

Knowledge Translation in the Healthcare Sector. A Structured Literature Review

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Abstract: Knowledge translation can be understood as the ability to translate concepts between different contexts by stakeholders who have different skills, aims, and even feelings in their relation to such concepts. Knowledge translation tools allow for the effective transfer of existing knowledge as well as the emergence of new knowledge of value to some or all of the stakeholders involved in the process. Knowledge translation is particularly challenging in healthcare and medicine, where different practitioners (e.g. physicians, biologists, engineers, researchers) and professionals need methodologies and tools to communicate and share knowledge among them and with patients in an effective manner. To better understand this phenomenon, we conducted a Structured Literature Review (SLR). The concepts *knowledge*, *translation* and either *healthcare* or *medicine* were used as search terms in the title, abstract or keywords on Scopus, which highlighted more than 2,000 contributions in the medical literature and only 22 in Business and Management. Our review of these documents revealed a need in the healthcare sector for better managerial and organisational practices to cope with the various challenges related to the sharing of knowledge among stakeholders. At the same time, the business and management communities appear to have made significant progress in addressing the same issues. We therefore decided to concentrate our analysis on the works published by the business and management community as a mean to highlight future research directions for the healthcare management sector. Thus, our research identifies areas of relevance which are currently underdeveloped, provides insights on both theoretical and empirical developments and offers a critique of the approaches, research frameworks and methods used, as well as emerging trends in these domains. Despite a lack of an agreed definition of the term Knowledge Translation, our findings highlight a growing interest in the topic, with most of the contributions published after 2015. Scholars have approached the term from a variety of perspectives depending on the nature of the stakeholders of relevance to their studies. Whilst there does not seem to be a predominant framework, the literature reveals several tools and techniques that are effective in enhancing Knowledge Translation in different contexts. New research opportunities in this domain emerge in terms of underinvestigated areas within the healthcare sector.

Keywords: Knowledge Translation, Healthcare, Knowledge Management, Knowledge Transfer • Medicine

1. Introduction

Knowledge management stands as a crucial business process in both the private as well as the public sector (Aureli et al., 2019; Del Giudice and Maggioni, 2014; Massaro, Dumay, and Garlatti, 2015; Sousa, 2010). Among the various fields, healthcare stands as a critical one, given its ability to impact on people's lives and wellbeing (Reay et al., 2017; Ware et al., 2008). The relevance of knowledge and its management in the healthcare scenario has been widely investigated in the literature (Ferlie et al., 2015; Jacquinet et al., 2019; Miller, 2015; Sánchez-Polo et al., 2019; Sousa et al., 2020).

Still, the healthcare sector is currently under great pressure, and several challenges to be addressed have arisen. The impact of new technologies like mixed and augmented reality, artificial intelligence, robotics, big data analytics are affecting several medical disciplines, changing the way surgery, diagnosis, and treatments are performed (Dal Mas, Piccolo and Ruzza, 2020; Dal Mas et al., 2020b; Dal Mas et al., 2019b; Giulianotti et al., 2003; Presch et al., 2020). Innovation involves not only new medical equipment and instruments but also

clinical protocols, like in the case of oncology (Cobianchi *et al.*, 2016; Hogan *et al.*, 2012; Vitolo *et al.*, 2019). Medical doctors and clinical staff require new skills and training methods (Garcia Vazquez *et al.*, 2020), and blended curricula are leading to new professional figures, like technical physicians (Groenier, Pieters, and Miedema, 2017). Several budget reductions, especially in developed countries (Massaro, Dumay, and Garlatti, 2015) make it difficult to cope with the increasing request for outpatient and inpatient services by an ageing population (Howdon and Rice, 2018) with more chronic diseases (Miceli *et al.*, 2017). The recent COVID-19 pandemic at the beginning of 2020 (WHO, 2020) has further highlighted the need, for the entire healthcare system, to profoundly review its global strategies (Cobianchi *et al.*, 2020a, 2020c).

In this evolving international scenario, the healthcare ecosystem had to open up its boundaries to the engagement and the interaction of several different stakeholders (Ardito and Messeni Petruzzelli, 2017; Secundo *et al.*, 2019). Not only multidisciplinary and diverse teams are more and more involved in clinical practices and medical innovation (Cobianchi *et al.*, 2020b; Qadan *et al.*, 2020; Saini *et al.*, 2012), but the patient plays a central role in the co-production of the healthcare products or services (Batalden *et al.*, 2016; Elwyn *et al.*, 2019). In the modern healthcare scenario, patients are more and more engaged in the co-design (Hussain and Sanders, 2012; Reay *et al.*, 2017) and co-production of their needed services (Biancuzzi *et al.*, 2020; Dal Mas *et al.*, 2020a), in a patient-centric perspective (Brunoro-Kadash and Kadash, 2013).

The transfer and sharing of knowledge stand as key tasks to ensure the creation of new knowledge and innovation (Sousa, 2015). Still, the presence of a variety of stakeholders with different characteristics makes it challenging to manage the knowledge flows properly (Sousa *et al.*, 2020). Distinct features in terms of competencies, needs, feelings, education create barriers in the transfer and sharing of knowledge, calling for a translation process to enable knowledge, data, and information to be understood and exchanged successfully.

The topic of knowledge translation is gaining increasing attention both from academia as well as practice due to its crucial role in supporting innovation in various business fields (Lander, 2016). Savory (2006) highlights how the social nature of knowledge needs something more than a “knowledge transfer.” A complete translation is necessary, recalling the idea of a foreign language which is translated into another language in a different environment (Simeone, Secundo and Schiuma, 2017, 2018). The translation act recalls metaphorical thinking (Bratianu and Bejinaru, 2019; Lakoff and Johnson, 1999), as part of a mental process to understand and handle new knowledge and information (Pinker, 2007).

While the topic of knowledge translation is considered relevant in several business fields (Bagnoli *et al.*, 2020; Massaro *et al.*, 2019; Simeone *et al.*, 2018), it is even more prevalent in healthcare and medicine. At the time of our analysis, the search key “knowledge AND translation AND healthcare OR medicine” in the title, abstract, or keywords on the scientific database Scopus led more than 3,000 contributions of which over 2,000 in the medical and clinical literature. Still, just a few contributions were labelled under the business and management fields.

Our initial thought was that the topic had been better developed in healthcare than it was in business and management. However, an initial analysis revealed how many of those works published in healthcare had mentioned knowledge translation as a challenge in the context of the research, rather than focusing on it as part of solutions. Additionally, those works from the healthcare sector that were focused on the concept of knowledge translation were reporting research conducted in business and management.

In these circumstances, we concluded that there was more value for the research and practice communities in a review of a smaller number of highly relevant contributions from the business and management domain than a larger, less focused and therefore less productive review of the research in the healthcare sector which, ultimately, would only confirm the need for a review of works published in other contexts.

Moreover, the recent challenges and events which are impacting on the healthcare scenario, including the COVID-19 pandemic, have stressed the need to identify successful managerial practices to redesign the new healthcare system (Lillemo, 2020). Furthermore, the recent clinical literature connected to the COVID-19 events has suggested the need for a multidisciplinary approach to medicine (Brindle and Gawande, 2020; Cobianchi *et al.*, 2020c; Grasselli, Pesenti, and Cecconi, 2020; Qadan *et al.*, 2020), in which managerial practices and strategies play a central role (Cobianchi *et al.*, 2020a; Cobianchi *et al.*, 2020c; Parodi and Liu, 2020; Wang, Ng, and Brook, 2020).

Starting from these premises, this paper aims to investigate the current debate on knowledge translation in healthcare and medicine by conducting a Structured Literature Review (SLR), according to the framework of Massaro, Dumay, and Guthrie (2016). Our first attempt to map the phenomenon, taking into consideration the need to study it from a managerial perspective, includes only the works published in the Business and Management field, meaning in journals or books which are labelled to belong to the Business and Management areas. The aim is to understand the dialogue about the managerial and organisational practices involving organisations belonging to the healthcare sector in the translation of knowledge among the business rather than the clinical community, to spot the most relevant topics, techniques, and research and practical implications. Our preliminary analysis made us understand how exploring the subject in the context of Business and Management (particularly if related to healthcare organizations) would serve to inform the direction of research in the healthcare sector.

2. Research method

This paper employs a Structured Literature Review approach (Massaro, Dumay, and Guthrie, 2016). An SLR “can help experienced scholars develop new and interesting research paths by accessing and analysing a considerable volume of scholarly work” (Massaro, Dumay, and Guthrie, 2016). Moreover, it can “contribute to developing research paths and questions by providing a foundation” for future research activities, by providing a different choice to classic literature reviews to lead to more “defensible” and “replicable” outcomes. The following paragraphs summarise the steps undertaken to conduct the SRL.

2.1 Write a literature review protocol and define the questions that the literature review is setting out to answer

A first preliminary protocol was defined to document the procedures followed in undertaking and in developing the literature review, and in making it repeatable and trustworthy. The initial protocol document contributed to identifying three central research questions.

RQ 1: What are the main features of the literature on knowledge translation in healthcare and medicine, seen from a managerial perspective?

RQ 2: What are the most frequent issues and themes/topics of this literature?

RQ 3: What seem to be the possible implications for future research in this field?

2.2 Determine the type of studies and carry out a comprehensive literature research

We used the database Scopus to identify relevant contributions to be analysed. At the time of the study, the search key "knowledge AND translation AND healthcare OR medicine" in the title, abstract, or keywords on Scopus led to more than 3,000 total contributions of which over 2,000 in the medical and clinical literature and only 22 in Business and Management. Of those 22 between papers and book chapters, 18 have been considered appropriate for the analysis and thus have been coded using Nvivo.

The following table summarises the selected contributions included in the SLR. One first result comes once browsing the year of publication. While the earliest work is dated back in 2008, ten contributions (55% of the sample) were published after 2015, highlighting the increasing interest towards the topic.

Table 1: Authors, articles, and sources

Authors	Title	Year	Source title
Karimi, L., Dadich, A., Fulop, L., Leggat, S.G., Eljiz, K., Fitzgerald, J.A., Smyth, A., Hayes, K.J., Kippist, L.	Brilliant health service management: challenging perceptions and changing HR practices in health services	2019	Asia Pacific Journal of Human Resources
Fulop, E.L., Kippist, L., Dadich, A., Hayes, K., Karimi, L., Symth, A.	What makes a team brilliant? An experiential exploration of positivity within healthcare	2019	Journal of Management and Organization
Grigoriadis, N., Bakirtzis, C., Politis, C., Danas, K., Thuemmler, C., Lim, A.K.	A health 4.0 based approach towards the management of multiple sclerosis	2017	Health 4.0: How Virtualization and Big Data are Revolutionizing Healthcare
Currie, J., Mateer, J., Weston, D., Anderson, E., Harding, J.	Implementation of a clinical governance framework to 17 Combat Service Support Brigade, Australian Army	2017	International Journal of Health Governance
Mohaghegh, N., Zarghani, M., Tahamtan, I., Ghasghaee, A., Mousavi, S.	Assessing knowledge translation in Iranian medical research centres	2017	International Journal of Information Science and Management
Dadich, A., Olson, R.E.	How and why emotions matter in interprofessional healthcare	2017	International Journal of Work Organisation and Emotion
D'Andreta, D., Marabelli, M., Newell, S., Scarbrough, H., Swan, J.	Dominant Cognitive Frames and the Innovative Power of Social Networks	2016	Organization Studies
Lander, B.	Boundary-spanning in academic healthcare organisations	2016	Research Policy
Dadich, A., Abbott, P., Hosseinzadeh, H.	Strategies to promote practice nurse capacity to deliver evidence-based care: An example from sexual healthcare	2015	Journal of Health, Organisation and Management
Avila-Robinson, A., Islam, N.	Evolution of emerging iPS cell-based therapies for age-related macular degeneration (AMD)	2015	Portland International Conference on Management of Engineering and Technology
Radaelli, G., Lettieri, E., Mura, M., Spiller, N.	Knowledge sharing and innovative work behaviour in healthcare: A micro-level investigation of direct and indirect effects	2014	Creativity and Innovation Management
Oborn, E., Barrett, M., Racko, G.	Knowledge translation in healthcare: Incorporating theories of learning and knowledge from the management literature	2013	Journal of Health Organization and Management
Brunoro-Kadash, C., Kadash, N.	Time to care: A patient-centered quality improvement strategy	2013	Leadership in Health Services
Baigorri, A., Villadangos, J., Astrain, J.J., Córdoba, A.	A medical knowledge management system based on expert tagging (MKMST)	2013	WIT Transactions on Information and Communication Technologies
Komporozos-Athanasidou, A., Oborn, E., Barrett, M., Chan, Y.E.	Policy as a struggle for meaning: Disentangling knowledge translation across international health contexts	2011	Knowledge Management Research and Practice
Ioannidis, J.P.A.	Limits to forecasting in personalized medicine: An overview	2009	International Journal of Forecasting
Savory, C.	Building knowledge translation capability into public-sector innovation processes	2009	Technology Analysis and Strategic Management
Ware, C., Buckwell, C., Small, S., Wood, R.	Activation of evidence: A new approach to knowledge translation and closing the clinical care gap	2008	Journal of Medical Marketing

2.3 Define an analytical framework

A fundamental step in conducting an SLR is the definition of a framework of analysis. The list of the leading nodes and sub-nodes is taken from previous SLR papers, adapted to the aim of the study.

