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**Toward an Actor-Network Approach for Investigating
Education and Learning within a Corporate University: A
World of Heterogeneous Assemblages**

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*Pulling out of the old scarred skin
(old rough thing I don't need now
I strip off
slip out of
leave behind)*

*I slough off deadscales
flick skinflakes to the ground*

*Shedding toughness
peeling layers down
to vulnerable stuff*

*And I'm blinking off old eyelids
for a new way of seeing*

*By the rock I rub against
I'm going to be tender again*

(Shedding Skin, Harryette Mullen, 1953)

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List of Abbreviations

CU: Corporate University

ANT: Actor-network theory

ICT: Information and communication technology

IT: Information technology

RQ: Research question

KBE: Knowledge-based economy

KM: Knowledge management

IC: Intellectual capital

KMS: Knowledge management systems

ESN: Enterprise Social Networks

IS: Information systems

SNA: Social Network Analysis

AREs: Action Relevant Episodes

OADI: Observe-assess-design-implement

GDSSs: Group Decision Support Systems

KPIs: Key performance indicators

CSI: Centre de Sociologie de l'Innovation

LO: Learning objects

HE: Heterogeneous engineer

IP: Internet Protocol

IPTV: Internet Protocol Television

STIPEL: Società Telefonica Interregionale Piemontese e Lombarda

SIP: Società Italiana per l'Esercizio Telefonico

IRI: Istituto per la Ricostruzione Industriale

STET: Società Finanziaria Telefonica S.p.A.

ISP: Internet Service Provider

Chiara Meret

EBITDA: Earnings Before Interest, Taxes, Depreciation and Amortization

OPP: Obligatory passage point

ID: Username

HRS: H.R. Services

PM: Project manager

MOOC: Massive Open Online Courses

PC: Personal computer

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Chapter 1 - Introduction to Research

Introduction

“The goal is this, what could be a scenario: a central core that, through relationships, connects physical locations, virtual settings and people ...”.

ITC_BP, Multimedia Support Coordinator

September 2018

Education and learning in organizations are dynamic in nature and they are widely considered to be dependent on social relationships between individuals for impacting on knowledge creation, sharing, and use. Most knowledge is shared informally than through formal channels, but the increasing sophistication in technology-based knowledge management systems call attention to an area where more research is needed (Mohammad Hosein, 2013).

The development of web and internet networked technologies has provoked a broad interest in the activities of knowledge creation and sharing, thus influencing education and learning. Learning is no longer only a human activity which is undertaken within physical classrooms, but also can happen in different sites, such as the workplace or home (Bell, 2010).

When the focus moves on organizations, according to Taylor (2010) and Iannotta et al. (2016), the extant blurred boundaries between education, business and educational institutions necessitate the rise and affirmation of Corporate Universities (CUs). Their technological sophistication makes an extensive use of Information and Communication Technologies (ICTs), creating new opportunities for the development of training processes (Homan et al., 2005; Iannotta et al., 2016) and spaces of interaction.

The use of web-enabled learning and training grants interesting implications. They concern not only the improvement of flexibility in time and space for learning and higher levels of cost savings, but also the opportunity to adopt more social and collaborative learning methods (Alavi and Gallupe, 2003; Bell, 2010; Homan et al., 2005; Iannotta et al., 2016 Leidner et al., 1995; Robey et al., 2000). In this sense, technology supports in framing the understanding of learning theories, and knowledge as a social activity. Technology is also changing where and when learning takes place and how it is

supported. New groups can form around learners' interests or educational philosophy, rather than organizational role, location, age, or proximity. By removing (or integrating) traditional learning, new technological models increasingly focus on participation and negotiation, rather than direction and instruction (Cisco Systems, 2010). By providing a more sophisticated, integrated learning mix, technology allows access to learning that can occur outside traditional organization settings, whether at home or within communities.

The theoretical proposal that knowledge should be defined as a collective activity (namely, knowing) drives to its consideration as something situated in time and space. Situated learning can therefore take place in work practices (Blackler, 1995). Such practices, therefore, constitute the "locus of learning" (Gherardi, 2000). The overcoming of the individualistic concept of learning introduces the notions of participation and reciprocal relations between individuals and practices (Fox, 2006; Gherardi, 2009; Gherardi, 2013; Gherardi and Nicolini, 2001; Orlikowski, 2007). Learning does not solely take place in the minds of individuals, but it relies on (and stems from) their participation in social activities (Gherardi, 2000; Lave and Wenger, 1991). That is: "learning is a social process" (Gherardi and Nicolini, 2001), and participation enables to have access to organizational learning realized by the results of actions and through actions (Gherardi, 2013). Furthermore, when knowledge derives from participation and relationships between individuals, it contributes to the development and transformation of their identities.

However, involved material artifacts tend to be ignored as part of the setting for human action, or relegated to tools for human intention and design (Fenwick, 2015; Waltz, 2006). Nonetheless, nowadays it is fair to acknowledge growing educational interest in understanding both everyday material and social interrelations (Fenwick, 2015). This is made possible only by the joint analysis of these relationships, their practice, the artefacts constituting that practice and the social organization of the communities in which the practice takes place (Gherardi, 2013; Lave and Wenger, 1991).

Looking at a Corporate University as a set of people and material artifacts, it is possible to consider the total set of components in this assemblage. By focusing on practice, Lave and Wenger (1991) and Gherardi (2009) claim that activities themselves generate communities, which support together the configuration of involved people, artefacts, and social relations. In line with this research project, participation and learning are activities

that take place in the CU, where knowledge, therefore, is not a mere “asset” of the community, but rather the activity of “knowing-in practice” (Gherardi, 2009).

Considering the many ways in which employees’ education and lifelong learning unfold, material actors cannot be neglected (Edwards, 2002). This sociomaterial turn highlights the contribution of objects in learning processes and practices and advocates that it takes both human and non-human actors to perform any practice (Introna, 2007). In Fenwick’s (2014: 265) words: “materiality is particularly highlighted, revealing ways that bodies, substances, settings and objects combine to actually embed and mobilize knowledge, materialize learning and exert political capacity”.

A methodological shift is needed in this perspective, by means of researchers draw on a process logic (Mohr, 1982), “constructing detailed historical and ethnographic accounts of technological production, use, and change” (Orlikowski, 2009:9). However, when comparing the ontological and empirical evidences of sociomaterial perspective, Contractor et al. (2011) recognizes that “although the sociomaterial approach provides an important way of thinking about technologies as parts of networks (as opposed to entities that exist independent of networks), this approach does not provide much guidance in specifying how researchers might depict sociomaterial relations empirically in ways that recognize these important differences (Contractor et al., 2011:685). Hence, they propose the study of “multidimensional networks”, where technology is moved inside the social network and becomes an endogenous variable of it. The reason behind the emergence of this new conceptualization relies on the limited capacity of traditional unidimensional network approaches to explain the dynamic implementation processes of a non-human actor (for example, a technological tool). It follows the need to recognize the importance of considering the organization as an assemblage of heterogeneous social, material and practices (Bruni, 2005).

To overcome these deficiencies in evidence, I believe in the strong contribution of considering and analyzing how individual stories are told about the context of analysis of the CU under investigation in this study. This is to gain personal experiences about the research problem, in order to answer the research questions as a result of a continuous interweaving between me (as a researcher), the people I interacted with, the setting, and its material artifacts. Therefore, the focus on narrative inquiry and narrative techniques I will undertake is “not only valorizing individuals’ experience, but also an exploration of

the social, cultural, familial, linguistic, and institutional narratives within which individual experiences were, and are, constituted, shaped, expressed and enacted” (Clandinin, 2013:18).

Hence, knowledge cannot be seen as stable and thus relegated to subjective constructions of meanings and interpretations. Rather, knowing is the result of the enactment of connections among different things continually performed. This different understanding of knowledge is of particular importance in a time when lifelong learning is promoted among all sectors, and “knowledge exchange in a web-linked social order has opened difficult tensions around knowledge authority, use, convergence and ownership” (Fenwick and Edwards, 2010:24). This scenario leads a number of scholars to go back in the past to resume some theoretical and empirical questions about what knowledge is, how it is produced, how we can trace and ascribe its ownership, how it is generated, how it circulates and how it is contested. These are accompanied by timeless issues such as: innovation, creativity, (old and new) skills and competences, learning processes and practices. But to go beyond the results from the past, with an eye on the changing contingents of the working conditions, there is a need for shifting our conceptions of the world around us.

Since education and learning cannot be separate from the networks through which they are endorsed, surfacing the materialities of practices is faced with Actor-Network Theory (ANT). ANT approach has increasingly been adopted in organizational studies (see: Cooper, 1992; Czarniawska and Hernes, 2005; Latour, 1996; Suchman, 2000) and creates a foundation for regarding objects as legitimate actors (Thompson, 2015). The focus is on empirical research, with the aim of tracking everyday materiality, set of activities, practices, individuals. In this sense, both humans and non-humans behave as actors that exert force and influence, whose effects linked together create a coherent network. All components are treated as “simultaneously real, like nature, narrated, like discourse, and collective, like society” (Latour, 1993:6). Accordingly, technologies are not merely background tools but significant actors in co-creating teaching and learning environments, such as CUs, or even human identities (Tryggestad, 2003) In this sense, ANT creates extensive openings to investigate work-learning practices formation and fruition. Overall, ICTs artifacts and devices must now be seen as materials for enrolling in actor networks (Callon et al., 2002; Holmström and Robey, 2005; Norén and Ranerup,

2005). In addition, the possibility of technology construction must include negotiation of interests, tied to the goals of all subjects and objects involved (Latour, 1987). Coherently with Fox's statements (2000), it becomes necessary to question the canonical analysis of the organization in the study of organization learning theories.

For these reasons, the space for learning, which could be the CU under consideration in this dissertation, is an emerging phenomenon that is subject to continuous change over time. People, work, learning, and the learning environment itself develop collaboratively. Accordingly, rather than studying these phenomena through a top-down logic, the researcher should start by the underlying relations.

As Fenwick claims, ANT "offers the most radical material challenge to understandings of learning, work and organization" (Fenwick, 2010b). Furthermore, the use of ANT approach can also be considered as a way of intervening in educational issues and of engaging with them (Fenwick and Edwards, 2010). The same Authors affirm: "the evaluation of learning becomes a question of how knowledge circulates to enroll, mobilize and stabilize as well as to open spaces of multiplicity and uncertainty within particular practices and ideas" (Fenwick and Edwards, 2010:128).

ANT allows for evaluating learning by following actors and emerging patterns among them. These patterns will shape the networks of interactions. Assessment will also provide feedbacks on connections among humans and non-humans and answers on possible attunes. Hence, ANT has important implication for the understanding of knowledge and processes of education and learning. ANT provides a valuable analytical lens through which to observe IT-related issues concerning nowadays meaning and functioning of a so-called learning organization, by penetrating the different sociomaterial negotiations between occurring networks.

This introductory chapter provides an overview of the study and the structure of the dissertation.

1.1 The Setting

In line with the contents of the introductory section, this work analyses a Corporate University (CU) within TIM S.p.A., one of the most important Italian telecommunication companies. This CU is called TIM Academy. It is conceived as a digital and physical learning place aimed at the developing technological and business innovations, basing on people's knowledge, know-how and skills, and partnerships with external bodies, such as universities and research centers. TIM Academy offers training courses in different innovative format: web-based training, webinars, virtual learning, interaction and co-production of contents, training materials directly produced by owners of the contents in a widespread faculty logic, experiential courses and labs based on gaming scenarios. At the same time, it allows for participating in workshops, seminars, internal learning tours with qualified teachers and testimonials at national and international level.

The quality of the training offer is guaranteed by a Faculty of teachers composed by training professionals and employees who make their know-how and expertise available through classroom and virtual lessons, training on the job and learning-objects.

To follow the continuous challenges, evolution of technologies, business models and processes, the Company also aims to use an Open Model of Partnership and Research involving universities, national and international research and training centers, peers, suppliers and vendors, start-ups and digital champions. In this way TIM Academy promotes contamination with different realities, offers the opportunity to confront and create networking on the most relevant topics, through the organization of hackathons, workshops, seminars and think tanks. Inside the company people are involved in education activities; most of the population is enrolled in core business issues and a large part in training interventions aimed at transforming the company.

The CU's offer is developed through five paths: a) self-directed learning, which is open to everyone through the online platform; b) the individual development plan, through which each person can participate in training courses following an assessment or for career development needs; c) performance management, in which the employees can have access to an improvement plan defined by their manager; d) the corporate training plan, which measures the collective training needs of the business lines and staff functions for updating, creating and developing the skills necessary to implement the strategic guidelines of the Company; and e) the professional reconversion plan, that offers specific

paths useful for updating professional skills to guarantee the employability of employees on new professional roles of interest to the company.

To make a parallel with the work of Norèn and Ranerup (2005), employees might take on a new role: they might be both consumers and producers of education and learning. Unlike the past, in which it was the company itself that controlled the contents and the distribution of the service, they are an active part of education and learning. This does not mean that today companies do not have to control the process of education and learning. However, a purely top-down logic is accompanied by a bottom-up type.

1.2 Motivation for the Research

Many different Information and Communication Technologies and technological tools, are leading to the creation of inseparable *ensembles* between the social and the material dimensions. As a consequence, researchers cannot focus anymore individually on organizations or technology. There is an inseparable link between technology's influence on users and users' effect on technology, that cannot be overlooked (Luck, 2008).

While there is much literature on technology and its usage for educational purposes, in particular inside educational settings, it seems to focus only on measuring of the effects of technological tools' implementations. Nevertheless, not only do technological tools contribute to education and learning practices. There are also many material artefacts that are combined with the modalities of education and learning, influencing their fruition and outcomes.

Furthermore, most of the studies keep focusing particularly on schools, neglecting those places that have become fundamental for company training, which are now spreading all over the world, namely, Corporate Universities (CUs). The training paradigm of CUs is not that of simply training, but rather that of learning, conceiving it as a long-term process, in which the relationship between individual and organization it is continually redefined in a partnership logic to activate learning opportunities and processes. Often, CUs are realities that take the form of structures separated by the company they belong to; specifically dedicated to the provision of training services, through innovative organizational models. Therefore, they are entities devoted to the strategic development of individuals and overall organizational learning (Allen, 2002;

Iannotta et al., 2016). These entities are composed by components of different nature, be they material, technological, human.

ANT and Information Technology (IT) can be combined to guide the investigation of networks of people, organizations, software and hardware (Holmström and Robey, 2005; Lanzara and Morner, 2005). New technologies play a fundamental role in organizing nowadays' companies, beyond formal or informal organization (Holmström and Robey, 2005; Lanzara and Morner, 2005). ICTs in general are now facing an increasingly affirmation of a phenomenon that is more and more dissolving the boundaries between the social, the material and technology.

Moreover, "ANT regards the technological artefact as being moved and changed by social actors who are engaged in it" (Holmström and Robey, 2005:167), and social actors themselves are also changed through the diffusion of the IT artefact across a given social-network. Overall, IT artifacts and devices must now be seen as materials for enrolling in actor networks (Callon et al., 2002; Holmström and Robey, 2005; Norén and Ranerup, 2005).

Materiality has been widely discounted by organizational and management research, even though sometimes inspected separately from the multiple and dynamic ways in which the social and the material are actually constitutively entangled in everyday life (Jones, 2014; Orlikowski, 2009). However, conceptualizing technology as a material determinant of organizational characteristics led to limited attention to either specific technological essentials and the role of human agency in determining technology (Orlikowsky, 2009).

There are embedded meanings, interests, and activities that produce an ensemble of dynamic technological and material relations (Kling, 1991; Orlikowski, 2009). "ANT analyses show how knowledge is generated through the process and effects of these assemblages coming together. In this approach, learning is not simply an individual or cognitive process. Nor it is simply a social achievement. Learning itself becomes enacted as a network effect" (Fenwick and Edwards, 2010:4). The same Authors continue by underlying the link between education and sociomaterial world, as for the personal and the social cannot be separated from things in all educational endeavors. In this vein, Lawn and Grosventor (2005) describe education as the set of material artifacts that are continually distributed, employed and managed. These objects and material artifacts

shape workplace learning, technology implementations and all the other activities when they associate with human ideas, actions and meanings.

According to Waltz (2006), things cannot be seen as mere products of human design, or as empty tools under human control. In other words, materials are not mere instruments to advance educational practices and performance. This would translate into an underestimation and overlooking of the power and contribution of things and their associations in shaping the events. Rather, both researchers and practitioners should account for the so-called “performativity” of material things. Artifacts act and relate exerting their force to regulate, create or exclude forms of participations within networks. ANT does not focus on what things and artifacts mean, but on what (and how) they *do* in relation to humans and non-humans. This results into an identifiable assemblage – an actor-network - which is not agentic itself but is an effect of a particular set of associations. For ANT, objects have agency and can influence actions as well as humans (McGregor, 2004). This agency is the result of assemblages of people, objects and technologies.

