The Digital Innovation at Inter-communal Level: An Adaptive Process Associated with a Meta-method Dedicated to Hybrid Territories

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ABSTRACT— *The SITIV Syndicate is an inter-communal structure founded in 1972, and eight cities that make up, are to be questioned by changing uses in a more and more dematerialized Society. The environment of local communities, are constrained ways by specific ministerial instructions for transition to dematerialization of a number of operations which are transforming relations of local community with its stakeholders.*
The approach we present in this article is based on work, direct actions, reports, researches, thesis (PhD) done in the field of territorial intelligence in France, in Europe and in other parts of the world to a territorial, local, inter-municipal, regional and national. Some of them were based on intense use of ITs, others less but either way, we have, for all these years, developed a model, we call meta-model, we will use in the body of this article explaining how, within the Complex Approach, depending in large part on human behavior, we have to implement other ways to reach the goals to be reached because only computer method isn't able in that case.
Through past works and researches we have seen how the territorial intelligence process could, by mixing virtual territories with real ones, help local decision-makers to avoid, or reduce, the informational silos phenomenon on the way setting up hybrid territories.

Keywords— Citizens, Innovations, Inter-communality, Digital Projects, territorial Intelligence.

1. INTRODUCTION

Our article aims presenting how driving, with the help of an adaptive process associated with a meta-method dedicated to hybrid territories, on innovation in an inter-communal structure we called SITIV Syndicate dedicated to data processing and information technology (IT), in particular. The latter is a single-purpose French inter-communal syndicate (SITIV: specialized in IT) which consists of eight cities: Corbas, Grigny, Givors, Pierre-Bénite, Rive-de-Gier, Saint-Chamond, Vaulx-en-Velin and Vénissieux, an inter-municipal area of nearly 200,000 inhabitants and 6,000 territorial agents.

2. MISSION OF SITIV SYNDICATE AND ITS CRAFT

The information system (IS) managed by the SITIV syndicate, on behalf of its member cities, has always been on a steady evolution, and in parallel, local communities had to face contingent mutations from digital uses. These developments, created by new practices, impinge work habits of local organizations and their agents [2], [10]. The SITIV is thus firstly seeking to regularly incorporate the latest functional and technological innovations in order to provide new services to agents of its cities, citizens access to these digital resources and more widely to local stakeholders, and secondly, it is trying to work on acceptance of innovations by them. For this reason, the SITIV management is constantly looking for the creation of an enabling environment for current and future changes.

Evolutions in uses we notice are leading two major changes. On one hand, our observations show that they are unquestionably marked by advances in communication and information processing uses [13]. On the other hand, we take the issue of mobility management and data storage is a recurring debate because mobility is subject to plural definitions, at every major technological paradigm change.

Challenges of these new issues are related to important transformations of the uses we see emerging in the territories. Indeed, the activities and tasks of the SITIV cities evolve from one centered design of information systems, that is to say, coordinated by a central point, City Hall, now to more opened devices and in relation to the outside, so to get closer to citizens. Therefore, local communities face different structural challenges that are deemed crucial by leaders of the SITIV

cities. For this reason it is necessary for SITIV leaders they must examine the numerical and organizational arrangements to put up-to-coherent with existing and future vision of city leaders.

The digital era seems to take more and more space forced cities to initiate change in their interactions with their environment and local stakeholders. It is probably with the advent of a "territorial intelligence process" [3], [9], [11] the cities will be able to better respond to necessary changes, because of territoriality, that is to say, how is done appropriation of land resources, will find in reworked. Furthermore, we can refer to hybrid territory made of mixed territory, virtual and real ones [12], [13].

3. INTO THE CONTEXT AND EMPIRICAL FIELD OF DIGITAL INTER-COMMUNAL INNOVATION

Our empirical field is based on an inter-municipal structure we call the SITIV syndicate which acts synergistically with eight cities members that make up the syndicate. This structure is a specific structure embedded into the system of locals governments. Its steering comes under the complex approach because numerous and plural are interactions both at the policy level of the Policy Direction, and as management level as operational status.