The first category of nodes is about the type of authors, dividing them into scholars vs practitioners. The second category refers to the location where the study is conducted (Massaro, Dumay, Garlatti, 2015). The third category is about the sector type, dividing it into public and private sectors. The fourth group of nodes

refers to the healthcare sector, while the fifth one is about the healthcare service. The sub-nodes of the fourth and fifth category were added while coding the papers. The sixth category concerns the research methodology used in the study (Dal Mas et al., 2019a; Massaro, Dumay, and Garlatti, 2015). The seventh category analyses the framework model used (Dal Mas al., 2019a; Massaro, Dumay, and Garlatti, 2015; Massaro et al., 2016). The eighth node group maps the type of knowledge translation explained in the research and the eventual definition given. The ninth category analyses the knowledge translation tools cited in the various studies. The tenth category is about the eventual explanation of the findings. The last three categories refer to the eventual research, practical, and policy implications.

The following table summarises the framework model and the main results of the coding.

Table 2: Analytical framework

Category	Variables	Results	%
Author type	Scholars	15	83%
	Practitioners	1	6%
	Practitioners and scholars	2	11%
Location	Continental Europe	2	11%
	UK	2	11%
	Australia	5	28%
	North America	2	11%
	Central South America	0	0%
	Asia	1	6%
	Africa	0	0%
	New Zealand	0	0%
	Russia	0	0%
	Various countries together	1	6%
	No Location	5	28%
	Sector type	Public Sector	13
Private Sector		1	6%
Both private and public sector		0	0%
General		4	22%
Healthcare Sector	Scientific and Clinical Research	3	17%
	Hospitals	4	22%
	Army	1	6%
	Government agencies	5	28%
	Interprofessional Practices	1	6%
	E-Health	1	6%
	Academic Healthcare Organizations	1	6%
	General	1	6%
	Pharma	1	6%
	Healthcare Service	Regenerative Medicine	1
Radiology		1	6%
Neuroscience		1	6%
Governmental Army		1	6%
Governmental Networks		1	6%
Primary Healthcare		1	6%
Oncology		2	11%
Multiple Sclerosis		1	6%
Personalised Medicine		1	6%
Quality Healthcare		1	6%
Stroke		1	6%
Infection and immunology		1	6%
General Clinical Research		1	6%

Category	Variables	Results	%
Research Method	General	2	11%
	Palliative care	1	6%
	Pharma	1	6%
	Quantitative cross-sectional	3	17%
	Case Study	4	22%
	Literature review - normative	2	11%
	Other qualitative	2	11%
	Viewpoint	2	11%
	Mixed methods	2	11%
	Interviews	2	11%
Framework	Discourse Analysis	1	6%
	No framework-model used	6	33%
	Applies previous framework	10	56%
Definition of Knowledge Translation	Proposes a new framework-model	2	11%
	Type of KT	16	89%
	No	0	0%
Knowledge Translation tools	Clear definition	6	33%
	Yes	18	100%
Findings	No	0	0%
	Explains findings	15	83%
Research implications	Not explained	3	17%
	Explains research implications	8	44%
Practical implications	Not explained	10	56%
	Explains practical implications	13	72%
Policy implications	Not explained	5	28%
	Explains policy implications	7	39%
	Not explained	11	61%

3. Findings, insights and critique

This section analyses the coding to answer to RQ1: What are the main features of the literature on knowledge translation in healthcare and medicine, seen from a managerial perspective? and RQ2: What are the most frequent issues and themes/topics of this literature?

3.1 Author types

Scholars wrote almost all the papers. Practitioners authored only one article, and just two works are the joint effort of scholars and practitioners together.

3.2 Location

Interesting enough, five papers are about Australia. Continental Europe, the UK, and North America account for two studies each. Only one work comes from Asia. Several articles do not refer to any locations. No studies were conducted in Africa or Central/South America.

3.3 Sector type

Most papers refer to the public sector. Only one paper is about the private sector.

3.4 Healthcare Sector

The most analysed sectors are government agencies (five works), hospitals (four works), and scientific and clinical research (three works). Additional sectors are investigated but only with one article.

3.5 Healthcare Service

As can be seen from Table 2, results are incredibly fragmented. Only oncology and healthcare in general terms are present in two papers.

3.6 Research Methods

There does not seem to be a dominant research method used. Authors use quantitative as well as qualitative studies, and there are literature reviews and viewpoints as well.

3.7 Framework model

Although six papers do not use or clarify the framework model used, most of the authors declare to use an existing framework. However, all models are different, since there is no framework which is used more than one time.

The key frameworks that are currently used in the literature include, among others: institutional theory (Dadich and Olson, 2017), critical discourse analysis (Komporezos-Athanasiou *et al.*, 2011), mode 2 knowledge production (Savory, 2009), linear translation by Nelson *et al.* (2011) and Morlacchi and Nelson (Avila-Robinson and Islam, 2015; 2011)

3.8 Definition of Knowledge Translation

Interesting enough, the types of knowledge translation are defined in several ways, according to the stakeholders and actors involved. Indeed, it can be seen as the translation:

- from science to clinical results (four results); meaning the translation of scientific research into clinical practices (like new medical protocols, pharmaceutical treatments, or surgical techniques);
- from the physician to the patient (one result), meaning the translation of clinical knowledge (e.g. diagnosis, potential treatments, risks, ...) from the healthcare professional to the sick person;
- from the patient to the physician (one result), meaning the translation of the feelings, priorities, goals, concerns from the ill person to his or her medical consultant;
- among scientists and professionals in the healthcare/clinical setting (three results), meaning the translation of scientific knowledge within professionals of different disciplines or backgrounds, which may include, as an example, various clinical specialities, engineering, biology, management, physics while dealing with a healthcare issue or research;
- from the central government to single units (one result), meaning the translation of healthcare policies, regulations, and guidelines;
- in general terms (eight results).

Only six articles clearly define the concept of "knowledge translation," some of them citing other works. Results are reported in the following table.

Table 3: Definition of Knowledge Translation

Paper	KT definition
Dominant Cognitive Frames and the Innovative Power of Social Networks (D'Andreta <i>et al.</i> , 2016)	'Knowledge Translation' is the process through which research findings can be applied in medical practice (Denis and Lomas, 2003; McAneney <i>et al.</i> , 2010).
Strategies to promote practice nurse capacity to deliver evidence-based care An example from sexual healthcare (Dadich, Abbott, and Hosseinzadeh, 2015)	Knowledge translation is "any activity or process that facilitates the transfer of high quality evidence from research into effective changes in health policy, clinical practice, or products" (Lang, Wyer, and Haynes, 2007, p. 355).
Policy as a struggle for meaning: disentangling knowledge translation across international health contexts (Komporezos-Athanasiou <i>et al.</i> , 2011)	Translating evidence into practice
Assessing Knowledge Translation in Iranian Medical Research Centres (Mohaghegh <i>et al.</i> , 2017)	"Knowledge translation" is defined as turning knowledge into action which includes "knowledge creation" and "knowledge application" to improve taking advantage of research benefits (Graham <i>et al.</i> , 2006)
Knowledge translation in healthcare Incorporating theories of learning and knowledge from the management literature (Oborn <i>et al.</i> , 2013)	The process of "knowledge translation" includes knowledge dissemination, communication, technology transfer, ethical context, knowledge management, knowledge utilisation, two-way exchange process between researchers and those who apply knowledge, implementation research, and development of consensus guidelines (Canadian Institutes for Health Research - CIHR). A few years later, the World Health Organization (2006) adapted the

Paper	KT definition
	CIHR's definition and defined knowledge translation as "the synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people's health."
Knowledge Sharing and Innovative Work Behaviour in Healthcare: A Micro-Level Investigation of Direct and Indirect Effects (Radaelli et al., 2014)	During idea promotion, individuals do not merely transmit information and data about the proposed innovation, but must also 'translate' these into a form that is understandable and palatable for other individuals and teams

3.9 Knowledge translation tools

The literature identifies 32 different knowledge translation tools and methods, which can foster or enhance the effective knowledge transfer and thus the creation of new knowledge and outcomes. Among the most frequent ones, we may mention online medical records (3 references), web portals (3 references), lesson learned and best practices (5 references), committee and meetings (3 references), mixed and interdisciplinary teams (5 references), training (6 references), interpersonal skills (5 references), and the use of testimonials (3 references). Full results are reported in the following table.

Table 4: Summary of Knowledge Translation tools

Knowledge Translation Tool	Details	Sources
The pathogenesis and mechanisms behind diseases	The use of epidemiological observations to understand the underlying causes of a disease	1
Mobile electronic Medical records and online tools	The use of online or cloud-based apps or systems	3
Design	The use of design elements and artefacts like sketches and images	2
Web portals	The use of online web sites and other web tools	3
Image tagging	The use of clinical imaging	2
Lesson Learned and Best Practices	The use or identification of past conducts which proved to be successful or not, and that should or should not be replicated	5
Tours to share experiences with others	Visiting in person other institutions, hospitals, or organisations	1
Committees and meetings	The establishment of dedicated groups or group gathering to discuss specific topics	3
Journal publications	Dissemination through publishing in academic or non-scientific reviews, journals, magazines, newspapers	2
In-person visit and talking	The use of face-to-face meetings with dedicated time	1
Establishment of mixed teams	The creation of working teams made of diverse people, including professionals with different expertise, skills, and specialities	5
Co-production	The engagement of more meaningful stakeholders, including patients, who take an active part in the production of the healthcare product or service	2
Leaflets and brochures	The use of printed or online booklets devoted to one or more specific topics	1
Training	The organisation of dedicated courses or classes	6
Clinical cases	Explanations using past clinical case reports	2
Clinical guidelines	Explanations using guidelines issued by medical scientific societies	1
Use of interpersonal skills	The use of soft skills like empathy, leadership, teamwork	5
Discussions, debates, curiosity	Time devoted to in-group talks	1
New Technological tools	The use of modern technologies	2
Mentoring and leadership	Dedicated time to guide, teach, and assess other people	1

Knowledge Translation Tool	Details	Sources
Testimonials	The engagement of famous or reputable people, whose knowledge or role is well recognised in one specific field	3
Engaging with the patient's family	Including the patient's family members in the discussion or decision-making process	1
Empowerment	Giving more relevant roles to people	2
Tensions	Understanding eventual paradoxes to foster decision-making	1
Community of practice	The use of a group of people to share knowledge and learn	1
Multidisciplinary people (Eg. degree in medicine + IT)	Getting people with more than one meaningful skills or expertise within the team	1
Use of evidence-based methods	The use of methods which are backed up by objective, scientific evidence that proves they are effective	2
Quality assessment by stakeholders	Asking meaningful stakeholders to judge the quality of one product, service, or process according to certain standards or key performance indicators	2
Prototyping	Using a first or preliminary version of a device starting from its project, from which other forms may be developed.	2
Simulations	Imitating a situation or process, to assess the potential results or outcomes	1
Self-assessment	Self-evaluating the quality of one product, service, or process according to certain standards or key performance indicators	2
Use of simple language	Avoiding technical terms, and replacing them with words from common language	1

3.10 Findings, research implications, practical implications and policy implications

Most papers explain the findings. Most interesting, while several articles stress how knowledge translation can be used in a practical way, just a few works highlight the eventual policy and research implications of the study.

