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# Smart City and E-Governance in India. Mapping a New Urban Landscape

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## ABSTRACT

The creation of a new greenfield capital in Andhra Pradesh, Amaravati, is an opportunity for its Chief Minister to test new forms of e-governance through the mobilisation of ICT tools. According to Naidu, this project of “People’s Capital”, Praja Rajadhani in Telugu, will enable them to build a more inclusive city. To achieve its goals, he mobilises all the resources of the web to make the project more transparent and promises to rely on citizen participation. In this article we will evaluate by a structural analysis of the Internet networks built by this government, if these affirmations have a chance to be realised during the construction of the capital. The challenge is to move from a *top-down* approach, from government to citizens, set up by the e-government procedures of the 1990s, to a *bottom-up* approach, from the citizen to his government promised by the web 2.0.

## KEYWORDS

Smart city, E-governance, Web 2.0, Networks, India

## RÉSUMÉ

La création d’une nouvelle capitale *ex nihilo* en Andhra Pradesh, Amaravati, est l’occasion pour son Premier ministre de tester de nouvelles formes de gouvernance grâce à l’utilisation des TIC. Ce projet de « capitale du peuple », *Praja Rajadhani* en telugu, doit selon Naidu permettre de bâtir une ville plus inclusive. Pour parvenir à ses fins, il mobilise toutes les ressources du web pour rendre le projet plus transparent et promet de s’appuyer sur la participation des citoyens. Dans cet article nous évaluerons grâce à l’analyse structurale des réseaux internet construits par ce gouvernement, si ces affirmations ont une chance de se concrétiser lors de la construction de la capitale. L’enjeu étant de passer d’une approche par le haut, du gouvernement vers le citoyen, mise en place par des procédures d’e-gouvernement dans les années 90, à une approche par le bas, du citoyen vers son gouvernement promise par le web 2.0.

## MOTS CLÉS

Ville intelligente, e-gouvernance, web 2.0, réseaux, Inde

## INTRODUCTION

Since the creation of Telangana, the 29th Indian state, the residual State of Andhra Pradesh (AP), has had a decade to create a new capital. It is a new greenfield city, Amaravati, that N. Chandrababu Naidu, the State Chief Minister, has chosen to build. Based on the global model of the smart and sustainable city, Naidu wants to build an inclusive city which it named Praja Rajadhani, the “People’s Capital” in Telugu. To achieve this goal, he opted for a set of ICT tools to improve the transparency of the building process and ensure an efficient monitoring system. Taking into consideration Naidu’s past achievements in planning and urban governance through the example of Cyberabad, it seems legitimate to question the political mantra “People’s Capital” and the concept of smart city mobilised for the future capital of Amaravati. In this paper, we will

discuss the concept of “digital city” along its influence on the equity and inclusion definition of an Indian metropolis in progress. Our objective is to visualise this new e-governance machinery in order to understand if ICT tools deliver their promises of efficient and participative democracy.

### **1. SMART CITY AND E-GOVERNANCE: THE ANDHRA PRADESH CASE**

If we take the definition of Dameri and Cocchia (2013), “a smart city is a well-defined geographical area, in which high technologies such as ICT, logistic, energy production, and so on, cooperate to create benefits for citizens in terms of well-being, inclusion and participation, environmental quality, intelligent development; it is governed by a well-defined pool of subjects, able to state the rules and policy for the city government and development”. In a shorter way, we could say that a smart city improves spatial justice (inclusion and participation) through ICT. In their definition, they conceive the smart city with a *bottom-up* approach, from citizen to government. This participatory conception of the city is a direct consequence of the web 2.0 and a transition from e-government (paperless) to e-governance where citizens are engaged in the management of the city.

This is the road taken by the government of the new Andhra Pradesh. Chandrababu Naidu has embarked on a digital agenda to create the new capital, Amaravati. He tried to harness the web 2.0 with online engagement with citizens through multiple digital and social media platforms like Facebook ([facebook.com/prajarajadhani](https://facebook.com/prajarajadhani)), a twitter account (with hastags #manaamaravati, #manarajadhani) and a channel on Youtube ([youtube.com/prajarajadhani](https://youtube.com/prajarajadhani)). Of course, the questions are: are all these new online tools delivering their promises? Will Amaravati be a more inclusive city?

### **2. THE E-GOVERNANCE NETWORK OF AMARAVATI**

As Amaravati is for now a paper dream, to answer these research questions we will analyse the various digital initiatives set up by the Andhra Pradesh State in order to realise its goal of e-governance. To conduct this survey we analysed the network of web entities concern by the project of Amaravati and performed a structural study of this network to compare the respective influence of official websites and other web actors (Diminescu, 2012; Leclerc, 2013). Our objective is to understand the range of the e-governance policy of the AP government, to whom these websites are related?