From an organizational and managerial point of view, this can have some relevant implications. First of all, the possibility to account for the analysis of the effectivity of the material networks of objects and technologies in determining the success of departments, and the necessity of rethinking the signification of context (McGregor, 2004). Alike Law’s (1992) study of educational technology of projects, materialities are not mere machines, but active constructors of relationships and interactions, as well as the spatial configuration of the network they belong to. Contexts are materially constructed through this social and physical heterogeneous production of spaces that involve humans, things, structures, ideas. Thus, organization is a network effect, and “ANT explores how organizations keep themselves in place” (McGregor, 2004:353).

There is a need to overcome “the blindness toward the question of how educational practice is affected by materials” (Sørensen, 2009:2). At the same time, this sets the ground for an in-depth analysis of knowledge generation, “that is so often missed in studies of learning” (Fenwick and Edwards, 2010:29). On the empirical level, this type of analysis is extremely relevant, as well as current. In an era where problem-based solutions and experiential approaches to professional learning are increasingly encouraged, there is a necessity of investigating multiple perspectives and ontologies, in order to achieve a certain degree of coherence. This is made possible through the application of ANT for

studying different enactments of the same issue as the result of different competing local knowledges. It also allows for understanding the underlying reasons behind the enforcement of standards of practice and knowledge, by making them visible.

With the evolution of learning activities and available tools, companies must rethink new ways of involving, connecting and interesting individuals, with the aim of stimulating personal learning and development. Thus, by examining these multiple sources of evidence, using qualitative approaches and involving informants as co-authors, it is possible to provide a detailed empirical investigation of work-related complex negotiations, underlying the implementation and maintenance of an enterprise CU.

To achieve this important result, it is necessary to explore in depth the underlying practices and changes, both in human terms and in material terms in the strict sense; and therefore, in organizational terms. Therefore, with this study I wanted to respond to intermediate objectives, just as important, such as the analysis of the practices of interaction, support and/or rejection of the artifact responsible for the use of training within the CU.

With these understandings, a researcher can co-draw important implications for the introduction and use of these tools within knowledge-intensive contexts. Accordingly, several audiences will benefit from the results of this study.

An in-depth analysis of the contributions on these different fronts is presented in Chapter 7 of this thesis.

1.3 Research Purpose

The purpose of this qualitative study is to explore, describe and understand the experiences related to the education and learning phenomenon for the heterogeneous actors (both humans and non-humans) of the TIM Academy Corporate University, at TIM S.p.A.

The story I will tell develops from an Actor-Network Theory view of the reality. The result will be an exploration of narrative features and participant observations, including the critical role of researcher-informants (both humans and non-humans) relationships, the role of spatial and temporal factors of the research context.

Given the nature of the abovementioned approaches, I started from the following research problem: *What does Tim Academy reveal about the dynamics of sociomaterial interplay for organizational education and learning?*

Then, I overarched a central question: *How does ANT illustrate the network aspects of the CU?*

From this, I compared all the linkages that could be included in the study, after gaining experience in the field.

1.4 Research Questions

Given the nature of qualitative research, research questions in this study were open-ended, evolving and non-directional (Creswell and Poth, 2018). According to the purpose of my research, I first developed a so-called “central question”:

RQ1: *How does ANT illustrate the network aspects of the CU?*

Then, drafting this central question by triangulating the methods I applied, together with the theoretical gaps I wanted to fulfil, the resulting “sub-questions” arose:

RQ2: *How do humans and non-humans act upon one another in ways that mutually transform their characteristics and activities in the CU?*

RQ3: *How do individuals and artifacts act and relate exerting their force to regulate, create or exclude forms of participations within the actor-network?*

RQ4: *How do individual and technical differences and interests influence the use of the CU?*

RQ5: *How do particular spatial arrangements encourage or constrain education and learning of the CU?*

RQ6: *What are the characteristics of the effective operating of a contemporary CU?*

1.5 Research Methodology

To analyze these issues, I adopted a qualitative research standpoint. Accordingly, I will pose a definition of it, by drawing from different authors, to capture its faceted nature. “Qualitative research is a situated activity that locates the observer in the world. Qualitative research consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs,

recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them” (Denzin and Lincoln, 2011:3). To provide a deeper insight on the design of the research, Creswell’s (2013) definition should be included. Therefore, “qualitative research begins with assumptions and the use of interpretive/theoretical frameworks that inform the study of research problems addressing the meaning individuals or groups ascribe to social or human problem. To study this problem, qualitative researchers use an emerging qualitative approach to inquiry, the collection of data in a natural setting sensitive to the people and places under study, and data analysis that is both inductive and deductive and establishes patterns or themes. The final written report or presentation includes the voices of participants, the reflexivity of the researcher, a complex description and interpretation of the problem, and its contribution to the literature or a call for change” (Creswell, 2013:44). Alongside the abovementioned considerations, I recognized the need to ingrate a human-centered focus on *social or human problems*, where the setting is, *de facto*, not only subjected to people. Places are made of the interaction between people and things, this is what I call a *setting*.

The positionality that guided my research action derived from sociomaterial theoretical orientations, ontologically embracing the idea of multiple realities. These concepts employed the study of material and human interactions from advancements in structuration theory and Actor-Network Theory.

In line with the nature of the study, I applied an inductive logic, using an emerging design and embracing dynamic and emergent procedures. This inevitably led me to review my research questions during the study, to better reflect the research problem. The choice of qualitative research relies on the impossibility of quantitative measures and analysis to fit the research problems, alongside the interest in interactions among people and material artifacts, which cannot be deepened through quantitative existing measures in nature. Accordingly, “to level all individuals to a statistical mean overlooks the uniqueness of individuals” (Creswell and Poth, 2018).

Multiple methods of data collection were necessary to best answer the research questions. First, I started from a period of 3 years in close contact with the organization in which I conducted the study. This favored a slow process of naturalization (LaFramboise et al., 1993). In fact, this acculturation has been extremely functional not

only for me, as a researcher, but also for the context as a whole in which I found myself acting, as well as with different informants.

Then, coherently with the emerging logic of my study, my research design was also emergent. For this reason, a two-kind of researcher introspection was undertaken (Gould, 1995; Wallendorf and Brucks, 1993). A first one to reflect on the process of acculturation, referred to above. One of the main reasons why I thought it was necessary to adopt this technique is certainly my background of an economic and organizational theory nature; where the research I have decided to undertake has profound sociological origins. A second one, to enhance the efficacy of the iterative process of data analysis, with a view to stimulating the derived ethics (Berry et al., 1989).

Following Callon's four moments of the Sociology of Translation, I started my journey through ANT deploying it as a conceptual framework, a research method and an analytical framework (Luck, 2008).

The actor-network approach to reality also helped me in what Star calls "the ethnography of infrastructure" (Star, 1999). The same concepts were later adopted by Bruni in 2005, for shadowing a digital clinical records system. Here, for infrastructure I mean the entire set of relationships that links both people with several material artifacts I encountered.

After, I learned about people stories using a variety of narrative approaches, including narrative interviews, participant observation, internal document collection, external document collection related to the press, ongoing informal conversations with people I randomly encountered during my observations, writing of extensive field notes, pictures taken during different daily events, and personal interaction with related-material artifacts.

During the collection of stories, particularistic introspection in narrative form (Gould, 2012; Wallendorf and Buck, 1993) was applied with the informants, to stimulate contextualized experiences. This allowed a triangulation of introspective data, in the phase of data analysis (Minowa et al., 2012).

Moreover, I applied projective techniques by proposing two tests to people with whom I have interacted, exclusively for epistemic purposes. In particular, with a physical moodboard I collected both images I took from TIM website, pictures I took from my participant observation, and objects I wanted to focus on, which represented the sources of inspiration that the informants were asked to connect.

Also, I asked each participant to make a list of *non desiderata* of their CU, which methodologically is defined the noteness.

The design of the research had to be clearly outlined within a research proposal, which, in turn, was shared with the target to which it is addressed. Traditionally, next to sharing a work plan, different ethical considerations emerge. Each consideration I pondered, are discussed in the following paragraph.

1.6 Ethical Issues

In this section I present the way I addressed the ethical issues I encountered, by following Creswell and Poth's (2018) considerations and classification. The focus is on addressing the ethical issue across the entire study. Each step and related processes are synthesized in Table 1.

Table 1: Undertaken Ethical Issues. Source: Adapted from Creswell and Poth, 2018.

Timing During Research Process	Type of Ethical Issue	Done or not (if not, why?)	How to Address the Issue	Done or not (if not, why?)
Prior to conducting the study	-Seek company approval;	√	-Submit for institutional review board approval;	√
	-Examine professional association standards;	√	-consult types of professional ethical standards;	√
	-Gain local access permissions;	√, but the choice was not random	-Identify and go through local approvals among site participant, with the help of a gatekeeper;	√, although there is a certain amount of power within any relations
	-Select a site without a vested interest in the outcome of the study;	√	-Select a site that will not raise power issues against the researcher.	√
	-Negotiate authorship for publication;	√	-Give credit for work done on the project;	√
	-Seek permission for use of unpublished instruments or procedures that others might consider to be theirs.		-Obtain permission for use materials that might be considered proprietary.	
Beginning to conduct the study	-Disclose the purpose of the study;	√	-Contact participants to inform them of the general purpose of the study;	√
	-Avoid pressure for participants into signing consent forms;	√	-Assure volunteer participation;	√
		√		√

	-Respect norms and characters of indigenous societies; -Have sensitivity to the needs of vulnerable populations.	No vulnerable population was encountered	-Find out cultural, religious, gender and other identities to be respected; -Obtain appropriate consent.	√
Collecting data	-Respect the study site and minimize disruptions; -Avoid deceiving participants; -Respect potential power imbalances of participants; -Do not “use” participants by gathering data and leaving the site without giving back; -Store data and materials using appropriate security measures.	√ √ √ √ √	-Build trust and convey the extent of anticipated disruption in gaining access; -Discuss the purpose and use of the study data; -Avoid leading questions and sharing personal sensitive information; -Provide reward for participating and attend opportunities for reciprocity. -Store data and materials in secure locations for five years.	√ √ √ No, result of agreements between participants and the company √
Analyzing data	-Avoid siding with participants and disclosing only positive results; -Respect the privacy of participants, by using anonymous verbatim.	√ √	-Report multiple perspectives, including contrary findings; -Assign fictitious names and develop composite profiles.	√ √
Reporting data	-Avoid falsifying authorship, evidence, data, findings, and conclusions; -Avoid disclosing information that would harm participants; -Communicate in clear, straightforward, appropriate language; -Do not plagiarize.	√ √ √ √	-Report honestly; -Use composite stories so that individuals cannot be identified; -Use language appropriate for audiences of the research; -Respect permissions needed to reprint or adapt the work of others.	√ √ √ √
Publishing study	-Share reports with others; -Tailor the reporting to diverse audiences; -Do not duplicate or piecemeal publications; -Complete proof of compliance with ethical issues and lack of conflict of interest.	√ √ √ √	-Provide copies of the report to participants and stakeholders; -Share practical results, consider website contribution, and consider publishing in different languages; -Refrain from using the same material for more than one publication;	√ √ √ √

-Disclose funders for research and who will profit from the research.

1.7 Thesis Structure

This thesis is organized into seven Chapter. This first Chapter provided an overview of the rationale behind this study, by starting with a comprehensive introduction. Then, the setting was presented, together with the motivation for the research, the research purpose and the research questions. After, the research methodology was introduced as a triangulation of different qualitative methods and techniques. Finally, ethical issues were addressed.

Chapter 2 reviews the theoretical background, providing different perspectives on knowledge management and education and learning approaches, as theoretical foundations of the research. Then, it closes with first essentials of Actor-Network Theory, in order to provide the reader with a useful vocabulary for understanding the future development of the study.

Chapter 3 contextualizes the study by focusing on the definition of Corporate Universities. It starts with an overview on the theme. Then it provides a distinction between traditional and modern Corporate Universities. Lastly, the company TIM and its TIM Academy Corporate University are presented.

Chapter 4 offers key concepts on the conceptual framework of the study. It starts with an outline of the application of Actor-Network Theory for education and learning. Accordingly, Actor-Network Theory is deployed to account for the interplay between humans and non-humans in implementing the TIM Academy Corporate University, by deploying Callon's (1986) Sociology of Translation. Then, it provides the conceptual framework and the six research questions the guided the research.

In Chapter 5, the multiple methods and techniques of data collection are exposed. Starting from the story of Actor-Network Theory as a research method, it recalls Callon's moment or categories of translation (Callon, 1986). Then, it deepens the different methods of data collection, namely: gathering of both internal and external documents, participant observation with human and non-human actors and narrative interviews. Then, Table 2 and Table 3 shows the data set of the study. The Chapter ends with the

exhibit of the strategy for data analysis. As an iterative process, it has been adapted from Creswell and Poth (2018) and articulated into six loops.

Chapter 6 focuses on the analysis of the data collected to address the six research questions, through the deployment of the analytical lens and methods showed in the conceptual framework. The first section illustrates some first accounts of the TIM Academy actor-network. Afterwards, it exposes the results through Callon's (1986) four moment of translation, until a differentiation emerges between two distinct moments of inscription. Lastly, the Chapter ends with the analysis of the characteristics of the TIM Academy as a punctualized modern Corporate University.

Chapter 7 summarizes the findings of the study in answering the six research questions. It derives conclusions from the research problem and provides the readers contributions to theory, implications for practice, and some suggestions for future research.

The first appendices contain the basic steps I adopted for eliciting narrative interviews, the interview guide and the checklist of items for identify the characteristics of the TIM Academy Corporate University. Appendix D shows the observational protocol I used for observing human and non-human actors. Appendix E contains the pictures I showed to the informants for the moodboard technique during the narrative interviews, together with an example of resulting moodboard. Appendix F provides an example of codebook for one of the themes that emerged from data analysis. Appendix G concludes with the anthropomorphizing representations of the two different moments of inscription, and their explanations.

Chapter 2 - Theoretical Background: It is a Matter of Perspectives

Introduction

This doctoral thesis opens with a review of theoretical backgrounds on which to base the whole analysis.

The growth of cooperation at the national and international level has meant that the traditional ideas of organizational structure is lost, along with the slow and progressive fogging of the concept of intra and inter organizational borders.

The growing possession of specific knowledge owned by people or groups of people within companies, attributes to them a strategic role that traditionally was not considered of strategic importance.

The need to ponder not only visible networks, but also the invisible ones (together with the increased relevance attributed to the dichotomy between formal and informal relationships), drives researchers and practitioners to look with greater interest at the location of knowledge and power of the networks within and between companies. As reported by Mourtisen and Flagstad, “knowledge in the knowledge society is not interesting only for its truth-value but also for its transformative abilities- knowledge is interesting if it survives in networks being constantly reproduced or repeated” (Mourtisen and Flagstad, 2005:214).

In this chapter, the theoretical background is analysed starting from the knowledge economy and organizational learning theories.

Continuing with the basic assumptions of sociomateriality perspective and its related concepts, the Chapter ends with a detailed analysis of Actor-Network Theory and its fundamentals, as an anticipation of the conceptualization of the study, in its entirety.

2.1 The Knowledge Economy

Started in the 1980's, the knowledge-based economy (KBE) is the dominant post-industrial economic paradigm, with an emphasis on the role of knowledge as the primary driver in the process of economic growth (Harris, 2001). Labor-intensive manufacturing hierarchical organizational structures have given way to knowledge-based organizations (Adler, 2001; Davenport and Prusak, 1998). Drucker (1959) first described the characteristics of the knowledge economy predicting major changes in society, grounded on knowledge workers¹ and the way they use information in their work. Accordingly, economic wealth is created through the creation, production, distribution of knowledge, with the support of new technologies as physical infrastructures for the development of knowledge-based products. The economic law of diminishing returns is partially replaced by the notion of knowledge applied an infinite number of times, with no deterioration in its value due to repeated use, durability over time and space, and storage at low to zero cost, in the new digital environment (Felin et al., 2009; Harris, 2001). To sum up, knowledge is now seen as a commodity and intellectual asset, while maintaining some radically different characteristics from other valuable commodities: a) its use does not consume it; b) its transfer does not result in losing it; c) it is an abundant resource, but the ability to use it is scarce; and d) it is embedded within people.

