Organisational (un)learning of public research labs in turbulent context

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Abstract: The purpose of this paper is to analyse the underlying mechanisms of organisational learning within public research labs. Results of individual cognitive maps and congregate map, based on a critical case study, show inertia in the organisational learning with negative effects on strategic change and scientific performances of the public research institution. Some main causes of this organisational (un)learning are the effects of friction on the intra-organisational communication among researchers and scientific groups driven by hasty restructuring, high bureaucratisation of public bodies, low coordination and incentives of public servants. Some management implications of learning organisation are discussed.

Keywords: organisational learning; innovation; learning; public research labs; internal communication; knowledge creation; learning organisation; cognitive mapping; congregate maps.


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1 Introduction

Research organisations play, more and more, a main role in the creation, management and diffusion of knowledge in current fast-changing markets (Mullins, 1999; Coccia, 2008b; Coccia and Rolfo, 2009). A typology of research labs is public research institutions, funded by government and that are affected by external environment and socio-economic forces (cf. Coccia and Rolfo, 2010). In particular, public research institutions have a current uncertain organisational behaviour that is growing with the turbulence, i.e., complexity and dynamicity of the environment driven by continuous shrinking public research lab budgets, restructuring, and in general economic and financial crisis (Coccia and Rolfo, 2007, 2008, 2009, 2010; Coccia, 2008a, 2008b, 2009a, 2009b, 2010). The survival and efficiency of public research bodies depend on their strategic change and organisation learning (Coccia, 2001a, 2004, 2008a). Nonaka (1994) has analysed, to understand the organisational behaviour, the mechanisms of the knowledge creation, conversion and interaction within organisations. Argyris and Schön (1996), instead, have focused on key mechanisms that support the transition of the knowledge from individual setting to organisational learning (cf. also Ellström, 2010).

Pastuszak et al. (2011) argue that organisational learning has been considered to be an effective developmental initiative in an organisation that aims to develop, sustain and advance in a global market (p.365). Kamya et al. (2011) show the positive relationship between organisational learning and competitive advantage and that the interactive influence of knowledge management and innovation increases the predictive power of the relationship (p.276).

The purpose of this paper is to detect the mechanisms underlying the organisational learning of public research bodies and their effects on strategic change and scientific performances. This paper also discusses the determinants of organisational learning and apt public management best-practices in order to support the organisational behaviour of public research bodies. The study here analyses public research laboratories because they play a key role of paramount importance in driving the scientific development of countries and supporting their industrial competitiveness and economic growth (cf. Coccia, 2005b, 2012; Coccia and Rolfo, 2010). In particular, this research focuses on a main case study: a leading research institute of the largest Italian public research body because it has an organisation and governance similar to several public research bodies and the analysis of this research institute is important to understand the main communication processes and underlying dynamics leading to the knowledge creation and organisational learning associated to fruitful scientific performances. Let me describe the theoretical framework, before introducing the research methodology, analysing and discussing the results of the case study.
2 Theoretical background

It is important to distinguish between information and knowledge. Knowledge is just a flow of information (Brown and Duguid, 2000) whereas information is a flow of signals allowing knowledge to blossom out into organisations. Different pieces of information have a meaning if they are linked with a context but they acquire a deeper meaning after being processed by individuals (Davenport and Prusak, 1998). In addition, information can be explicit and communicated in a clear way from the top of the organisation through hierarchical channels (cf. Coccia and Rolfo, 2009, 2010).

In general, knowledge is represented by a growing spiral process that is diffused from individual to group, organisation and, sometimes, also reaches inter-organisation level. Polanyi (1961) analyses the differences between explicit and tacit knowledge stressing that: “we know more than what we can say”. Two main settings of the knowledge creation in organisations are epistemological and ontological dimensions [cf. Nonaka, (1994), pp.16–17]. The ‘epistemological’ dimension is the site of ‘social interaction’ between tacit and explicit knowledge that creates new knowledge, whereas the ‘ontological’ dimension focuses on the passage from individual to inter-organisational knowledge via group and organisational level [Nonaka and Takeuchi, (1995), p.73ff]. In addition, Nonaka and Takeuchi (1995) show the connection among knowledge interaction and learning, both on cognitive and on behavioural levels. These processes amplify the individual knowledge that is ‘crystallised’ as part of the knowledge network of an organisation [cf. Nonaka, (1994), pp.17–18]. The concept of ‘knowledge conversion’ in organisations is introduced in order to stress the complementary nature and interactivity between tacit and explicit knowledge. Four modes of knowledge conversion are identified [see Nonaka and Takeuchi, (1995), pp.57–60]:

- **Socialisation:** transfer of knowledge from tacit to tacit. It is a process of sharing experience, which can transform the group in team.

