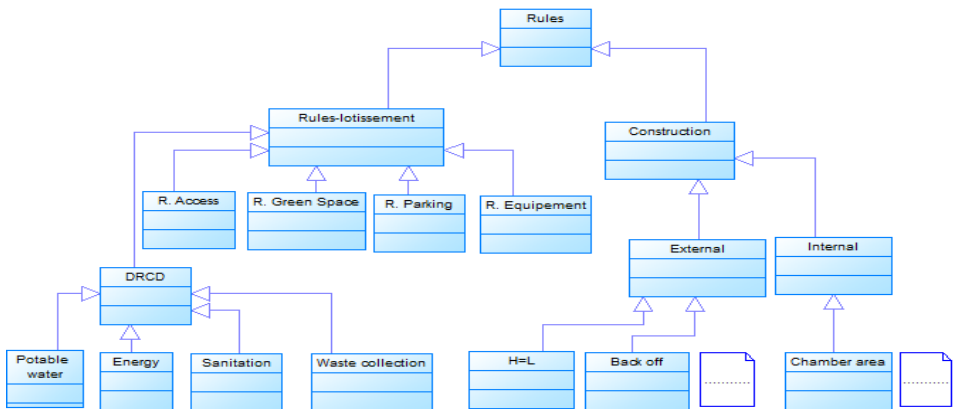


Figure 6. Operating process for developing improvements to planning rules

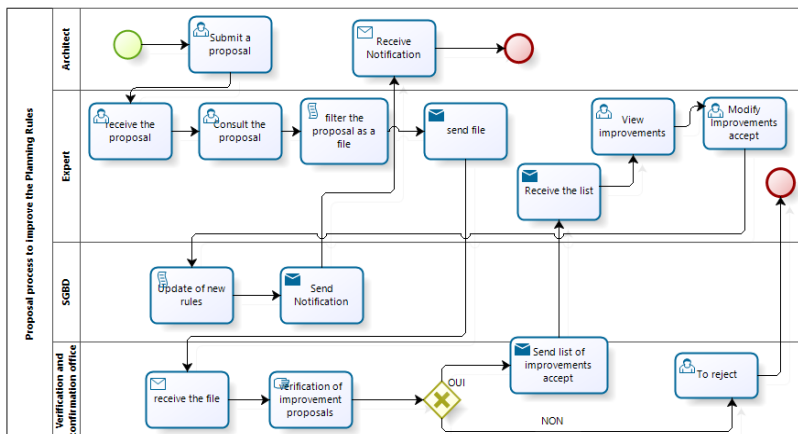


Table 2. Proposal to improve three planning rules

Articles	Statements	Issues	Solutions
Article 8-B: Parking of vehicles	For sector B2: * One parking space per subdivision lot;	Creation of large area for parking, without any percentage logic. Promoter: injure by this insane and not studied article. Manager: intimidate by not applying this article without any regulatory support for the justification of the diversion of the article to (one place for 5 lots)	Set the number of parking spaces as part of a reasonable and logical study (either in the private plot or as part of the subdivision).
Article10-B: Architectural easements	In zone B, the building strips may in no case exceed a length of 60m. These lines of 60 m must be separated by pedestrian paths of 6m minimum or carriageways of 12m of minimum footprint.	First: The strip of 60m linear is not as long on reality to judge on the monotony and the length of the block to be built, whether in the context of the subdivision or in the context of the construction of a group of dwelling. Second: the separation of blocks or lots with 6m passages, regardless of the depth of the passage, where openings are prohibited, creates a kind of corridor with no urban value and sometimes even creates social insecurity and depositories of waste.	Remember to review the length of the built front upward and no longer reproduce the partitions with 6m passages, but with carriageways or pedestrian subdivision routes with a regulatory footprint depending on the zoning.

