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Research

Quality Management Systems Underpinning National Public Health Institutes Units and Leverage of Organisational Knowledge

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Abstract

Purpose: This study aims to contribute to the understanding of how the organisational knowledge leverage is crucial to develop and implant quality management systems underpinning national public health institutes units. The objective is to analyse whether organisational knowledge leverage is decisive to develop and implant quality management systems supporting national public health institutes units. **Methods:** Relevant academic books and manuscripts in English, Portuguese and Spanish languages were identified as an income to support the results. The information was contrasted with the experience in a biologics manufacturing unit of the Argentinian national institute of public health – ANLIS “Dr. Carlos Malbrán”. Data were collected through group interviews and group exercises involving members of the unit who represented different positions, functions, roles, and age groups. **Main Findings:** The findings remarkably underline that knowledge socialization and externalization are imperative at the time to develop and implant a quality management system. In addition, the authors identified how this knowledge conversion arose. A formal knowledge management system is strongly proposed to support the quality management system, making synergy between them, facing present and future challenges in national public health institutes. The study reinforces the need of formal knowledge management practices to mature a quality management system, based on the experience in a biologics manufacturing institute. **Research limitations/implications:** Data were collected from a single biologics manufacturing unit and therefore, to generalise the findings should be necessary further research involving more units.

Key words: Public health, knowledge management, quality management, organisational performance, continuous improvement

Introduction

ISO 9001:2015 standard “Quality management systems – Requirements” unlike its previous editions, deems organisational knowledge as a resource. It states that “...The organization shall determine the knowledge necessary for the operation of its processes and to achieve conformity of products and services. This knowledge shall be maintained and be made available to the extent necessary. When addressing changing needs and trends, the organization shall consider its current knowledge and determine how to acquire or access any necessary additional knowledge and required updates...” [1]. The organizational knowledge can be based on: a) internal sources (e.g., intellectual property,

experiences, lessons learned from failures, successful projects, process, products and services) or b) external sources (e.g., standards, conferences, knowledge from providers and customers). Additionally, ISO 9004:2018 standard “Quality management — Quality of an organization — Guidance to achieve sustained success” [2], also emphasise knowledge as a resource. Therefore, according to the International Organization for Standardization (ISO) knowledge is a key factor not only for an organisation’s quality management system, but for its sustained success, achieving organisational excellence.

This study aims to contribute to the understanding of how the leverage of organisational knowledge is crucial to develop and

implant quality management systems underpinning national public health institutes units.

Materials and Methods

The hypothesis to assess is whether “organisational knowledge leverage is decisive to develop and implant quality management systems underpinning national public health institutes units”.

PICO approach was understood as: a) population, public health institutes; b) intervention: knowledge management practices; c) comparison: absence of knowledge management practices; d) outcome: quality management system improvement and maturity, monitored by key performance indicators.

Relevant academic books and manuscripts in English, Portuguese and Spanish languages were identified as an income to support the results. Furthermore, manuscripts were searched in PubMed "Knowledge Management" [Majr] term as strategy.; consequently 256 items were found. At the time to constrain by ("Knowledge Management"[Mesh]) AND "Public Health"[Mesh], 158 items were found. Finally, focused on ("Knowledge Management"[Mesh]) AND "Public Health Administration"[Mesh], one manuscript was retrieved.

In order to review the local experience in a biologics manufacturing unit of the Argentinian national institute of public health – ANLIS “Dr. Carlos Malbrán”, data were collected through group interviews and group exercises involving members of the unit who represented different positions, functions, roles, and age groups.

Results

Theory of organisational knowledge creation

The organisational knowledge creation theory was proposed by Nonaka and Takeuchi in 1995. This phenomenon is defined as “...the capability of a company as a whole to create new knowledge, disseminate it throughout the organization, and embody it in products, services and systems...” [3]. The authors assert that knowledge is initially created by individuals and then it is converted into organisational knowledge through the spiral process of knowledge creation, which encompasses two dimensions: epistemological and ontological.