- **Externalisation:** from tacit to explicit knowledge through dialogues in which members of the group communicate their opinions.

- **Combination:** conversion of blocks of the explicit knowledge between individuals by comparing different semantic language codes.

- **Internalisation:** shared explicit knowledge is internalised generating new unspoken knowledge, which is no longer individual but collective. In the spiral of knowledge, the internalisation is a critical stage for growing up.

Of course, the knowledge conversion mechanisms are different in private and public organisations. In particular, public research bodies, based mainly on public servants and higher bureaucratisation (Coccia, 2009a), can have factors that hamper knowledge creation, circulation and as consequence organisational learning (cf. Coccia, 2001b, 2009a, 2009b; Coccia and Rolfo, 2010).

Argyris and Schön (1996) propose models that facilitate organisational learning, i.e., how the organisation learns and adapts to turbulent context. This is important since organisational learning can support the change and in particular the: “strategic change [that] involves an attempt to change the current modes of cognition and action to enable an organization to take advantage of important opportunities or to cope with consequential environmental threats” [Gioia and Chittipeddi, (1991), p.433]. The term of
organisational learning is at times used to indicate a product, and in other cases to indicate a process (cf. also Martelli et al., 2012). In fact, Argyris and Schön (1996) differentiate between ‘learning product’ (identified as any acquired information content); ‘learning process’ (indicating the acquiring of the information) and ‘learning subject’ (which can be individual or collective). It should be clear that the classic subject of learning is the person. Action ceases to be individual and becomes organisational action when shared decision-making processes emerge. Therefore, an organisation learns when members act as a cooperative system, i.e., they learn in the interest of the whole organisational system. As a matter of fact, individuals can also learn in their own interest, but this action does not lead to organisation learning (cf. Ellström, 2010). According to Argyris (2000), it is possible that the organisation acts strategically on the basis of a set of knowledge, beliefs and tacit as well as explicit rules that if shared and tested are the foundations of the ‘organisational culture’.

Argyris and Schön (1996) also distinguish between single-loop and double-loop learning:

- **In single-loop learning**, individuals, groups or organisations modify their actions according to the difference between expected and obtained outcomes.
- **In double-loop learning**, the entities (individuals, groups or organisation) question the values, assumptions and policies that led to actions in the first place; if they are able to view and modify those, then second-order or double-loop learning has taken place.

In addition, the single-loop learning modifies the strategy of action and assumption in order to achieve a result in a specific situation; whereas, the double-loop learning is more complex and implies what is required for the former; it is a learning process which takes longer time to achieve some aims but it has a longer-lasting outcome, once obtained (cf. Cadario, 2003).

The concept of organisational learning differs from learning organisation. Organisational learning identifies and analyses determinants, mechanisms and bottlenecks of how organisations learn and adapt to environment in order to support their organisational behaviour and efficiency (Ellström, 2010; Allahyari et al., 2011; Jiménez and Sanz-Valle, 2011; Safari et al., 2011). Organisational learning ideally implies cohesion, consent, in other words a unity of approach and shared values that are underpinned in the organisational culture. Sanchez de Pablo Gonzalez del Campo and Skerlavaj (2011) show that: “organizational learning has a strong positive direct impact on innovativeness. In addition, the impact of organizational learning on innovation is also indirect, via innovative culture” (p.401). Instead, learning organisation mostly refers to management implications of organisational learning in order to implement best practices that spur organisational learning, such as the creation of teams, leaders, incentive schemes that support job involvement, job satisfaction and higher knowledge creation and diffusion within organisations. These learning organisation actions support, as consequences, higher performances and efficiency of organisations.

Considering this background, next section presents a methodology to analyse the organisational learning by a congregate map (based on several individual cognitive maps) in order to detect the underlying mechanisms of organisational learning that drive organisational behaviour and scientific performances of public research labs.
3 Methodology of analysis: self Q-test

The purpose of this paper is to investigate the mechanisms of organisational learning by the construction of a congregate map of the research personnel which can be representative of vital aspects connected to the organisational behaviour of public research labs. The cognitive mapping approach is based on self Q-test, which is applied with some changes and adaptations from original version by Bougon (1992) to analyse the case study of a public research lab. This technique is founded on the theory of the graphs, a part of the network analysis.