#### **2.1. Mobilising a “curation-oriented crawler”: Hyphe**

Inspired by the methodology of digital humanities we decided to rely on the web as a field of study (Ackland, 2013; Rogers, 2013). The main method to analyse a network of online entities is to crawl the web in order to discover all the hyperlinks between these entities. For this purpose, we used Hyphe, a free web-tool<sup>1</sup> developed by the Sciences Po Paris Medialab (Jacomy *et al.*, 2016) which has been tailored for social scientists. Its developers define it as a “curation-oriented crawler” because “it uses the concept of ‘corpus’ as a pivot to articulate web-mining constraints with social science methodology”. In this case, we decided to explore all the web entities related to the construction of Amaravati starting from the official websites of the AP government.

We proceeded in three phases: firstly we built the corpus combining automatic crawl and a manual selection process of the websites; which resulted in a final corpus of 100 web entities and 222 links. Secondly, we spatialised this network of web entities in order to be able to

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1 [hyphe.medialab.sciences-po.fr](https://hyphe.medialab.sciences-po.fr)

interpret the graph. For this second phase, we used Gephi which is an open graph visualisation platform<sup>2</sup> that mobilises the Force-Atlas algorithm developed by Jacomy to draw our graph. Thirdly, we interpreted of the graph to understand whether the e-governance network built by the Andhra Pradesh government around Amaravati is open or closed. The main interest of Hyphe is that it is not a crawler dedicated to one kind of web entities (website, blog, or social networks, Facebook or Twitter) but it is open to the diversity of the web.

## 2.2. Lessons from the corpus building process

The construction of the corpus goes through a selection process which is already interesting. We have decided to keep only web entities directly related to the new capital Amaravati. Which explains why we eliminated many websites on Buddhism, including temples in various places of the world named Amaravati. They are not directly related to the new capital, but to the small city Amaravathi which was the capital of the Satavahanas from the 3rd century BC to 3rd AD, a small town 15 kms NW of the new capital. We also put aside the numerous websites concerning archeological museums or art galleries related to the remains of the stupa of Amaravathi that are nowadays stored in the British Museum. From all websites dedicated to architecture and architects, we only kept those involved in the project of Amaravati: Japanese architect Maki, and British architect Rodgers.

During the selection process, Hyphe enables you to make a first analysis by creating categories that describe web entities. At this stage, we defined three variables to characterise the corpus. First variable: the *type*, with two categories, website or social network (in other words the web 1.0 and the web 2.0). The second variable: the *producer* of the web entities, with 4 categories: government, private companies, associations or individuals. The third variable: the *geographic origin* of the web entities, with 4 categories: Andhra Pradesh, Maharashtra, India, World. The town of Amravati in Maharashtra was kept in the corpus as an element of comparison with the capital of Andhra Pradesh.

## 3. A TOP-DOWN APPROACH OF E-GOVERNANCE

### 3.1. Two generations of web-entities

As described in the previous section, the spatialisation of the network provides a graph (fig. 1) that we can analyse. The size of the nodes that represent web entities are proportional to the number of in-coming links, and also the label of the web entity: ig circles therefore represent web entities with maximum authority in the network, while other entities refer to them. The second element that we can analyse on this graph are the clusters of web entities that constitute aggregates (Ghitalla, 2004). They are built by the algorithm Force-Atlas because they have more interconnection within the cluster than with the rest of the network.

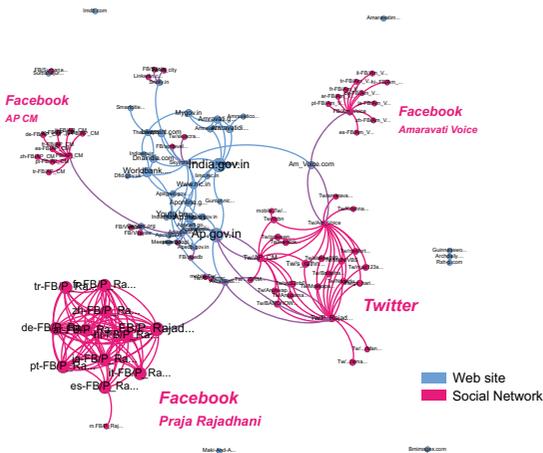
On this first representation we identified 5 clusters. The main cluster at the centre of the graph is made of websites (blue color) among which we can identify two authorities: the government of Andhra Pradesh (ap.gov.in) and the central government (india.gov.in). On the periphery, we find 4 clusters of social network entities. The bigger is created by the Facebook account of the capital Amaravati, Praja Rajadhani. There are also two smaller clusters of Facebook accounts one for N. Chandrababu Naidu (Facebook AP CM) on the left, and one for "Amaravati Voice" (a media dedicated to the capital and its development) on the right. The last cluster is made of

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2 [gephi.org](http://gephi.org)