Rules Public Equipment of Amenagement Regulation Plan

- **R1 / Rule - Assignment-:** their occupations are prohibited for any other destination (Ex, Subdivision ...).
- **R2 / Rule - Height:** may not be applied if the planning authority has previously reserved its opinion.
- **R3 / Rule - Displacement:** the displacement of the plots is authorized inside the blocks on the condition of preserving their areas, their numbers and respecting their initial assignments and not prejudicing their accessibility.
- **R4 / Rule - Reverse:** all constructions bordering on public facilities must observe a 6m drop (Figures 3-4).

Meta-Model Of Generic amenagement plan

By grouping together, the different sub-models, the authors have developed a generic model of amenagement plan (AUSF,2015) (AUST,2015) (L. G. Olivier, 2014).

Meta-Model Of Generic Amenagement Regulations

By grouping these different sub-models, the authors have developed a generic layout plan model (Figure 5).

Process For Generating And Correcting Amenagement Plan Regulations According To A Context

The business process is specifically developed to coordinate the sequences of actions and messages that exist between the various business players in the company.

Figure 6 explains the process for generating a planning regulation, for which an Architect user triggers the process by sending the new proposal for the article to another Expert user. the latter would perform a filtering of the list of proposals by rule, in order to extract an XML file, which will be sent to a verification officer, to filter the proposals and decide either on their approval and approval or on their rejection.

Case Study: Proposed Scenario For Improving Regulations / Amenagement Articles

Table 2 presents two cases of articles of the regulations of zone B of the amenagement regulations of the municipality of Ain Attig with a description of their problems, while giving our proposal for improvement to resolve them.

Result

Conscious of the dismal quality of town planning in Morocco and of the severe shortcomings that the authors encounter every day because of the procedures practiced for decades. The creation and development of this automated platform is dedicated to the generation of updates to articles of the regulations of development plans, in order to improve the quality of town planning, remedy the multiple obstacles and deficits experienced by architects and developers, in addition to limiting the time for change and updating of planning regulations, which remain over the years.

The platform welcomes us with an entry page containing three parts. A first displaying the total number of users of the platform with the number of people connected by displaying their information according to their profession, the second part is a “TO-DO List” or a task list each user of which has his own and can once add, modify or delete a task as needed, the third part represents a Calendar. As for the menu, it represents a list of links to several pages of the platform facilitating navigation between them and it is present on all the pages of the site varying from one user to another according to his type of profession (Administrator/Architect/Expert).

- Same operation as the components page (Title/Description/Assignment/Article) (Figure 7).
- A form with the necessary fields to fill in to Add or Modify a regulation (Figure 8).