A map is identified by the following characteristics:

- It is an oriented graph.
- The number of knots can be limited (6–20 knots) or very great (30–120 knots). A single knot acquires centrality in reference to the number of bonds that receives or departs towards other knots (indegree and outdegree).
- The hierarchical structure of the map can identify causes and effects.

The first step is the construction of individual maps to gather the reflexive thought of individuals. The basis to construct the individual maps is interviews. In particular, the individual cognitive maps of our case study have the aim of discovering what individual agents think of their work environment about three main topics: internal communication, creativity and research interests. The maps are analysed by the presence of single or double-loop learning (Argyris, 2000; Argyris and Schön, 1996). Individual cognitive maps lay the foundation of the congregate map where some knots are cryptic organisational activities4 [Bougon, (1992), p.381]. In addition, every single knot must be put in relation to the general context in order to understand the structural meaning of the map and specific links. In this manner the presence of a hierarchical relationship among knots could be justified. The analysis of the structure of a map is carried out, therefore, by connection and centrality of knots (Eden and Ackermann, 1992).

Tegarden and Sheetz (2003, p.113) argue that: “Organizations would like to capture and merge the perceptions of key individuals into an organizational memory. Various cognitive mapping approaches have been used to identify and capture these perceptions”. The study here applies the congregate map by Bougon (1992), which exceeds the methods of aggregate map (i.e., the mere superimposition of several individual maps).

The construction of cognitive mapping is based on self Q-test with some changes, as said, from the original procedure by Bougon (cf. Cadario, 2003). The number of meetings to construct the maps is four. One step has been carried out by e-mails, which avoid disturbing the interviewees, reducing the initial time to gather data and information, and so accelerating the collection of data and analysis of results. In particular, the steps to construct the maps are:

1. First step is the administration to all research personnel of a questionnaire online with a link in the e-mail. Three main topics investigated are: internal communication, creativity, research interests. Such concepts are the potential nodes of the map.

2. The second meeting is face-to-face. The questions of the first step are turned into statements, which are then re-submitted to each interviewee. Nodes are presented in a list and individuals are asked to ascribe – where deemed appropriate – a causal
connection between pairs of nodes. If the connection exists, its force and direction need to be explained. As far as direction of relationships is concerned, arrows are used. As regard to the influence among nodes is concerned, the + (plus) sign is attributed if node \( a \) grows then node \( b \) grows (or if node \( a \) decreases then node \( b \) decreases); the – (minus) sign is applied if \( a \) grows then \( b \) decreases (or vice versa).

The intensity of the relation between two nodes is within a range from +3 (very intense positive); +2 (rather positive); +1 (little positive); to −1 (little negative); −2 (rather negative); −3 (very intense negative); 0 indicates the absence of causal relation.

3 Third. The individual map is constructed and is presented to the interviewee in order to evaluate it.

4 Fourth. The congregate (collective) map is constructed. “The collective map is based on a least number of connections among the individual maps. The accord is not produced to deep level, but only on superficial elements, that is on expression-label (in the sense of label of a box) that they are intentionally cryptic so that you opportunistically able be interpret in different way by each of the parts in cause (…) the cryptic concepts (that is he/she expression-labels her) the material with which the collective maps can be built on the base of the individual maps become therefore” [Nicolini and Fabbri, (1994), p.68]. The fusion of cognitive maps by individuals in a congregate map is important to pinpoint the drivers of organisational learning. The congregate map proposed by Bougon (1992) overcomes the methods of united map and is more than a simple overlap of individual maps. It contains fruitful results for our study.

Next section shows the results of this research method on a main case study.

4 Empirical analysis of the case study

This research analyses a main case study represented by a public research institute, which is an autonomous institution funded by government where employees are public servants. Public research institutions are different organisations from private research labs that, instead, are part of the R&D function of private firms and funded by headquarters to carry out mainly applied research to spur product and/or process innovations in order to support the competitive advantage of firms in fast-changing markets (cf. Chiesa and Frattini, 2009). This difference also affects the mechanisms of knowledge creation, circulation and organisational learning between public and private organisations as it will be described later. The research methodology is applied to a leading research institute within the National Research Council of Italy (CNR): the Institute of Research on Firm and Growth (acronym CERIS). The CNR is the largest and the most important National Research Institution in Italy with the aim of promoting scientific research and technological progress.