In regard the epistemological dimension, the authors recognise two types of knowledge: tacit and explicit. Tacit knowledge is the one that arises from intuition and experience; it is deeply personal, subjective, and informal, being difficult to articulate, formalise and transmit to others. “...At the same time, tacit knowledge has an important cognitive dimension. It consists of mental models, beliefs, and perspectives so ingrained that we take them for granted, and therefore cannot easily articulate them. For this very reason, these implicit models profoundly shape how we perceive the world around us...” [4]. Explicit knowledge is the one that can be written, hence becoming systematic. It is relatively easy to be communicated and shared and can be transferred from one person to another. It can be described in procedures, product specifications, scientific formulas, and computer programmes, among many other ways.

Ontology, in its generic definition of science of being, is the basis for defining the ontological dimension. It refers to the entities that create knowledge and includes individual, group, organisa-

tion, and beyond it, inter-organisation.

Some tacit knowledge can be transferred directly to another individual (socialization) or converted into formal knowledge (externalization). Sequentially, the knowledge may be formally available to a group (combination) or be incorporated by another individual or group (internalization). Across these modes of conversion, tacit knowledge of an individual turns to tacit knowledge of a group. Starting over the cycle as a spiral, knowledge is formalised and expanded to the organisation as a whole and can subsequently interact with other organisations.

“...The spiral emerges when the interaction between tacit knowledge and explicit knowledge is dynamically elevated from a lower ontological level to higher levels...” [5]. This spiral is created by the four modes of knowledge conversion which include socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit) and internalization (explicit to tacit).

Socialization: to share and generate tacit knowledge through direct experiences.

Externalization: to articulate tacit knowledge through reflection.

Combination: to systematize and apply explicit knowledge and information.

Internalization: to learn and acquire new tacit knowledge in practice.

In summary, “...Making personal knowledge available to others is the central activity of the knowledge-creating company...” [6].

“...The concept of a knowledge economy has emerged to represent a ‘soft discontinuity’ from the past. It is not a new economy with new laws. Instead, it is an economy driven by knowledge intangibles rather than physical capital, natural resources or low-skilled labour...” [7]. A discipline of high impact on the academic and organisational fields arose: knowledge management, which premise is that knowledge has become the key asset for the sustained success of an organisation. It is a discipline that draws on several diverse ones related to information systems and technologies, cognitive sciences and learning resources, economic and management sciences. Jashapara defines knowledge management as “...the effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to enhance an organisation’s intellectual capital and performance...” [8].

The Organization for Economic Cooperation and Development (OECD) asserts that in many countries the terms intellectual capital and intellectual or intangible assets are equivalent. “...There is no globally accepted definition and classification of intellectual assets. Most definitions seem to agree that they have three core characteristics: i) they are sources of probable future economic profits; ii) lack physical substance; and iii) to some extent, they can be retained and traded by a firm. They generally include at least R&D, patents, and trademarks...” [9].

Knowledge in an organisation can be approached from two conceptually distinct, but intimately linked perspectives: or-

organisational learning and learning organisation. Organisational learning is defined by Fiol and Lyles as "...the process of improving actions through better knowledge and understanding..." [10]; it is related to individual learning, team learning, knowledge processing in the organisation, rules, routines, and organisational procedures. The concept of learning organisations has been widely spread by Peter Senge on his work *The Fifth Discipline*; conceiving the quality movement as the first wave in true learning organisations. It is achieved by practising five disciplines: personal mastery, mental models, shared vision, team learning and systemic thinking. He defines learning organisations as "...organisations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together..." [11]. In summary, "...learning organisation is an entity which requires knowledge management, while knowledge management is a process which assumes the learning organisation..." [12].

As expressed in the Introduction to this manuscript, the International Organization for Standardization (ISO) considers knowledge as a vital factor in the overall sustained success of an organisation. The Model of Excellence in Public Management in force in the Federative Republic of Brazil, holds the information and knowledge dimension [13]. The EFQM Model of Excellence developed by the European Foundation for Quality Management is a tool to stimulate and support knowledge management. "...Explicitly, through its definition of the fundamental concepts of excellence, this model recognises that to achieve maximum performance, organisations need to manage and share their knowledge in the context of a culture oriented towards learning, innovation and continuous improvement..." [14]. To enable studies that link the concepts of knowledge management and quality management, a profuse review [15] concludes establishing the dimensions of knowledge management and quality management. The first comprises: knowledge creation, knowledge transfer and storage, and finally application and use of knowledge. The dimensions of quality management, according to such review are leadership, planning, people management, process management, information and analysis, customer focus, supplier management and product design.

