MANAGING A WIDESPREAD E-PROCUREMENT IMPLEMENTATION IN PUBLIC HEALTHCARE

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Abstract

In large parts of Europe, the development of healthcare is subject to contrasting forces. On the one hand, there has been an explosion in spending and, at the same time, governments are faced with strict budget constraints. On the other hand, public healthcare is under pressure to be innovative, technologically advanced and to provide increasingly better quality of services. In this context, e-procurement can be seen as an instrument to offer a solution to the first issue of this dilemma. However, e-procurement initiatives in such domain have not been widely deployed, and most of them have not fully delivered the expected benefits so far.

In order to investigate this scenario in more detail, a case study of a wide e-procurement implementation in an Italian Local Healthcare Agency has been examined. This experience is considered remarkable because of the comprehensive design of the e-procurement system, the differentiation of adopted tools, the long-lasting experimentations and the multiple solutions implemented and in progress.

The aim of this paper is to reconstruct, by following the Lam's (2000) knowledge management approach, the different steps that led to a widespread introduction of e-procurement as a new operating practice in this LHA, by thorough redesigning supply purchasing, supply chain and logistics processes.

Keywords: knowledge management, innovation, public e-procurement, healthcare, supply chain and logistics.
1 INTRODUCTION

In large parts of Europe, the development of healthcare is subject to contrasting forces. On the one hand, there has been an explosion in spending and, at the same time, governments are faced with strict budget constraints. On the other hand, public healthcare is under pressure to be innovative, technologically advanced and to provide increasingly better quality of services. In this context, e-procurement can be seen as an instrument for providing solutions to the first issue of this dilemma. Two recent European directives 2004/18/EC and 2004/17/EC, according to the i2010 eGovernment Action Plan, promote e-procurement in order to reach significant improvements also in the public healthcare efficiency, with the reduction of purchasing and administrative costs.

However, e-procurement initiatives in such domain have not been widely deployed, and most of them have not fully delivered the anticipated benefits, so far. The main reasons for this lack of tangible results are the traditional resistance of public institutions to IT-based process innovation and the complexity of the healthcare procurement – in terms of goods' variety and specificity, and of suppliers' number – that asks for different supply processes and diverse competences.

In order to investigate this scenario in more detail, the case study of a wide e-procurement implementation in an Italian public Local Healthcare Agency (LHA – Azienda Sanitaria Locale, ASL), considered one of the most advanced by the Central Procurement Agency (CONSIP), was explored. This experience is remarkable because of the comprehensive design of the e-procurement system, the differentiation of adopted tools, the long-lasting experimentations (since 2000) and the multiple solutions implemented and in process within the Agency. The decision to examine this case study is also due to the fact that the use of e-procurement tools is seen as only one aspect of a deep reorganization of the entire supply process.

The purpose of this paper is to reconstruct, through documents and interviews performed with some of the most representative actors, the managerial interventions that made this innovation possible and, particularly, how knowledge has been managed in this innovative programme. From this perspective, it was presumed that the introduction of e-procurement and the reorganization of purchasing, supply chain and logistics, had required diverse knowledge which has been investigated through the cognitive level, the organizational level and the social and institutional level of knowledge, proposed by Lam (2000).

Distinguishing between individual and related to a specific social context, this approach represents a comprehensive picture of the concept of knowledge. Furthermore, this perspective seems particularly helpful for examining the realities of Public Administrations (PAs) like LHAs, which keep to be characterized by the importance of rules and procedures and by hierarchical organizational form. The Lam extensive referring to the classical Mintzberg’s work (1979) is important to this point, as the organizational forms singled out by Mintzberg fit particularly well with the PA domain, reinforcing the accurateness of this analysis.