SITIV's Syndicate Policy Direction consists of elected people organized in committee "SITIV Committee or COS" themselves typically part of the political leadership of one city. Due to pooling of resources, action done by the SITIV management is strongly interacting and linked with actions of cities management. Thus, an inter-community steering committee (COPIL) secures and explains the available options and resulting trajectories in order to reach and satisfy interests of the cities. The SITIV leadership is leading actions, decided by COPIL, in respect of decision rules and processes validated by COS, legitimate structure.

In order to convert decisions into business processes, and meantime also to maintain operational information systems, working groups were formed. Working groups were created on a business basis, technical basis, with creation of a new committee in 2009, called the "Strategic Directions for Community Action to imagine the digital age", shaped of top management cities (DGS in French) and SITIV syndicate. This committee is working on strategies to be implemented into information systems for the optimization of community action and identification of necessary changes accompaniments.

The organization of these meetings allows the SITIV acting as a promoter and a facilitator of cooperation and inter-municipal cooperation. So, SITIV's position seems to make it occupying a both position, all at once Mastery of Work Assistance (AMO in French) and project manager (MOE in French). Project management assistant is for cities according to the top cities management, because cities are solely responsible for their needs. While performing services for cities, the SITIV cannot be assimilated, analyzed as a service provider, but as a transverse structure, both technical and managerial. This last point seems representing specificity in the EPCI (public inter-municipal cooperation structure).

Beyond the immediate response, and necessary of course, to operational requirements and project management for its communities, mission and essential concern of SITIV is to achieve continuous alignment of information systems with the strategies of each community[5], [27] . It's about getting the strategic alignment of information systems [26]. This a priori requires, for SITIV Syndicate, to have a global view of cities information systems, interactions between all elements with update knowledge of the following topics: - what is the central and local infrastructure? - What are the central and local application solutions? ; - How is structuring and securing data? ; - What are the uses of tools and technologies?

3.1 The SITIV syndicate is to be viewed as competence centers through its inner organization

Under the leadership of Executive Committee of the SITIV syndicate, guidelines have been initiated to address needs of the cities. In 2009, The SITIV was then organized in three centers of competence (or skill centers): innovations, engineering and production. These competence centers can be associated with missions and concurrent engineering [24]; With the aim of meeting needs of the local authorities, members of the inter-municipal association SITIV [27]. We now will describe these competence centers.

- The innovation competence. This skill, resuming the work of Fimbel [26], produced a rather special process. Indeed, everyone knows the risk, especially in technological innovation disappointments and setbacks. Innovation must post, Fimbel (Op.Cit), be reflected as ensuring continuity between the technologies, techniques and emerging organizations, and uses (existing or future ones) in our cities. Therefore due to Fimbel [26] one has to ask the key questions: - What is the nature of innovation? ; - What are the stakeholders? ; - What types of positive results on local customs? ; - What kinds of impacts on the actual skills and on organizations? ; - What budget must we mobilize?

The question of stakeholders seems to be crucial for the transformation of an innovation process or technology making a positive step forward for the community [30]. The challenge for the SITIV leadership is to create a fertilizing environment so the cities can be in standby and in technology situation of decryption innovations in order to detect if their organization is able to accommodate it and offers potential for them. Therefore, a co-validation of innovations has to be organized in order to avoid purely, and simply, technological approaches that often produce disillusionment management and, generally speaking, means computing discredit [28], [33].

Innovation thrives on watching activity, and for this reason, the SITIV Syndicate is conducting for its public and for himself, intensive monitoring of its environment. The SITIV is also keeping in a position of watchfulness, and is looking for weak signals that may impact the territorial environment. Therefore, the monitoring (or watching) activity is important to SITIV for example regarding: - Changes in regulation; - Changes in practice; - Technological developments; - Changes in security flaws; ...This is for these reasons that SITIV Syndicate is planning, organizing or has to be present in seminars for functional and technological intelligence.

- The engineering skill. This skill lies with the design of Sciences [39] and activates the steering process. Regarding that skill cities management, members of SITIV, is waiting from the syndicate it can intervene at several levels by assisting the project owner (called AMO) to accompany the management in organizational and project management (OPM) at level of information system or technology. In the OPM field, the requested competence involves project management in order to install a new tool (or device) and technology activation. For SITIV Syndicate the proven contribution in this engineering competence seems different from a classic installation in case of simply delivery a tool. Indeed, SITIV Syndicate is operating throughout the project cycle: - by analyzing needs in partnership with the cities; - by choosing and buying the right tool; - By Installing it; - By managing change management support for users; - And by following evolution of uses and tool versions.