The Institute of Applied Economic Research (IPEA) of the Federative Republic of Brazil, outlined the challenges of knowledge management for public administration in thematic areas for development [16]. Based on these challenges, Batista proposes a knowledge management model for the Brazilian public administration. He defines knowledge management as "... an integrated method of creating, sharing and applying knowledge to increase efficiency, improve quality and social effectiveness; and contribute to the legality, impersonality, morality and publicity in the public administration and for Brazilian development..." [17]. The author develops a model in knowledge management for public administration, postulating the KDCA cycle, which is naturally based on the PDCA Deming improvement cycle (plan - do - check - act); the letter "K" refers to the emphasis on knowledge. The model is generic for the entire Brazilian public administration and in opinion of the authors of this manuscript, of extensive application to other countries.

Milton and Lambe [18] have identified four critical facilitators in knowledge management: a) roles and responsibilities; b) processes; c) technology; and d) governance. A multidisciplinary team that encompasses these facilitators is highly appropriate in health science and technology institutions, particularly national health institutes. This would enable sustainable performance on its essential functions, as recommended by the International Association of National Public Health Institutes [19].

On the field of public health administration, three case studies reveal that appears to be crucial the role of a new actor, the knowledge broker, who facilitates the integration of evidence-informed decision making [20, 21].

In the context of an organisational transformation programme at the National Biologicals Manufacturing Institute, which is part of the National Laboratories and Health Institutes Administration - ANLIS "Dr. Carlos Malbrán" (the Argentinian national institute of public health), it was considered imperative to design and implement a quality management system that utterly fulfils the applicable legal and regulatory requirements. Knowledge management practices were carried out, particularly at the time to socialize individual and group knowledge and externalize them into formal documents of the quality management system. These documents allowed to attain and to boost part of the tacit individual and group knowledge, making it explicit and available to other members of the organisation. According to the metaphor of the conceptual umbrella for knowledge management [22], the following tools were mobilised: information management, mapping and process management (complying with the Association of Business Process Management Professionals Common Body of Knowledge – BPM-CBOK), intellectual capital management, skills management and personnel management, training-space context to promote knowledge management, strategic associations with universities and institutions of excellence, among others. Hence "...quality management takes the form of systems and proposes that the evolution of organisational knowledge is the result of the adoption and maintenance of an efficient quality management system, allowing a continuous improvement of the organisation, which in turn generates more knowledge..." [23].

In order to identify the conversion knowledge practices at the socialization and externalization modes, three stages presented in the literature were fulfilled: a) metaphor; b) analogy and c) model [24].

a) Metaphor: at this stage, free associations are made between concepts, abstract or not, in which a network of new concepts is formed.

b) Analogy: at this stage, the contradictions originated in the metaphor stage are harmonised through a more structured and logical association process based on the structural and / or functional similarities between two entities. In this process, the new concept emerges from the previous ones and gains autonomy, becoming explicit.

c) Model: after a new concept becomes explicit, it can be modelled and transformed into a logical model in which contradictions do not occur and the concepts are expressed in a coherence systematic language.

Discussion

Knowledge management became a concept widely addressed in the last decade and included in the models of excellence in public management. However, the adoption of globally accepted methodologies is a challenge to overcome, even in organisations with recognised investment in quality management in their resources, processes, services, and products. Modern society increasingly requires public organisations to respond to their needs and expectations, within reliability expressed in a huge set of standards. These growing and complex demands require articulated responses among managers, technicians, policy formulators and society, whose actions are determined in networks within a globalised world. Particularly in health science and technology institutions, where the nature of its mission imposes the need for autonomy, with integration and peer alignment, network arrangements and performance in technological platforms are contemporary demands. Therefore, the perspective of creating spaces to share and generate knowledge among national health institutes is fostered. A remarkable fact is the absence of harmonised key performance indicators among national public health institutes. This may be due in part, to diversity of governance and structure. Nevertheless, it would be an important contribution to standardise indicators which would allow to assess the improvement and maturity of national health institutes quality management systems. The International Association of National Public Health Institutes may have a critical role on this issue.