The predominance of attention paid to knowledge assets in today's society relies in a concrete response to main socio-economic trends, such as the globalization and the ubiquitous computing (Prusak, 2001). In line with these considerations, starting from the 1990's several scholars questioned the role of knowledge in driving the strategic management of the firms. This set the ground for the emergence of a new perspective: the knowledge-based theory of the firm. Based on the previous Penrose's resource-based view of the firm (Alavi and Leidner, 2001; Grant, 1996; Nonaka and Takeuchi 1995; Penrose, 1959; Spender 1996), the knowledge-based perspective assumes that knowledge is embedded within different units, namely individuals, routines, documents, norms, organizational culture. Accordingly, most of the tangible assets an organization owns depend on the combination and the application of its resulting know-how. Therefore,

¹ Knowledge workers can be defined as high-level workers who apply theoretical and analytical knowledge, acquired through formal training, to develop products and services (Drucker, 1959).

knowledge assets emerge to be essential for reaching a sustainable competitive advantage in the long run. Hence, “almost all the resources of the firm can be viewed as a form of knowledge: while information and technology may be the only “pure” knowledge resources, the value of people derives almost entirely from the knowledge they can deploy; similarly, capital equipment may be viewed as the physical embodiment of knowledge; capabilities represent knowledge at the organizational level resulting from the integration of the knowledge of multiple individuals” (Grant, 2010:163). The more a firm is able to effectively apply the existing knowledge to generate new knowledge, the more it increases its possibilities for achieving competitive advantage from knowledge-based assets. In this sense, organizations must turn on integrating specialized knowledge of different persons to achieve effective coordination through interdependence of specialized knowledge (Grant, 1996). Additionally, scholars suggest that the KBE requires governance that extends beyond a single organization’s boundaries to networks, such as communities of firms and larger groups of individuals (Adler, 2001; Kogut and Zander, 1996). Communal forms are expressed by Adler (2001) and others often referring to communities of practice (or collaborative communities), increasingly recognized as effective organizational principle and forms for generating and sharing knowledge (Adler, 2001; Benkler, 2006; Brown and Duguit, 2001; Davenport and Prusak, 1998; Felin et al., 2009; Nahapiet and Ghoshal, 1998).

Despite a widespread recognition and agreement about the importance of managing organizational knowledge, in the last ten years many theories have been put forward for practicing knowledge management, with a wide range of organizational factors considered in influencing the phenomena of creation, sharing and utilization of knowledge (e.g. individuals, organizational culture, intrinsic and extrinsic incentives, leadership, business processes, technology and trust) (Alavi and Leidner, 2001; DeLong and Fahey, 2000; Drucker, 1999; Nonaka, 1994; He et al., 2009; Wenger et al., 2002). However, there is still lack a consensus on the definition of knowledge management (KM) and its related concepts, because of the intrinsic subjective nature of knowledge itself (Alvesson and Karreman, 2001; Hislop, 2009).

Over the years, each perspective of analysis suggests different strategies for defining and managing knowledge through diverse systems in support of knowledge management. Therefore, different views of knowledge drive to different perceptions and definitions of knowledge management (Alavi and Leinder, 2001; Carlsson et al. 1996). Overall,

knowledge management represents the systematic approach to ensure the strategic utilization of the organization's knowledge base. This knowledge base cannot be separated by individual skills, competencies, and thoughts. Therefore, it sets the foundation for differentiation among organizations that owns context-specific know-how (Davenport and Prusak, 1998).

Initially, scholars defined knowledge management as the systematic approach for managing the capture, structure, and dissemination of knowledge, by focusing on cost reduction, lessons learned, best practices and organizational memory (Grant, 1996; Nonaka and Takeuchi, 1995; Pfeffer and Sutton, 2000; Senge, 1990). This shifted the emphasis on intellectual capital (IC), as the business value (or wealth) generated by knowledge and its applications. Typical examples of IC assets are: intellectual property rights, patents and actionable knowledge (Stewart, 1997). According to the Author, the best way an organization has to retain its valuable knowledge is to identify intellectual assets and then ensure they are stored, valued, exploited and reused (Stewart, 1997). This process should ensure a continuous flow of knowledge between individuals, members of groups, and between people and the organization itself.

According to Grant (2010:162), "knowledge management is an umbrella term that comprises a range of organizational processes and practices whose common feature is their concern with generating value from knowledge". Therefore, knowledge management should be applied to three organizational levels: the individual, the group or community, and the organization. In other terms, knowledge management refers to identifying and leveraging the collective knowledge in an organization to help the organization compete (von Krogh, 1998). Going back to Davenport and Prusak's work (1998), most knowledge management efforts have at least one of three objectives: a) to make knowledge visible and show the role of knowledge in an organization (e.g. through knowledge maps, and hypertext tools); b) to develop a knowledge-based culture by encouraging knowledge sharing; and c) to build a knowledge infrastructure based on network of connections to encourage interaction and collaboration.

By synthesizing a broad range of relevant literature, Alavi and Leinder (2001), identify five different perspectives of studying organizational knowledge. First, when knowledge is viewed as an object, knowledge management need to find the correct way of building and managing knowledge stocks. Second, if knowledge is considered a process, knowledge management must focus on the so-called knowledge circle. This involves the

processes of creation, sharing, and use, which consist in the flow of knowledge. Third, knowledge as a capability requires knowledge management concentrating on building core competencies for maintain the strategic advantage of the firm-specific know-how.

A fourth perspective is derived by McQueen (1998), who considers knowledge as a condition of access to information. Thus, the role of knowledge management is to facilitate access to relevant contents.

Finally, knowledge has been seen as the capacity to use information with the potential for influencing future action (Carlsson et al. 1996). Consequently, learning is the ability to interpret relevant information for decision making.

Nowadays work environment is more complex due to the increase in the number of subjective knowledge items we need to filter every day, and workers are expected to be connected all the time. This represents the phenomenon of information overload. It means people are expose to, or provide of too much information or data. This overload must be managed. Accordingly, organizations face an increasing awareness of the importance of contents, and how they can be easily accessed by people.

2.1.1. Knowledge Management Systems

It is only with the advent of the Internet and ICTs that knowledge management have been enriched with interactive tools, capable to faster store and connect people and groups of people inside and outside organizations. Face-to-face interactions encounter virtual interactions, enabling to organize and manage the intellectual assets of an organization using new techniques for knowledge capturing, storing and sharing. The crucial role of ICT emerges when the geographical dispersion of knowledge workers impedes traditional knowledge flows. When organizational knowledge is dispersed, knowledge preservation and knowledge owners' retention become a significant challenge. Accordingly, knowledge management represents one response to the challenge of trying to manage this complex, information overloaded work environment. In addition, also the management and coordination of diverse technology architectures, data architectures, and system architectures poses obvious knowledge management challenges. These challenges result from the need for integrating diverse systems, and data sources across internal business processes (Hislop, 2009). However, there are several related arguments emerging from ICT based knowledge management linked to the very real nature of knowledge. For example, Hassell (2007) argues that knowledge can only be embodied within people, so

that each attempt to codify it into computer-based structures only produces information storing. One must recognize advanced ICTs (e.g., the Internet, intranets, extranets, browsers, data warehouses, data mining techniques, and software agents) can be used by organizations to systematize, enhance, and promote large-scale intra and inter firm knowledge management.

Knowledge management systems (KMS) refer to a specific class of IS for managing organizational knowledge (Alavi and Leidner, 2001). These IT-based systems are developed to support and enhance the managing of knowledge processes of creation, codification, acquisition, sharing and application. The abovementioned characteristics of the today's economy drove the organizations to develop many of their knowledge management initiatives on IT, as an important enabler (He et al., 2009). Among the facilities IT-based systems can bring, some have already been cited, such as: a) the possibility of finding experts or a stored source of knowledge using online directories and searching databases or tags; b) sharing knowledge and working together in virtual teams (such as communities of practice or, to be more precise, networks and Enterprise Social Networks (ESN)); and c) access to information on past projects and derive best practices and lessons learned (Collins, 2006; Davenport and Prusak, 1998; Hislop, 2009).

There are several ways organizations can foster knowledge networks. For example, providing online chats or forums for communication and discussion. Due to the advances in technology, these online ways of communication can be also interactive. Social networking tools are essential in making easier for employees to participate in the creation, sharing and diffusion of knowledge. When we introduce the concept of rich media, we include visual literacy by adding the power of images to influence others. Images are not only able to communicate information, but also to share moods, persuading audience's emotions. In addition, the rise of virtual communities of practice also represents new rich forms of communicating and sharing ICT-mediated knowledge (Ardichivili et al., 2003; Hislop, 2009; Usoro et al., 2007). However, no KMS has the possibility to succeed without the full understanding, active participation, and enthusiasm of people (Sultan, 2013).

2.1.2. Taxonomies of Knowledge

Overall, different taxonomies of knowledge offer different design of knowledge management systems (KMS), by focusing on the support of diverse types of knowledge

and the flows among them. The study of knowledge emerged as a broad discipline in philosophy known as Epistemology. Many philosophers attempted to provide insights to the nature of knowledge. However, Plato first, and his disciples Aristotle later, provided the initial description of knowledge, paving the way for the main distinction in the field between the Rationalism and the Empiricism respectively. The rationalists believe that knowledge is gained through reasoning, while the empiricists assume that knowledge is gained through sensory experience and induction, as the logic of scientific discovery and gaining new knowledge (Burnyeat, 1981; Nonaka and Takeuchi, 1995).

Over the years, different definitions of knowledge have been provided, depending on manifold perspectives. Some scholars address the question of defining knowledge by distinguishing among knowledge, information, and data. Accordingly, data are seen as raw numbers and facts at the base of a pyramid, followed by information, which are processed data that, once assembled and elaborated, give birth to knowledge (Vance, 1997). In this sense, knowledge has been considered personalized information possessed in the mind of individuals, and influenced by observations, experiences, interpretations and judgments. Thus, knowledge might be the result of a cognitive process, and it is necessary to reach the same understanding of data and information for individuals to share a certain knowledge base (Alavi and Leinder, 2001; Fahey and Prusak, 1998).

Starting from Polanyi's works (1962), Nonaka (1994) outlines two dimensions of knowledge organizations must consider: tacit and explicit. The first typology refers to the cognitive dimension of individuals' actions and context-specific experiences, and it is rooted in personal beliefs, know-how, and skills. Explicit knowledge is articulated, codified and easy to communicate in symbolic forms and/or natural language (Hislop, 2009; Nonaka 1994; Panahi, et al., 2013). It can be communicated at negligible marginal cost between individuals and across space and time. These characteristics of knowledge reflect those of a public good, which once created, can be replicated among many users at a low cost.

In addition, the phenomenon of digitalization has increased its spread and further reduced the costs of its dissemination (Grant, 2010; Mathur, 2018). Notably, Polanyi (1975) argues the non-dichotomous nature of knowledge, underlying their mutual dependency. Explicit knowledge derives from the interpretation of personal tacit knowledge. At the same time, knowledge can also be viewed as individual or collective (Nonaka and Takeuchi, 1995), depending on the perspective of creation. Literature has

distinguished among two types of collective knowledge: explicit and tacit. Taylor (2007) delineates collective explicit knowledge as everything that can be collected in common repositories, books, and formal data media. Indeed, it is readily accessible to organization's members and transferrable. Collective tacit knowledge resides in systemic routines, and the relationships between technologies, roles, and (unwritten) formal and informal procedures in the group, organization, or society. It encompasses both explicit and tacit individual's knowledge, since much of an individual's knowledge of the group procedures and routines can be easily articulated. Tacit collective knowledge recalls also the attempts of the social network analysis (SNA) method to evaluate the informal network of the existing relationships between people in the firm, which generates the exchange of information, data and knowledge. However, there must be some overlap in people's underlying knowledge bases to create the conditions for sharing knowledge (Alavi and Leider, 2001; Tuomi 1999).

Alavi and Leider (2001), basing on Zack's work (1998), classify knowledge as procedural (know-how), causal (know-why), conditional (know-when), and relational (know-with). Norton (1998) adds declarative knowledge, referring to the know-about. In line with Grant (2010), the tacit nature of knowing-how encompasses skills that are expressed through their performances (e.g. playing the piano), whereas knowing-about has an explicit nature and it comprises facts, theories, and a set of instructions.

Personal knowledge can change into social knowledge when it is representative of a society (Downes, 2007). Thus, it is the result of connections between individuals. In doing so, a distinct and new form of knowledge is what Downes (2007) defines connective knowledge. Using the Authors' words, this type of knowledge "could be described as distributed, because it is spread across more than one entity. A property of one entity must lead to or become a property of another entity in order for them to be considered connected" (Downes, 2007:1). It implies interactions between entities, without specifying whether these entities can only be represented by humans, providing a basis for viewing knowledge as residing in networks of humans and non-human appliances (Bell, 2010).

The link between knowledge and dynamic relations of the world is also at the basis of Barab et al.'s (2001) study on the development of a methodology for capturing the process of learning *in situ* through Action-Relevant Episodes (AREs). Accordingly, knowledge does not merely reside inside human heads, but is consistent with our relational acts.

Knowledge is then “knowing about”, which is characterized by four main specifications. Accordingly, it:

- “1) refers to an activity-not a thing.
- 2) Is always contextualized-not abstracted.
- 3) Is reciprocally constructed as part of the individual-environment interaction-not objectively defined or subjectively created.
- 4) Refers to functional relations-not objective truths.

... Knowing about and learning are simply different ways of describing the dynamics of evolving participation. Becoming knowledgeable skillful, from this perspective, is characterized by an individual’s increasing potential to build and transform relations with the (material, psychological, and social) world” (Barab et al., 2001:66). Knowing about is situated, where learners’ understandings and the related abilities are distributed across different temporal and spatial contingencies through which competences emerge. The unit of analysis is then conceived as a complex and dynamic intersection between people, activities and materiality. Anticipating what will be explored later, Latour affirms that knowledge is only made effective when it is both *immutable* and *mutable*. This means that knowledge is fixed into a relative stable set of relations because of network effects, but it can also travel across and beyond its starting point to have effects elsewhere at distance. To see knowing as a relational effect means to look at it as the situated activity of learning. These concepts will be recovered in the continuation of the dissertation.

2.2 Organizational Learning

What is undoubted, is the fact that the learning process itself creates knowledge, regardless of the type of taxonomy that different authors want to adopt.

Learning within organizations is a vast and multidisciplinary topic since early 1990s. Some Authors link this growing interest in organizational learning to a wider interest in the value of learning in contemporary societies (Contu et al., 2003; Hislop, 2009). In this sense, the organization’s capacity to learn represents one of the major sources of competitive advantage.

No model of organizational learning has widespread acceptance. Despite diversity in conceptualizations, there is a common way of considering how learning occurs when considering individuals, groups and organizations.

Accordingly, learning can occur in a wide range of manners. Hislop (2009) categorizes learning into three different types: a) learning via formal training and education; b) learning via the use of interventions in work processes; and c) learning embedded within daily work activities. In line with the Author, “organizations can be understood to learn, not because they “think” and “behave” independently of the people who work within them (they cannot), but through the embedding of individual and group learning in organizational processes, routines, structures, databases, systems of rules etc.”. However, “organizational learning only occurs when learning at the individual or group level impacts on organizational level processes and structures” (Hislop, 2009:93). This is reached through reflection and modification of the norms and values embodied in those established organizational processes and structures.

The abovementioned differentiation highlights that knowledge does not only occur as a consequence of education and training, but also due to a range of organizational practices, activities and values. Therefore, knowledge is shared, combined and applied by individuals or groups, and then embedded within organizational features. This, in turn, will influence and shape the ways people and groups learn.

By analyzing the previous debates on this topic, it is possible to trace a set of common factors.

2.2.1. **Previous Debates: Learning Processes and Learning Types**

A common starting point between different ways in which the Academia has worked on the study of organizational learning is the analysis of previous debates developed around the question of whether learning is a cognitive or behavioral process (Easterby-Smith et al., 2000; Hariharan and Vivekanand, 2018; Hislop, 2009). Then, this led to available types of learning and organizational learning.

A cognitive perspective of learning conceives learning as a transformation in intellectual thoughts and frameworks, both at individual and group level. Organizational learning is explained through human information processing (Akgun et al., 2003). Huber (1991) defines organizational learning the situation when units acquire knowledge that the organization recognizes as somehow useful. No accompanying shifts in behaviors are mentioned (Argote, 2013). This follows the definition of conscious change in people’s cognitive maps or understandings, as suggested by Friedlander (1983). Learning happens

in organizations through nonstop changes of the composition of the elements within the key individuals' cognitive structures (Hayes and Allinson, 1994).

A behavioral approach advocates learning can occur primarily through actions, then followed by a process of critical reflection (Hislop, 2009). New behaviors can lead to new understandings (Argyris, 1977; Crossan et al., 1999; Easterby-Smith et al., 2000; Kim, 1993), thus learning is characterized as a process of consuming and storing new behaviors, and translating the, into capabilities (Hariharan and Vivekanand, 2018). Learning is "increasing one's capacity to take effective actions" (Kim, 2003:3). Kofman (1992) provides a version of a learning cycle called the "observe-assess-design-implement" (OADI) for which people assess their experience by reflecting on their own observations. Hence, people construct an abstract concept to response to the previous assessment. They then test their design by implementing them, which leads to a new practice. Levitt and March (1988) define organizational learning as something that derives from the codification of inferences from the past into new routines guiding the behaviors. According to Simon (1991) and March and Olsen (1975), individuals learn and change their cognitive thoughts and actions influencing, in turn, individual and organizational behaviors. In line with these considerations, Daft and Weick (1984) make a distinction between learning and interpretation, stating that the latter involves cognitive change while learning involves behavioral change (Hariharan and Vivekanand, 2018).