4. Discussion and implications

This section aims to discuss the main findings to answer RQ3: What seem to be the possible implications for the research in this field of knowledge translation in healthcare and medicine? In trying to reply to this issue, we try to develop and address some emerging themes as outlined next.

4.1 Implication 1: practitioners should be involved in the dialogue

Scholars authored most papers, and there is limited involvement of practitioners in the dialogue. This evidence contributes to stress the academics and practitioners divide. While scholars typically use robust methodological approaches, practitioners use real knowledge translation tools in practice to achieve their own ends (Massaro *et al.*, 2018). Given the practical aim of knowledge translation and its wide field of application in healthcare and medicine, stronger cooperation between academics and professionals should be recommended (Presch *et al.*, 2020; Renaudin *et al.*, 2018). Multidisciplinary research teams, merging scholars and practitioners with different skills and experience may be advised, as recommended by the most recent literature, especially following the COVID-19 experience (Albutt *et al.*, 2020; Cobiauchi *et al.*, 2020c; Qadan *et al.*, 2020).

4.2 Implication 2: some areas of the world are more investigated than others

Although our sample is limited, there are areas of the world which are over investigated, while others are absent or underinvestigated. Our literature review highlights the presence of several studies conducted in Australia, which may mean that the topic of knowledge translation is considered relevant in Australian institutions. The UK, continental Europe, and North America are investigated by some works. No studies have been conducted in Africa and Latin America, and only one article analyses Asia. This opens up to new research

opportunities to investigate organisations in such locations and share eventual knowledge translation tools or best practices which may be useful also elsewhere in the world. Comparative studies may also be recommended, as only one paper investigates more countries together. Part of the literature analyses the topic of knowledge translation in general terms, without binding it to some specific location. This may mean that, in the Business and Management community, there is still interest towards a general discussion about knowledge translation as a theoretical topic, which dominant framework still needs to be clarified.

4.3 Implication 3: the private sector deserves attention

Our literature review highlights how almost all studies are about the public sector. This may be due to the availability or access to data by authors, most of whom are academics, as underlined in section 5.1. However, healthcare is a wide field that includes several institutions, firms, clinics, labs, and private universities that belong to the private sector. Understanding the knowledge translation processes in such organisations may open up to further research horizons. In a healthcare system which is becoming more and more interdisciplinary, blended situations are present, in which public and private healthcare institutions and companies cooperate. Understanding the knowledge translation dynamics may open up to further research avenues, and suggest new enablers and techniques which may be useful in practice. In such a perspective, the dialogue between academics and practitioners stand a key point in ensuring the more exciting results, which are linked to real-world situations.

4.4 Implication 4: several healthcare services are investigated

As reported in the previous sections, papers investigate several different healthcare services: from regenerative medicine to stroke, from pharma to palliative care. Only oncology and healthcare in general terms are analysed in more than one contribution. We may then highlight how much the topic of knowledge translation is transversal when it comes to healthcare and medicine, and the potential practical areas of investigation may be several.

4.5 Implication 5: there is a lack of a dominant framework

Section 4.7 has highlighted the absence of a dominant framework model, as no scheme is used in more than one paper. The fragmentation of the literature implies that there is the opportunity to study a common framework that may be used to compare studies and support managers and policymakers towards a useful integrated knowledge translation model. This idea is also supported by the relatively high number of general papers, which are not linked to a specific location, as reported in section 4.2.

4.6 Implication 6: there is not a common definition of knowledge translation

As for the framework model, there does not seem to be a unique definition of knowledge translation. Most articles even do not define it. Again, there is a research opportunity, to sum up previous descriptions to reach a standard paradigm, or, at least, to summarise the main points beyond the metaphorical language used (Bratianu and Bejinaru, 2019)

4.7 Implication 7: there is an open list of knowledge translation tools

Interestingly, even a limited sample of 18 publications led to 32 different knowledge translation tools and methodologies. Some of them seem more common, as they are mentioned in more works, some others are cited by only one article. As highlighted before, knowledge translation tools represent the engine to grant effective knowledge sharing, transfer, and the creation of new knowledge and outcomes. Identifying knowledge translation tools and how they can work in-action leads to practical implications, which may allow theory to be effective in the real world. There is indeed a need to collect more knowledge translation tools and methodologies and understand their dynamics in healthcare organisations, evaluating as they do work in action. Further studies investigating how some enablers and techniques work in practice may contribute to the theoretical debate, as well as to real-world implications.

5. Conclusions

In ending our work, we want to start from the premises of the study. We wanted to investigate the literature on knowledge translation, an increasing phenomenon which is particularly relevant in healthcare and medicine, where professionals and patients have different skills, competencies, and emotions, and thus find knowledge transfer difficult. The recent challenges that are questioning the way healthcare systems work have intensified the debate about the stakeholder's dialogue, and how different actors should be engaged and

cooperate in the healthcare scenario. Given the growing interests towards the managerial and best practices to be applied in healthcare institutions to overcome the current challenges and address the main issues, we decided to concentrate first on the Business and Management literature, to see what the current debate was about. Our limited sample, grabbed from the works listed on Scopus and labelled under the Business and Management fields, highlights an increasing academic interest towards the topic. New research avenues can be defined, as a more significant involvement of practitioners and private institutions, the investigation of some locations and areas, the idea of establishing a standard framework and a set of definitions, and the collection of practical tools and techniques to ensure an effective sharing, transfer, and creation of knowledge. Particular emphasis is placed on the potential relevance of future studies that seek to revisit the concept of knowledge translation from a practitioner's perspective, to better understand not only the drivers of knowledge translation but also the methods used and their transferability across different contexts and domains.

As every study, this paper has several limitations. First, we focused only on peer-reviewed work listed on Scopus and labelled in the Business and Management fields. While including all studies in the clinical field may bias our research aim (thousands of papers, chapters and books only mention the translation factor, but are about clinical cases or techniques), a more comprehensive result may be gathered while enlarging the sample to medical journals devoted to public policies or the wide field of Social Sciences. Despite in academic research, the peer-review process is considered as a synonym for quality in published works, several other relevant publications can be missing, like articles or books in languages different than English. This means that while our findings are informative for the relevant research and practice communities, these may not necessarily be generalisable to every area within the healthcare sector or to every context, and some initiatives, frameworks and models focused on knowledge translation may have been inadvertently omitted. Moreover, the validity of results can only be granted at the time of the analysis, also considering the growing academic interest towards the topic of knowledge translation in healthcare. Future contributions may indeed change the validity of the outcome. Readers should recognise that SLRs are not a panacea offering ultimate answers. Instead, such literature review methodologies have the ambition to detect research gaps and further opportunities for future studies.

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Knowledge Translation in Oncology. A Case Study

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Abstract: Knowledge translation (KT) is the ability to make knowledge accessible to different stakeholders by translating it into various contexts. Translating knowledge is particularly crucial in the healthcare sector, which is currently under significant pressure due to technological innovation, increasing demand of services by an ageing population, budget reductions, and new organisational challenges posed by the latest events like the COVID-19 pandemic. While the first definition of KT was focused on the translation of scientific research into clinical practice, other types of KT later emerged. In healthcare, while stakeholders have different skills and competencies (such as clinical scientists versus physicians or other healthcare professionals), others experience diverse emotional feelings (like the patients or their families). An effective KT allows the transfer, sharing, and creation of new knowledge, enhancing innovation and co-production dynamics. The paper employs a case study by analysing the Breast Unit of the C.R.O. National Cancer Institute of Aviano, Italy, one of the most acknowledged hospitals and research centres in Europe in the field of cancer surgery and treatments. The paper aims at studying the knowledge translation dynamics and tools by analysing the various relationships with the internal as well as the external stakeholders of the Breast Unit. Internally, knowledge translation is needed to merge the competencies of highly skilled multidisciplinary teams, which include surgeons and physicians with various specialities, researchers, psychologists, nurses and other healthcare professionals. Externally, knowledge is translated to meet the needs of patients, patients' associations, sponsors, citizens, and policymakers. Results highlight how different techniques and dynamics allow KT to happen within internal as well as external groups. Contributing to the knowledge management and knowledge translation theories, our findings open up to practical as well as research implications.

Keywords: Knowledge Translation, Healthcare, Stakeholders, Breast Cancer, Medicine

1. Introduction

Knowledge management is becoming a key issue in the private (Del Giudice and Maggioni, 2014; Shujahat *et al.*, 2019; Sousa, 2013) as well as in the public sector (Massaro, Dumay and Garlatti, 2015). Several studies have investigated the relevance of knowledge and its management in healthcare organisations (Jørgensen *et al.*, 2019; Miller, 2015; Sousa *et al.*, 2020). Knowledge management has also been considered as a means to cope with all the challenges that the healthcare field is facing, including the introduction of new technologies like augmented reality, big data analytics and artificial intelligence (Dal Mas, Piccolo and Ruzza, 2020; Dal Mas *et al.*, 2020b), the need to provide services to an ageing population with chronic diseases (Bowser *et al.*, 2019; Miceli *et al.*, 2017), the budget cuts (Massaro, Dumay and Garlatti, 2015) and last, but not least, the need to redesign the system in a “new normal” after the COVID-19 pandemic at the beginning of 2020 (Cobianchi *et al.*, 2020b).

In this evolving scenario, the healthcare ecosystem is turning to a wide-open system (Secundo *et al.* 2019a) in which several different stakeholders need to engage in transferring, sharing, and creating new knowledge, enhancing innovation. While a multidisciplinary professional perspective is required in medicine and surgery (Gabel, Hilton and Nathanson, 1997; Olson, Tooman, and Alvarado, 2010; Qadan *et al.*, 2020), there is an

increasing call to engage the patients in the co-production of the healthcare products and services (Batalden et al., 2016; Dal Mas, et al., 2020a; Osborne and Strokosch, 2013). In such a perspective, the topic of knowledge translation is gaining increasing recognition both from academia as well as practice due to its decisive role in supporting innovation and the creation of new knowledge (Dal Mas, et al., 2020a; Simeone, Secundo and Schiuma, 2018). Knowledge translation is needed when the stakeholders involved have diverse characteristics in terms of skills, competencies, and expertise (Lemire, Souffez, and Laurendeau, 2013; Savory, 2006). Such features build relevant barriers that make it more difficult to transfer and share knowledge effectively, forcing institutions to find tools to enable the translation process.

Starting from this premise, the paper wants to investigate how knowledge is translated within a specific multidisciplinary unit of a public cancer centre located in Italy. Trying to understand the knowledge translation dynamics, the article addresses the following research question:

How is knowledge translated within a high-skilled knowledge institution in the healthcare sector?

The paper is organised as follows. The next section reports the trends in the literature regarding knowledge translation in medicine. The following section describes the methodology used, deepening the research context and data collection and analysis. Results are reported next, followed by the discussion. The conclusion section ends the paper.