In relation to the Argentinian national biologics manufacturing institute, two categories have been identified in the metaphor stage: knowledge exchange and knowledge construction. In both categories the interaction technique consisted of proximity and personal understanding. The knowledge exchange took place in informal meetings and training activities on conceptual levelling, particularly concerning standards and regulations applicable in quality management. As a result, the identified knowledge and a work schedule were attained. The knowledge construction consisted of formal meetings among the working groups involved and as a result shared knowledge was achieved.

Two categories have also been found in the analogy stage: conceptual harmonisation and conceptual autonomy. In both categories, the interaction technique was based on personal proximity as well as by distance. During the conceptual harmonisation, meetings and training activities were carried out, in adherence to regulatory requirements and voluntary quality standards. As a result of these activities, the organisational work practices were progressively changing and the compliance to regulatory requirements was attained. Additionally, the core quality management system documents in its preliminary version were drafted and reviewed, achieving semi-structured organisational knowledge, converting tacit knowledge into explicit. In the category of conceptual autonomy, preliminary documents were painstakingly analysed during formal meetings and after the necessary adjustments, the quality management system documents original versions were approved. The documents are available to the personnel involved in the processes.

The model stage includes the conceptual modelling category.

At this stage, process modelling (practice of the process life cycle), internal self-inspections and quality audits and the quality management system critical review began. These activities allowed to strength the formal management system, the improvement in the effectiveness and efficiency of the processes, the organisational learning, and the maturation of the Institute as a technical unit.

In definitive, as an organisational transformation programme tangible result, the Institute's qualification as a biological drugs manufacturer by the national regulatory authority (ANMAT) was attained. This milestone in institutional history brings the need of more efforts and more resources, both to consolidate progress as well as to face new challenges. Pending challenges are certainly greater than this achievement, but it has undoubtedly been a motivating fact on the whole organisation. One of the challenges is to strength is knowledge management, since despite demonstrating its potential in institutional integration and impact on its performance, at present it is not yet structured as a formal governance system.

Conclusion

Knowledge is the main intangible asset in any kind of organisations and particularly in health science and technology institutes. Therefore, its systematic management is a key factor to ensure innovation and sustained success in the performance of the organisation, based on a model of management excellence.

The organisational knowledge creation theory authors, Nonaka and Takeuchi, assert that the core activity of a knowledge creating company is to turn personal knowledge into knowledge available to others. Hence, the two crucial knowledge conversion modes are socialization and externalization.

The reflection-action process is intrinsic to the practices in health science and technology organisations. The implementation of a formal quality management system fosters the creation of institutional integration spaces, where knowledge is built through knowledge exchange which is systematised, registered, and disseminated across the organisation.

The experience in the development and implant of a quality management system at the National Biologics Manufacturing Institute –a technical unit part of ANLIS “Dr Carlos Malbrán”– that utterly fulfils applicable legal and regulatory requirements; enabled the establishment of formal spaces which conducted to institutional integration, promoting the exchange of knowledge and the construction of new knowledge, and revealed that it is inexorably necessary to mobilise organisational knowledge. Additionally, the critical relevance of establishing networks among peer institutions is underlined, fostering their alignment and integration.

Abbreviations

ANLIS; National Laboratories and Health Institutes Administration of Argentina; BPM-CBOK; Business Process Management Professionals Common Body of Knowledge; IPEA; Institute of Applied Economic Research of the Federative Republic of Brazil; ISO; International Organization for Standardization; KDCA; an adaptation of the Deming Cycle in which P is substituted with K to emphasise "knowledge"; OECD; The Organiza-

tion for Economic Cooperation and Development; PICO; Query strategy using a structured strategy of search including population, intervention, comparator treatment and outcome; PDCA; The Deming Cycle (or Plan-Do-Check-Act (PDCA)) is a four-step iterative technique used to solve problems and to improve organizational processes, including Plan-Do-Check-Act.

Conflicts of Interest

The authors declare no conflict of interest.