2 THEORETICAL FRAMEWORK

The issue of e-procurement in the public sector has been, so far, a rarely discussed topic. Studies are mostly concerned with the analysis of policies and behaviour of central PA's and central procurement Authorities (Hardy & Williams 2005, Somasundaram & Damsgaard 2005, Somasundaram 2004, Devadoss et al. 2002). Even less frequent are works on the healthcare sector, particularly at the local operating level, where e-procurement solutions must be actually implemented, with impacts on structures and knowledge already acting within the organizations, and then asking for different approaches.
2.1 Procurement within the healthcare sector

Firstly, it is necessary to take into consideration that healthcare structures deliver critical and specialized services (vs. the rest of the PA): more than in other sectors, it is paramount safeguarding high quality standards for many goods and services purchased (for their impact on the service quality), together with the economy and timeliness of purchases, the transparency of activities and conformance to competition principles among Companies. Healthcare spending for goods and services can be classified into three sections:

— **common** for the whole PA, independent from the type of buying Administration (e.g.: phone services, office materials);
— **common-but-differentiated**, existing for all Administrations but highly differentiated through the buying sector (e.g. in the healthcare sector: maintenance and cleaning of hospital buildings);
— **healthcare-specific**, composed of drugs and medical devices (appliances and materials that, separately or jointly, are used in case of injury, disease or surgical operation).

This diversity must be taken into account when devising innovative ways to manage procurement before choosing the most appropriate solutions, in order to improve quality and efficiency of supplies, whilst rationalizing and reducing spending. The large differences among the three spending categories indicated above and the availability of diverse electronic tools ask for a deep reflection on which solution mostly suits each type of good / service, according to a segmented approach (Federici 2006).

Secondly, the term "procurement" is often used in a narrow sense, being associated with the sole purchasing phase, as can be seen in Panayioutou *et al.* (2004) or in Kim & Shunk (2004). Consequently, the term "e-procurement" becomes a synonym for a class of electronic tools that directly link buyers and suppliers on the same network to make a deal. According to other studies (Somasundaram 2004, MacManus 2002), and with the typical operation of a healthcare agency, in this paper "procurement" indicates a broader process, which begins with a need for a good or service and ends with its use and the payment for its supply, then involving: purchase programming, sourcing choice, purchasing act, incoming material handling, warehouses' logistics, inventories control, invoice processing.

An e-procurement system then deals with the whole procurement process, and not just with its purchasing phase. Consistently, the term "e-procurement" indicates here that organizational solutions supported by ICT-based tools, which allow electronic forms of procurement, potentially more effective and efficient than traditional ones, whereby a more or less wide-reaching and thorough redesign process is required, to take into account the whole life-time of a product or service.

E-Procurement solutions include process redesign and the use of appropriate tools in two main areas, which have to be used in a complementary way to streamline the whole procurement process:

— **e-purchasing**, includes very different tools which allows the purchasing phase to be entirely managed, from finding a product to invoicing and payment, through on-line tenders (*e-tendering*) and the use of marketplaces and electronic catalogues (*e-requisitioning*), electronic invoice exchange and processing (*e-invoice*) and liquidation activity (*e-payment*);
— **e-logistics**: which aims to optimize the management of inventories (in healthcare structures: pharmacy and the supply office) and internal goods flows, based on Intranet / Extranet technologies, integrating Supply Chain Management (SCM) solutions, linking both internal and external players.

2.2 Knowledge management: Lam’s perspective

The knowledge management approach and, especially, Lam’s (2000) interpretation of it, considers three levels (the cognitive level, the organizational level and the societal-institutional level) that could outline the e-procurement phenomenon in a comprehensive manner. The present issue is to build a bridge between an abstract concept like knowledge and an organizational process supported electronically, such as e-procurement in the Health sector. In other words, the wonder is how this process can be represented in terms of the concept of knowledge.
According to the Lam’s model, any organizational form, if seen through the lenses of the concept of knowledge, characterizes itself in terms of the three levels mentioned above. In particular, any individual, in a single or collective dimension, interacts with others on the basis of his/her background (the cognitive level of knowledge). The same individual operates in an organizational context with a low degree of autonomy, in case of an organizational environment characterized by rigid procedures and routines, or a high degree of autonomy in case of an organization environment loosely coupled (organizational level of knowledge). Furthermore, he/she is part of a specific labour market that rewards some profiles, but not others; moreover he/she has formed a background on the basis of a particular educational or training institution (societal-institutional level of knowledge). Of course, these three levels overlap each other and knowledge characterizing a specific organization is something unique that emerges from their combination. Nevertheless, Lam’s approach leads to a wide-ranging perspective to investigate organizational life, and the introduction of an important innovation such as an e-procurement system.