2. Literature review

The terms “knowledge translation” recalls the concept of a foreign language which is literally translated into a different language in a divergent context (Secundo et al., 2019b). Savory (2006) stresses how the social nature of knowledge does not allow to talk about a “knowledge transfer” simply. A more comprehensive “translation” is necessary.

Knowledge translation in the healthcare sector is particularly interesting. Indeed, the healthcare ecosystem is based on the interactions of individuals and organisations into a complex adaptive environment (Jacquinet et al., 2019). Productive relationships need to be managed as part of this complex system, and interactions among various actors allow to “produce valuable, new, and unpredictable capabilities that are not inherent in any of the parts acting alone” (Plsek and Wilson, 2001, p. 746). Healthcare ecosystems have been experiencing a shift from a centralised and sequential model of value creation to a more distributed and open model (Bowser et al., 2019; Chen et al., 2019; Cobianchi, 2020b; Gordon, Perlman, and Shukla, 2017; IBM, 2013; Siemens, 2018), where citizens and patients are co-creators of their own wellbeing (Batalden et al., 2016; Bessant, Moeslein, and Kunne, 2012; Biancuzzi et al., 2020b; Dal Mas et al., 2019a; Dal Mas, Paoloni, and Lombardi, 2019; Dal Mas and Paoloni, 2019, 2020). The healthcare ecosystems usually involve a vast number of parties (patients, physicians, clinical researchers, nurses, policymakers) that share their innovation processes to incorporate knowledge flows originated from or co-produced with external stakeholders (universities, research centres, industries, governmental agencies, NGOs, public institutions) (Ardito and Messeni Petruzzelli, 2017; Cobianchi, et al., 2020a; Dal Mas et al., 2018; Gassmann, Enkel, and Chesbrough, 2010; Huizingh, 2011; Renaudin et al., 2018).

In the healthcare scenario, one of the most renowned definitions of knowledge translation is the one developed by the Canadian Institutes of Health Research¹, later adopted by the World Health Organization (Wallace, 2012). In this perspective, knowledge translation is defined as “the synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people’s health.”

The increasing interest towards the topic can be easily recognised through a search key named “knowledge AND translation AND healthcare OR medicine” in the title, abstract, or keywords on the scientific dataset Scopus (Massaro, Dumay, and Guthrie, 2016). Such search leads to more than 3,000 contributions, of which over 2,000 in the medical and clinical literature. The search key “knowledge translation” on PubMed leads to more than 85,000 results. The review of the literature highlights the presence of several different kinds of Knowledge Translation, according to the stakeholders involved and the aim of the transfer.

¹ <http://www.cihr-irsc.gc.ca/e/29418.html>

More in details, Knowledge Translation can be seen as:

- The translation of scientific research into clinical practice (Barcellini et al., 2019, 2020; Cobianchi et al., 2016; Hogan et al., 2012; Peloso et al., 2017; Turin et al., 2018; Vitolo et al., 2019a, 2019b), which aim is to transform knowledge into real-world outcomes, like new clinical protocols, surgical techniques, or drugs;
- The translation of the physician's knowledge to the patient (Kerosuo, 2010), in order to help the patient to understand the diagnosis, the possible treatments, the side effects, supporting decision-making;
- The translation of the patient's knowledge and needs to the physician (Angelos, 2020; Baigorri et al., 2013), to understand the patient's situation and what may best suit him/her in terms of potential treatments;
- The translation of healthcare policies from the central government to specific units (Wallace, 2012), to allow knowledge to be translated into applicable policies, rules, and protocols;
- The translation of knowledge among organisations and professional groups (Cobianchi et al., 2020a; Straus et al., 2008), including the education of healthcare professionals (Garcia Vazquez et al., 2020; Sokol and Shaughnessy, 2018), to enhance innovation and skills development;
- The translation of healthcare policies from public agencies to citizens (Giesbrecht et al., 2009), to foster co-production of services, including good behaviours and best practices like in the case of prevention;
- The translation of clinical practices in healthcare policies (Ward et al., 2012) to translate the latest medical innovation into proper regulations, laws, and protocols.

Most of the contributions in the clinical and medical fields highlight the way specific scientific research can be translated into clinical practice and then policies. Just a few studies emphasise how different professionals (scientists, physicians with various clinical backgrounds and specialities, other healthcare professionals, managers, engineers, physicists, patients ...) may translate knowledge to each other, fostering the sharing and creation of new knowledge. This opens up to a relevant research gap, given the interdisciplinary trends in medicine, surgery, and clinical education to face the abovementioned challenges of the healthcare sector in terms of digital technologies (Dal Mas et al., 2020b; Gordon, Perlman, and Shukla, 2017; Presch et al., 2020), budget reductions (Massaro, Dumay and Garlatti, 2015), and required skills (Dal Mas, Bagarotto, and Cobianchi, 2021; Fulop et al., 2019; Groenier, Pieters, and Miedema, 2017; Schutt et al., 2017).

3. Research method

To investigate our research question, we apply a qualitative case study approach (Yin, 2014). According to Massaro, Dumay and Bagnoli (2019, p. 275) "qualitative methods allow researchers to discover to reveal and understand relationships between variables even within complex processes, and to illustrate the influence of the social context." The literature considers the case study methodology applicable when a how or why question is asked on present issues where the researcher has no control (Yin, 2014). Moreover, case studies permit an insightful comprehension of a real-world case (Ridder et al., 2014). To ensure transparency (Massaro, Dumay, and Bagnoli, 2019), the research context, the data collection and analysis process are explained in the next sections.

3.1 Research context

The case study is about the Breast Unit of the IRCCS ("Istituto di Ricovero e Cura a Carattere Scientifico" - Scientific Institute for Research, Hospitalization and Health Care) C.R.O. National Cancer Institute of Aviano, a public hospital devoted to oncological pathologies located in the north-east of Italy. The C.R.O. Institute of Aviano is one of the most recognised hospitals and research centres in Europe in the field of cancer surgery and treatments, awarded the status of "International Centre of Excellence" by the Italian Ministry of Health. In one year, the Institute performs over 2,300 surgeries, more than 20,000 radiotherapy treatments, over 3,600 positron emission tomographies performed and 453,000 outpatient services². The Institute serves as an educational and training centre for the Universities of Milan, Trieste, Udine, and Modena Reggio Emilia.

² Source: the Institute's website <http://www.cro.sanita.fvg.it/>, last accessed March, 7th, 2020. Numbers refer to the fiscal year 2018.

Every year, nearly 1,7 million new breast cancer cases are diagnosed worldwide. Statistics claim how 1 out of 8 women has experienced breast cancer in her life, making it one of the most relevant diseases for women all over the world (Biancuzzi et al., 2019; 2020a). Breast Units are made up of multidisciplinary teams (oncology professionals, surgeons, psychologists, nurses, ...) fully devoted to the prevention, diagnosis, treatment, and rehabilitation of breast cancer patients (Kalager et al., 2009; Plate et al., 2018; Wilson et al., 2013). Thanks to the multidisciplinary approach and knowledge (Kesson et al., 2012; Saini et al., 2012), Breast Units seem to have a higher success rate (Skinner et al., 2003; Taylor et al., 2010) in terms of survival and quality of care of their patients compared to non-specialised centres³.

3.2 Data collection and analysis

Data collection and analysis were made involving several stakeholders from the Institute, including physicians and oncology experts, patients, and a public policy researcher involved in one of the Breast Unit's project, named "Oncology in Motion" (Biancuzzi et al., 2019; 2020b; Dal Mas et al., 2020a). More than 30 semi-structured interviews and 20 internal meetings about the abovementioned project were carried on in the period January 2019 - February 2020. Additional material like the Institute's website and social media channels and publications devoted to the general public was collected and analysed.

The following table highlights the data collection.

Table 1: Data collection

Methodology	Object
Semi-structured interviews	Two patients
	One manager from the administration department
	One researcher
	One project manager
	One policymaker
	One breast surgeon
	One medical doctor (oncology)
	One physiatrist
	One physiotherapist
	One fitness professional
	One nurse
	Two librarians
Qualitative and Content Analysis	One of NGO's members
	The Institute's official website
	Social network profiles (YouTube, LinkedIn, Twitter, Facebook)
	Six among brochures, leaflets, and booklets from the "Oncology in Motion" project

All the collected material has been double-checked with the scientific head and principal investigator of the project (LM). To safeguard construct validity and data triangulation (Yin, 2014), we collected data and information from various sources, besides interviews. One of the researchers is himself part of the Breast Unit team (LM); one (AB) is a radiation oncologist belonging to a different cancer institution; one (LC) is an academic and oncological surgeon; one more (HB) was involved in one specific Breast Unit project for more than one year; and two of them (FD and MM) are experts in the fields of knowledge management and public management. All the results were regularly discussed among the research team. To investigate the data, all the material was manually coded by one of the authors and then discussed within the research group.

4. Results

To analyse the knowledge translation flows, we first decided to map the various actors involved. In doing so, we divided the stakeholders into two different groups. One first group is represented by healthcare professionals with a common healthcare background. Most of such stakeholders work directly within the Institute. The second group included the external stakeholders, meaning actors who may not have a healthcare background, and who

³ <https://europadonna.it/progetti/breast-unit/le-breast-unit-in-italia/>

may experience not only different skills and competencies but even contrasting feelings compared to the healthcare professionals.

4.1 Knowledge translation dynamics among the healthcare professionals group

The healthcare professionals group includes physicians and specialists (nurses, ...) from the following departments:

- Breast Radiology
- Pathological anatomy
- Breast and Plastic Surgery
- Medical Oncology
- Radiotherapy
- Nuclear Medicine
- Oncological Psychology
- Experimental Oncology
- Genetics of Hereditary Tumors
- Biobank.

Moreover, the group includes members of the Institute's General Direction and one data manager. Given the clinical background, we decided to include in the group also the GP (General Practitioner) of the patients, despite not being part of the institute.

Our analysis shows how, despite the different skills and competencies, knowledge translation is pretty smooth among the group members, thanks to the common healthcare background. Several knowledge translation and knowledge management tools and techniques emerge.

First of all, the Institute invested in technological tools which allow to translate and share data and knowledge in a more accessible and standardised way. Electronic medical records (Ambra system) are used to store data and share information both internally and also with external professionals, like the GPs. One medical doctor involved in anaesthesia and pain medicine declared:

"Our systems need to comply with several regulations in terms of security and privacy of the patient's data. The use of electronic medical records is very expensive, still useful. We can access information anytime, and at the same time, we had to agree to a way to store and share information. In the beginning, we had some troubles in getting used to it; but now I cannot think about a better way to share patients' information with my colleagues."

Multidisciplinary teams are established, and they meet on a regular basis to discuss the most challenging clinical cases. One surgeon stated:

"Working with a multidisciplinary perspective is one of the requirements of a Breast Unit. Every case is analysed as a unique one, and each of the professionals brings his or her own expertise and opinion. Open discussions and meetings are the central part of it. Not only we can assure the best cure to our patients, but we learn from each other's expertise and experience. While the past matters, there is always something new to learn."

In-person discussions have been highlighted as an effective way to share knowledge, starting from clinical evidence and learn. The same surgeon later said:

"In-person discussions are our preferred way to share knowledge about the cases to be treated. We look at each other, and even non-verbal communication matters when we have doubts or concerns."

Beside learning-by-doing, pieces of training are planned for all the staff, both online, as well as attending external courses, conferences, and seminars to learn about the new techniques and protocols and facilitate knowledge transfer. Journal publications are encouraged, as well as the use of literature synthesis and reviews according to the Cochrane library. Another medical doctor stated:

“We always need to keep up with what is going on in our scientific field. Not only we are pretty active in publishing, but we monitor the most relevant journals of our field. If some of us find some interesting news, we share the article with our colleagues, and we discuss results.”

The members of the Breast Unit are encouraged to travel and spend visiting periods at other research centres all over the world. External visitors are welcome as a way to improve knowledge. The Director declared:

“We always host scholars and clinicians from other centers all over the world, and I strongly encourage my staff to travel and spend time at other institutions. There is always something new to learn, not only in medical terms but also from a managerial and organisational perspective.”