By distinguishing between individual and organizational learning, Kim (1993) refers to conceptual learning (know why) when denoting the first, and to operational learning (know how) for the second. Education, in turns, is a matter of shaping the responses of learners by using procedures such as modelling, demonstration and reinforcement. This best reflects the direct instruction teaching, with an active and direct role assumed by the teacher who maintains control over the content, the space and the time (Sullivan Palincsar, 1998). Hence, from a theoretical point of view, it does not encompass the mechanisms that account for sufficient evidence for problem solving, flexibility in novel contexts (Sullivan Palincsar, 1998).

These previous conceptualizations can help in framing different learning types. Traditionally, it is possible to distinguish between three kinds of learning types: a) single-loop learning; b) double-loop learning; and c) deutero learning (or triple-loop learning).

Single and double-loop learning concepts have been developed by Argyris and Schön (1996). According to Hislop (2009), single-loop learning concerns incremental changes

within a coherent framework. Accordingly, individuals, groups or organizations modify their actions according to the difference between expected and reached outcomes (see Figure 1). It involves an adaptation of actions to mitigate a problematic situation. This view is not free of critical issues. By only removing symptoms, the root causes of problematic situations still remain. Moreover, single-loop learning assumes problems and related solutions to be close to each other in time and space. However, this is not generalizable in daily reality.

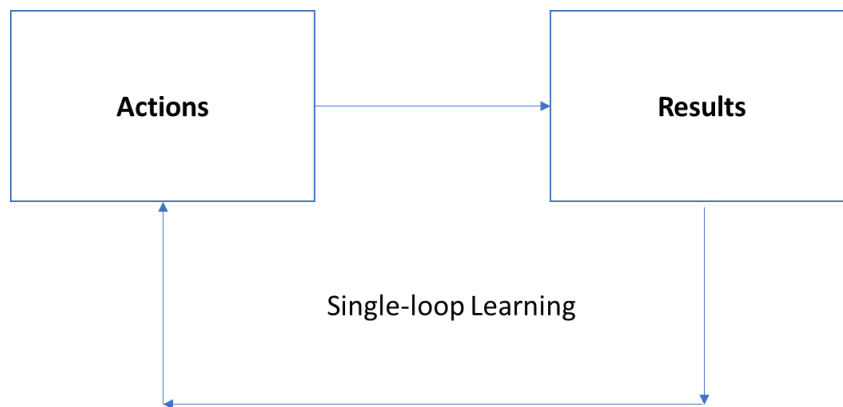


Figure 1: Single-loop learning. Source: Own elaboration.

In double-loop learning, existing theories and assumptions are questioned and reflected on (Hislop, 2009). By thinking about their actions, in double-loop learning (Figure 2) people also correct or change the underlying causes behind problematic actions. In addition to the previous learning type, here individuals need to think and analyze their own processes. Therefore, double-loop learning will lead to deepen understanding of basic assumptions and allows examining the underlying assumptions behind the actions and behavior and learning from those mistakes and incorrect methods. By comparing two successful episodes of post-accident reviews in an elite combat unit of the Israel Defense Forces, Naot, Lipshitz and Popper (2004) present a conceptualization of organizational learning quality, based on the occurrence of double loop learning. According to the Authors, “double-loop learning can be considered to be of higher quality because effective solution of some problems requires the examination of sensitive ‘undiscussable’ issues, and the reframing of assumptions, values and goals. In addition, the governing values of double-loop learning – valid information, free and informed choice, and internal commitment to the choice and constant monitoring of its

implementation – ensure the continuation of inquiry by reducing the likelihood of disruptive self-sealing defensive routines” (Naot et al., 2004:453). They propose that outcomes of learning, processes of learning and contexts of learning are important factors for deciding the quality of learning. Outcomes are associated with changes in behavior, which are caused by sharing of mental models (the process) and supported by a facilitative leadership that increases psychological safety of the members (the context).

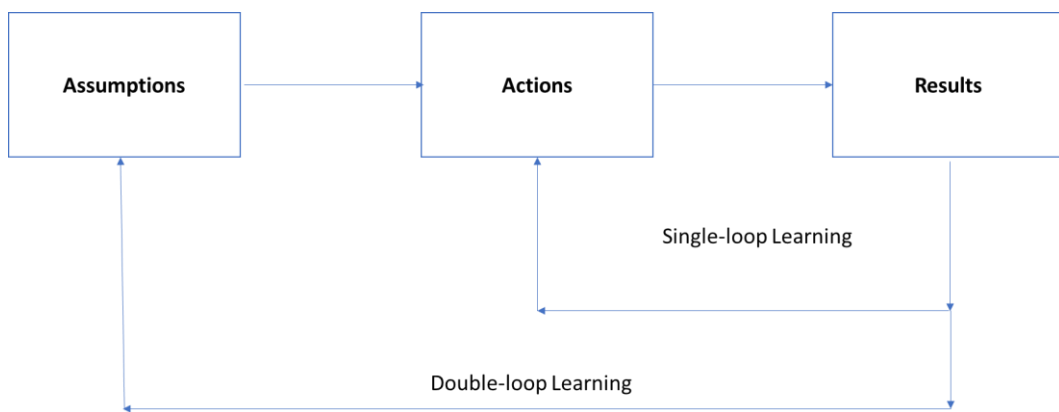


Figure 2: Double-loop learning. Source: Own elaboration.

Deutero-learning, or triple-loop learning, encompasses and transcends both single-loop and double-loop learning (Argyris and Schön, 1996). Originally formulated by Bateson (1972), it concerns the highest level of learning and involves the process of questioning and reflection of learning itself (Hislop, 2009). As in Figure 3, this type of learning focuses on transforming organizational members by helping them learn how to learn. In accomplishing this task, organizational members learn how to tap the collective knowledge embedded in various parts of the organization. By learning how to learn over time, organizational members discover what facilitates or inhibits their learning and can thus produce new strategies to develop their knowledge. According to Levitt and March (1988:332) “learning itself can be viewed as one of the technologies within which organizations develop competence through use and among which they choose on the basis of experience”. Hence, with deutero-learning it is possible to know new ways of learning and new commitments. To this regard, there is a need for the establishment of appropriate

structures, capabilities, processes, and strategies to facilitate learning at the organizational level (Geppert, 2000).²

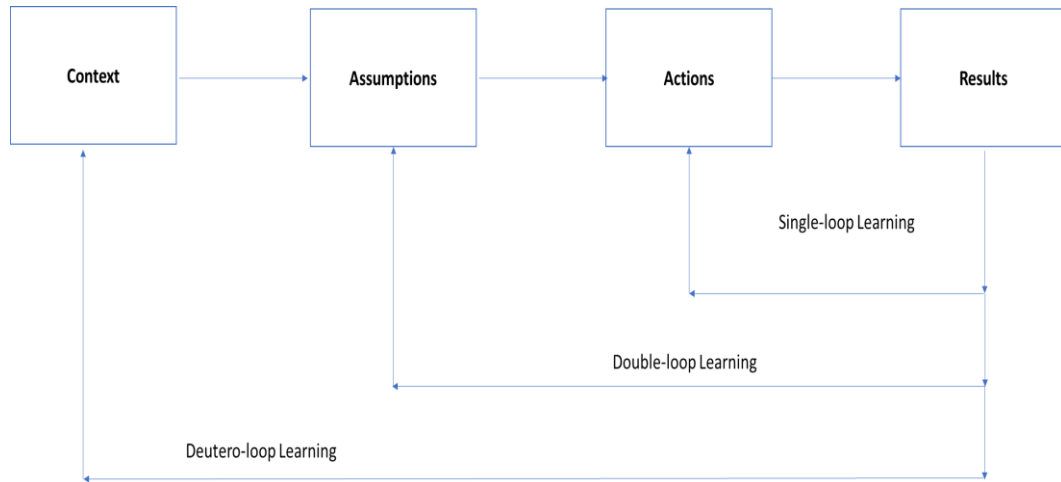


Figure 3: Deutero-loop learning. Source: Own elaboration.

Overall, the sphere of formal and informal knowledge and learning overlap. In fact, they should not be seen as counterpoised, but each one should be a condition for the other. Accordingly, a distinction can be done between what Mulcahy (2006:57) defines “discipline knowledges” and “life knowledges” (or experiential). The theoretical stuff and Cooper and Laws’ (1995) *distal thinking* occurs only with *dialogic* and *experiential learning*.

2.2.2. The Social Constructionist Perspective and the Practice Turn

More recently, scholars investigating learning have built from the cognitive-behavioral approach to situation-practice learning (Easterby-Smith et al., 2000). This perspective advocates that learning is an integrated component of individual’s everyday organizational life and work practice and it is not only restricted to individuals’ knowledge acquisition (Gherardi, 2001). There is interdependence between individual and social processes, which drives to the co-construction of knowledge (Sullivan Palincsar, 1998).

Accordingly, organizational learning is seen as a means of increasing the ability of parts of an organization to communicate with each other’s. In line with the previous

² For complete information, some authors such as Visser (2007) further articulate this dimension concerning deuteron-learning, defining it as “planned learning”.

considerations, Brown and Duguid (1991) conceive organizational learning as construction of understanding out of social environment, physical environment and social relations of the people involved. This perspective changes the way of considering the learning process from taking place in the minds of individuals to being part of the participation patterns of the organizational members. Therefore, conditions in which learning takes place influence learning, and this situation-specific context does support a state of knowing.

The way individuals apply, combine and construct their knowledge necessarily requires the ability to collaborate (Wenger et al., 2002). Wenger (1998) refers to practice-based learning and knowing in organizations, by making use of the notion of the community of practice. These communities represent the pillars of social learning systems and derive from the intersection between personal experiences within a context of shared engagement in a communal practice (Nicolini et al., 2004). Learning requires involvement and belonging to communities of practice outspread the notion of mutuality to participate in a social learning system (Ardichvili et al., 2003; Wenger, 1998). As a consequence, socially accepted practices among members of organizations promote a shared identity and facilitate relationships (Wenger, 1998). Knowing represents the activity and process which reveal over time (Blackler, 1995; Gherardi, 2009).

Gherardi and Nicolini (2001) developed an approach to organizational learning according to a sociologic perspective. Considering organizational learning through a sociologic and post-cognitivist perspective it is possible to highlight the emphasis on the “participative and collaborative aspects of work and learning, based on the notion of the social construction of reality, through a practice-based approach which is experiential, pre-reflexive and centred in action” (Nobre, 2007:281). This implies that it focuses on knowledge both in terms of “content” and “process,” converging on the practical features of the social, cultural and past contextualization of the “content” (Nobre, 2007).

This has paved the way to the so-called “practice turn” in the studies on learning and knowing in organizations (Blackler, 1995; Gherardi, 2001; Gherardi, 2009; Gherardi, 2013; Schatzki et al., 2001). According to Gherardi (2001:132), “learning is an interpretative device. It enables construction of a representational system that can be used to analyze the organizational processing of knowledge: how it is produced, how it circulates, how it is institutionalized, what emancipatory (or otherwise) contribution it can make to society. A constructivist ontology therefore is appropriate”. Hence the

practice represents the locus in which learning occurs. Following these considerations, the distinctions between areas of individual, group and organizational learning can be heuristically useful distinctions as long as we keep in mind that knowledge circulates between and unites these various levels and that any distinction in levels is purely arbitrary (Gherardi, 2001). In line with the Author, it is the organization that promotes subjects (individual, collective and organizational), objects and the relationships between them around a given practice. There is a need for showing “how a practice-based theorizing arises from multiple perspectives and negotiations”, since “to focus on analysis of knowing within a situated practice allows study of where knowledge is socially constructed and how it is socially constructed both as activity and passivity” (Gherardi, 2001:137).

By assuming that learning is a social process (Gherardi and Nicolini, 2001), organizational learning and knowledge derive from participation, and relationships between individuals contribute to the development and transformation of their identities (Gherardi, 2013). As a consequence of these relationships’ development, knowledge must not be considered anymore as a mere “asset” of a community of individuals, rather it represents the activity of “knowing-in practice” (Gherardi, 2009). To analyze this phenomenon, a researcher needs to jointly consider relationships, their practice, the artefacts constituting that practice and the social organization in which the practice takes place (Gherardi, 2013; Lave and Wenger, 1991). This practice-oriented approach focusses on “how and under what conditions action it is actually carried out” (Nicolini et al., 2004:22). In this sense, it considers temporal organization of such actions and the resources that makes them possible not only between human beings, but also with artifacts, both material and symbolic. By focusing on practice, Lave and Wenger (1991) and Gherardi (2009) claim that activities themselves generate the community which supports together the configuration of involved people, artefacts, and social relations.

In line with the research project, participation and knowledge are both typical characteristics of Corporate Universities (CUs), so that it is possible to study the TIM Academy Corporate University as a community, and to ponder on the total set of its components.

However, advancements in technology have sometimes reduced knowledge to something analogous to information. Consequently, some authors concentrated on the ways it can be stored, retrieved, and processed by modern communication technologies,

with an uncritical translation (Bontis, 1997; Nicolini et al., 2004; Stewart, 1994). In line with McDermott (1999), a credit that both knowing and knowledge are first and foremost effects of social practices is necessary for advancing practice-based approaches to manage the diffusion of innovation, and the emergence of information and communication technologies (ICTs).

In this context, technology is altering the modalities we use to define and shape our thinking. Individual learning is a component without which social and organizational learning cannot take place. At the same time, the collective “doing” of those participating in a practice represents the *locus* for individual learning.

According to Bell, Lee and Yeung (2006), emerging technologies advance some common challenges for both organizations and employees (Iannotta et al., 2016). The origins of these challenges are driven by the interaction between three main factors: a) the properties of emerging technologies; b) the changing character of employees; and c) the changing character of organizations in managing their human capital (Bell et al., 2006). In this sense, Corporate Universities encounter both opportunities and challenges for improving training activities (Iannotta et al., 2016).

2.2.3. Sociomateriality Perspective

In the attempt to understand “the constitutive entanglement of the social and the material in everyday organizational life” (Orlikowski, 2007:1438), sociomateriality is built upon the intersection of technology, work and organization. In doing so, it considers how humans, spatial arrangements, objects, and technologies are entangled with language, interaction, and practices in organizing. Material artifacts and technology are central for the constitution of modern organizations (Jones, 2014; Leonardi and Barley, 2010; Orlikowski and Scott, 2008). Hence, the sociomateriality perspective allows analyzing technology at the workplace by studying the social and the material simultaneously. According to Orlikowski (1992), technology has deterministic impact on organizational structure. In her structural model of technology, she states that different interactions with technology may both shape and be shaped by new forms of organizing.

As a matter of fact, materiality has been widely discounted by organizational and management research, even though sometimes inspected separately from the multiple and dynamic ways in which the social and the material are actually constitutively entangled in everyday life (Jones, 2014; Orlikowski, 2009). A conceptualization of technology as a

material determinant of organizational characteristics, led to limited attention to either specific technological specifics and the role of human agency in determining technology (Orlikowsky, 2009). Therefore, “to the extent that the management literature continues to overlook the ways in which organizing is critically bound up with material forms and spaces, our understanding of organizational life will remain limited at best, and misleading at worst” (Orlikowski and Scott, 2008:466).

Technology is not to be considered as a mere exogenous force (Huber, 1991; Perrow, 1986), but as a contextually contingent product of ongoing human interpretations and interactions (Leorardi and Barley, 2008; Orlikowski, 2009). Nevertheless, “it is understood as material artifacts that are socially defined and socially produced, and thus as relevant only in relation to the people engaging with them”; human agency has a role in technological change, since technologies are essentially social, grounded in definite cultural contexts, dependent on specific meanings and on contingent processes (Orlikowski, 2009:9). Accordingly, nowadays organizational life faces a real entanglement in practice of technological tools.

Sociomaterial perspective states that materiality is a critical force in the constitution and recognition of all entities inside an organization, together with their relations, and the ways they change or learn (Fenwick, 2010b). The dynamic process of materialization includes both material and discursive practices that allow things to emerge and act in entanglements of everyday practice. All these entities are mutually and simultaneously constituted with the composition of the dynamic phenomena and events in which they are implicated (Fenwick, 2010b). This is made possible through the ongoing flux of multiple interactions and connections. Thus, “the sociomaterial can help reveal the dynamics that are actually constituting what comprises everyday life, including learning” (Fenwick, 2010b:106). Hence, technology is not fixed or universal, but it emerges from situated and reciprocal processes of interpreting and interacting with particular artifacts over time (Orlikowski, 2009; 2010). Thus, there are embedded meanings, interests, and activities that produce an ensemble of dynamic technological relations (Kling, 1991; Orlikowski, 2009). Suchman (2007) argues that scholars need to attend to the boundary work through which entities are defined by “beginning with the premise that discrete units of analysis are not given but made, we need to ask how any object of analysis-human or nonhuman or combination of the two-is called out as separate from the more extended networks of

which it is a part” (Suchman, 2007:283). Hence, every single case is enacted, and not given.

In this vein, the aim of researchers is to explain how particular interests and situated actions of social groups can shape the designs, meanings, and uses of new technologies over time (Ciborra and Lanzara, 1994; Orlikowski, 2009).