To thoroughly examine Lam’s work, it requires a detailed study of each level. The double entrance matrix is the methodological instrument used in order to analyse any level of knowledge. This matrix surveys relationships between two variables but in this case they are represented by dichotomies leading to a four cells matrix. For instance, the cognitive level is exemplified by the relationship between the ontological dimension of knowledge, presented in terms of the individual-collective dichotomy, and the epistemological dimension of knowledge, explicit-tacit dichotomy (see fig. 1).

![Fig. 1. Cognitive Level: Knowledge types (source: Lam 2000).](image1)

The same methodology has been used to examine the remaining two levels. To sum up, a theoretical approach has been built up with at its basis the cognitive level that constitutes the background for the organizational level that, in its turn, constitutes the background for the societal-institutional level (see fig. 2).

![Fig. 2. Knowledge, Organizations and Institutions: Three Interlocking Levels (source: Lam 2000).](image2)

The sum of these three levels enables a cumulative process of knowledge to employ in organizational analysis. Nevertheless, to represent a variable through a dichotomy has some limits: on the one hand,
it streamlines the analysis of a phenomenon and, on the other hand, leads to a simplified representation of reality. So, each of the three levels of analysis generates a four cells matrix with different content.

Opposing the dichotomy explicit-tacit and individual-collective in the cognitive level of knowledge, four categories emerge (Collins 1993, Blackler 1995):
— Embrained knowledge (individual-explicit) can be exemplified by what is learnt at school. It is abstract, theoretical and used to solve conceptual problems such as calculations and speculations;
— Embodied knowledge (individual-tacit) is based on practical experience. It does not depend on the activity of reasoning but on action alone. The “learning-by-doing” method represents this kind of knowledge and learning to ride a bicycle is a prime demonstration of it;
— Encoded knowledge (collective-explicit) is codified and stored into rules and procedures. Therefore, it is readily transmitted through language, signs and symbols (information). Scientific management principles, for example, were an attempt to codify workers’ skills and ‘know-how’;
— Embedded knowledge (collective-tacit) represents shared values and beliefs that define informal rules and norms of specific social context contributing to govern interactions and communication among members of a society.

Lam’s work proceeds looking for organizational forms that can support the types of knowledge just above mentioned. In her understanding of this point, this result can be reached opposing “knowledge agent” and “standardization of knowledge and work” in the double enter matrix. “Knowledge agent” is characterized by the dichotomy individual-organization and “standardization of knowledge and work” by the dichotomy high-low. If the “knowledge agent” is individual, there is the possibility to enjoy a certain degree of autonomy and subjects can develop their own know-how and practical problem-solving. If the “knowledge agent” is the organization, the managerial hierarchy becomes the engine of organizational activities transforming individual knowledge in rules and procedures. An high “standardization of knowledge and work” suggests a scenario in which each role is strictly coordinated with others in an environment characterized by hierarchical controls. On the other hand, a low standardization outlines an organizational environment in which coordination is achieved via direct interaction and mutual adjustment and not on the basis of comprehensive design.

The match of these dichotomies results in four organizational ideal-types:
— ‘Professional bureaucracy’ (embrained knowledge) experiences a reduced role of top management. Organizational activities are based on individual expertises related to specific professional bodies. Nevertheless, coordination and control are governed centrally through standardized and bureaucratic means. Hospitals are a typical example of this organizational form;
— in the ‘machine Bureaucracy’ type (encoded knowledge), coordination and control are also centrally governed. Moreover, the entire organization is direct to a continuous process of formalization and codification of knowledge in which the top management is at the head formulating strategies and directives;
— the ‘operating Adhocracy’ form (embodied knowledge) sees a losing of importance of the organizational chart and coordination and control is not based on rules and procedures. In this instance, mutual adjustments among organizational actors prevail and activities are not managed vertically but left to subjects’ undertaking;
— the ‘J form’ (embedded knowledge) idealized characteristics of Japanese companies (Aoki 1988). Coordination is not loosely coupled like in adhocracies because of a strong corporate culture rather than hierarchical control. At the same time, horizontal coordination prevails giving space to shared work experiences and joint problem solving of organizational members.