The longevity of the members, together with a low turnover, are considered relevant to retain and share knowledge, and also mentor students or residents from universities. The quality is assessed not only internally, but also thanks to the various certifications and accreditations of the Institute. The Director underlined:

“Quality assessment is not only relevant to measure our standards, but it encourages us to manage data in a certain way. Enhancing knowledge transfer and sharing is a key element in all our assessments.”

4.2 Knowledge translation dynamics among the “external” group

The "external" stakeholders group includes various actors who need to translate knowledge from and to the Breast Unit. The main parties of such group include:

- The patients and their families
- The citizens
- Associations which actively provide services for the Institute
- No-profit associations and NGOs
- Policymakers belonging to the central and local government and various towns and cities
- Private companies (mainly belonging to the pharmaceutical sector) which sponsor clinical trials.

As said, the lack of healthcare and clinical background, as well as the intense feelings and emotions (especially those of patients and their family members) make the knowledge translation process more challenging. Several tools and techniques are used by the Breast Unit members to translate knowledge with such stakeholders effectively

Clinical data and information are often difficult to understand. Design elements, meaning the use of sketches, graphs, cartoons, videos, are used to translate knowledge communicating to a general audience of patients but also citizens seeking for information, considering that prevention is one of the most relevant tasks of the Breast Unit. The Project Manager of “Oncology in Motion,” a project devoted to the recovery of women who underwent breast cancer surgery, declared:

“The Oncology in Motion initiative required the engagement of several stakeholders who differed from skills, aims, and feelings. The use of design elements and artefacts like sketches, graphs, and pictures helped the group a lot in staying focused and cooperate in the definition of the idea, in its fine-tuning, and even in the communication to external parties.”

Communication materials and documents such as brochures and leaflets were designed even co-producing the content with patients, citizens, and no-profit associations, in order to ensure the maximum results. The same Project Manager underlined:

“We put a lot of efforts in designing the project brochure. The whole project team made up of professionals and the population, including patients and citizens, wanted it to be perfect for the women who had to undergo the cure. The cooperation within the group and the design were central elements to ensure that all meaningful information and details were included, from everyday tips to easy fitness exercises to enhance the rehabilitation.”

Online tools and social media channels are used to share contents with the general audience. Specific seminars, roundtables, discussions, Q&A sessions, and information tables at local events are organised to get in touch with

citizens, associations, private companies belonging to the healthcare industry and policymakers. A member of one of the many NGOs which regularly cooperate with the Institute declared:

“Today, the use of social media networks is a must, especially when it comes to citizens. All the initiatives are advertised and promoted via Facebook and other channels, also creating nice posts and events to remind people about the meetings and initiatives, and tagging eventual hosts or partners.”

One medical doctor stated:

“The institute’s Youtube channel features many of our interviews and speeches. Talking in front of a camera sometimes embarrasses me, but I do understand that this is a means to communicate with our patients and with people in general. Prevention is one of the central aims of our breast unit, and we must be effective when transferring knowledge to the general public about what should be done in order to monitor the health status. Showing our faces helps in creating one first relationship with our patients. Of course, we try to use a simple language while doing this. Our psychologists help us a lot in polishing our communication techniques.”

Testimonials like athletes and celebrities are involved in disseminating ideas and information and in raising funds. The Breast Unit members are trained by the Institute’s psychologists to use a simple language, metaphors, interpersonal skills and get engaged with the patients and their families during the cure and the rehabilitation path. The Director highlighted:

“One of our main goals is to be able to communicate with our patients in an effective way. We undergo training with our psychologists to be prepared to discuss with our patients – who may be young, old, educated, or not. The fact is that sometimes is not about communicating a diagnosis, but the patient needs to decide among some possible alternatives. Our duty is to make sure that the patient understands all the pros and cons and makes the best decision for her. It is not only about talking. It is also about listening. Narrative medicine is a means to make sure that we speak less and listen more, trying to understand the patients’ needs and concerns. As a team, we are trying to work a lot about this.”

During the clinical journey, routines and checklists are used to ensure that the knowledge is effectively translated to the patients, who contribute to the co-production of the service. One nurse said:

“Our leaflets, brochures, and publications devoted to patients and the general public are designed in a clear way, or at least we try to! Marking our patients understand what they can or cannot do or what they should do or avoid is a starting point for them to heal. Therefore, translating knowledge to them [the patients] is central to help them in their healthcare journey.”

5. Discussion

Investigating the knowledge flows at the Breast Unit of the National Cancer Institute of Aviano, we noticed the presence of different stakeholders groups (Biancuzzi, et al., 2020a; Bowser et al., 2019; Secundo et al., 2019a).

One first group was made up of healthcare professionals, who, thanks to both tacit as well as explicit knowledge management tools, could translate knowledge more easily (Sousa et al., 2020). Dynamics within this group suggest the relevance of technological tools and routine practices (Baigorri et al., 2013; Friberger and Falkman, 2013) as knowledge enablers. Pieces of training and learning about new protocols (Aruni, Amit, and Dasgupta, 2018; Cobianchi et al., 2016; Dal Mas et al. 2019b; Vitolo et al., 2019b), publishing (McAneney et al., 2010), mobility, visiting periods at other institutes or hospitals (Conway, Dowling, and Devane, 2019) and meetings with colleagues and professionals from other centres (Olson, Tooman, and Alvarado, 2010) contribute to the accumulation and creation of new clinical knowledge.

The second group includes those stakeholders without a specific healthcare background, who often experience intense feelings engaging with the Breast Unit. The strategies employed by the Breast Unit members to translate knowledge to such stakeholders are for sure different than the ones used within the clinical team. Design (Dal Mas et al. 2020a; Simeone, Secundo and Schiuma, 2017, 2018), brochures and guides, social media channels and online tools (Dal Mas, 2019; Massaro et al., 2018; Presch et al., 2020), specific Q&A sessions (Sokol and

Shaughnessy, 2018), the use of a simple language (Wallace, 2012) and kindness (Tribble *et al.*, 2008) represent tools which are capable of engaging the patients and the community (associations, private companies, sponsors, members of the local government and cities). Translating knowledge to engage external non-professional stakeholders leads to co-production as a way to co-create new knowledge and services (Batalden *et al.*, 2016; Biancuzzi *et al.*, 2020b). Knowledge translation appears strategic in all the aims of the Breast Unit: engaging with the community to enhance prevention, to better treat the disease, and to improve rehabilitation, leading to the wellbeing of the patients and the population.

Thus, in answering our research question "*How is knowledge translated within a high-skilled knowledge institution in the healthcare sector?*" we may highlight the differences between professional and non-professional stakeholders groups in leading the knowledge translation. While within professional groups, like the one of the Breast Unit, knowledge flows are easier to manage, better with the help of technical tools and routines, non-professional stakeholders require the use of more creative techniques like design, testimonials, social media and interpersonal skills. The team dynamics highlight the fact that permanent teams differ from temporary groups. These dynamics can be described not only starting from the fact that competencies and skills vary (the professionals belonging to the Breast Unit do have a common clinical/healthcare background and a clear working mission), but also the fact that permanent groups, which work in a completely different way than temporary teams (Massaro *et al.* 2019), build their own language, routines, processes, which make it easier to translate and share knowledge in an effective way. People who engage with the Breast Unit only when needed do not have enough time to do so. Therefore, more creative ways such as design and social media help to manage the skills and emotional barriers. In such a perspective, the relevance of non-technical skills emerge (Dal Mas, Bagarotto, and Cobianchi, 2021; Lepeley, 2021; Lepeley and Alborno, 2012; Yule and Smink, 2020).

6. Conclusions

In concluding our work, we would like to recall the premise that inspired it. Knowledge management is a central topic for modern healthcare organisations. While healthcare institutions are more open to the engagement of several different parties, knowledge translation issues emerge. There is a need to understand which dynamics lead to the effective transfer, sharing, and creation of new knowledge. Multidisciplinary groups and teams are more and more frequent in the healthcare scenario, like in the case of Breast Units. The Aviano experience highlighted how the effectiveness in translating knowledge both among internal as well as external stakeholders might help the healthcare organisation in reaching its goals, even by involving the non-professional actors and users in co-production processes, allowing the patients to co-create their own value. In this perspective, the leading institution should ensure that appropriate knowledge translation tools and mechanisms are put in place to allow the various groups to soften up their differences and foster the sharing and creation of new knowledge.

As a polar case (Yin, 2014), the National Cancer Institute of Aviano experience may be useful to other healthcare institutions experiencing the same issues, in defining practical tools to enhance the translation of knowledge.

Like all research works, ours has some limitations. The specific context (a multidisciplinary Breast unit in a vibrant research and clinical institute located in Italy) may bias the results. Although we tried to ensure data validity and reliability, some results come from the researchers' evaluation and perspective.

Further research implications may include the detailed investigation of some of the knowledge translation techniques described in the case or comparative studies with other Breast Units or centres located in different areas.

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Detrivialization as a Strategy to Challenge Organizational Groupthink

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Abstract: This paper aims to contribute to the literature on knowledge construction and knowledge sharing within the field of organizational communication. The research underlines the importance of exploring human learning contextually, descriptively, interpretively, and inductively. Through a participant-observer methodological approach, the study contributes to the literature by introducing detrivialization as a strategy to explore 'participants' rhetoric related to their organizational procedures. The paper describes a case study that took place for 18 months in a cancer research lab in Belgium, where employees seemed unable to question several taken-for-granted practices. The present research primarily reveals the consequences of trivialization, when the rationale of essential organizational practices go unnoticed until observer-participant challenges the status quo. Also, the study highlights the outcomes of the detrivialization approach, which triggers unprecedented knowledge. Finally, the paper introduces the (de)trivialization dynamic model, which can depict the consequences of opening black-boxes in organizational contexts. This research is a new approach in organizational ethnomethodology, revisiting 'Garfinkel's (1967) breaching experiment to describe science in action. The suggested model offers a methodological approach for exploring trivialized organizational dynamics and challenging groupthink. Detrivialization is an opposite approach to trivialization, to offer a new debate topic to scholars aiming to conduct ethnographic research and discourse analysis in organizational communication.

Keywords: Detrivialization, knowledge construction, knowledge sharing, groupthink, discourse analysis, organizational culture, organizational communication.

1. Introduction

How do we know what we know? This fundamental question functions as the basis for knowledge construction. The present paper calls attention to *trivialization practices* within organizations as a strategy to examine how employees make meaning and share collective knowledge in organizational contexts. In organizations, as in any social setting, trivialization practices go unnoticed to the extent that employees follow them unquestionably and fall into groupthink (Carlson, 2016; Kuhn, 2014; Hällgren, 2010; Mpeera Ntayi et al., 2010; Garfinkel, 2002; Latour 2005; Simon et al., 1995; Kroon et al., 1991; Whyte, 1989; Latour, 1987; Janis, 1982; Latour & Woolgar, 1979; Janis 1971; and Festinger, 1962). In the same pursuit, the present research inductively identified a case where employees trivialize pieces of information to the extent that groupthink occurs over issues that they paradoxically consider to be of great importance. What outcomes could such practices generate in the context of knowledge construction? What happens if people identify and question trivialized organizational practices?

Kuhn (2014) argues that the study of knowledge construction from an organizational communication perspective is gaining an increasing interest. This research is part of a global academic pursuit regarding "*what is learning or what makes knowing?*" The authors suggest that studying trivialization practices as such can be an effective strategy to understand the unexplored aspects of organizational knowledge and to avoid groupthink. By *triviality*, we mean the "lack of seriousness or importance; insignificance," and by trivial, we refer to something "of little value or importance" (Trivial, Oxford dictionaries, 2018). To *trivialize* means to "make (something) seem less important, significant, or complex than it is.