The abovementioned characteristics base their roots on diverse currents of thought that have gone through organizational studies. By challenging the technocentric focus of traditional work design, an early influence derives from the socio-technical systems school. The underlying idea is that social and technical elements mutually shape each other in a system and thus, they must be jointly designed (Davis and Taylor, 1986; Mumford, 1981; Trist and Murray, 1993). Accordingly, the social, environmental and technological systems need to be assessed as a whole (Trist and Murray, 1993).

Another influence came from scholars investigating social construction of technology (Bijker and Law, 1992; Woolgar and Grint, 1991), who focused on the black box of technology. In doing so, they attempted to take out the socio-historical processes through which technologies were shaped. This is made possible by analyzing the multiple and competing identities, interests and interpretations of prominent social groups (Leonardi and Barley, 2008; Orlikowski, 2009).

Following the structuration theory (Giddens, 1984), other academics focused on processes of social structuring in constructing of technologies within organizations (DeSanctis and Poole, 1994; Orlikowski, 1992), trying to explain “the multiple ways in which work practices and social structures mediate and are mediated by engagement with the new technology” (Orlikowski, 2009:9). This is what Orlikowski (2009) defines the “emergent process perspective”. That is, “practices don’t just mediate work, they perform organizational realities” (Orlikowski and Scott, 2008:467).

It must be noted that the massive emphasis on the social may be interpreted as too human-centric; thus, it may inhibit assigning agential power to the distinctive technological capabilities that interact with human and social action (Berg, 1997; Orlikowski, 2009).

Leonardi (2012) set the basis for the need of sociomateriality in extant organizational studies, since all materiality is created through social processes and it is interpreted and used in social contexts. At the same time, all social action is possible because of some materiality. On this view, Orlikowski (2009) introduces the concept of “entanglement in

practice”. Actions are seen to be enacted in practice with a focus on constitutive entanglements, such as associations or networks of human and technology (non-human) (Orlikowski, 2007).

One of the most influential contributions to the abovementioned considerations is that of Actor-Network Theory (ANT), for which there are no separate social or technological elements. Rather, ANT entails a specific methodology for studying the co-evolution of sociotechnical contexts and content (Law, 1992), where human and non-human actors assemble their interests in a common project.

In this vein, there is still a need for organizational research to explain how “powerful actors can shape technological momentum through the institutions they inhabit”, since “analysts cannot adequately explain the micro-social dynamics of technological change without considering the macro-social processes of technological change (and vice versa)” (Leonardi and Barley, 2010:41). As Leonardi (2009) suggests, “technologies are as much social as they are material (in the sense that material features were chosen and retained through social interaction) and are such material as they are social (in the sense that social interaction are enabled and constrained by material properties)” (Leonardi, 2009:299).

Contractor et al. (2011) combine sociomateriality with action-network theory (ANT), to study the ontological claim of symmetry between human action and material (or non-human) actions. Accordingly, humans and non-humans are parts of a single network where actants shape and are shaped by their relations with one another. Drawing on ANT, Law (2004) focuses on objects as effects of arrays of relations, through which humans and technologies are both reciprocally interdependent and symmetrically relevant (Orlikowski and Scott, 2008). There are no distinct and separate social or technological elements, but technological artifacts are considered as equivalent participants in a network of human and non-human agencies (Orlikowski and Scott, 2008). However, Contractor (2011) recognizes that “although the sociomaterial approach provides an important way of thinking about technologies as parts of networks (as opposed to entities that exist independent of networks), this approach does not provide much guidance in specifying how researchers might depict sociomaterial relations empirically in ways that recognize these important differences (Contractor et al., 2011:685). Thus, they identify the necessity to treat technologies as endogenous to social networks and define them “multidimensional networks”. The reason behind the emergence of this new conceptualization relies on the limited capacity of traditional unidimensional network

approaches to explain the dynamic implementation processes of a non-human actor (for example a technology).

2.3 From Technology-Mediated Work to Technology-Mediated Education and Learning

While in the past, contingency theorists equated technology with production systems based on the coordination for transforming inputs into outputs, there was a strong determinist vision of technology and materiality. Different production systems spawned different forms of organizing with a causal role (Leonardi and Barley, 2010).

Then, the socio-technical theory stated that social and technical systems influenced each other and led to effective organizing whether organizations could optimize both jointly. However, in both the abovementioned theories, studies were primarily concerning different ways of altering the social to fit the technical (Leonardi and Barley, 2010; Orlikowski, 2009).

When social practices admit a foreground role of technologies, we can assume technologies contribute to the production of social life. However, “work-life is fully entangled with material practice, technologies, vehicles, architectural spaces, roads and roadblocks, nature and objects of all kinds, in ways that are often not even acknowledged in the preoccupation with understanding human activity and meaning-making” (Fenwick, 2010:106).

Sociomateriality is founded on the mutual constitution of the social and technological components (Mohammad, 2013). The underlying premise of mutual constitution is coevolution among that which is technological and that which is social. This phenomenon has at least two implications: a) both humans and technologies have some kind of ability to act in a given situation, and b) actions are not deterministic and do not depend from surrounding events. Thus, *a priori* judgements regarding the relative significance of social or technological aspects do not have real meanings (Latour, 1999; Latour, 2005). This will impact on the relationships between technology and work, and between technology and education and learning.

2.3.1. Technology & Work

As Leonardi and Barley (2008:161) states, “materiality matters”, since the material properties of artifacts represent the tangible resources that allow people to “do old things

in new ways and to do things they could not do before”. However, only little research has been devoted to a division of labor, when investigating what happens before and after a technology is introduced within a work setting (Leonardi, 2007; Leonardi and Barley, 2008; Orlikowski, 1996).

As Lanzara and Morner (2005:74) state, “computer-mediated communication... allow(s) for asynchronous communication, agents’ ubiquity, and extended network-based transactions. These features are constitutive of the social practice”. By attending from actions of social groups and contextual influences (including the processes of development, adoption, adaptation, and use of new digital technologies) it is possible to analyze the interdependency between humans and technologies (Jones and Orlikowski, 2007; Mohammad, 2013). Therefore, social practices are intrinsically connected to material things, “given the dynamic, distributed, and interdependent nature of technologies in use today, and the multiple and unprecedented ways in which they are shaping and will continue to shape organizational realities” (Orlikowski and Scott, 2008:437).

At the same time, organizations need to pay attention to the case a particular technology, even if specifically designed to the organizational purpose, does not guarantee that that purpose will occur (Leonardi, 2009). The reason behind is that, if in practice people resist a technology that provides material features that must be used to enable new patterns of interaction, they will probably lack the capabilities and fail to implement it. This is the result of an alignment or misalignment of technology’s material features and social interactions. By taking Joshi’s (1991) and Lapointe and Rivard’s (2005) works, they underline that some people resist a new technology because they are dispositionally willing to do so (e.g. they do not like change or they do not want to have to learn to use a new technology).

Differently, other Authors suggest that people may also resist new technologies for more structural reasons (e.g. they do not want to upset the balance and distribution of roles, responsibilities, and existing power relations) (DeSanctis and Pool, 1994; Edmondson et al., 2001; Leonardi, 2009; Pinch, 1996; Pool and DeSanctis, 1992).

Accordingly, structures are not static but they exist because of structuration processes that continuously produce and reproduce in the long term through interaction systems (Pool and DeSanctis, 1992) Thus, “structures are stable if actors appropriate them in a consistent way” (Pool and DeSanctis, 1992:8). Rice and Aydin (1991) also demonstrate

how different sorts of proximal relations and discussions about technology significantly influenced individuals' perceptions of a new information system (and their usage), by combining social influence and network theories (Leonardi, 2009). The underline reason is that people share information with others about the technology during their initial engagement with it; thus, they begin to form their interpretations about its functionality (Leonardi, 2003; Leonardi, 2009; Orlikowski, 1992; Poole and DeSanctis, 1992). "An important implication for the management of new technology implementation is to be mindful that even though the way people talk about a new technology may not entirely dictate the kinds of interpretations they form about it, talk provides a frame of reference that will be qualified (either positively or negatively) by one's material interactions" (Leonardi, 2009:435).

Accordingly, organizations should examine not just what a technology is capable to do, but also how technologies are used in practice based on what people interpret them as capable of doing (the "how and why") (Orlikowski, 2000). This practice-oriented understanding allows for studying "the recursive interaction between people, technologies, and social action" (Orlikowski, 2000:404). In her study, Orlikowski (2000) underlines that technologies cannot be considered as "stabilized" after development, since stabilization discloses the social construction process only during development. Rather, highly internetworked technologies should be seen as dynamically reconfigurable and user-programmable today. Hence, she refers to emergent and enacted technological structures, where "structures of technology use are constituted recursively as humans regularly interact with certain properties of a technology and thus shape the set of rules and resources that serve to shape their interaction" (Orlikowski, 2000:407). In addition, "technology structures are thus not external or independent of human agency; they are not "out there," embodied in technologies simply waiting to be appropriated. Rather they are virtual, emerging from people's repeated and situated interaction with particular technologies" (Orlikowski, 2000:407). Simultaneously, the enactment of what Orlikowski (2000; 2002) defines "a technology-in-practice" is situated within a number of nested and overlapping social systems, thus people's interaction with the technology will always enact other social structures along with the technology-in-practice (such as a hierarchical authority structure within a large bureaucracy).

When talking about how the produced technology achieves its stabilization through different processes of negotiation, persuasion, and debate, one can refer to the process of inscription (Callon, 1986; Latour, 1992)³.

2.3.2. **Technology & Education and Learning**

The sociomateriality perspective considers the social and the material to be ontologically inseparable (Suchman, 2007) and seeks to understand how social meanings and technological actions are inextricably related, also shaping social practices (Orlikowski, 2002). The massive proliferation of technologies in every aspect of education and learning and workplace practice draws attention on matters of different characterizations of knowledge, its constraints and enactments, functions of different objects, as well as functions of the same object as interpreted by different actors. Learning is enacted over time through people's practices, and knowing is inseparable from practices, constituted through actions and interactions (Gherardi, 2013). In this way, the functioning of ICTs and the way people will use material artifacts are not *a priori* given; rather. They are both temporally and situationally emergent. "There is an inherent inseparability between the technical and the social" (Orlikowski and Scott, 2008:434), and learning is not only an activity situated in practices, it is also an activity distributed between humans and non-humans (Bruni et al., 2007). According to the Authors, "knowing is a situated activity" and this means that learning takes place within "settings in which people, symbols, and technologies work jointly to construct and reconstruct understanding of social and organizational action" (Bruni et al., 2007:83). By deepening the issue of practice knowing, Bruni et al. (2007) highlight the role of artifacts in performing a fundamental role in mediating action, since they are stringently connected with work practices and the knowledge activities within them. This shows the utility of analyzing technology-mediated work and designing new technologies, as social practices, as work has become fluid and transitory and contemporary organizing takes place in "a net of fragmented, multiple contexts" and "through multitudes of kaleidoscopic movements" (Czarniawska 2004b:786).

A sociomaterial perspective does not privilege human consciousness or intention but traces how knowledge, knowers and known emerge together with/in activity (Fenwick, 2015). In this sense, researchers aim to trace how different elements emerge in webs of

³ For an in-depth discussion of the process of translation, see the following Chapters.

activity and convert into connected assemblages that jointly exercise power and create knowledge.

Drawing on Bruni et al. (2007), we could define the utilization of modern CUs as knowing-in-practice; therefore, as the mobilization of the knowledge embedded in humans and non-humans. Learning happens because of the situated performance of a practice inside a network of human and non-humans, symmetrically associated in the ongoing enactment. The central assumption for sociomateriality is not to focus on an individual learning subject, but on the larger sociomaterial collective.

A key contribution of sociomateriality is to move away from a conception of learning and knowledge production as a strictly human-centered socio-cultural ontology. In its place, “agency and knowledge are understood as enacted in the emergences, the interactions and the exclusionisms from “material-discursive agency” (Fenwick, 2010:114). The same Author clarifies four years later: “materiality is particularly highlighted, revealing ways that bodies, substances, settings and objects combine to actually embed and mobilize knowledge, materialize learning and exert political capacity” (Fenwick, 2014:265).

As a consequence, the use of the CU itself represents practicing as knowing-in-practice. At the same time, artifacts in use embody their designers’ knowledge, several suggestions for use, and potential courses of action resulting from knowledge of use (Norman, 1990; Bruni et al., 2007). Not to be underestimated, in fact, is that the knowledge embedded in artifacts only partially derives from the designers’ vision of the world; thus, the meaning of the inscription changes as soon as relations in the network change and only alignment between all the involved parties represents the “facticity” of the practice under analysis (Bruni et al., 2007). Differently, another practice may occur: footing (Goffman, 1974; 1980). It represents the dialectic that enables people to align themselves within a predetermined frame and disrupt its coordinates; once “in step with it” they are able to disturb its rhythm and deviate its path. Hence, education and learning through non-human artifacts may be the result of the abovementioned processes.

According to Fenwick (2010a; 2010b), most of the perspectives of learning in work that has been confined to the personal and the individual have gradually shifted to more collective or participative understandings of knowledge construction. However, there is still an under investigation in education theory and research on participative knowledge construction. Moreover, the associated concepts of participation are confined to human

interactions, focusing on social relations and cultural forces and the activities in which humans utilize tools in different settings (Fenwick, 2015). In such conceptualizations, processes of materialization that designate the interrelations between those different entities and their possibilities for interaction are still vague. Hence, “given the entanglement of lifelong learning with material practice, technologies, vehicles, architectures, nature and objects of all kinds, sociomaterial perspectives of practice and knowledge would appear to be very useful to adult education” (Fenwick, 2010b). In this vein, the Author affirms five years later: “any educational practice is a collective sociomaterial enactment, not a question solely of one individual’s skills or agency” (Fenwick, 2015:88).

As for Poole and DeSanctis’ (1990; 1992) Group Decision Support Systems (GDSSs), it is possible to refer to modern Corporate Universities as social technologies, since group’s interaction processes are as important to their operation as the software and hardware. According to the Authors, a perspective that focuses on social interaction is especially expected to reveal useful evidences as to CUs effects and applications. Moreover, they identify two generical key aspects of technological structures: a) their spirit (the general goals and philosophy that the technology promotes), and b) specific features through which the spirit is realized. However, as they outline, the specific features are functionally independent from the spirit, so they may be used in contrary ways. Hence, “the group may draw on some parts of the structural potential and leave other parts unrealized” (Pool and DeSanctis, 1992:11). When discussing technologies-in-practice, Orlikowski (2000) affirms that users have the option, to "choose to do otherwise" with the technology at hand at any moment and with their existing conditions and materials. Hence, this options to “choose to do otherwise” set the ground for non-programmatic behaviors, as well as for potential innovation, learning, and change.

2.3.3. **Actors Call for an Analytical Shift**

Nowadays, education and learning centers are undoubtedly around (and constantly mediated by) material things (Fenwick and Edwards, 2010). The use of information and communication technologies in education and learning drove to the establishment of terms such as: e-learning, online learning, open learning, virtual education, technology enhanced learning and networked learning. Each of them tries to represent the underlying relationships between technology and education, teaching or learning. Thus, they are

commonly associated to new different spaces, relations and also identities. However, one must be aware when considering technology as mere computing. Differently, every equipment and technology are actually a result of an assemblage between different and powerful things, for which ANT (as we have seen above) refers to as actants.

According to Fenwick and Edwards (2010), education and learning are inseparable from the networks through which they are enacted. As they state one year later, “contexts such as schools, lecture hall and workplaces are created and continually shaped through social and material processes. These folds and overlaps of practices are very much about *socio-material* network relations” (Fenwick and Edwards, 2011b:5, *emphasis added*).

There are different reasons behind the necessity of an analytical shift in the study of technology-mediated education and learning. Since the advent of digital information technology has dramatically changed the landscape of education and learning, there is not any *a-priori* inherent technological determinism for which technology can be considered both as a replacement and as a substitute for already existing functions within the education process (Johri, 2011). Accordingly, educational artifacts range from electronic laptops and mobile phones to web-based tools such as online gaming and social networking. The related infrastructure is then used to easily manage content, to simplify and enable interaction among students and teachers at distant locations, and to undertake several other useful functions such as grading and analysis of key performance indicators (KPIs). This could drive practitioners to an empirical determinism in how to evaluate the role of new technologies in education. However, this determinism only represents simplistic notions of technology as a vehicle for efficiency, and “invariably emerges from a larger focus on education per se rather than on learning” (Johri, 2011:208). A sociomaterial perspective can help to better understanding of the role of technology in learning.