- The production skill. This skill should allow, on the one hand, keeping the computer systems operational, supervision, administration, assistance and, secondly, producing material or immaterial objects. In the production competence, which has to be probably seen day after day, by users is the ability from SITIV syndicate to provide safe information treatment, so operational data. A priori legitimacy of SITIV is based on this specific skill to lead previous ones. For example, if the wages of agents are not published on time, or if financial data is not transmitted to the cash department, so it seems unnecessary for the cities top management, to work on the development of the human resources information system or Finance ones.

These SITIV competence or skill centers appear to be consistent with the evolution, organizational and computing, requested by the cities. Indeed, the pervasiveness of digital within the cities department and into the population is showing the need that cities have in place new tools to initiate and accompany their changes, in particular with the expected optimization of the relationship management in connection with the citizens (RMC), and expected by citizens, in this new environment increasingly digital [35].

4. CHANGE IN MANAGEMENT OF RELATIONS WITH CITIZENS IN DIGITAL AGE

In the very first point SITIV's management questioned the issue of the purpose of this new plan. We here indicate the main questions related to this approach: To whom it is directed to you? To users? To clients (Cities?)? Towards Citizen? What are the stakeholders? What are the existed exchanges with the cities populations? etc.

During a meeting qualified of strategic directions SITIV's management has questioned the top cities management, about the target or targets to be reached. The latter then express what needs they perceive, and thus the perimeter of work is known, based on their knowledge of the empirical field. The top cities management gives some examples of the encountered situations (Table 1).

Table 1: Description of encountered situations throughout the cities and exposed by the top cities management.

Users	Co-partnership	Companies
One family enrolled one child in school.	An association made a grant application.	A company is seeking information from the town on aid for installation.
A resident asks cleaning green areas.	An association requires equipment for a demonstration in the territory.	A company requests information about settlement of its market.
A citizen applies for a building permit.	A humanitarian organization asks for advice and logistics on hygiene and health aspects.	A company indicates its intention to compete for a market.
A user pays the child nursery.	An association consults the availability of slots to practice its activity.	A company indicates a signage fault in a business park.
A student is applying for an internship.	An association indicates the place of its annual general meeting to be hold.	Companies inform the creation of a consortium.
A citizen is registered to vote.	An association says its merger with another one.	A company requests information about an upcoming Activity Zone.
A citizen suggests an improvement for the town.	An association made a communication on a new activity.	A company reports his move and his new address.
A resident asks for cleaning graffiti on his house.	An association communicates on the organization of a sports event.	A company mention new settings for parking

SITIV Syndicate management then proposed in response to segment the overall population in sub target populations and define scope of work for each of them. On this basis, SITIV Syndicate draws up an inventory of cities: what is already available, what is to be done and what is wanted by politicians and by the cities management. Follow by the goals to be achieved. During working meetings, debates emphasize the management of these new processes, highlights importance of involvement of concerned directions and the human investment, normally decisive for this project, on

supporting change involved and for training of agents.

The transformation of strategic thinking under guidance of debate in relation to expressed needs by Cities management (Table 1) projects is a complex step because it requires question to be expressed and shared: How are we doing? It is, moreover, one recommendation which emphasizes that analysis must lead to action and therefore, here to SITIV management, a project.

The situation at hand, relevant themes within the Complex Approach given multiplicity of actors and constraint priorities based budgets. The SITIV Syndicate management then suggests an approach involving the collective intelligence (Lévy, 2003) rather than a more classical computer analysis, which might be more linear and less systemic [31]. In this perspective, SITIV Syndicate management, for establishing and running workshops of collective intelligence, wishes to turn in: -Sharing a global vision about the issues; - Build a participatory way or scenario (s) target (s); - To each individual player choice of target taking into account expectations and vision and initiating change in the community; - To create a dynamic group that makes everyone adhere to objectives sought; - Achieving time savings in the analysis; - Obtain a document, a deliverable, pragmatic and officially all recorded with goal of trying to pool the largest number of projects.