Knowledge creation and sharing are discussed in the literature. The organizational behavior factors of organizational culture, job performance, and knowledge sharing lead to job satisfaction. Kucharska and Bedford (2019) argue that to optimize company performance and increase job satisfaction, organizations should enhance knowledge sharing. Evans et al. (2019) suggest a two-way method to examine knowledge sharing. The authors argue that research should first explore the usefulness of shared knowledge, and second, the participants' willingness to communicate that knowledge. Through surveying legal professionals at a large Canadian firm, the latter study revealed that organizational ties, competence, integrity, and trust have a substantial impact on

sharing tacit knowledge. Kyakulumbye et al. (2019) explain that social interactions construct and share tacit knowledge in organizational settings.

People say that *the devil lies in the details* when they explain the importance of accurate information in knowledge construction. Sometimes employees fail to notice the rationale of their daily work routines, considering some practices and pieces of information as trivial. Furthermore, when this situation occurs in scientific research labs, it may have more serious consequences. Research findings may unnoticeably and avoidably be skewed. Therefore, the authors adopt a participant-observer ethnographic approach to explore the views and rhetorics of researchers about trivialization practices in a cancer research lab. Following an ethnographic approach, the others examined the inextricable relationship between human communication and knowledge construction through a case study of a cancer research lab in Belgium.

The authors use a pertinent case study, a learning organization and focus on some practices of *trivialization*, aiming at understanding their underlying dynamic. They studied the organizational dynamics caused by *trivialization practices* as a strategic entry point to explore aspects of the *learning or collective knowledge construction*. Through a case study, the authors identify and explore some trivialization practices that emerge in interactions as key and unique moments in the knowledge construction dynamic. We suppose that if we capture and study those moments where people (scientists in the case of the present research) trivialize matters, we can gain insights into what they collectively assume, how they make choices and drop others, and how they prioritize matters and play down others, etc. More particularly, the research pays attention to whether our scientists trivialize matters systematically or sporadically, noticeably or inadvertently, and most importantly: can they rationalize their choices? We assume that such a pursuit could constitute a new strategy to observe knowledge construction in situ (scientists in a research lab). Therefore, this paper has two objectives. The first objective is to examine how *trivialization* occurs in organizational communication, to focus on the outcomes within the broader learning dynamic. The second objective is to suggest an organizational communication model of reverse *trivialization*. For this reason, we introduce the term *detrivialization* as a neologism to refer to the reversal of trivialization. We are using *detrivialization* as a strategy to explore what our scientists have 'silently' taken-for-granted.

The next section builds on the existing literature to include past research findings reporting how people in organizations can distort or compromise scientific knowledge. This paper aims to inquire about the usefulness of studying *trivialization* to explore knowledge construction in organizational communication.

2. Literature review

Groupthink is a well-established concept in social psychology and communication. Groupthink refers to an illusion of agreement and to an excess of group cohesiveness, which causes limitations to knowledge building (Beebe and Masterson, 2014). Hallgren (2010, p.97) writes that "groupthink behavior is associated with people retaining the status quo by minimizing their conflicts without critical assessment, analysis, and evaluation." A group experiences groupthink when it meets three conditions: overconfidence, closed-mindedness, and pressure towards conformity (Manz and Neck, 1997).

Whyte (1952) was the first scholar to use the term groupthink, but Janis (1971) researched within the theoretical framework of social psychology. Janis (1982) argues that groupthink is a concurrence-seeking tendency that relates to cohesiveness, structure, and context. Janis (1971, p. 43) establishes the relationship between groupthink and trivialization "in the spirit of Parkinson's law [...] the more amiability and esprit de corps there is among the members of a policy-making ingroup, the greater the danger that independent critical thinking will be replaced by groupthink, which is likely to result in irrational and dehumanizing actions." *Parkinson's Law of Triviality* (Parkinson, 1958) also addresses the connection between groupthink and ambiguity in knowledge construction.

Although the term groupthink was primarily discussed by Whyte (1952), the literature remains limited to understand how groupthink affects knowledge sharing (Carlson, 2016). Koerber and Neck (2003) revisited Whyte's groupthink framework to analyze several resignation decisions in the Major League Umpires Association. The latter authors underline the relationship between groupthink and defective decision making. Also, Ben-Hur et al. (2012) suggest that the organizational context affects knowledge sharing and decision making. On the same wavelength, Kroon et al. (1991) argue that the realization and reduction of groupthink in

organizations, lower collective avoidance, and increase individual accountability. Mpeera Ntayi et al. (2010) and Eaton (2001) confirm the strong relationship between social cohesion, groupthink, concurrence-seeking, and ethical attitudes among employees as significant factors of ethical behavior. Studies on groupthink show that group over-cohesiveness causes defective decision making (Sai On Ko, 2005), while over-reliance on collective organizational trust can impact negatively on performance (Erdem, 2003).

In the present case study, once we identify instances of trivializations in the cancer research lab, we question them. We are not content with “clear cut” answers that are usually solicited by structured questionnaires. Instead, we explore these trivializations by opening detailed discussions with the lab members. We also aim to compare and contrast the different responses and accounts, because if the lab members happen to be avoiding controversies, we may not be able to understand the complexity of the trivialized issue.

As a psychological phenomenon, scholars who ask open-ended questions can recognize groupthink within real meeting dialogues over trivialized issues (Eisenberg et al. 2010). This research suggests detrialization as a method to explore existing knowledge. Eisenberg et al. (2010, p.46) distinguish among four types of dialogues: *the mindful communication dialogue*, *the equitable transaction dialogue*, *the empathic dialogue*, and *the real meeting dialogue*. The latter authors emphasize the need for the real-meeting dialogue in learning because it is “not merely for the purpose of exchanging ideas or information in order to learn, it is engaged in for the purpose of revising how the parties involved actually understand something.”

Although the empathetic dialogue can be essential in achieving cohesion, harmony, and understanding between group members within organizations, the real meeting dialogue “involves far more than simply getting someone’s “take” on a situation for the sake of information; it involves being open to changing an opinion as the result of soliciting the perspective of another” (Eisenberg et al. 2010, p.46). To avoid empathizing with others at the expense of being authentic (e.g., being able to say what we think and not what others want to hear), real meeting dialogues lead to new and better ways of organizational practices. Daring to rethink what has otherwise been trivialized or taken for granted is that crucial moment where we shift from an empathetic to a real meeting dialogue (Garfinkel, 2002).

Trivialization is another socio-psychological phenomenon that this research examines. Within the framework of the *Sociology of Scientific Knowledge* (SSK), scholars have emphasized the importance of focusing on triviality and trivialization in scientific contexts (Kuhn, 2014; Latour 2005; Latour & Woolgar, 1979). Through observation of a biology lab, Latour & Woolgar (1979, p. 274) reported that what interested them as sociologists was described by the biologists (their own participants) to be “unsurprising if not trivial” and that such “reaction was a nice confirmation of the accuracy of our [their] observations.”

Moreover, Latour and Woolgar (1979, p. 154) offer examples of how “facts can be created and destroyed during brief conversational exchanges.” The latter authors argue that group members face difficulty contradicting one another to avoid controversies at the expense of accuracy. Latour & Woolgar (1979, p. 243) write “the standing of one scientist might be such that when he defines a problem as important, no one feels able to object that it is a trivial question.”

Building on the fundamental research of Latour & Woolgar (1979), the current paper’s authors aimed at following scientists in their habitat to explore their knowledge construction on the go; i.e., before packaging. Latour (2005) argues on the need to open “Pandora’s black box,”; i.e., urging scientists to engage in thoughts and discussions about how otherwise taken-for-granted things actually work inside (example machines) and not just to assume that they are working correctly. Latour (2005) stresses the need to follow scientists during their construction of knowledge (in situ), not when they present their ‘nicely packaged’ findings.

After observing people at work, “reality was the consequence of the settlement of a dispute rather than its cause” (Latour & Woolgar, 1979, p. 236). The latter authors mention that the lab members avoided disagreements at the expense of scientific accuracy, regardless of the consequences of compromising knowledge building. Based on these findings, Latour and Woolgar (1979) stress the importance of distinguishing between what is scientific and what is not in the scientists’ discourse.

At the individual level, socio-psychological studies have described in different ways the psychological hassle that an individual can experience. Simon et al. (1995) conducted four separate studies and concluded that their

participants use trivialization (reduction) when they face the psychological pressure of cognitive dissonance (being seen as contradictory). Rather than changing of opinion or admitting the contradiction, participants played down the importance of disagreement.

Other studies illustrate that people do not want to be seen as contradictory or inconsistent because they suffer from mental stress (Festinger, 1962). In the present case study, we examine how individuals in a cancer research lab would argue when contradictions would be pointed out. Also, the authors examined to what extent participants were compromising knowledge to avoid talking inconsistently. Finally, building on several scholars' research (Kuhn, 2014; Garfinkel, 2002; Whyte, 1989; Janis, 1982; Latour and Woolgar, 1979), the present paper argues that observing how people interact at work helps at understanding how knowledge is being constructed. This paper's authors argue that: a) *trivialization* can potentially hinder knowledge building and that b) studying detrialization can be a good strategy to gain insights on knowing.

After defining *triviality* and building on Latour's work (1979, 1987, and 2005), the paper explores how *trivialization* would function within a cancer research lab. Using Callon's (1986) translation theory model, the authors enquire how to trace back knowledge building over long-established trivialized ideas and how to distinguish between the scientific and non-scientific constructs. The next section explains the methodology that this research follows.

3. Methodology

Discursive psychology forms the theoretical and methodological framework of this paper. The research hinges on Potter's and Wetherell's (1987) discursive psychology assumptions. The latter authors argue that knowledge is a discourse activity, and studying how people construct knowledge can be achieved through the analysis of the discourse practices in all their forms. We decided to adopt discursive psychology as our framework for two reasons:

1. discursive psychology is a discourse analysis method oriented into socio-psychological factors and is therefore well-positioned to study knowledge construction issues (i.e., trivialization, individual and group practices, learning organizations) (Potter and Wetherell, 1987);
2. discursive psychology is effective in analyzing scientific discourse since our data is scientific (cancer research data, collected through observation and interviews). Because "*discourse*" applies in a variety of interpretations across disciplines such as linguistics, psychology, anthropology, literary studies, philosophy, and communication studies, in the present study we use the term to mean "all forms of spoken interaction, formal and informal, and written texts of all kinds" (Potter and Wetherell, 1987, p. 8).

The present research aims at exploring the trivialization practices in a cancer research lab in Belgium. The study seeks to understand the covert and overt dimensions of sharing trivialized scientific information and how such an organizational communication dynamic relates to knowledge construction. This paper's authors adopted a participant-observer methodological approach to understand how employees were sharing scientific knowledge and identify which information seemed to be trivialized to their work routines.

The study follows a similar methodological approach, as developed by Latour and Woolgar (1979), who describe their research as "microprocessing of facts." After conducting a longitudinal observation within a biology lab in the US, Latour and Woolgar (1979) provided details on how people constructed scientific facts. The latter authors scrutinized moments where the biology lab scientists took decisions and made choices in a somewhat unexpected way. Many times, scientific facts were "born" (when proved by scientists) and "destroyed" (when rejected as wrong). The same study showed that sometimes an odd set of accidental circumstances dictated the scientists' decisions, unnoticeably. Hence, specific scientific facts, no matter how well-established they could be, were seen by the lab scientists as [as]sociologically (rather than logically) determined (Latour and Woolgar, 1979).

This study aims at exploring three main questions: a) how trivialization practices construct organizational knowledge; b) how organizational knowledge emerges through detrialization approaches, and c) how ethnomethodology and discourse analysis could be useful in understanding aspects of knowledge building. The study suggests the exploration of the (de)trivialization dynamic in terms of three research levels:

(inter)organizational, individual, and group following the chronological sequencing that we undertook: observation, individual, and then group interviewing.