Figure 7. Amenagement rules list interface

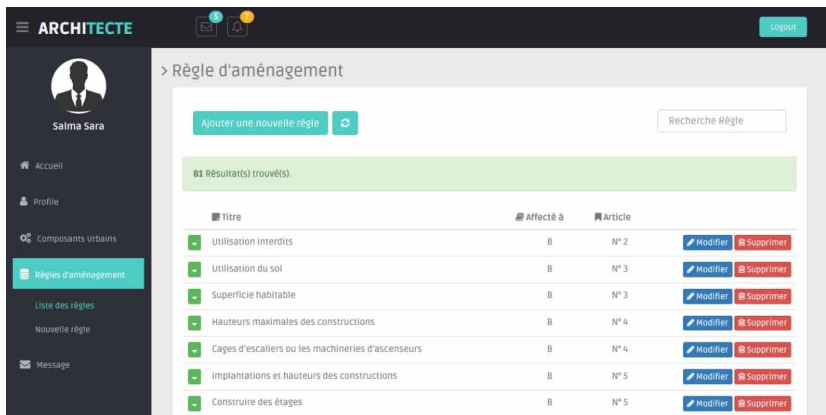
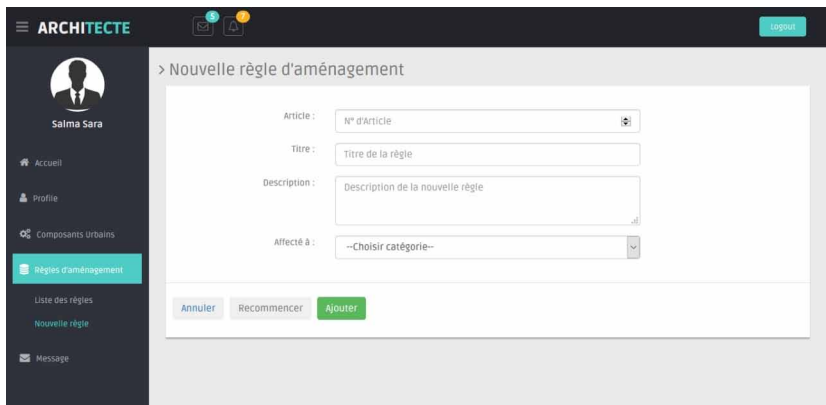
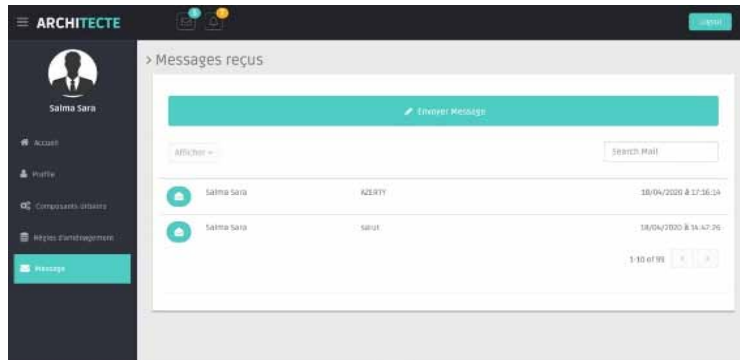


Figure 8. The proposal interface for adding a planning rule / article



- It is a mailbox allowing the exchange of professional messages between the users of the platform. Thus, the list contains the bare minimum of a message to be displayed, with a link to the form for sending messages and the filtration of messages (Improvement messages / Sent messages / All messages), the search system is also present on this page.
- It is the form allowing to send one or more messages at the same time (individual message using the email / message for a group using the profession) (Figure 9).

Figure 9. Interface for sending planning regulations scenario



Conclusion AND Perspectives

The dematerialization of the procedures of the realization of the development plans and more precisely their regulations, is our main objective to soften and be able to update and make up for any errors that may be made in the regulations, and also to review the time of validity of the plans. amenities, so that they support the development of each municipality according to its economic, social, demographic, political potential, etc.

In this article, the authors have proposed and described in detail the PSM model of various component models of existing planning and building regulations. Based on these PSM models, the authors have proposed two meta-models of high level of abstraction, which consists of a general hybrid model of land use plan and regulation, combining all the common concepts between the PSM models, which corresponds to a class diagram. In which each fundamental concept is represented by means of a class and each existing relation between the concepts. In terms of perspective, the authors plan to prepare a new scenario for the next job. This is the establishment of social housing - the case of the municipality of Ain Attig - in terms of density and in terms of support for local facilities.

REFERENCES

- AUSF. (2015). *Urban and backup agency of FES*. Planning regulations for the municipality of Séfrou.
- Aust. (2015). *Urban Agency*. Harhoura Municipality Development Plan Regulations.
- Aust. (2015). *Urban Agency*. Regulation of the Development Plan of the municipality of Ain Attig.
- Chatzis, Thébaud-Sorger, Wanecq, Passalacqua, Le Gallic, Lyon-Gaen, Morera, Chatzis, Picon, & Fernandez. (2018). Systèmes d'information et gestion de l'urbain (XVIIIe-XXIe siècles). *Flux*, 1-2(111-112).
- Henriot, Douay, Granier, Languillon-Aussel, & Leprêtre. (2018). Perspectives asiatiques sur les smart cities. *Flux*, 4(114).
- Olivier. (2014). *Introduction à l'approche ADM de l'OMG*. Academic Press.
- Pierre. (2016). *Extraire la Business Logic du code*. Academic Press.