Lam maintains that knowledge outlined through organizational forms is not sufficient for investigating the entire knowledge configuration operating in organizations as they are part of the larger social context. Education and training systems (Maurice et al. 1986) and the nature of labour market organization (Marsden 1986) are the two elements believed able to enrich the understanding of knowledge at work in any organization leading, in this way, to the social and institutional level.

Labour market organization is interpreted according to the dichotomy occupation based labour market (OLM) and firm-based internal labour market (ILM). The former sketches a situation in which market forces govern personal careers and domains on learning. In the latter instance, expertises are internally
controlled by firms causing a lower level of standardization and, thus, the difficulty to be governed by market forces. Concerning education and training systems, they can be studied according to the high or low degree of formalization and academic bias. Again, a double entrance matrix can be built: the opposition of ILM and OLM, on one dimension, and of low and high degree of formalization and academic bias, on the other one, suggests four institutional configurations:

— the ‘professional model’ (embrained knowledge and professional bureaucracy) arises from a situation in which an high degree of formalization and academic bias, on the one hand, and OLM, on the other hand prevail. Here, certified expertise permits the entrance in professional bodies and, on this basis, market forces can operate as personal careers are transparent and easily valuable.

— in the ‘bureaucratic model’ (encoded knowledge and machine bureaucracy) persists a high degree of formalization and academic bias. Expertise is far removed from problem-solving practices and is based upon a deductive method of reasoning. ILM characterizes this model as well and a narrow on-the-job training, in which careers are based on hierarchies of jobs with tiered boundaries, can contribute to establish a bureaucratic work layout.

— even though the ‘occupational community model’ (embodied knowledge and operating adhocracy) characterizes itself because of OLM, inter-firm mobility is not based on certified expertise but on the ‘know who’ of networks constituted by a cluster of interdependent occupations and firms. It is inside these communities that practical expertise and problem-solving can be maintained.

— the ‘organizational community model’ (embedded knowledge and ‘J-form’ organization) distinguishes itself because of a broad-based education and training system. Learning by doing and problem-solving capabilities are encouraged to the detriment of abstract theoretical knowledge in a context in which team working is seen as an instrument for connecting different workforce layers. An ILM based on a broad on-the-job training and not linked to tiered boundaries but a common ranking system can contribute to build this community (see fig. 2).

3 E-PROCUREMENT INTRODUCTION AT THE LHA OF VITERBO

3.1 Context and e-procurement experiences

The LHA of Viterbo – like other similar structures (Cicchetti 2004) – is organized in three areas: hospital services, territory services, administration services. With about 3.200 administrative and healthcare employees, it provides healthcare to the province of Viterbo (859 hospital beds), with a production value of about 350 €m, determined according to the individual spending allocated for each citizen of the province (a total of 297.686 people as of December 31, 2001).

With the aim of gaining efficiency and reducing the spending for goods and services procurement, since 2000 the LHA of Viterbo has managed several experimental projects on e-procurement, in partnership with Italian public as well private subjects (Federici 2005):

— the first initiative, in the year 2000, was a trial of a marketplace promoted by a private merchant: despite some positive results, this experience ended quite early, when the marketplace platform failed because of the low volume of transactions;

— in 2002 – when these tools were still under construction and not yet addressed to the healthcare sector – the LHA started to use the Public Electronic Catalogue of goods and services which could be purchased at predefined conditions through the Framework Contracts negotiated by the Central Procurement Agency (CONSIP 2003) and the Marketplace for the Public Administration (MEPA), also created and managed by CONSIP (the LHA of Viterbo was one of the first 20 Italian PA’s that took active part in the MEPA implementation);