The research presupposes that trivialization is a practice that exists in cancer research labs, as in any other social context (Eisenberg et al. 2010; Whyte, 1989; Janis, 1982; Latour and Woolgar, 1979). From a broader philosophical perspective, our research addresses Feyerabend's (1978) concern regarding the dogmatic and sectarian practices of modern sciences. One of the paper's authors conducted the field research as participant-observer at a cancer research lab in Brussels, Belgium. The observation period lasted 18 months with sporadic absences. Through this period, the field researcher was able to access the lab daily. The field researcher received permission to access any area in the lab and speak to all stakeholders.

After gathering several contradictions and inconsistencies for this case, during the observation stage, we conducted semi-structured tape-recorded individual interviews with the ten lab members, which we analyzed synchronically. Approximately six months later, we conducted collective tape-recorded interviews questioning the same issue with the lab members, which we analyzed diachronically. We used Potter's and Wetherell's (1987) methodological tools to analyze our findings.

Using the data that we collected from the individual interviews, we identified several variations of accounts across persons and some inconsistencies made by the same person during the same interview. We detailed where 'scientific knowledge' is interwoven with ungrounded knowledge: 'common sense' and 'value judgments.' We also identified how individuals' accounts and positions regarding the issues (previously trivialized) were developing on the move about our questions or to how the ongoing discussions were progressing. This method helped us identify discourse strategies used to avoid dissonance. Hence the detrialization prompted by our research triggered new accounts and positions, which have research implications.

The diachronic and collective interviews helped us identify the same variations and controversies as examined synchronically and individually. The intermingling between 'scientifically grounded knowledge' and the 'common sense' and 'value judgments' that emerged during the synchronic interviews persisted in the diachronic conversations, and the ungrounded trivialization practices in discourse grew stronger. Hence, depending on our questions, the participants oscillated recursively and restlessly between trivializing and detrializing positions. We outlined dissonance avoidance (Festinger, 1962) strategies used by the participants to bypass controversies without settling them.

Following the same steps of fieldwork research, as Garfinkel (1967) explained in his *breaching experiment*, the study's field researcher adhered to the lab's safety rules and explained to participants the central role that anonymity and confidentiality play in social sciences research. The field researcher requested for participant's formal consent to participate in the study by assuring them that anonymity is guaranteed. Therefore, all names mentioned in this paper are not real to ensure that no one can trace back and link the people with the data they provide.

The study's participants were ten lab members: the principal investigator, four postdoctoral researchers, two doctoral researchers, two technicians, and one intern. Except for the intern, all the members have considerable experience in cancer research labs (from 7 to 25 years). Two of them are Belgians; the others are from different nationalities: Dutch, French, Spanish. Except for one technician, all of them have international experience either in Paris or in the USA. The lab director and founder pursued his graduate and postgraduate studies at universities in the USA.

To support the lab staff's scientific competence, we visited the lab's website to read people's bios. The director is involved in the publication of 217 research articles; 30 of them also include the names of the postdoctoral researchers. The same website lists 17 reviews, dated from 2002 to 2017, each of them is of multiple authors (usually 3, but a couple of them have 5 and 6 authors). Finally, the lab staff has published nine scientific books between 1995 and 2012. The next section introduces the case study and explains in chronological order some critical discussions between the field researcher and the participants that lead to knowledge creation.

3.1 Case Study: The incubator's CO₂ level for cell culture

The case study below is a narrative written in the first person to highlight the field 'researcher's first-hand experience with ethnographic research. Hence, the case study aims to bring the reader closer to the lab's

experience and demonstrate the levels of familiarity and openness between the field researcher and the lab scientists.

During my first weeks in the lab, I walked into the culture room and found Sophie, Stephan, and Marie (all names are given by the authors to maintain anonymity and assure confidentiality). Sophie is a medical doctor and had worked as a physician in hospitals for six years before joining the lab. When I faced an incubator, I noticed that it displayed the following two figures: 5% CO₂ and 37°C. I assumed that 37°C is the appropriate temperature to maintain the cells as in a healthy human body. But why is 5% the appropriate level for CO₂? I was trying to see how the gas tank was linked to the incubator, assuming that it was there to automatically feed it with the quantity of CO₂ each time the pressure within the incubator drops.

Sophie, who had been willing to explain things to me, looked at me and said in French: “that’s for CO₂”. My follow up question was: “Why do these cells in the incubator need CO₂?”. The response was, “as in our body.” I said, “but why 5%?”. When I said that, she looked away and I felt that the mood changed in the room, but could not tell what was wrong. I moved next to Stephan, who listened to the discussion and was usually willing to talk. Stephan’s response also demonstrated some ignorance in providing us with an answer, as it seemed to him a trivialized matter. I decided not to insist on asking to follow up questions to avoid disturbing anyone.

A few minutes later, Sophie asked Stephan, who said: “I have no clue why 5%”. Then, I deduced that the silence in the room has something to do with my question, and possibly they were trying to find an answer to the question. Then, Sophie looked at me and said in French, “it’s shameful.” I said, “what is shameful?”; she said that they didn’t know why the incubator is regulated at 5%. I told her, “but no one knows everything.” Sophie said, “yes, but this is important.” I later realized why Sophie was upset about the fact that she does not know the answer. Being a physician, she probably thought that she should have known how much CO₂ the human body needs.

This CO₂ indicator proved to be a trivialized issue that lab scientists were observing unquestionably. I asked several people in the lab about the CO₂ indicator, including the three post-doctoral researchers, two technicians in the culture room, and an intern. The responses to my questions were like the following: “I don’t know,” “I have no clue,” “ah, that’s a good question, but I don’t have an answer, right now,” but whenever I kept the discussion going the lab scientists responded in a rather similar fashion. Some participants aimed to justify an answer, but they lacked scientific proof. “I don’t know, but it is important for the equilibrium of the cells,” “it’s to maintain the cells in good condition,” “it’s important for the phenotype.” All participants seemed to provide me with confusing and sometimes off-topic explanations. On the first day where this issue was identified, none of the lab members was able to explain why the incubator is regulated at 5%.

After searching online for relevant answers to the question about the CO₂ indicator, I found that no matter what the exact answer was, the CO₂ was said to be used in the incubators to maintain the acidity or the pH level in the medium, where the cells are cultivated. The next day, I discussed with everyone I came across, and many of them provided me with the same answer that I found online. I started to hear things such as, “yeah, that’s normal because, without CO₂, the pH level would drop,” “yeah, it’s related to the acidity of the medium.” Knowing the source of their answers, I pushed for further discussions by asking, “ok, but why 5% in particular?” and “who decided that?”. At this level, all of them said in a way or another that it was tested in the past and that was part of the basics that research at this level should not rebut.

Discussions started to become interesting for both sides. Certain lab scientists showed great interest in discussing with me. A trivialized matter that was taken for granted had become a topic of general interest and discussion. People seemed to agree that the matter was “related to the pH level,” my question evolved into why 5% in particular and not more or less? The main question evolved into several other sub-questions, such as, “does the human body also have 5% of CO₂?” and “are there other side effects that could happen to the cells if the 5% is not the best choice?”

After a couple of months of discussions over similar issues of trivialized organizational procedures, the general feeling was that many matters were taken for granted without any of the experts in the lab trying to challenge the status quo. Lab scientists were relying on each others’ knowledge. It was a unique case, where I could experience and observe discussions over issues that were initially said to be either trivialized or unknown and to explore how organizational knowledge could be constructed in discourse. Although we discussed several

matters during my field observation, the authors of this paper find the case of the incubator's CO₂ level for cell culture to be unique and representative of how organizational knowledge could be constructed. Therefore, we decided to conduct tape-recorded follow-up interviews with the lab scientists over the issue of the CO₂ level in the incubator.

We designed a semi-structured interview, which we conducted with each participant individually. Then we organized a collective interview with a few participants six months later to cross check our findings. The individual interviews included eight questions each, which allowed us to start the conversations. The eight questions are listed below:

1. Why is the incubator regulated at the level of 5% CO₂?
2. Have you heard this question before?
3. Do you think that this question has been trivialized or neglected?
4. Do other biology labs in Belgium and elsewhere also regulate their incubators at 5% CO₂?
5. Do you think that this question is important for your research?
6. Is 5% of CO₂ the same condition in the human body?
7. How true this is: "incubators are regulated at 5% CO₂ because that is how the desired pH level can be maintained"?
8. What other negative consequences can happen to the cells, due to this 5% level?

Depending on the participant's accounts in each question, we asked further questions. The different interview questions were designed to invite the participants to account for the following central issue: *Does the 5% level of CO₂ have negative consequences on research?* The collective interview, which also included the same eight questions as the first interviews, was less structured because the participants anticipated many questions. Nonetheless, we made sure that we went through all of them to get as much data as possible to analyze.

4. Findings

Through the analysis of the case study and the collected data, this study identifies three major findings. The first finding is that the lab participants had never discussed why they were using 5% of CO₂ in their daily cell culture operations. The field researcher's questions on a trivialized matter triggered internal discussions and constructed organizational knowledge. Through field observation and question #2 of the individual interviews: *"have you heard this question before?"* the participants realized that they were experiencing groupthink by not challenging a piece of scientific information.

The lab scientists were surprised by our questions and were initially not able to provide answers (saying typically: "I don't know," "it's a shame that we don't have an answer"). At the same time, the participants said that the use of this level is extremely important and that they should not change it by any means. Later in discussions (during observation), the participants figured out more or less the same answer to our question: *that the 5% is important for the pH regulation*. With further detailed discussions, we found that the different lab members' responses were quite variant and sometimes contradictory. Likewise, accounts of the same person were sometimes inconsistent.

During the individual interviews, new ideas emerged out of the detailed discussions; and participants shifted positions several times. All participants said that the 5% level is a standard (or a norm) that is accepted worldwide, but all of them have accounted for the negative consequences of this standardization. They said that it might potentially skew any of their experiments, which they do on cells that do not require 5% of CO₂. They mentioned the following skews: "phenotype change," "shifting from in vivo model," and "blinding."

The second finding is that the use of the 5% level was *a seen but unnoticed practice* (Garfinkel, 2002) and that our question, which aligns with Garfinkel 1967's strategy of breaching experiment, triggered unprecedented discussions. Hence, more and more detrializing accounts emerged and gained ground. Additionally, we found that one postdoctoral researcher had -to the surprise of her colleagues- used 10% in one of her previous labs, although all the participants said that any level other than 5% would not be acceptable; because it would change the cells' pH, and therefore skew their experiments. The postdoctoral researcher said that she does not know why this lab is using 5%, although she said that she already knows that this level is a worldwide standard.

The third finding is that the origin of the standard of 5% was not known. Instead, the lab director concluded during the interview that it was initially *dictated commercially* and did not emanate from research. The lab director also said that the providers who were first able to produce a medium with a pH of 7.4 (which was solicited by research) dictated the level of 5% of CO₂. Hence, the 5% level is successful in reaching a pH of 7.4, but its drawbacks for other considerations are at least according to our participants not known. They have never been discussed within the scope of cancer researchers.

In line with Latour and Woolgar (1979), several non-scientific accounts were used to justify scientific positions: a) defending the need to standardize the level of 5%, even after saying that the level can skew research and that it needs to be revised depending on the requirements of the cell; b) justifying the 5% level by the need to replicate the same research by another lab, even after we pointed out many times that labs that are interested in replicating their experiment can do so by following the research protocol with whatever level it mentions and not necessarily 5%.

Finally, some participants realized after openly discussing the matter that they are using the 5% level even for cells that do not need a pH of 7.4, but rather 6.5. Some participants said that a 5% level was appropriate for any desired pH level, whereas others assured that the 5% is specifically for the cells that need a pH of 7.4. Because the lab uses the same incubators (regulated at 5% by default) for all types of cells (those that need a pH of 7.4, 6.5, etc.), the participants who said that 5% is only suitable for a pH 7.4, clarified that they add buffers to cells that require 6.5 pH. When they referred to buffers, all participants added or implied that the buffers' negative consequences are not trivial and that they would need to reconsider how to reach the desired pH level, not through the 5% level of CO₂. The next section discusses the study's contribution to suggest detrialization as a method of examining how trivialized matters could construct organizational knowledge.