The approach led by SITIV Syndicate, is structured in two distinct phases: First phase aims collecting, analyze and complete synthesis after sensitization workshops conducted by the SITIV syndicate (Figure 1), in order to prepare final workshop. The second step aims to build common targets scenarii. This short phase is carried out in premises of "CAP Gemini" specifically dedicated to this kind of approach.

The following increment makes us appear six projects, he enrolled in the idea submitted by Blondel (2011) for which "it requires rethinking public management by building on existing strengths."[10] This means this phase must seek how to bring new digital services that meet identified needs by the cities, by teaming up with already developed processes in local communities. At this stage, our problem lays in the "retroactive circular causality" which Edgar Morin (2005), says that an organization must provide its services to external needs. [32]

In this spirit, SITIV management initiated, with CAP Gemini company help, building workshops discussions, like hybrid forum, according to Ferrary, Pesqueux (2004), that is to say, hybrids workshops both mixing, experts, politicians, technicians and laypersons who feel concerned in [23]. This is a "laboratorisation of society process" (Callon, Lascoumes and Barthe, Op.Cit) [17] where, for example, discussions on technical choices undertake the collective. These discussions must produce decisions that cause actions, and this is the reason for this work with CAP Gemini. For as suggested by Alcaras, Gianfalconi and Pache (2004), "before any production or consumption of goods or services, men must produce decisions."[1]

It also emerged that a status report and a joint analysis to stakeholders were needed to accurately identify needs and set priorities. The goal of "mutualisation" projects led SITIV management to differentiate what is specific to each city by what may be meanest part, called "mutualisable". Realization of a purpose for the cities management and their strategies for achieving this must a priori based on an analysis methodology, so possibly trying to exclude simplification due to by empiricism. Marie-Josée Avenier (1997), writes that "collective goals will have chances to be shared only if they are congruent with individual purposes" of different members within group.". Making of purposes must, resuming work of Thietart and Xuereb (2005), to have a priori by analyzing general environment of each community with cities management.

Workshops of ASE (Accelerated Solution Environment of Capgemini Consulting) revealed six distinct projects: the citizen account, track requests and responses, management of internal information, the digital city, Multi channel approach -, organization of reception, they seem possible and desirable to combine in a meta-project named "MCR" (management of citizen relation) concerning optimization of management of relations with citizens.

The so meta-project called CRMP by SITIV Syndicate for « citizen relationship management project », applies only to residents-citizens of local municipality and excludes users temporarily crossing territory, and users also considered of public customers. In this way, it is only therefore providing digital resources to citizens of local municipalities participating in activities of it or asking for services. But SITIV management draws attention of cities top management to the fact that participation of citizens in a new mode of communication with local communities is to be effective. Therefore, it is probably necessary to set up a mobilization process because collaboration cannot be decreed a priori. Moreover city agents will have to take, additionally to their daily tasks, a new way of relationships with external stakeholders.

For these reasons, it is to identify the conditions for mobilizing individuals for collective action. This means, including cities agents to invest in experimental policies supported by commitment and participation of local citizens and relying on opportunities offered by information and communications technology. At this stage, local decision-making bodies, elected representatives and managers, are strategically placed in social projects catalyst. But success of these exchanges and pooling depends of the will of each to contribute to the "MRC system". Workshops ASE showed the priority management project "citizen account", which we partially transcribe below.

4.1 *The priority management project "Citizen Account".*

The will of leaders is to build a communal virtual shop that will create an account, i.e a "citizen account" which admits in one single input keys information of inhabitants and members of his inner home.

The goals of the cities appear to be:
- Access to a large bouquet of online initiatives; - The possibility of transmitting electronic vouchers when necessary; - Choosing a preferred method of communication with the City for processing of applications (email, SMS, letters); - The ability to track progress of requests.

Thus, to cities top management, it seems that online services are intended to simplify, secure, customize and enrich exchange with citizens. For these managements, the virtual communal desk, the "Account Citizen" permanently reachable must provide possibility (for examples): - create an account for all household members; - Uniquely enter information that will be reused for several steps, subject to their validity; - Offer a bunch online access of steps; - Send scanned supporting documents; - Monitor progress of steps taken; - exchange with the City Council by email, phone or SMS during examination of applications.

Arrival of RCM in digital age is seeking for high IT availability infrastructure (hardware & software), taking into account mobility (that is to say, regardless of location of tool connection) and security (of course, safety) of provided services. For all these reasons, it forces, for computer team, for necessary work at computer software tool supports of infrastructure that can not hinder mobility, service availability while ensuring data security protection.