The CERIS Institute deals with studies of technological innovation and industrial organisation, and is considered an institute of excellence for the Italian economic research (after a process of national research evaluation over 2009 to 2011, cf. also SCIMAGO, 2011). The analysis of this case study is important since public research labs within the CNR have a similar organisational behaviour to other public research bodies.
Hence, this main case study can provide critical inductive implications to understand the organisational learning and behaviour of public research labs.

Figure 1 Congregate map of the research institute (see online version for colours)
Fifteen researchers (four women and 11 men) have been involved in this research, and analysed over six months. The Director of the Institute has also been added, because of his experience as researcher, his professional record, and his main role within the institute; he represents a ‘summarising view’ of long-term organisational events of the institute. Data of several meetings are the foundation for constructing individual maps and congregate map in order to analyse the mechanisms, drivers and effects of organisational learning, behaviour and scientific performances of the research institute.

Fifteen is the number of e-mails sent in the first step. Nine replies (47.37% of the research personnel of the institute). The first stage is the construction of individual maps, which are presented to the sample and 88% of units expressed satisfaction. The evaluation by researchers of one’s own map (nodes, relationships and so on), it is a significant moment to understand, learn and cement about organisation behaviour of the institute. For the sake of briefness, individual maps are not presented but their results are included in the final congregate map (Figure 1).

In particular, the questions of the first step are transformed in statements, which are then re-submitted to each interviewee; the evaluation of statements has the purpose of gathering similar research activities by labels. It should be remembered that labels with the highest number of preferences by research personnel are probably the most cryptic activities of the organisation. In fact, after identifying the key labels, they are translated in organisational terms and inserted as nodes in the congregate map of the institute (Figure 1).

The symbols used in Figure 1 are:
** for internal communication (seven nodes);
# for creativity (ten nodes), and
§ for research interests (four nodes).

The degrees of connection among nodes show that the node number 1, relating to the communication of ideas and exchange of opinions, has the highest number of links (11: i.e., indegree five and outdegree six). This node is followed by node 2 (sharing ideas with other colleagues) and node 18 (interest for topics which have a concrete use), both with eight links.

Node 5 (sharing work results) and number 20 (ability to study theoretical themes in detail) have five links. All other nodes have a lower number of connections. As a matter of fact, node three (cooperation) does not appear among the central nodes, although it has been chosen ten times and therefore can be considered a cryptic activity. Node eight (thinking innovatively) has also a fair degree of centrality (it has been chosen six times). The analysis of the outgoing arcs shows that six go out from node one, five from node two and four from node 18.

As far as centrality is concerned, node one is the most central (see Figure 1), followed by node 18 and node five. Node 1 refers to the label that has received 21 choices, therefore, it can be said with a certain degree of certainty that such node is a cryptic activity and, at the same time, central one. Node one is also important to better understand the connectivity across critical organisational actions for organisational learning. Unexpected, but as central as the previous ones, it is node 21 (working in team).

Node seven (finding new ideas) refers to intra-communication, which is not only means but also an objective. The loop concerning the interest for themes having a
concrete use (node 18) and innovative and creative thinking (node eight) is significant. Node 18 has also incorporated the “ability to produce something useful for others”. Hence, the map shows that the promotion of internal communication, sharing ideas, belonging and interiorising of organisational culture should spur knowledge creation. These activities and their fluent interaction are important to support the organisational learning in order to transform a group in a team (cf. Argyris and Schöon, 1996), increasing the ability to produce useful scientific outputs and the efficiency of public research labs.

The last step of the empirical research has showed the congregate map to each researchers/technicians for a final evaluation; in general, the staff is ‘rather satisfied’ of results represented by the congregate map. In addition, some nodes are pinpointed by researchers as critical activities for the organisational learning but they are missing actions in the current research institution due to lack mainly of intra-communication and presence of higher bureaucratisation (Coccia, 2009a, 2009b) and a static organisational behaviour (Coccia, 2008b; Coccia and Rolfo, 2009, 2010). In fact, if the organisation behaviour does not support job involvement and a fluent exchange of information, facilitating exteriorisation and knowledge diffusion in the organisation (cf. Nonaka, 1994), the research lab can generate low job satisfaction and efficiency. Bottleneck in communication channels is indicated as a distress element that spurs structural deficiencies in organisations (cf. also Favretto, 1994). Map confirms that success of organisations and their efficiency should be driven by involvement and motivation through fruitful intra-communication among research personnel and research groups (cf. Iacci and Soro, 1999).