5. Discussion

In the present study's analysis, we aim to distinguish between scientific facts of weak rhetoric as opposed to scientific facts of strong rhetoric. The former is rather a well-established truth that scientists are unable to justify, especially when they state that they have never thought of or known why it was so. Also, we consider a scientific truth to be of persuasive rhetoric, when scientists account for its origin and can justify its usefulness, in a somewhat consistent way. Our conception of scientific knowledge is rather constructionist; no matter how strong the scientists' justification is, we still consider scientific facts to be contingent and highly sociological in nature (Callon, 1986). The latter author conducted a field study to identify elements and factors that played a major role in the decision making of scientific matters. Non-human elements and factors played a major role in trivialized organizational decisions that people see as scientific, rational, and well thought.

As discussed in the paper's introduction, to *trivialize* is to consider that the matter is not important. In contrast, *detrivialize* is a neologism that we are suggesting in this study to explain the change in one's mind when something trivialized turns out to be important. The use of the word "*(de)trivialize*" is referring to the oscillation between the two positions: trivialization and detrivialization. Concerning the individual detrivialization practices, some participants already started with some degree of detrivializing accounts during the synchronic interviews and increased their detrivialization, during the focused discussions. Other participants (one of them stepped back from his accounts that he made before the interviews) started by trivializing the negative consequences of the standardization of the CO₂ level and ended the interview by detrivializing it, mentioning the possible skews. The lab director detrivialized the issue, all along with the interview, justifying his accounts with details of the potential skews. Still, suddenly at the very end of the interview, he concluded with ungrounded trivializing accounts that the skews are "minimal."

We also found that when we pointed out a contradiction between two accounts or a problem regarding a particular practice, the participants responded to our comments, reframing the dissonance or trivializing the importance of the problem. Discursive tools were used: 1) Switching from the first personal pronouns "we" and "I" (also their equivalents "nous" and "je" in French) to the second personal pronouns "you" or sometimes "people" (also "tu" and "des gens" in French). While the use of "we" (and equivalents) referred to practices that emphasize that things are under control, the use of the inclusive "you" referred to weaknesses implying "you too would do what we're doing," or to practices that are hypothetical rather than confirmed to have been implemented; 2) Using "also," "sometimes," and "it depends" to connect two incongruent ideas and to minimize the contradiction. Finally, we found that some participants used the "yes but no" while others used the "no but

yes” strategies. 3) “*Yes but no*” consisted of agreeing on everything and admitting all the weaknesses of a particular practice but disagreeing (at the very end of the interview) with the idea that the discussed practice should be revised, without backing up such a position. 4) “*No but yes*” consisted of disagreeing and challenging all critiques to the practice, but agreeing that the practice should be revised.

During the collective interviews, the participants started by trivializing the consequences of the standardization of the 5% level. They initially made short and unproblematic answers, as if we have never discussed the complexity before. Furthermore, they did not contradict each other even though they had already made contradictory accounts during the individual interviews. Only when we pointed out the contradictions that we found after analyzing the individual interviews did the participants start to account for the negative consequences of the standardization of the CO₂ level. The same skew risks emanating from the standardization, which were accounted for during the individual interviews, were then again accounted for during the collective interview.

Finally, the participants did not stick to one position, but rather restlessly oscillated between opposite positions. When they detrivialize the negative outcome of the standardization, they provide justifications (i.e. “phenotype change,” “shift from in vivo model,” and “blinding”), but when they trivialize it, they mention two reasons: 1) that they need to standardize, to align with oncology research practices worldwide, without detailing the advantage of such an alignment; and 2) that other labs if they want to replicate any of this labs’ experiments, they will do it using 5%. Furthermore, we found that the participants avoided on many occasions to respond to the following two questions, regarding the two reasons they mentioned: 1) why do you need to standardize a condition that you say that it may skew your experiments? And 2) if other labs are interested in replicating your experiment, why don’t they use the level that you would anyway mention in your research protocol and which you would decide to be suitable to your type of cells? The next section concludes by suggesting detrivialization as a strategy of challenging organizational groupthink.

6. Conclusions

A major concern of the present research was to reflect on how organizational knowledge is constructed by studying detrivialization. Could detrivialization function as a strategy of challenging organizational groupthink? The case study reveals that almost all lab members said that they had never thought about such issues before. The study discusses groupthink as an organizational dynamic that affects people’s knowing activities and perhaps puts organizational communication capacities at stake. This paper highlights the role of ethnomethodology and discourse analysis in understanding aspects of organizational knowledge construction. Also, the paper concludes that groupthink is an organizational communication dynamic that is responsible for knowledge construction on two levels.

The first level of groupthink resonates with what Foucault (1969) identifies as “a microphysical power.” Groupthink is a hidden and unnoticeable dynamic that could construct organizational knowledge on the background (Hallgren, 2010). More precisely, the detrivialization of this issue emanated from the problematization of what participants call: a) the existing knowledge, b) the standards, c) the practical knowledge, and d) the previous validation. This underlying power could also be explained by the robustness of the “structure” (Giddens, 1984) and its supremacy over the “agency.” The participants were defending the “structure” when they embodied it against their knowing freedom- “agency.”

The second level is illustrated through the dynamic of knowledge automatization when participants were visibly aiming at converging, conforming, and agreeing, particularly during the diachronic interview. This dynamic is similar to Janis (1982)’s *groupthink*, which occurs in various organizations. Groupthink causes individuals not to be able to dare to ask new questions or to practice their knowing activity genuinely (Janis, 1982). This study argues that groupthink occurs when people feel that they might destabilize the group’s harmony and homogeneity by not challenging trivialized matters.

Studying this case of detrivialization from a discursive psychological point of view enabled us to zoom in and out between the following three levels that come into play concerning how knowledge is constructed: 1) the (inter)organizational level; 2) the individual level, and 3) the group level. The study suggests a three-level organizational interaction model to explore groupthink as an organizational dynamic responsible for knowledge construction.

1. The Organizational Level

Our first question was confronted by a long-established trivialization that is rather an organizational default condition or tradition (structural), a standard of unknown origin, than an individually-motivated or an explicit group decision. Nonetheless, the same trivializations were, to some extent, group and individual practices. No matter how 'passive' or inadvertent these practices are, they are, to some extent, choices made by the participants (researchers) during the design of their research protocols. Before our breaching experimental questions (Garfinkel, 1967), the trivializations were unnoticeable conditions and taken for granted practices. The moment our questions came up to the surface, the trivialization started to be noticed. Noticing the long-established trivialization and especially what underlies it in terms of consequences for their research was the first spark of detriivialization.

2. The Individual Level

During the individual interviews, participants were invited to reflect and account for the previously (personally but less formally) discussed issues. Right from the beginning of the interviews, we made it clear that accounts such as "this or that condition is a standard" would not suffice, by responding "what is the rationale of this standard?" Similarly, if the participants say, "this is an existing knowledge," we would respond, "why do you need it? Or how useful is it for your research"? Consequently, the individual participant embodied the whole lab and sometimes the whole research domain, because he or she needed to explain the rationale of the research practices, for which they are not directly or personally responsible.

This study illustrated how participants restlessly oscillated between two stances: the "cozy but imprisoning structure" and the "free but uncomfortable agency." Individually, they tend to say that they are following a standardized process, which is beyond their control, and that applies to the whole domain. But when they fail to justify or explain the situation, they do not identify with it (the standardized process) and would prefer to move to another position, where they are free to criticize the status quo. And once individuals are settled in new positions, they would notice that in reality, much of their previous research was done differently, which makes this new position equally uncomfortable. The oscillation between the two positions was less frequent than in the diachronic and collective interview but was equally related to the contradiction that we pointed out.

3. The Group Level

The diachronic and collective interviews were conducted about six months after the last individual interview. The participants knew in advance that the interviews were going to be about the same questions that we discussed individually during the synchronic interviews. No matter how divergent their accounts and positions were during the individual interviews, they dramatically converged during the collective interviews. The result was that participants collectively and recurrently oscillated between two opposite positions, in five steps:

1. participants start by selecting and playing up a single aspect that demonstrates the accuracy of their practice (under discussion);
2. researchers point out another aspect that participants ignored or played down unintentionally (based on what some of them mentioned in the individual interviews to be of greater importance);
3. participants account for the negative aspect of the trivialized practice and consequently detriivialize the issue;
4. participants change their original point of view and reach a new conclusion (participants do not expect to reach consensus as individuals might insist that this is a matter of personal judgment);
5. researchers step back to adopt a detriivializing position to bring up the previous argument and seek for new justifications regarding the discussed practice. Hence, the oscillation between steps one to five was visibly recurrent and reflected the restless state of the group.

Figure 1 - (de)trivialization dynamic model- depicts the existing trivialization that preceded our present study and the detriivialization provoked by this research, at the three levels described in this section.

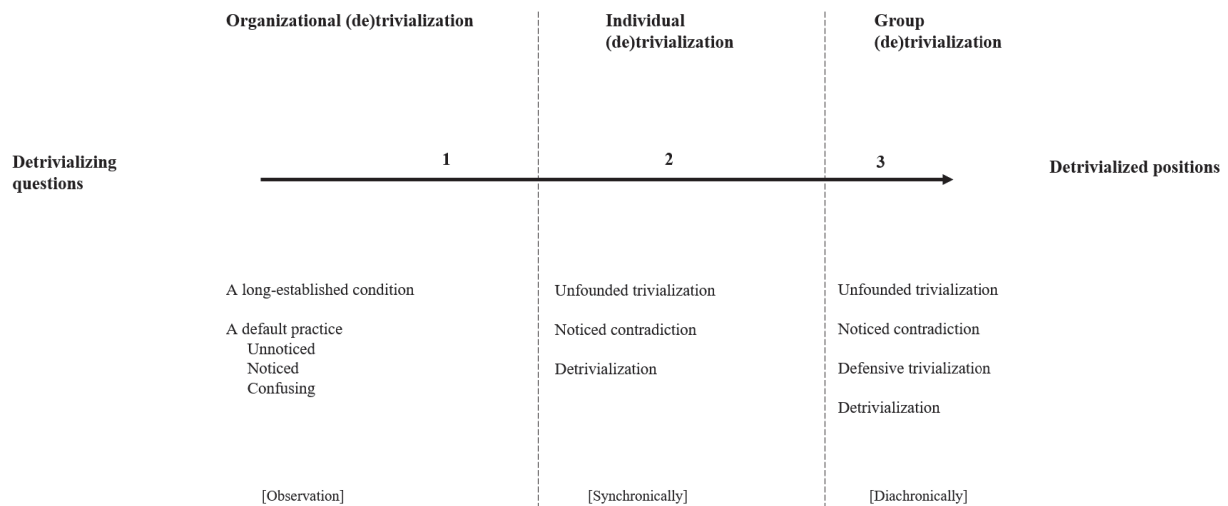


Figure 1: The (de)trivialization dynamic model

The (de)trivialization dynamic model portrays this paper's suggestion for exploring *trivialization*. The model exposes what our *detriivializing* questions faced at three levels: a) the (inter)-organizational level (as a long-established condition or practice within this lab but also in almost every cancer research lab in the world); b) the individual level (how our participants responded to our questions, individually); and c) the group level (how our participants conducted themselves during the collective interview).

Organizations could study participants' knowledge bases through a series of detriivializing questions and interviews, as suggested by the present study. This paper concludes that regardless of people's level of education, organizational culture is more potent than the individual's knowing capacity. The periodic application of detriivialization as a strategy to challenge groupthink and construct knowledge could apply in various organizations.

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