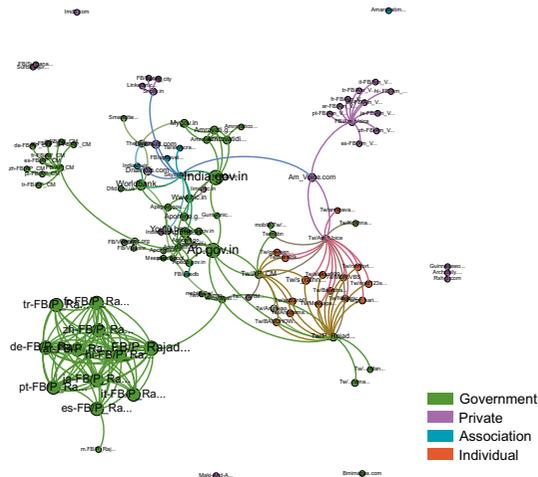
twitter accounts. Therefore each social network has its own cluster because they form groups of interlinked accounts. And there are also for Facebook separate clusters of account. Chief Minister's and "Amaravati Voice"'s look like hub because one parent account has out-going links with other accounts. All Facebook clusters show the main account with its variants in the different countries. Web 1.0 and web 2.0 are not so represented with, respectively, 29 and 70 entities, even though web 1.0 seems more diverse than social network clusters that aggregate the same kind of accounts.

Figure 1. Amaravati's network: types of web entities (built with Hype)



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Figure 2. Amaravati's network: producers of web entities (built with Hype)



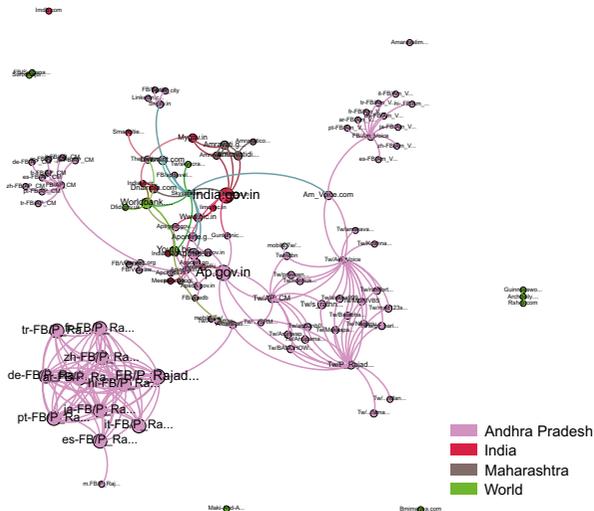
### 3.2. A State-sponsored network

The second representation (fig. 2) takes into account the *producer* of web entities. 50% entities are produced by government agencies both for the central cluster of the web 1.0. But these are also active on the web 2.0 with accounts on Facebook for the capital and for the Chief minister. The second main producers are private companies (24%), situated on the periphery together with the “Amaravati voice” cluster, and various isolated web entities websites of the architect, and of Surbana Jurong, a Singapore company that produced the Master plan of the capital). These private entities are not connected with the main network. The third kind of producers are individuals (16%), only present through twitter accounts, mainly a sample of people re-tweeting official news about the capital. Finally the fourth producers are associations (7%), who are either not very active on the web, or without links to official web entities (and were therefore not within our scope).

### 3.3. A local network

The third representation is based on the *geographic variable*, where from are the producers creating these web entities? Four places are located on this graph (fig. 3): Andhra Pradesh, Maharashtra, India and the world. This network is massively from Andhra Pradesh (81%) and especially thanks to social networks. This completes the previous analysis underlining the diversity of the web 1.0, and the homogeneity of social networks. For the geographic origin, the central cluster has two levels of government web entities, Andhra Pradesh et India. We also find 3 websites for the Maharastrian town of Amravati, isolated, on the right of the graph. But there is also the world scale, with links with the World bank or the British agency of development (DFID).

Figure 3. Amaravati's network: geographic origins (built with Hype)



Eric Leclerc / TVES : Univ-Lille

The analysis of this network demonstrates that it was initiated by the Andhra Pradesh government both on the web 1.0 through e-governance portal and on social networks with official accounts on Facebook and Twitter. But this network is not well connected with the web because private companies keep themselves outside, and the bulk of the links are with other public entities (Indian government or international institutions).

## CONCLUSION

Evaluating the inclusiveness of a policy is a rather difficult task, and even more when you consider a not-yet-realised project. The construction of Amaravati officially started on the 30th of September 2017; it will not be possible to verify the promises of the Chief Minister before at least a decade. This is why we decided to focus on the ICT tools used by this government to foster e-governance. Beyond the current statistics about the number of hits on a website or the number of followers for a social network, the structural analysis of the network of web-entities provide more insightful conclusions. In our case, we can conclude that the e-governance system of the new government of Andhra Pradesh is a small word in a sociological sense. The websites or accounts on social networks are few and they are heavily related with one another. It demonstrates that although the government e-governance strategy has been very active on the web, the reach is very poor. It used the web 2.0 but in a *top-down* approach and considers these tools as new ways to advertise its action, which basically remains very centralised. They might have a more participative e-governance process with some of the applications dedicated to the citizens, like "Mana Amaravati"<sup>3</sup>; it is too early to assess it, but it will be interesting to analyse the data collected.

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3 Android version : [play.google.com/store/apps/details?id=com.ajnanetworks.manaamaravati&hl=fr](https://play.google.com/store/apps/details?id=com.ajnanetworks.manaamaravati&hl=fr)