Therefore, the congregate map is an accurate representation of mechanisms underlying the organisational learning and behaviour of the public research lab over time. Next section discusses these results and provides best practices to support organisational learning in public research institutes.

5 Discussion and management implications

Pastuszak et al. (2012) argue that: “Knowledge and learning ability are critically successful factors in the competitive advantage of an organisation....

1 organizational learning directly influences innovation
2 innovation directly affects performance
3 organisational learning directly influences performance through innovation.

As a result, organisational learning is essential for continuous performance improvement and long-term competitiveness” (p.200ff). This research has analysed the underlying mechanisms the process of organisational learning in a public research laboratory by a congregate map. Some nodes of the map are cryptic activities for organisational learning, confirming that what spurs efficient organisational behaviour is the crypticity. Some key activities can support the organisational learning which, ultimately, leads to a collective action of fruitful scientific performances (cf. Lee et al., 2011). Jiménez and Sanz-Valle (2011) claim that: “organizational learning and innovation contribute positively to business performance, and that organizational learning affects innovation” (p.408).
5.1 How cognitive mapping can be used to analyse organisational learning and to improve it, as well as knowledge creation and scientific performances of public research labs?

The analysis and process of evaluation of the congregate map can pinpoint key cryptic nodes (activities) that if missing actions generate organisational bottlenecks and *inertia* in organisational learning and as consequence in efficient organisational behaviour of labs. In particular, the analysis of congregate map pinpoints main factors of friction of the organisational learning of the institute (case study). They are:

- partially closed intra (within)- and inter (with other research units) communication channels
- lack of trust among colleagues
- lack of problem sharing and group control
- lack of recurrent meeting devoted to dialectic debate
- lack of sense of commitment
- lack of leadership in research groups and research units
- lack of job satisfaction
- lack of job involvement
- limited opportunities of team-work
- envy among colleagues for achievement of scientific goals (publications, official appointments, etc.).

These weakness points, found out by congregate map, may generate organisational (un)learning and lower organisational efficiency. Critical determinants of organisational (un)learning can be entrenched in the governance of public bodies and public servants, such as: bureaucratisation, low incentive, low job involvement, salaries not linked to organisational performances and low job satisfaction. These organisational weaknesses tend to be away from private research bodies and/or to act with a lower intensity with fruitful effects on organisational behaviour, performances and efficiency (Coccia, 2001a, 2004; Chiesa and Frattini, 2009). In general, a main determinant of organisational (un)learning is the ongoing restructuring of public research bodies and universities since it has been carried out by governments with the aim/result: *plus ça change, plus c’est la même chose* (The more things change, the more they stay the same). This is a common approach of public reforms (in Italy) due to the influence of the lobbies of bureaucrats that would like to maintain their privileges. In addition, the impetus of reforms regarding the structure of Italian national research institutions has also created problems of coordination among research units and researchers and a higher bureaucratisation that affect the organisational learning and efficiency of research units (cf. Coccia and Rolfo, 2008; Coccia, 2008b, 2009a, 2009b). In particular, these reforms of the CNR have not changed the internal governance and have been generating structural deficiencies in terms of organisational learning due to increased red tape, hampered careers advancements and
low job satisfaction. Hence, low organisational learning and efficiency of the National Research Council laboratories in Italy are due to a public restructuring not focused on the theory of incentives and good public management. In other words, the ongoing restructuring of CNR is based on a misguided conception of a performance-oriented governance which generates an inertia in organisational learning of public research institutes in comparison to private research labs, with main negative effects in terms of scientific performances and organisational behaviour (Coccia, 2001a, 2004, 2005a, 2008a, 2009a, 2009b).

Findings and analysis of congregate maps can underpin specific managerial recommendations to support the mechanisms of organisational learning in public research labs. The best-practices are the background for learning organisation in order to improve internal efficiency as well as scientific performance, reducing the effects of organisational discrepancies. A set of public management mechanisms of learning organisations can be (cf. Pettigrew, 1990):

- **Leadership and coherence** are critical requirements for most efficient organisations. Leadership can support organisational learning (Yuan and Lee, 2011). A good leadership must be able to recognise its men, discover their talent and direct it into the right organisational role so that it can serve the team as a whole. Salleh et al. (2011) claim that: “significant joint effects of organisational leadership and learning factors of professional intellects that can contribute in enhancing organizational performance and innovativeness” (p.103). Instead, Reichard and Johnson (2011) argue that: “leader self-development enables leaders to adapt to the continually changing environment both within and outside of the organization”. ‘Team leaders’ should act as catalysts by allowing all institute staff to participate in research projects and activities. The role of team leaders is very important, especially when the workforce, as in the current institutes of CNR, is geographically dispersed and R&D workers have to collaborate in cross-functional teams (Kayworth and Leidner, 2002).