— in 2003 a first platform for e-tenders was tested, which was later dismissed because of its lack of functionalities; recently it has been replaced by a new one, that allows to manage a tender electronically, both in full and partial solution (leaving offers evaluation off-line);

— the LHA also carried out two distinct projects on e-logistics, both of them were promoted by private companies and based on wide outsourcing solutions supported by extranet platforms. The first one (e-Logistics) involved the central and the departments' warehouse logistics for managing common goods and non specific devices used routinely in hospital wards (e.g.: gauzes,
disinfectants…). The second project (Operating room e-procurement) coupled the supply of the specific medical devices used in the operating rooms with their overall logistics management: its driver was the innovative "intervention-based" concept of linking procurement to the surgical operations performed, instead of the traditional "stock-based" approach to purely manage the inventory levels.

These pilot projects were all driven by the Procurement and Logistics (P&L) Department of the LHA. Results were remarkable, even though different in nature and dimension, also taking into account the obstacles met (technological, organizational and also normative), like for any innovation.

After these pilot experiences, since 2004 the LHA of Viterbo has launched an extensive programme with the purpose of innovating the end-to-end procurement process (as seen above), through the adoption of diverse solutions, coherently linked with the different specific requirements. The first completed steps were the implementation of multiple e-procurement solutions in two segments of the broad procurement process: purchasing phase and invoice processing. At present, the full deployment of Operating room e-procurement is ending, while the implementation of e-Logistics outsourcing model for common goods and non specific devices is still ongoing.

3.2 Managerial interventions to promote the e-procurement

e-Procurement pilot projects and the recent deployment of e-purchasing solutions were already the subject of detailed analysis (respectively: Federici 2005 and Federici 2006), under the perspective of related process reengineering in terms of gained efficiency, organizational changes and IT tools introduced. The purpose of this paper is to investigate on knowledge and particularly on its management along the innovation process, as the shift from traditional procedures to innovative ones in purchasing, supply chain and logistics, was presumed to imply diverse types of knowledge and organizational forms. In order to carry out such investigation, internal documents were analyzed and semi-structured interviews with some of the key representative managers in charge of procurement, both operating in the traditional areas and in the innovative one were performed.

Prior to starting the e-procurement introduction, the purchasing activities were divided among four offices, on the basis of the typology of goods or services, as they are highly differentiated and specialized in healthcare, then implying diverse procedures and suppliers. The subject of the four offices is respectively: products (drugs, medical devices, consumables like paper, ink …), general equipments (furniture, cars, elevators …), electronic equipments (medical appliances, computers…) and services. This division has been kept up to now, as this specialization is considered useful.

On the other side, the unit in charge of e-procurement manages supplies regardless to the nature of the goods. In addition, even though innovative e-purchasing solutions have been already fully implemented and frequently used, this unit is still separate from the other offices, that continue to run the purchasing activity in the traditional ways. Furthermore, while the traditional offices manage the sole purchasing phase, the e-procurement unit not only operates as a buyer (through on-line tenders or direct purchases on MEPA), but also supervises the entire procurement process (including: supply chain and logistics) being directly linked to: external providers, warehouses (for common goods and for medical devices and drugs) and internal departments recipient of the supplied goods.

This scenario for the development of e-procurement is the outcome of a series of managerial decisions made by the general manager of the LHA and the director of P&L Dept. on the basis of the assumption that the characteristics of the two sides – traditional and innovative – are quite different in terms of: knowledge requested, ways of operating and profiles of the personnel.

The traditional purchasing offices, already existing before the e-procurement initiatives, are characterized by a knowledge oriented to correctly apply the rigid external laws (settled by the national or regional government, or by UE) and procedures (determined by the same LHA), that regulate purchases in a Public Administration. This sort of knowledge is strictly coded in rules and is shared within the Agency by means of official documents; for this reason, it can easily be transferred. Another important piece of knowledge concerns information about the distinguishing characteristics of the dealt with typology of products. To properly work in this area, the main issue is then to acquire
more and more experience in the field, while the education acquired previously to be applied in the position has little or no relevance (actually, none of the interviewed office supervisors had a degree, even less in law, as it could be expected before). The training is entirely performed within the organization and the acquired expertise can only be spent in the same office: also for this reason, career advancements and mobility are very limited. Moreover, it is important to notice that, in this context, collaborations with purchasing offices of similar structures (e.g.: others LHAs) are occasional, hampering the development of a professional network.