5. MOBILITY, AVAILABILITY AND DATA SECURITY: A CHALLENGE FOR IT INFRASTRUCTURE SUPPORTS

Citizens, elected officials and communities agents have digital changing needs in relation with new uses, including the Internet making them out of physical perimeter of the town hall. The SITIV Syndicate management believes this will, in one way or another, impact internal information system of the city. This is particularly case for communities' agents and elected officials with dematerialization and future electronic signature, remote access to documents and applications, shared calendaring and messaging system for elected officials, registration for events within the city. For these new uses, IT must be able to make it accessible information system, available on and secure.

This leads to IT professionals explore new physical and virtualized infrastructures (that is to say, dematerialized using software (soft) and not only dependent on hardware (hardware) and accommodated in special centers (Data Center, Data warehouses and others) ensuring a level of services almost unrealistic to obtain in traditional ways. The SITIV Syndicate set-implement in the previous term (2008-2014) most advanced technologies and now operates almost all of its resources in a specialized center (Data Center : DC) coupled to a digital network high speed (optical fiber) prepared to integrate into urban area network projects. Security technologies and service continuity formalized in a BCP (Business Continuity Plan) and DRP (Disaster Recovery Plan) are mastered, by the SITIV's Syndicate team in charge of IT infrastructure. Although technical teams SITIV mastered these technologies it does not wish be alone to face new needs and risks, including management cost reasons driven by this new mobility. For this specific reason, SITIV Syndicate has approached Management of Information Systems Management (ISM) of Greater Lyon (GL).

For SITIV Syndicate manager and management information systems of the Greater Lyon, their organizations should first think about hosting and internet central digital access infrastructure and secondly, work on safety and system availability and services using these systems. Therefore, all both management have studied the ability to host their infrastructure in a dedicated structure to this purpose, a data center (DC). DC, established at local, becomes support for a new response to the needs of urban users and provides hosting of digital devices of local communities. A DC is massively using logic routinely servers for virtualization that provides flexibility for computer scientists, space and energy savings by reducing number of physical machines. However, if IT infrastructure pooling meets needs of digital services required for residents, distancing of systems requires very high speed interconnects between town and hosting sites such infrastructure (DC).

The Mayor of Lyon and President of Greater Lyon indicated its intention of setting up a "digital city". To the town of Compiegne (2010), the concept of" digital society "now seems to be a substitute for hitherto devoted phrases such as" information society "or" network society "as if it were a new step. It emphasizes effect of technologies which now permeate the whole Society. For Compiègne town (Op.Cit) the arrival of "Homo Numericus" marks a new moment in humankind evolution. Citizen, the Homo Numericus, is moving into territory and, because he frequently participates in social networks, it is usually not alone. Excluding these so-called "social networks" are built using physical links by connecting individuals. In this perspective, Oinas-Kukkonen (2012) reminds us that "social networks can reveal communities, teams, organizations, companies or even entire geographical regions; they finally have the power to influence behavior of their users."[34] But for this author, these networks are also able to contribute to economic development when he writes, "Links into organization and with outside - especially those underpinning specialist knowledge- can foster collaborations in areas of strategic activities, R & D teams, communities of practice, as well as joint ventures and also help build a collective intelligence.". It is in this context we see emerging since 2006, a specific

kind of activity, "crowdsourcing" as defined Pénin and Burger-Helmchen (2012) "The crowdsourcing of inventive activities is to outsource a host of activities research, or complex creative tasks." It is also to reduce the costs of these activities."

The new behaviors becoming from "homo Numericus" are partially unpredictable for us, because dependent on technological innovations and their ownership, and it is for this reason that the SITIV's Syndicate management proposes to build a hand, high availability IT infrastructures always accessible and also provide information systems in a configuration called "agile" that is to say having ability to receive new services requested without having to make changes structural systems. These actions, which are under responsibility of SITIV Syndicate, must be contingent on changes decided by mayors and therefore SITIV's Syndicate management is questioning what can be done for elected in order to better incorporate digital plans during their mandates in.