According to Nielsen (2010), time spent on social media worldwide has increased 82% from 2009 and 2010, and users spend an average of over five hours on social media (ranging from 6 hours and 52 minutes in Australia to 2 hours and 50 minutes in Japan). Hence, pressures deriving from the raise of new technological tools are raising questions about the complexities of professional knowledge and knowledge strategies, which in turn challenge learning in practice (Fenwick, 2012). Nevertheless, technology is not independent from its use (LeBaron, 2002). That is: any separation is only necessary for analytical purposes, while these entities entail each other in practice (Orlikowski and

Scott, 2008). According to Johry (2011), “the objective here is to show how artefacts derive their meaning, for both people and their practices, through social agency; and social agency in turn is highly dependent on the material world for its meaning-making” (Johri, 2011:212). Along with the line of the present study, “a focus on materiality of learning practices provides a unique vantage point from which to advance socio-cognitive understanding by incorporating both materiality and sociality, without privileging either, and by accounting for emergent characteristics of assemblages” and “socio-materiality assists us in providing interpretive explanations of learning practices that account for technology contextually” (Johri, 2011:216; Akgü). Hence, by adopting a sociomaterial perspective managers and educators should encourage learners to recognize those material details that tack together their practice, knowledge and environments and emerging possibilities (Fenwick, 2014). By adopting this approach, Fenwick recognizes how these ideas are “particularly useful for reconsidering what it means to promote ‘critical learning’, which arguably is a central concern for educators at all levels” (Fenwick, 2015:85). In line with the abovementioned matters, she continues by stressing and clarifying what I recognize as the most interesting strength of sociomateriality. In critical terms, the aim is learning how to interrupt matters that seem settled and masquerade as fact, and how to hold open the controversies for matters of concern. This suggests a turn from learning as preparation and acquisition of competency to learning as attunement, response and even interruption” (Fenwick, 2015:94). In doing so, both educators and learners can consciously reason on which material artifacts most influence their education and learning processes - by limiting or enhancing possibilities for learning - and on the reasons behind stabilized, powerful and black boxed practices (and possible related problems). As Boyd (2007) outlines, online identities can often be associated to public spaces, replicability and, of considerable importance, invisible audiences. These set the basis for further reflections on equity, access, potential abuse and reproduction of traditional divisions and structures.

After all, practices of knowing themselves are specific material engagements (Barad 2007). In fact, material engagements act together with other forces to regulate (by excluding or inviting) all the different forms of participation (Fenwick, 2015; Waltz, 2006). This, according to Sørensen (2009), set the basis from a differentiation between what she defines liquid knowledge and representational and communal knowledge. Accordingly, liquid knowledge is inseparable from learning, while representational

knowledge can be stagnant and independent on whether learning takes place or not. On the other hand, communal knowledge can be present without learning, but it will be affected by it (Sørensen, 2009).

However, within the sociomaterial context, differences between individuals' attitudes and usage of artifacts matter. Accordingly, it is possible to talk about work-arounds, as a part of the negotiation process between users and producers of a certain technology (Pollok, 2005). In this vein, users are never simply modulated by technology but, using artifacts differently from the modality and the purposes they were created for, they can also shape technology. Thus, related skills might also be the result of the set of relations and connections to certain networks (Pollock, 2005).

2.4 Actor-Network Theory

Actor-Network Theory (ANT) has never been codified into a full-fledged theory, so that it has been considered more as an approach (or methodology) among scholars, who find it useful to regard the world in terms of effects, relationships, and performativity (Cooper, 1992; Czarniawska, 2004; Czarniawska and Hernes, 2005; Nicolini et al., 2004; Vickers and Fox, 2010). As McLean and Hassard point out (2004) when recalling Latour, ANT was never a theory of the social or a theory of the subject. No *a priori* definition is imposed to the actors and their world. It differs from Social Network Analysis (SNA), which treats human actors as defined and pre-existing entities in a given social setting. In this sense, social relations and network ties are analyzed because they are static and neutral (Nespor, 2002).

On the other hand, one must be aware of the possible problems related to maintaining a certain analytical distance when following the actors and constructing their experiences (McLean and Hassard, 2004).

It is a shared opinion that ANT is difficult to summarize. However, it is possible to go back to its origins in the early 1980s at the Centre de Sociologie de l'Innovation (CSI) of the École Nationale Supérieure des Mines de Paris, by looking at the work of the three scholars: Michel Callon, Bruno Latour and John Law (see: Latour, 1987; Callon and Law, 1997; Callon, 1981, 1999; Latour, 2005). Through the 1980s and 1990s ANT developed prominently in sociology, technology, feminism, environmental planning and organization studies. Whatever the different definitions, ANT has been used to reveal the

complexities of the social world, drawing upon the social study of technology (and Science of Technology Studies), mostly by applying empirical work in order to trace the ways in which practices were translated into inscriptions of involved parties (Callon and Law, 1997; Cressmann, 2009; Dankert, 2017; Fenwick and Edwards, 2011a; Latour, 1987).

2.4.1. **ANT Overview: Generalized Symmetry and Action Nets**

By approaching science and technology in the making (Latour, 1987), ANT suggests to “follow the actors” involved in a given network. Giving the huge number of actors within a generical network, ANT looks at network builders as the primary actor to follow, in an attempt to “open the black box” of the underlying science and technology, by tracing the complex relationships between actors (Cressmann, 2009). In addition, ANT not only considers both human and non-human actors, but also everything can be considered both an actor and a network (Callon, 1987).

To be precise, ANT makes use of a semiotic definition of actors, such as actants. According to Latour, an actant is something that is “granted to be the source of action” (Latour, 1996a:286), and it has meaning only in relation to other entities. That is, actors can be understood and analyzed within a network, only when their identities can be defined through their interaction with other actors (Cressmann, 2009). A simple distinction between actants and actors is provided by Feldan and Pentaland (2005). They merely distinguish actants, which can be anything, from actors, which have a relative stability based on their projects (and their success in accomplishing their programs) we can tell stories about.

People create associations between actants by putting them inside narratives (Feldan and Pentaland, 2005). The network of these associations consists of different elements. Therefore, ANT theorists use the term “heterogeneous network”. An actor-network can be considered an actor whose activity is networking heterogeneous elements, as well as a network able to transform its characteristics (Callon, 1987). In this sense, “scholars now understand that all objects tell a story, have a semiotics that people “read”. Every material object thus works through its semiotics handle and that kind of handle, as much as any other type, affects what something can be making it attractive in the first place and specifically useful in practice” (Molotch, 2005:82, original emphasis). In Law’s words, thinking of a network as a performative effect necessitates acknowledgement that all

entities are performed by (and through) the relationships in which they are involved (Law, 1999; Nicolini et al., 2004). This also means that when facing humans or machines, researchers should employ the same analytical and descriptive framework. In tracing humans and non-humans, all things are enactments and effects of webs of relations within both the social and the material world are located (Fenwick and Edwards, 2010; Law, 2007). Accordingly, “the person” or “the social” is not anterior to anything. “ANT’s key contribution is to suggest analytic methods that honour the mess, disorder and ambivalences that order phenomena” (Fenwick and Edwards, 2010:1). Therefore, the aim is to trace and understand how things come together and manage to grasp together to form associations and produce agency effects.

Generalized symmetry represents the ontological levelling of the role humans and non-human elements play in constructing the actor-network (Latour, 1987). Both humans and non-humans are capable to exert their force. By forming associations, they can expand. “As a result, it is possible to show the frequent anthropomorphizing of objects in various organizing attempts and to ponder its consequences” (Czarniawska, 2005:10).

The focus must be on the relational links between objects (both those involved and those on which they impact), rather than on their ontology (Bruni, 2005). The consequent concern of ANT is to study these associations between heterogeneous actors. “The objective is to understand precisely how these things come together – and manage to hold together, however temporarily – to form associations that produce agency and other effects” (Fenwick and Edwards, 2010:3). ANT allows for analyzing these assemblages by looking at how they are created or even destroyed by counter-networks, or black-boxed. In the processes and effects of assemblages, knowledge is generated. As Callon and Latour state: “our general symmetry principle is thus not to alternate between natural realism and social realism but to obtain nature and society as twin results of another activity ... network building, or collective things, or quasi-object, or trials of force” (1992:348). According to Waltz (2006), looking at things as a product of the human design or as mere tools controlled by humans represents an underestimation of their power and contribution in enacting events. Instead, “things exert force themselves. They do not just respond to human intention and force”, but “change and shape human intentions, meanings, relationships, routines, memories. Even perceptions of self” (Fenwick and Edwards, 2010:6). Bruni (2006) introduces the term “s-object” to indicate that observing a s-object “means looking at the relations of which is part, the contexts in

which it is located, the practices that construct it socially the other s-objects that cross its trajectory (Bruni, 2005:362). This represents what ANT's Authors define the performativity of material things, since things act to include, exclude and regulate different forms of participation. Specular, humans are not agentic and intentional but can be effects of a particular network association, in which things interact with one another.

To sum up, "for ANT, to study any type of organization, social order, technical innovation or scientific discovers is to study the connections between heterogeneous actors enrolled within a network. If we assume size and power without explaining how it is performed and made durable we miss out on explaining how it is that the sociotechnical world we inhabit is performed" (Cressman, 2009:5). Therefore, actors and networks can be conceived as the products of organizing activities. Citing Hägglund (2005:252), "in the process of organizing, macro actors are created and destroyed" ... "the company is also an arena where organizational actors with influence beyond their immediate reach are at work. People in the company can use these macro-actors as vehicle of power or can be subjected to the power of macro-actors". Organizing can be analyzed by studying the construction of the connections between these actions, and centers of calculation are defined as such because they manage to exert power in forward something in a way other actor accept. This implies enrolling them e mobilizing allies (Fox, 2000; Hägglund, 2005; Latour, 1987).

Notably, the concept of power is to be understood differently from its traditional meaning. As stated by Peltonen and Tikkanen (2005), it is not to be understood as being suppressive or inhibitory in nature; rather it is an idea of "productive power" (Peltonen and Tikkanen, 2005: 269), which would make it an effect of the emergence or construction of networks. In this sense, power is "a productive force that organizes, formats and solidifies actors into various sorts of economic agents that then go and perform" (Peltonen and Tikkanen, 2005: 269) and it is derived from "the actions of those who are the objects of power" (Peltonen and Tikkanen, 2005: 275), who direct the behaviors of others. Hence, power can be conceived as a network-type mechanism that is born and structured through the circulation of definitions and thoughts and at any moment can be questioned and modified.

The notion of the action net (Czarniawska, 2004) allows us to see how connections between actions eventually create actors. The concept was born from the combination of the new institutionalist theory and the Sociology of Translation, but it can also be

specifically adapted to organizational studies. In fact, at any moment it is possible to identify a set of institutions prevailing at a given time. These institutions constitute organizing, dictating actions tied together conventionally. An inclusive approach to the concept of action net, allows the researcher to reverse the traditional analysis, which puts the actors and organizations at the beginning. In fact, this allows us to consider actors and organizations as products rather than as sources of organizing, within an action net.

The traditional meaning of network takes the mere existence of actors who interact by creating contacts. In the case of action nets, it is assumed that the connections between the actions produce the actors and the networks (Czarniawska, 2004b). An action can be attributed to an action by linking the event to the social order in which it takes place. As a consequence, such attributions can be made on any type of actant, whether human or non-human. By borrowing an example from Czarniawska (2005), a computer used for handling complaints, if equipped with a proper vocabulary of reasons, may be able to make attribution of intent. So, action nets are empty concepts that need to be filled with content until they have a clear meaning, where actions are performed in “organizing attempts”, creating or destroying macro-actors (Hägglund, 2005:262). All this is possible through the process of translation ⁴.

Accordingly, actors are actants that acquire an identity by recurrently performing the same set of actions with similar results. When links between actions and actors are stabilized (even if periodically renewed), we can then talk about a network. When the connections and the separate identities are no longer discernible, we can then speak of an actor-network, a network that can be considered to be one actor. Similarly, “actors, organizations and networks can be seen in this way as the products or stabilized effects of organizing activities rather than something that exists a priori” (Porsander, 2005:18).

Networks do not have structural properties or exists autonomously if the analysis is not performed (Hernes, 2005). As McLean and Hassard (2004) point out while discussing the agency issue and the traditional dichotomy macro/micro-structure, macro-structures are made of a number of connections, so “big” is not to be intended as “overall”, but “connected” or “related”. Hence, “the capacity to be strategic should be described as the effect of an association of a heterogeneous network and not merely assigned to human actor” (McLean and Hassard, 2004:509, original emphasis).

⁴ For an in-depth discussion of the process of translation, see the following Chapters.

While traditional ANT introduces a dichotomy between programs and anti-programs, I prefer to refer to the work of Helgesson and Kjelberg (2005) and to their analysis of the variation in peripheral behavior. In affirming that the traditional dichotomy programmatic/anti-programmatic behaviors conceal some very important variation concepts to understand the relationships between the macro central peripheral actors, they introduce the distinctions between compliant/non-compliant behavior and aligned/non-aligned behavior.

In the first case, they refer to the possibility or not that the peripheral elements are subject to the prescriptions dictated by the center. In the second case, being aligned means that the peripheral elements "subscribe to the ascription made by the center based on these prescriptions" (Helgesson and Kielberg, 2005:149). Consequently, a programmatic behavior will occur in the case of aligned and compliant behaviors, while it will be non-programmatic in the case of non-aligned and non-compliant behaviors.

Alternatively, however, the possibility remains that the peripheral elements can behave either in an aligned/non-compliant manner, or in a non-aligned/compliant manner. This last case is not to be underestimated: inside an organization it means that some peripheral elements could have this particular behavior exclusively not to be excluded from the program. As a consequence, non-aligned and non-compliant behaviors may be performed by participating elements, as long as they are not transformed into anti-programs.

2.4.2. **Black Boxes and Punctualization**

The concept of *black box* was first use in an attempt to describe and reduce the complexity of technologies (Latour, 1987). Following technology studies, ANT refers to black box as a technical artefact which appears self-evident to an observer.

At the beginning, its complex sociotechnical relationships are rendered invisible, or black boxed (Cressman, 2009). When shifted in the sociology of science, the concept was used to refer to the unquestioned acceptance of the scientific method. By opening this black box, a researcher is able to investigate the different ways in which a variety of social and technical elements are associated, in a possible durable whole (Callon, 1991; Cressman, 2009). In this way, any object (from the simplest to the most complex) can be equally be understood as a black box that depends on techniques, materials, processes and behaviors.

Punctualization represents the process by which actor-networks are black boxed, when something is “fixed in time in the form of an object” (Fenwick, 2010c:7). Authors state that the ability of a macro-actor to linking other actors and establishing the set of links or relations means its capacity to black box them. Hence, the content of the black-box can be considered in its entirety and no longer discussed separately (Callon and Latour, 1981; Mouritsen and Flagstad, 2005). Different elements can be added to a black box, and the more relations are inserted into it, the stronger is the macro-actor. Then, they can be tied to other networks, to create a bigger one. In this way, an entire network can become a single node in another network (Callon, 1991). This makes feasible the idea that everything can be both considered an actor or a network, depending on the perspective of analysis.

Following Latour (1987:4), “opening the black box is made feasible by moving in time and space until one finds the controversial topic on which scientist and engineers are busy at work”. This allows for tracing how actors exercise their influence, by constantly defining and re-defining their sociotechnical world. Only by trying to understand how all the involved elements combine to create a phenomenon under investigation it is possible to understand the emergence of the phenomenon.

However, “punctualization is always precarious, it faces resistance, and may degenerate into a failing network. On the other hand, punctualized resources offer a way of drawing quickly on the networks of the social without having to deal with endless complexity” (Law, 1992:385).

2.4.3. **Heterogeneous Engineering and Translation**

The term heterogeneous engineering originates from Callon’s research on the development of the electric car in France in the 1970s. In his study, he found the engineers involved in the project to be also addressing social and technical problems concurrently. This kind of activities are “the function of the interaction of heterogeneous elements as these are shaped and assimilated into a network” (Law, 1987:113). As a consequence, to understand the processes by which the network emerges, we must attempt to understand how all of the involved elements combine to create the phenomenon under investigation.

As outlined in Cressman (2009), ANT pursues a symmetrical consideration of the social and the non-social dimensions. In this sense, “explanations of technological change the social should not be privileged. It should not, that is, be pictured as standing by itself

behind the system being built and exercising a special influence on its development...other factors – natural, economic or technical – may be more obdurate than the social and may resist the best efforts of the system builder to reshape them. Other factors may, therefore, explain better the shape of the artifacts in question and, indeed, the social structure that results (Law 1987:113). The functioning of heterogeneous elements inside a network is defined by Law (1987) as “heterogeneous engineering”. The heterogeneous engineer (HE), is an actor who is able to associate several different entities (Law, 1987). These elements may vary from objects, people, practices. Through the act of the HE they become stabilized because of their interrelations.

Translation arises as a development of the social studies of science and technology. According to Law (1992), it can be described as an interpretive accounting based on the notion that “the social” is nothing other than a patterned network of heterogeneous materials. These materials include not only humans, but also machines, animals, texts, and they are kept together by active processes of ordering (Law, 1992). Translation is a key concept in ANT, since it enables researchers to look at how assemblages come to be and to the way the actors interact with one another, referring to all the deployments through other actors whose mediation is indispensable for actions to occur. In Fenwick and Edward’s words: “when the actant becomes translated to become a performing part of the network, the actant behaves with what appears to be particular intensions, morals, even consciousness and subjectivity. In other words, when translation has succeeded, the entity that is being worked upon is mobilized to assume a particular role and perform knowledge in a particular way. It performs as an actor” (Fenwick and Edwards, 2011:4).