The four traditional offices – each of them, as stated above, operates separately from the others – have an average staff of four persons (generally: a supervisor and three clerks). Each of them is based on a precise division of the highly standardized tasks to be performed, that typically are: sourcing of information about the product to buy (price, characteristics, suppliers), writing and revising of the tender, issuing of the same, support to the evaluation process, award notification. Despite knowledge is rather shared among the personnel of the same office, interchangeability is pretty difficult because of the long-lasting practice of anyone in a specific task. In this context the role of IT systems is to automate the traditional procedures: with office automation tool (word processing and occasionally spreadsheet) or legacy systems (accounting system, to check funds availability and to reserve them). Consequently, a high IT literacy of personnel is not required to operate. The traditional purchasing offices have then the typical form of bureaucracy: because of their culture and organizational form, they are not flexible and not disposed to change. Moreover, even if they are effective in managing their duties, their activity is not efficient at all, as the results of the above quoted researches largely demonstrated.

As the two cited top managers perceived the exigency to explore new ways to gain efficiency and to produce savings (both in costs and time), they promoted a programme to introduce e-procurement. Having in mind the diverse issues at stake in the described scenario, they considered the four offices unfit for experimenting this innovation and decided to set up a project team, composed by new incoming resources. To do that, two fresh graduates in economics were called to constitute the staff that, jointly operating with the private or public partner selected for each experience, carried on all the pilot above mentioned experiences.

The activity of this team was highly experimental (also because this was one of the very first attempts of e-procurement in healthcare sector), and proceeded with a trial-and-error approach, where knowledge increased with an accumulation of learning-by-doing outcomes. Even though the level of education of the involved persons was quite high, this was directly spent only in some part of the work (like: analysis of the outcomes, auditing on costs …). Actually, they were selected also because their higher IT education (although they weren't IT expert) and their greater willing to innovation, in comparison to the workers of traditional offices. Many diverse IT systems (office automation, marketplaces, platform for e-tenders, e-logistics extranet solutions …) were tested, as they form the constitutive platform for e-procurement, being used in real operations for a planned period. The aim of each test was to model a new organizational solution, in order to provide streamlined and more effective process and to employ human resources in more value-added tasks.

It came out that the team worked, during the experimenting phase, as a real adhocracy: that is, experiencing a high level of individual autonomy, informal managerial controls, and repeatedly changing the subject to test and its related IT and organizational solution. Young resources have increased along the time their knowledge about: Agency ways of operating and structures, suppliers’ characteristics, purchasing rules, and so on. But they affirm that they never felt the obvious lack of this sort of knowledge at the first times as a big problem, as they used to turn to the "internal expert" on a topic, when they needed more detailed information in the field. As regards to the use of IT tools, they were trained on some of them, particularly those more structured, like MEPA or e-tender platform. Finally, they became used to collaborate with persons operating on e-procurement in other LHAs and overall in CONSIP, then creating a sort of professional network of e-procurement experts.

At the end of the testing phase, when it was decided to promote the widespread adoption of e-procurement, two more graduates were selected, and the former informal team became a Unit devoted to the all e-procurement processing (whose name is: Innovative Projects, IP). This unit was integrated
with two other offices (already moved to total paperless activity), in charge of orders and invoices processing, in the Staff under the coordination of the director of P&L Dept. Despite this formal change, the IP Unit still works as a project team, with a high degree of delegation and informal controls. Expertise highly shared among the workers of the unit, and they are fully interchangeable. They consider their knowledge easy to be spent in a similar position in other administrations, but hardly worth in other areas of the LHA. For this reason they judge their experience as exciting, but not so useful for the career success (also because of the budget constraints of the Agency).