- **Team building.** In a scientific research institute where scientists are from different research fields, methods of building and conducting groups oriented to strategic goals are important approaches. Job involvement in a small community is the starting point towards deeper forms of organisational learning. The group favours innovative solutions by the debate and the comparison of individual competencies. The construction of groups acting as a team should imply the active and charismatic participation of more experienced members. Jyothibabu et al. (2012) show that: “there is a relation between all the levels of learning – individual, group and organizational – with each other... That means group level learning mediates between individual level learning and organizational level learning. Thus, groups are also important learning entities. But more importantly, there is a need for special emphasis by organizations on roles and rules, routines, practices and standing operating procedures, culture, information systems, the physical structure of the workplace and sources outside the organization” (p.211). Allahyari et al. (2011, p.1549) consider that: “empowerment has positive relations with organizational learning … sense of incorporation with others and sense of competence predicts the organizational learning”.

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Motivation and rewards. The motivation determines the level of commitment each researcher devotes to his/her activity and in taking part in team work. Atak and Erturgut (2010, p.3472) argue that: “organizational commitment is an element which affects learning organization … the information age organizations need to obtain employees with high organizational commitment and take measures in order to increase commitments of employees in order to become learning organizations”. In addition, it is important to design reward schemes for human resources, mainly in public bodies, by flexible salaries, paying outstanding performers more than other workers. Kochanski and Ledford (2001) claim that without any differentiation in extrinsic rewards (such as salaries), high performers would feel dissatisfied and leave and/or working less if treated in the same way as low performers (this is a common organisational problem of public servants in current Italian CNR public research institutes and it has driving low organisational learning and performances). These best management practices could also reduce the brain drain (towards universities) that represents a loss of tacit knowledge accumulated over time within institutes.

Personal development. Groups usually develop their own way of operation and create their own work environment for personal development that supports organizational learning. The analysis of congregate map shows that there are not opportunity for discussion and debate among researchers concerning research projects. Arranging places where views and ideas can be compared and discussed (e.g., social events, meetings, conferences, work lunches, etc.) will improve the working environment, personal development, circulation of information and organisational learning. Open communication channels and strong social relations, beyond scientific collaboration, promote the rise of a learning milieu by united and winning groups associated to the scientific development of the Institute. In such environment, individuals express and appreciate their own potential and competence. It is always necessary to start from the job involvement of research personnel in order to construct a team able to improve and increase exchanges with the internal and external environment. Safari et al. (2011, p.1147ff) claim that: “the factors of psychological empowerment, self-efficacy, self-determination, impact and meaningfulness had the most power to predict the organizational learning respectively”.

Although the results of this research, focused on a specific public research institute, cannot be directly transferred to other organisations, mainly private ones, the tendency in public research sector seems to confirm several communication bottlenecks and organisational deficiencies of this analysis that hamper current organisational learning, behaviour and scientific performances of public research institutions. The study here can be considered a starting point to understand the organisational learning of public research labs and in particular the factors of friction that generate inertia with negative effects for organisational behaviour and performances. In brief, some main causes of this organisational (un)learning are the effects of friction on the intra-organisational communication among researchers and scientific groups driven by hasty restructuring, high bureaucratisation of public bodies, low coordination and incentives of public servants. These weakness points can be lessen by best practices of learning organisation. However, it is important to note that the implementation of above-mentioned managerial tools is not an easy task and requires to overcome several bureaucratic barriers within public research labs as well as cultural factors typical of public servants and bureaucrats.
in public bodies. The main challenge of policy maker is to design and implement these public management best practices that may improve structure and governance of public research labs to support their organisation learning and strategic change and, as consequence, their efficiency in fast-changing scenarios.

References


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Notes

1 A change involves an attempt to alter the current way of thinking and acting by the membership of an organization.

2 Decision making can be regarded as the mental processes (cognitive process) resulting in the selection of a course of action among several alternative scenarios. Every decision making process produces a final choice (Kahneman and Tversky, 2000).

3 It is a technique where interviews are about some organizational life main themes; Q is for questioning.

4 A knot is cryptic if it has a deep meaning and it acts from adhesive in the inter-subjective conversations.