In his Sociology of Translation, Callon (1986) identifies Translation as consisting of four distinct sub-processes (or moments) of translation: 1) problematization; 2) *interessement*; 3) enrolment; and 4) mobilization. During problematization, actors define a relevant problem and identify the critical actors. In the moment of *interessement*, the critical actors try to persuade others to invest in or follow their program. “*Interessement* achieves enrolment if it is successful” (Callon, 1986:211). During enrollment, the critical actors grant qualities and motivations to actors and establish roles. In the moment of mobilization, the formed network gains acceptance by making durable translations. When translations succeed, “the actor-network is mobilized to assume a particular role and perform knowledge in a particular way” (Fenwick and Edwards, 2010:10). Linkages among humans and non-humans are, in fact, the results of a series of translations that

change the entities participating in the network (Nespor, 2002). These translations become irreversible if it becomes impossible to go back to a point where alternative possibilities exist (Callon, 1986; Callon, 1991). Actors align their different interests through the process of translation, and they translate network elements to (re)formulate their interests to be attainable. To do so, the involved actors establish their roles and define conditions for building or destructing relationships (Ponti, 2012).

This process of translation was certainly not immune from criticism. This exploratory approach that challenges any a-priori concepts and structures focuses on contingent and emergent complexities. This might be viewed as a counterintuitive frame to be imposed on data. However, it should be seen as an analytic concept suitable for ordering complex, ongoing and iterative observations (McLean and Hassard, 2004).

Similarly to Callon, Nespor (2002) identifies two kinds of participants within material heterogeneous networks: reforms and contexts. Reforms are “contingent effects of struggles and negotiations in which groups try to define themselves and their interests by linking up with other relatively durable and extensive networks” (Nespor, 2002:366). Contexts are all the other parts of the heterogeneous network that relate to it. They might be seen to be outside, but they are connected and can affect its activity.

In another vein, Callon and Latour (1981) base their definition on a specific description they provide of the notion of power and its mechanisms involved. Hence, they define translation as all the negotiations, acts of persuasion and violence, for which an actor is able to speak or act on behalf of another actor. As reminded by Feldman and Pentland (2005) in citing Latour (1986a:268): “the amount of power exercised varies not according to the power that someone has, but to the number of other people who are brought into the composition: the actor-network”. In this sense, the focus shifts on the direct acts of constructing power, and translation involves constant negotiations among human and of non-human actors (Ponti, 2012). When an actor is functionally indispensable to the construction of a network, it represents the obligatory point of passage though with all the other actors must cross in the attempt of satisfy their interests. According to Law (1992), the degree of this alignment corresponds to the extent of agreement achieved by the actors involved within a network, and thus the extent of its convergence. Therefore, Law defines translation as the process generating ordering effects, such as devices or organizations (Law, 1992). Fenwick and Edwards (2010:10) add that “when translation has succeeded, the actor-network is mobilized to assume a particular role and perform

knowledge in a particular way” and “network signifies fluid complex associations with distinct internal points of connection achieved through processes of translation” (Fenwick and Edwards, 2010:16).

The main challenge for a researcher is to investigate and explain how this ordering is achieved in practice, how things are set up and maintain (Brown, 2002; Nicolini et al., 2004). This is made possible with the concept of translation. Therefore, it arises from the alignment of heterogeneous materials and interests, and their interrelationships. Knowing is, in this sense, the result of a system of ongoing practices.

Starting from the “uncertainties and controversies about who and what is acting when ‘we’ act” (Latour, 2005:45), ANT creates openings to explore work-learning practices. Learning is therefore performed in different ways, and it can also be mobilized. Through a series of moves, the need for educational and training activities can be translated into practice.

The reader will find a deepening on Callon’s Sociology of Translation (Callon, 1986) in Chapter 4, Chapter 5 and Chapter 6.

Chapter 3 - Contextualization of the Study

Introduction

In order to manage the new organizational contexts, education and training are critical factors, and as such they must constantly feed the portfolio of everyone's personal and professional skills.

Lifelong learning is fundamental for the full development of all workers. Participation in lifelong learning has the function not only of facilitating the acquisition and/or updating of knowledge and skills, but also of counteracting their obsolescence over time. Considering the prospects of lengthening the professional life, these projects are now necessary for maintaining the economic positions of individual countries in the global context. As Mulcahy highlights (2006:56), “workplaces are recognized as offering the potential for situated knowing and rich learning”, as well as “direct connections between theory and practice ... are the central organizing framework for the learning that students undertake”. In this sense, the combination between formal and informal learning represents the basis for work-based learning, which allows for learning beyond formal institutions.

Compared to a more traditional top-down approach, which is based on standard knowledge intended for obsolescence, new education and training must be based on an approach focused on the learning subject. This means it should encompass all students, leaders, teachers, tutors, internal subjects and external subjects (e.g. suppliers, partners, etc.). Meta-skills must be considered, and autonomous learning promoted to develop meta-competences, such as the capacity of reading the context, the construction of networks of relationships, negotiation and mediation, intercultural competences, etc.

To these ends, modern Corporate Universities are supposed to create “dense” contexts, in cognitive, emotional and relational terms, designing a specific and differentiated training offer, to favor a “pull” training process (solicited by the person) rather than “push” (solicited by the top management). This will translate into facilitation for autonomy in learning, cooperation and the exchange of information.

The use of “blended learning” approaches (mixing classroom and distance learning), through the integrated use of classroom training, e-learning, coaching,

mentoring, outdoor training, business theatre, can thus be contextualized in daily work activities and be functional to the concrete objectives of the organization in respect of the budget.

The abovementioned techniques will also favor collaborative and continuous learning. In recalling Mulcahy (2006), we might say that, as well as pedagogy, leaning “is a matter of material-discursive “intra-actions” (or, better perhaps, “intra-actings”) among teachers, students, technologies, texts, classrooms, workshops, and so on”, which perform relations of power. Accordingly, power and knowledge become co-implicated Mulcahy (2006:57).

In a research provided by the Society for Human Resource Management (SHRM, 2008:3) called “Strategic Training and Development: A Gateway to Organizational Success”, some key points must be respected for the planning procedures of these activities to be successful. The diversification of the portfolio of training activities, the involvement of a wide audience of the subjects and the analysis and possible moderation of the work environment so that it supports and helps to transfer knowledge in the organization are some examples.

According to Leonardi and Barley, “when studying the co-evolution of the material and the social, it may make more sense to follow the technology” ... “not only as a trajectory in time, but as movement within a number of social settings and groups” (Leonardi and Barely, 2008:167). This is exactly the starting point of the present investigation.

This chapter focuses on CUs and their different characterizations during their development. It starts with an overview on Corporate Universities. Then, a distinction between traditional and modern CUs is provided. Finally, the analysis of the setting is introduced, presenting the company in which the study was conducted, with an in-depth analysis of the CU under investigation.

3.1 Corporate Universities

Definitions of education and learning significantly vary from company to company, but it is a shared opinion that learning is a pervasive feature of contemporary organizations (Peters, 2017). Accordingly, the raise of Corporate universities (CUs) can be seen as contemporary to other developments: the emergence of the knowledge economy and the concept of learning organization; the frequency of organizational changes; the pervasiveness of Information Technology (IT) and its application; the diversity of educational systems. However, the way informal learning is enabled, the frequency and success of different approaches to training and learning, and reliable information on training investments and efforts, are still neglected.

Corporate Universities can be defined as strategic educational organisms that cultivate learning, knowledge, communication and interactions among all those who interact with the company for its success. They are places of interaction, both real or virtual, in which the subjects who participate have the opportunity to exchange ideas, knowledge and experiences, favoring activities that would otherwise be located in different company functions.

In a recent report based on a total number of 23 global companies, Boston Consulting Group estimated CUs ranks in the US alone doubled between 1997 and 2007, from 1,000 to 2,000, while worldwide the number of CUs reached 4,000 units. At the same time, companies in the G20 countries invested nearly \$400 billion in training in 2012.

The training paradigm of the CUs is not that of simply training, aimed at specializing human resources and adapting them to specific roles, but rather that of learning, conceiving training as a long-term process, in which the relationship between individual and organization it is continually redefined in a partnership logic to activate learning opportunities and processes. Often, these are realities that take the form of structures separated by the company they belong to; specifically dedicated to the provision of training services, through innovative organizational models.

In many companies, the CUs play the role of a real production department, which shifts from a mere cost center to a subject that contributes to the creation of added value for the organization. In these settings, it is common to observe a crossover between formal and informal domains of learning.

CUs not only allow workers to activate and support their training path in order to increase their attractiveness, therefore empowering the individual; but they also allow organizations to link training programs to corporate goals and strategies, configuring themselves as a connection between learning and knowledge management processes. This will allow counteracting the obsolescence of knowledge, by also nurturing a virtuous circle that updates and renews the organizational intellectual capital.

Starting from the 1950s, CUs have had a prevalent diffusion across organizations with the prominent issue of matching the creation of distinctive organizational skills with the opportunities of workers' employability (Costa and Gianecchini, 2013; Iannotta et al., 2016). Then, in the last 15 years the number of CU around the globe has aroused sharply (Peters et al., 2017). According to Taylor (2015), this could have been attributed to a thinning of the borders between education, business and educational.

Where learning is a key driver for corporate competitiveness, it also allows for improving individual skills and competences (Lytras and Sicilia, 2005). Therefore, CUs are entities devoted to the strategic development individuals and overall organizational learning (Allen, 2002; Iannotta et al., 2016).

As outlined in Walton (1999) and Iannotta et al. (2016), it is possible to distinguish between three different generations of CUs, according to their mission and learning strategies: 1) a first generation of CUs, generally based on traditional teaching methods and dedicated to the dissemination of the organizational culture and values; 2) a second generation of CUs, with a more strategic orientation toward organizational learning, mostly accomplished through partnerships with other institutions; and 3) a third generation of CUs, in which a better use of technology for learning activities, the ownership of computer-generated elements in their learning processes, and the strategic goal of integrating individual training with the objectives of the organization, are the baseline for my investigation.

Fresina (1997) distinguishes between three prototypes of CUs, basing on specific strategic purposes (Sammarra et al., 2017). A first prototype aims to reinforce and perpetuate organizational cultures, behaviors and competitiveness. A second prototype aims at supporting and managing strategic change. A third prototype is designed to drive and shape the organizational future direction.

According to Lui Abel and Li (2012), CUs have different stages of development, consistent with their life cycle. In this way, they identify three main stages: 1) the start-

up stage; 2) the growth stage; and 3) the maturity stage. CUs belonging to the first stage are starting their operations, while the ones in the growth stage already possess well documented processes and standards. In the maturity stage, CUs have the same characteristics of the previous one and gain external industry recognition (Sammarra et al., 2017).

Despite the consistent heterogeneity concerning different features among CUs, it is possible to outline how they differ from traditional corporate training centers, or departments, of functions. Clearly, these differences translate into different configurations and organizational set-ups of the CUs. Starting from Lui Abel and Li's (2012) and Sammarra et al.'s (2017) systematizations, with the support of further scientific and managerial documentation, this research confirms the need to adopt an integrated approach to the study of the CUs configurations, as complex entities characterized by multiple features, all of them capable of mutual influence.

3.1.1. **Traditional Corporate Universities**

Originally, training departments were devoted to orientation and technical skills training. This approach let Lui Abel and Li (2012) call them "reactionary" departments. Traditional CUs are based on formal learning, which refers to all structured training activities and programs, generally based on formal classroom (traditional channel), and it aims to provide employees with job-related knowledge and general skills (El-Tannir, 2002). In this sense, formal training approaches can ensure the same learning for every employee in organization by offering "catalogues" of courses (El-Tannir, 2002; Iannotta et al., 2016; Peters, 2017).

The concentration of time makes that the subjects are prevented from carrying out other activities at the same time as training. With spatial concentration, however, we mean the necessary physical presence of the subjects in the place where the training activity is delivered.

Typical examples are frontal lessons held in the classroom, where the teaching material is usually provided unilaterally by the teacher, while the learners listen to the lesson and study at a later time, usually at a different place.

With the evolution of learning activities and available tools, companies must re-think new ways of involving, connecting and interesting individuals, with the aim of stimulating personal learning and development.

3.1.2. **Modern Corporate Universities**

Information and Communication Technology (ICT) should be “implemented along with significant changes in teaching approaches and learning processes, rather than used merely for automating the information delivery function in classrooms” (Iannotta et al., 2016:3). Where one of the key attributes of the third generation of CUs is a high technological sophistication, the use of technology-based training tools gives birth to e-learning activities (Homan and Macpherson, 2005). According to Castellani (2008), we can summarize today's CU's main characteristics into: 1) plurality of the agents involved; 2) delocalization and networking; 3) use of ICT tools; 4) action learning; and 5) connection between employees' needs, training process and business strategic aims.

With e-learning, the learning experience takes place using multimedia technologies and the Internet, and access to resources and services is extremely simple and quick. The technology on which the e-learning systems are based are networked technology platforms (LMS), to which the subjects can access at any time and from any location, as long as there is a connection in the network. The learning experience becomes centered on the student, as he has the freedom to decide the times and places of learning, as well as to manage in a personalized way the contents of the training (the so-called training blocks uploaded on the net or learning objects-LO). By assembling blocks referring to different courses, people can personalize their training material and manage the informative archives of the contents, as active subjects of the learning path.

The presence of the network also may enable the creation of online communities, for which the learning experience is also based on collaboration and remote exchange.

Overall, it is possible to borrow Bruni's (2005) statement and adapt it to this context of analysis: the CU (understood in all its materiality) has become a constitutive element of expertise and a fundamental knowledge incubator. All its materiality, thus, constitutes its infrastructure, understood as a relational process of specific organizational practices. This reason can equally be extended to virtual settings. Their jointly structure is the result of an ecology of people, materials and symbols. Taken together, they give birth to the “materiality of the social” (Bruni, 2005:360).

E-learning is not a tool born with the aim of replacing the classroom, but for integrating it, enhancing its effectiveness, reducing costs and allowing to design more targeted and personalized interventions. This integration is the characteristic of the so-called blended training, thanks to which the boundaries of training are extended and embrace new

experiences. Unlike classroom training, training activities based on e-learning and net-learning are not concentrated in time or space. They are part of the wider category of distance learning, mediated by digital communication technologies, which envisage the creation of virtual environments of a multimedia nature of learning and interaction (Costa and Gianecchini, 2013). The central concepts of net-learning are interaction and collaboration. A social collaboration structure is established in the network, which makes each subject bear knowledge of others, emphasizing the passage from a simple use of the contents available online to participation in the learning experience.

What does not differ from the traditional meaning of CU is the purpose of gaining control over training and development activities in relation to strategic priorities (Peters, 2017). To this regard, CUs must be frequently re-positioned and defined, since strategic business priorities continually change. Thus, the nowadays scenario sees managers working together with academics to jointly define courses contents and methods of delivery. In line with the purpose of the research and according to Bell et al. (2006), emerging technologies can foster some common challenges for both organizations and employees, driven by the interaction between the following factors: 1) the properties of technologies; 2) employees and customers' changing characters; and 3) the changing character of organizations in managing their human capital.

In conclusion, CUs (also called Academies, Institutes, learning centers or colleges) are organizational entities dedicated to led learning into action. They are intricately linked to the company's business strategy with the aim of achieving corporate excellence, they help organizations to identify, retain and promote key figures, providing valuable, work-based learning and career development opportunities.

What emerges is that, despite knowledge management is progressively tangled with use of technologies, they should only be used to facilitate, and not replace, traditional learning, because learning (Allen, 2010; Iannotta et al., 2016). Thus, we see ICTs through e-learning and blended learning nurturing distributed communities, while rationalizing the source and tools of learning services (Peters, 2017).

3.2 The Setting

3.2.1. The Company: TIM

TIM S.p.A. is an Italian telecommunications company quoted in the FTSE MIB index, offering services of fixed telephony, mobile telephony, public telephony, Internet

Protocol (IP) telephony, Internet and cable television (via Internet Protocol Television - IPTV- technology) in Italy and abroad. It operates in Italy in fixed and mobile telephony with the TIM (private) brand and TIM Impresa Semplice (business), and in Brazil with the TIM brand. It represents the 7th Italian economic group by turnover and among the first 500 worldwide ⁵.

Originally, the “Società Telefonica Interregionale Piemontese e Lombarda” (STIPEL) was founded in 1925, the same year the Italian Government reorganized the telephone system, dividing the territory into 5 zones. It was only in 1964 that they joined, under the name of SIP (Società Italiana per l’Esercizio Telefonico).

After the economic crisis of the '70s, the company started its restructuring plan, with the introduction of the new corporate brand, a greater variety of services and products, as well as technological innovations, such as new information systems. In 1985 the numeration process of the telephone network began on the whole Italian territory, together with a first introduction of the optical fiber system.