After being set up, the IP Unit has led the full implementation projects of the new purchasing solutions and of Operating room e-procurement. Presently, it is: leading the e-Logistics project introduction, managing on-line purchases and supervising the go-live phase of the Operating room e-procurement. The P&L Dept. director's goal is now to completely substitute the traditional purchasing procedures with the innovative ones nowadays become usual for the Agency, at least in the IP unit. Then he wants to transfer to the four traditional purchasing offices the use of the e-purchasing tools in all of their operations: to reach this target, it must be transferred the knowledge on the new solutions, and he thinks to assign to the IP Unit this task, to be performed through brief courses and a long period of supporting. This will cause an interesting event, as the expert role, that was used to be played by the four offices, it will played in the future by the IP Unit. At the end of this process, IP Unit will lose its role of buyer and will have the charge of controlling and auditing the broad e-procurement process and of carrying out tests on other possible innovative solutions along it.

4 KNOWLEDGE MANAGEMENT AT THE LHA ACCORDING TO LAM’S MODEL

As stated above, the objective was to study the introduction of e-procurement in the LHA following Lam’s perspective. In other words, the wonder was if such perspective can interpret and evaluate the effects of this innovation in the organizational life of the Agency. Therefore, it was firstly analysed the situation ex-ante, namely prior to the introduction of e-procurement. The LHA is a typical PA and, applying Lam’s model, it comes out that this organization has a knowledge configuration characterized by supremacy of encoded knowledge due to the role of the collective-explicit dimension as far as it concerns the cognitive level. Moving to the organizational level, the machine bureaucracy is the organizational form representing this administration and the ‘bureaucratic model’ outlines the social and institutional level with reference to the labour market and the education and training system.

The story of e-procurement at the LHA under examination is marked by a significant number of projects, and since 2000 the project instrument has been used in order to introduce such innovation. Then, the first question concerns the impact of these projects on the knowledge configuration of LHA just above presented. For this proposal, projects can be considered an organization in itself as, according to Daft (2003), organizations are: 1) social entities; 2) guided by objectives; 3) deliberately ideated as coordinated and structured systems that 4) interact with an environment. Surely, e-procurement projects can be comprehended by this definition. The issue is then to study if these organizational forms share the same knowledge configuration of the LHA.

Starting from the cognitive level, in this instance encoded knowledge is no more important. The collective dimension, in particular, seems not appropriate to represent a context frequented by application vendors, Central Procurement Authority, university researchers and not a typical administrative unit of the LHA but a special unit just dedicated to the introduction of e-procurement. In this understanding the individual dimension rather than the collective dimension seems to prevail. But the cognitive level characterizes itself because of the explicit-tacit dichotomy also. At a first glance, there could not be the conditions for developing tacit knowledge even though this is not excluded as far as it concerns specific circumstances. Embrained knowledge (individual-explicit) then would prevail.

Moving to the organizational level, a professional bureaucracy could represent organizational forms of
e-procurement projects. The reason is that, differently from others PAs, the agent of knowledge is the individual with his/her professionalism. Civil servants, engineers, lawyers, economists etc. with their specific backgrounds collaborate for running the project. Professional bureaucracies distinguish themselves, also, because of a high standardization of knowledge and work. The variegated nature of actors participating to projects renders plausible control and coordination based on a high standardization although mutual adjustments and team working cannot be ruled out.

Taking into consideration the social and institutional level of knowledge, it emerges the prevalence of the ‘professional model’. Members of the projects seems in the circle of the occupation-based market (OLM) as professionals and thus with a transparent and valuable career subject to market forces. Concerning education and training, a high degree of formalization and academic bias seem to emerge because of the disparate figures involved; even in this case, however, forms of learning by doing and team building are not a remote possibility.