References

- [No authors listed]. ISO 9001:2015, "Quality Management Systems - Requirements," International Organization for Standardization, Geneva, Switzerland, 2015, www.iso.org
- [No authors listed]. ISO 9004:2018, "Quality management – Quality of an organization – Guidance to achieve sustained success," Geneva, Switzerland, 2018, www.iso.org
- Nonaka I, Takeuchi H. The knowledge creating company. How Japanese companies creates the dynamics of innovation. (p. viii). New York, Oxford University Press 1995.
- Nonaka I. The knowledge creating company. (p. 15). Boston, Harvard Business School Publishing Corporation, 2008.
- Nonaka I, Takeuchi H. The knowledge creating company. How Japanese companies creates the dynamics of innovation. (p. 57). New York, Oxford University Press, 1995.
- Nonaka I. The knowledge creating company. (p. 11). Boston, Harvard Business School Publishing Corporation, 2008.
- Jashapara A. Knowledge management. An integrated approach (pp. 9-10). Essex, Pearson Education Limited, 2011.
- Jashapara A. Knowledge management. An integrated approach (p. 14). Essex, Pearson Education Limited, 2011.
- The Organisation for Economic Co-operation and Development. (2006). Intellectual assets and value creation: implications for corporate reporting. Paris, OCDE. Retrieved on 22/08/2022 from <https://www.oecd.org/corporate/ca/corporategovernanceprinciples/37811196.pdf>
- Fiol C, Lyles M. Organizational learning. *Academy of Management Review* 1985; 10(4):803–13. Available on https://www.jstor.org/stable/258048?seq=6#metadata_info_tab_contents. Last accessed 22/08/2022
- Senge P. La quinta disciplina: el arte y la práctica de la organización abierta al aprendizaje. (p. 11). Buenos Aires, Granica, 2010.
- Jashapara A. Knowledge management. An integrated approach (p. 176). Essex, Pearson Education Limited, 2011.
- [No authors listed]. Instrumento para Avaliação da Gestão Pública, Programa GESPÚBLICA, 250 Pontos, Brasília. Brasil. Ministério do Planejamento, Orçamento e Gestão. Secretaria de Gestão Pública, 2016. -.
- Benavides Velasco C, Quintana García C. Proceso y sistemas organizativos para la gestión del conocimiento. El papel de la calidad total. *ICE Economic Bulletin* 2005; N° 2838. Spain.
- Tarí Guilló JJ, García Fernández M. Dimensiones de la gestión del conocimiento y de la gestión de la calidad: una revisión de la literatura. *Investigaciones Europeas* 2009; 15(3):135-148.
- Batista FF. Modelo de gestão do conhecimento para a administração pública brasileira: como implementar a gestão do conhecimento para produzir resultados em benefício do cidadão (p. 48). Brasília, Ipea, 2012.
- Batista FF. Modelo de gestão do conhecimento para a administração pública brasileira: como implementar a gestão do conhecimento para produzir resultados em benefício do cidadão (p. 49). Brasília, Ipea, 2012.
- Milton N, Lambe P. The Knowledge Manager's Handbook. A step-by-step guide to embedding effective knowledge management in your organization. London & Philadelphia, Kogan Page, 2016.
- [No authors listed]. Role of Essential Public Health Functions, National Public Health Institutes, and IANPHI in 21st Century. International Association of National Public Health Institutes. Report of Bellagio Meeting. Retrieved on 22/08/2022 from https://ianphi.org/_includes/documents/sections/tools-resources/all-frameworks/ianphi-folio-belagio.pdf
- Dobbins M, Traynor RL, Workentine S, et al. Impact of an organization-wide knowledge translation strategy to support evidence-informed public health decision making. *BMC Public Health* 2018;18(1):1412.
- Traynor R, DeCorby K, Dobbins M. Knowledge brokering in public health: a tale of two studies. *Public Health*. 2014;128(6):533-44.
- Dos Santos Costa R, Rodrigues Barbosa R. Práticas de gestão do conhecimento: um estudo em organizações associadas à Sociedade Brasileira de Gestão do Conhecimento. *Pesq. Bras. em Ci. da Inf. e Bib.* 2013; 8(2):10-22.
- Figueiredo LSR, Schmidt LM, Varvakis Rados GJ. Relações entre a gestão do conhecimento e a gestão da qualidade no âmbito da nova revisão da ISO 9001:2015. *Perspectivas Em Gestão & Conhecimento* 2018; 8 (Esp.): 55–69.
- Carvalho F. Gestão do conhecimento. São Paulo. Pearson Education, 2012.

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