6. SEARCHING FOR THE EMERGENCE AND RECOGNITION OF DIGITAL PORTION DURING A WARRANT PLAN

Arrival of new (and always renewed by ITs designers and users) digital uses request to examine the objectives devised by policy makers to achieve targets they want to get to with innovative solutions. This brings SITIV Syndicate to seek new creative solutions to co-build with the cities management a manner of embedding a digital strength within mandates plans or political programs. The SITIV management will lead this new approach, based on experience gained and described in Part 2, the ASE method, attempting to correct its imperfections, that is to say, by working more on sharing identified potential projects.

A meeting, in the last three months of 2014, was held between the President of SITIV Syndicate, its CEO and mayors confirmed that the structure has to work on development of new digital uses in cities and need to discuss priorities of the SITIV Syndicate's missions.

The conclusion of these exchanges has systematically focused on proposal of a participatory approach in 2015 to develop a multi-year planning of the SITIV Syndicate's projects, consistent with those cities, and allowing clear and shared decisions on sharing and customization applications and services provided by SITIV.

There was a general agreement on this point, with a two-stage approach. First, identification of digital fields that can be studied within cities, stage marked by an elected steering-agent meeting about digital object and opened on known experiences of digital city. Then prioritize projects to be included in SITIV Syndicate planning by sharing decision criteria on what can be put in common, a stage marked by a "reflexive seminar" in order to foster understanding between cities about priorities and criteria of this pooling. This approach is based on a MYIP (Multi-Year Investment Program) experimental in 2015 and should, for SITIV Syndicate management committee reach a shared implementation with cities and SITIV Syndicate budget for 2016. The following figure (Figure 1) summarizes the approach of SITIV Syndicate is planning.
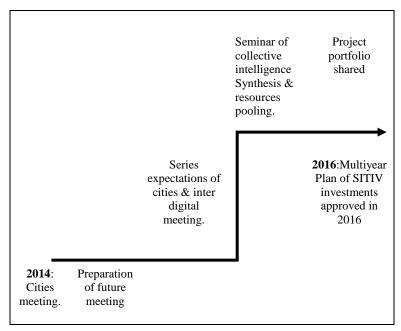

Figure 1: Research Approach Path for Emergence, Recognition of Digital Matter of a Warrant Plan

6.1. FROM TERM PLAN OBJECTIVES INTO OPERATIONAL PROGRAMS

SITIV management proposes to SITIV elected members to work with an incremental system as part of a continuum of steps. It is first carried out collecting needs of each city, while working on all potential projects, in order to try defining portfolios city project. Cities and SITIV Syndicate together define the potential uses and then determine portfolio project shared with ad-hoc agenda. By the end of 2014, process of the overall project is awaiting acceptance of DOB (Orientation Debate Budget).

7. CONCLUSION

Adaptive three-step process we have described in this paper is made of a set of milestones within projects. It cannot be equated with an incremental system but is rather a meta-method because modules keep coming without order and can be conducted in parallel in accordance with priorities established by stakeholders and with time, budgets constraints. This participatory process is, as far as we know, innovative ones because it allows to query and help leaders and elected to receive changes needed to transform local communities for inclusion in the digital age and provides them with structures ad'hoc to meet the expectations of local stakeholders i.e citizens, elected officials, companies, associations, administrations. This process joins the requirements of a territorial intelligence process to facilitate territoriality that is to say, ownership of physical and virtual local resources by understanding territory on using a meta-model [8]. We have developed and improved this approach at work and situation in research at local, inter-communal, regional and national in France, Europe and in some parts of the world.

This meta-method may be, at first glance, time-consuming but with longer maturities, it better prepares municipal agents to face the changes expected by citizens and also to better study the needs of the latter to respond.

To the SITIV Syndicate management, digital states take more and more space in the life of local stakeholders, this seems a fact. But this fact should not obscure the main difficulty, a context of budget cuts. We note how complex it is to demonstrate to interlocutors' SITIV Syndicate how digital can help in efficiency of their local organizations and how is essential to prepare at an inter-municipal level, communities to the expected changes in Society.

However, for the SITIV manager, when analyzing mandates plans, or failing that, the political programs may possibly be insufficient to help territoriality in order to evolve in the digital era and innovation that seems to be emerging. What Morin (2012), wrote "the main enemy is always repeating the same recipe, the same therapy; not to admit the complexity, trying at all costs to reduce." [32]

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