Therefore, it can be observed a significant diverse knowledge configuration between the LHA and innovative projects. On the one hand, encoded knowledge, the machine bureaucracy and the ‘bureaucratic model’ (LHA) prevail and, on the other hand, embrained knowledge, the professional bureaucracy and the ‘professional model’ (innovative projects) prevail. Then, the question is how the LHA knowledge has been reshaped because of e-procurement projects. The only part of the LHA that has been deeply involved in these projects is the e-procurement team, which later became the IP Unit. It is a relative small unit in comparison with the four offices in charge of the traditional purchasing and logistics, even though has been recently enlarged. So, the point, now, is to investigate on the impact of this unit on the entire P&L Dept.

The IP Unit plays a double role: on the one side, it is an agent of innovative projects and, on the other side, is member of the LHA, and of the P&L Dept. in particular. As it was mentioned above, this unit distinguishes itself because its organizational form turns to adhocracy, rather than to the machine bureaucracy like other parts of the LHA. Indeed, the IP Unit, as time passes by, has developed embodied knowledge (individual-tacit): individual because it has been stressed the personal backgrounds of unit members, and tacit because of the possibility to develop specific operational skills and know-how. Moving from the cognitive level to the organizational level, knowledge agent is the individual as members are not bound to specific rules and procedures that, on the contrary, affect the rest of the LHA. As far as it concerns coordination and control, mutual adjustment prevails suggesting a low standardization of knowledge and work. The social and institutional level sees the establishment of a low degree of formalization and academic bias due to the importance of problem-solving and practical expertises and of the occupation based labour market (OLM). In fact, figures of the IP Unit can be considered part of an inter-firm network formed by the project partners that contributes to outline a ‘occupational community model’.

Results due to the cohabitation between the IP Unit and the P&L Dept. were taken into consideration, principally, in section 3.2. However, drawing further conclusions, the organizational solution to constitute a specific unit like the IP Unit for introducing e-procurement can be considered successful as organizational forms like adhocracies fit particularly well for participating to innovative project. Knowledge configuration mobilized in this way adapts itself in order to cooperate in a context dwelled by variegated actors. The good results reached by pilot projects witness this fact. More problematic is the diffusion of the innovation to the rest of the P&L Dept. Here, a knowledge configuration characterized by embodied knowledge, operating adhocracy and the ‘occupational community model’ shows its inadequacy. This knowledge configuration responds promptly to idiosyncratic situations and tasks in a turbulent environment but this capacity of reaction as a reverse due to its inherent instability. The organizational chart loses its importance, roles are no longer designed in order to establish a comprehensive system and coordination and organizational members are no longer part of a general design that pre-determines organizational objectives and standards of task execution. The IP Unit can be considered, in some sense, isolated from the rest of the organization hampering the possibility to spread an innovation like e-procurement in the entire P&L Dept.
5 SOME FINAL SUGGESTIONS

In conclusion, it is evident that the configuration of knowledge mobilized by the IP Unit is not completely effective to support the introduction of e-procurement. This innovation is, on the one hand, so pervasive and complex to adopt but on the other hand, the normal configuration of knowledge of PAs (such as the LHA) are able to support only superficial learning and limited innovation. Consequently, diverse diffusion solutions are required.

From this perspective, we can question whether Lam’s model can provide help in this case and specifically for envisaging possible interventions for extending e-procurement adoption. It is believed that knowledge configuration characterized by embedded knowledge, a J-form organization and an ‘organizational community model’ could be a point of reference to follow. For example, as far as it concerns the organizational level, the organizational knowledge agent component seems more appropriate than the individual one which exists in a adhocracy. However, the solution proposed is not the same as the machine bureaucracy perspective, in which everything is centralized and in the hands of the top management that governs through standardized and bureaucratic means. Rather, the solution emphasizes the role of working teams and, in particular, of cross-functional teams. Due to their positions, they are at the junction of knowledge flows acting as a nexus among teams.

Actually, the P&L Dept.’s top management is moving in this direction, and it has not been ruled out that the IP Unit will play this role in future organizational charts. Finally, concerning the social and institutional level, the ‘organizational community model’ could represent a solution for overcoming limitations of the high degree of formalization and academic bias that typifies public administration careers, and the risk of focusing excessively on the so-called ‘on-the-job’ training that tends to neglect practical experiences and problem solving exercises.

References