The birth of Telecom Italia was closely linked to the process of liberalization of the telecommunications sector, launched in the United States of America at the beginning of the '80s. In Europe, the process was strongly linked to the privatization of national operators. Accordingly, it was formally established on 27 July 1994, from the merger deed with Iritel, Telespazio, Italcable and SIRM S.p.A. This followed a telecommunications sector reorganization plan presented to the Ministry of the Treasury by IRI (Istituto per la Ricostruzione Industriale), in June 1993.

In 1995, with a partial demerger from the parent company, TIM (at that time still Telecom Italia mobile) was founded. Its capital was 63.01% controlled by STET (Società Finanziaria Telefonica S.p.A.), when two years later, both STET and Telecom Italia financial institutions were merged in a new company called Telecom Italia. In October 1997, the Italian government implemented a privatization of the company, with the consequent sale of 35.26% of the capital. This fact resulted into a quasi-total exit of the Treasury from the shareholding, while on the 27th October 1997 the privatized Telecom Italia was traded on the Italian Stock Exchange.

Nowadays, TIM is one of the major leading Italian ICT group and digital partner of the Country. The Group is also active in the rest of Europe, in America, Africa and Asia

⁵ <http://fortune.com/global500/>.

http://www.storiaindustria.it/repository/fonti_documenti/biblioteca/testi/Testo_SIP-Telecom_Storia.pdf

through Sparkle, a leading global operator, which provides IP, Data, Cloud, Data Center, Mobile and Voice services to fixed and mobile Carriers, Internet Service Providers (ISPs), Content Providers, Multimedia Operators, Application Service Providers and Multinational Customers.

Figure 4 shows TIM S.p.A. across the world. Dark blue indicates its reference markets, while light blue represents all the other markets. Italy is the Country where this research takes place.



Figure 4: The Company in the World. Source:

<http://www.telecomitalia.com/tit/it/about-us/geographical-dispersion.html>.

TIM organizational structure as at September 2018 appears as follows in Figure 5:

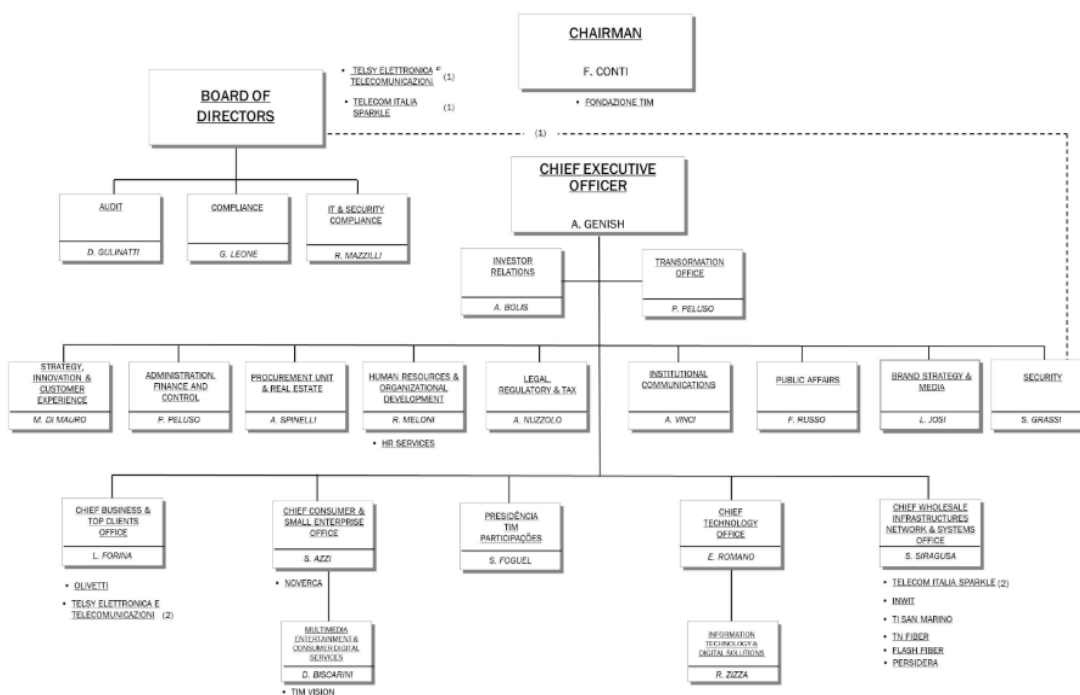


Figure 5: Organizational Chart of TIM S.p.A. Source:

<http://www.telecomitalia.com/tit/it/about-us/organizational-chart.html>.

Up to now, it is possible to derive some data from TIM website. By June 2018, TIM customers in Italy were 31.6 million mobile lines, 13.3 million of which were user broadband and ultrabroadband. At the same time, they recorded 19.3 million fixed accesses, where over 15 million were broadband or ultrabroadband accesses. While looking at TIM Brazil, they count 56.6 million customers on the mobile network, over 31.3 million are user broadband. TIM main economic-financial data can be summarized as follow:

- € 1,597 million for industrial investments (€ 5.7 billion in 2017)
- € 9.5 billion in revenues (€ 19.8 billion in 2017)
- 4 billion euros EBITDA (8.7 billion in 2017)
- € 25,141 billion adjusted net financial indebtedness (€ 25,308 billion as of December 31, 2017)⁶.

⁶ source available at: <http://www.telecomitalia.com/tit/it/about-us/profile.html>

3.2.2. **The Corporate University: TIM Academy**

The TIM Academy Corporate University was founded in April 2016 as a new center of knowledge for TIM, to develop and disseminate knowledge and digital skills necessary to support the digital transformation and evolution of the Group, on a triple point of view:

1. Technological;
2. Market;
3. Cultural.

The new CU is based on the concept of sharing knowledge to support the company strategy.

The initiative was born within TIM's People Strategy almost 4 years ago. The CU as we can see it now is the result of 18 months of work carried out with the support of a community of over 100 employees from different business functions, with the support of some external partners.

TIM Academy is both a physical and a virtual place, dedicated to learning and sharing knowledge, to the generation and diffusion of technological innovation, leadership and networking. These processes are enabled by a dedicated digital platform and by a social area (managed by oracle) which, jointly combining internal and external contents, encourage the exchange and co-generation of ideas, even at a distance. The cloud platform is also accessible from mobile and 50% of content can be used by smartphones and tablets. Developing and disseminating new skills and contaminating the knowledge of different realities also requires the involvement of new talent, based on the strategic path of digital transformation of the company.

The headquarters are located in Rome, with physical settings characterized by high-innovative technologies and physical spaces specifically designed to pursue the above-mentioned objectives, in a smart environment. The other locations in which TIM Academy is present are: Milan, Turin, Padova, Bologna, Naples, Palermo, Bari and Geneva.

Among the innovative tools used for the training offer it is possible to include: virtual learning, open meeting, web training, gamification, and other artifacts which will be discussed later in the analysis. Alongside these, there are also opportunities for exchange in seminars, workshops, thinkthanks and hackathons. The exchange of know-how and the contamination of ideas and work, in fact, rely on the purpose of professional updating.

The modalities with which the contents of the training are defined are based on a periodic survey of the training needs, as well as on the company strategies, the detection of the need of some people to strengthen their skills in order to be more efficient in their respective roles, and free access to different routes, based on individual preferences.

The training staff is represented by the Faculty, composed of about 30 full time teachers, called "*social digital educator*". They are joined by a hundred employees called as experts, testimonials and trainers for some specific issues.

More detailed information will be presented in Chapter 7, as an outcome of this research.

Chapter 4 - Conceptualization of the study

Introduction

This chapter develops key concepts in the thesis's conceptual framework which is based on Actor-Network Theory (ANT). As declared from the beginning, ANT is deployed as a conceptual framework, a research method and an analytical framework (Luck, 2008).

By accounting for the interplay between humans and non-humans, in the past years ANT has been mainly used to describe implementations of technological innovations. In addition, there are several studies undertaking ANT for studying education. However, these are only related to school settings.

On the other hand, the conceptual features brought together in the following conceptual framework allow a connection of the multiple dimensions of this study, in relation to the implementation and maintenance of a Corporate University which, as far as I know, is an innovative contribution of its kind.

The Chapter opens with an overview of the application of ANT for education and learning. Then, it embraces Callon's (1986) Sociology of Translation as a conceptual framework and expands what was already anticipated in Chapter 2.

With reference to the analysis under consideration, the six research questions are also presented at the end of the Chapter.

4.1 Actor-Network Theory for Education and Learning

Actor-network theory allows for tracing the processes by which different elements (both human and non-human) come together until they assemble collectives. According to McGregor (2004:353), “fieldwork data and experience in schools suggest that ANT provides a useful lens for the study of teacher interaction and collaboration, and technologies of teaching”. Fox (2000) also deepens the concept of learning, in relation to the interplay of technology, objects and changes in knowledge and actions. This recalls Lave’s (1993) concept of situated learning.

Learning is not a simple result of individuals’ mental processes and negotiation of meanings; rather it is a reshape of different inscriptions (Fox, 2000). However, there are relatively few educational studies drawing from ANT and questioning how educational practices are affected by the materiality (Sørensen, 2009). Not only that, as can be deduced from most of the studies on the topic, this approach has been used almost exclusively in conventional school contexts, leaving an evident gap with reference to work learning habits.

In line with Fox (2000), learning is the effect of many struggles between humans acting upon (and also shaped by) the material world.

In the nowadays educational environment, technologies and mundane objects have changed. To provide some examples, fixed desks, textbooks, fountain pens and ink have gradually left space for the internet, new interactive forms of teaching and use of the lessons, the use of images and videos, etc. However, there are some material forms much more lasting than others (just think of the classrooms). This persistence can be attributed to the stability of certain durable power relations (McGregor, 2004).

This results in a deep analysis of the ongoing generation of knowledge. Therefore, differently from traditional theories, ANT is more a way of conceptualizing and intervening on educational issues. As for other dimensions of reality, education and learning can also be described as a set of material artifacts that are distributed, managed, mediated and employed (Fenwick and Edwards, 2010).

In this sense, knowledge generation is a joint exercise of relational strategies within a given network. This network is then composed by nodes in relation, beings in precarious arrangements. Thus, ANT aims to study how knowledge is generated through the effects of these assemblages.

Accordingly, knowledge cannot be considered to be stable or universal, as well as limited to subjective cognition and interpretation. Knowing is situated, embodied and distributed (Fenwick and Edwards, 2010). In other words, knowing is the enactment made possible by the connections between things. In this vein, learning is a result of a network effect (not simply a social achievement), and education can be understood as the implementation of a set of material things and human behaviors. This means that material components of educational settings are linked to educational and learning practices that constitute them (McGregor, 2004). Therefore, material objects are not to be considered as passive artifacts, but they mediate between humans and can be active parts of these relations (McGregor, 2004).

As Fenwick claims, “selected concepts of this field that have been most frequently applied to questions of learning, knowledge generation and practice include central notions of: symmetry - that objects, nature, technology and humans all exercise influence in assembling and mobilizing the ‘networks’ that comprise tools, knowledge, institutions, policies, and identities; translation and stabilization – the micronegotiations that work to perform networks into existence and maintain them while concealing these dynamic translations; the processes of enrolment and mobilization that work to include and exclude; and the fluid objects and quasi-objects produced by networks that perform themselves as stable, even ‘black-boxed’, knowledge and bodies” (Fenwick, 2010b:112; Fenwick and Edwards, 2010).

Drawing on the concepts of ANT, it is possible to trace both the webs and players in the network under investigation. This will mine the black-box of heterogeneous assemblages. In other terms, “the network inscribes a new geography of social and material relations throughout an educational system” (Fenwick and Edwards, 2010:112-113). This kind of readings can pave the way for inquiring processes for protecting, amplifying or realizing educational changes and implementations.

Though the process of translation, education and learning can be investigated in a rich materialized conception. Subsequently, ANT offers a more precise way to intervene. As Edwards stated, ANT “provides a framework for analyzing the exercises of power by which cultural, social and economic capital is produced and reproduced” (Edwards, 2002:355). Along this line, Fenwick and Edwards (2011a) affirm that ANT offers important insights about the processes and objects of education and learning.

Knowledge generation becomes a joint result of relational strategies within networks performed through humans and non-humans in momentary arrangements of time and space. Learning and knowing occur as processes of assembling and maintaining these networks through negotiations that occur at various nodes. That is: relational interactions can explain the phenomenon of education and learning, and the interplay of force relations between technology, objects, humans, non-humans represent education and learning (Fenwick and Edward, 2011b).

Some examples of studies using ANT approach for studying educational settings and technologies implementations can be found in chronological order in: Barab et al. (2001), Fox (2000, 2006), Luck (2008), McGregor (2004); Mulchay (2006), Nespor (2011), Pollack (2005), Sørensen (2007).

An important point is to understand and avoid what Latour defines “too hasty closures”. This will translate into the creation of hegemonic social explanations that produce inequalities. To do so, he claims that educators should resist to use available explanatory categories and scrutinize more carefully the arguments and uncertainties about the distribution of resources and agency, through the enactment of different sociomaterial formations and the ways that actors contextualize one another (Fenwick, 2014; Latour, 2005). This will allow for investigating the mechanisms of the relations that act to stabilize and black box certain categories, hierarchies or practices. Indeed, it is only by tracing the assemblage and, thus, the networks of ICTs that it is possible to identify how technology-mediated learning occurs on a daily basis.

4.1.1. **Previous Applications of ANT for Education and Learning Investigation**

ANT offers a rather radical material challenge to understand learning, work and organization together (Fenwick, 2010b). It does not represent any new learning theory, but an alternative way of enacting social practices where materials are not subordinated to humans. Only their combination creates actions, such as learning. By reconciling the social and the material, ANT does not privilege one of them, nor it assigns any symbolic or cultural meaning to artifacts. In his study, McGregor (2004) defines teachers' working environment as a dynamic built reciprocally by the effects of teachers' and students' networks. The aforesaid commingling characterizes, and therefore constrains, the working lives and the same dichotomy (even if the dichotomy is certainly not among the favorites of the ANT) space-time of any organization. In this context, negotiations, formal

and informal relationships, definition of specific practices and languages are affirmed. The Author investigates the relevance of material equipment and technologies and the relations between them and changes in pedagogic practices and contents, through interviews with staff, observations, pictures and personal mental maps. By focusing on the concept of spatiality of a grouping (e.g. the teaching team) and by tracing its networks, someone can understand the dynamic construction of work-related relationships and reciprocal influences. In addition, he also underlines the role of ANT in deeply analyzing ICT potentialities for teaching and learning, when the role and the characteristics of ICT should not be taken for granted. In this way, researchers and practitioners only render invisible the involved social, political and economic constraints.

Accordingly, Fenwick and Edwards (2010:41) provide an ANTish definition of learning and teaching: “Learning is, therefore, an effect of the networks of humans and non-humans that identify certain practices as learning, which also entails a value judgment about learning something worthwhile. Thus, teaching is not simply about the relationships between humans, but is about the networks of humans and things through which teaching and learning are translated and enacted. Teaching and learning do not exist and cannot be identified as separate from the networks through which they are enacted. They are not independent entities of processes, but assemblages”. This somehow represents the concept of performativity in education and learning, where objects and technologies actively mediate and act between and upon human (and non-human) relations. The learning experience is both social and material (Mulcahy, 2006).

Hence, as Law and Callon (1992:46) argue that the success of a “technological project” relies on the possibility it has to:

- a) construct “global network that will for a time provide resources of various kinds in the expectation of an ultimate return”;
- b) construct “a local network using the resources provided by the global network to ultimately offer a material, economic, cultural, or symbolic return to actors lodged in the global network”;
- c) “impose itself as an obligatory point of passage between the two networks”.

I believe these characteristics can be extended to any kind of project a researcher might investigate on.

In a study about the introduction and implementation of an interactive videoconferencing system within a higher education institution, Luck (2008) demonstrates how heterogeneous engineering allows for *interesement*, enrolment and acceptance of the system. The stabilization of the network as a result of multiple negotiations was mainly based on the links between technologies and human intentions, expectations and actions. Accordingly, linkages and relationships need to be built among objects, technologies and humans for strengthening the network and assuring its durability and mobility. Here it is evident the link with mechanisms of power. Durability represents the network capacity of ordering over time, achieved through relational patterns of durable materials and their related links. Mobility is the network capacity of ordering over space through immutable mobiles inscribed in the network. Recalling Latour (1990), immutable mobiles possess some certain characteristics: a) they are able to retain their shapes, regardless of whether they are moved from one place to another; b) they can be moved from their starting point, still maintaining their significance at distance; c) they can be easily seen and/or mentally grasped; d) they can be modified in their scale, without undergoing substantial changes in their fundamental characteristics; and e) they can be reproduced and shared at little cost. Luck's analysis showed how sociomaterial negotiations between humans and non-humans allow for assemblage, connection, translation and changes of a network. The key actor around which the network arose was, in fact, a written document about existing teaching-learning systems able to enroll sufficient entities to success and survive. Moreover, ANT does not recognize any *a-priori* distinction between levels of actors, so that it can happen that lower hierarchical levels in an organization are able to locally implement network which proliferates and extend across it. Hence, ANT aims to understand how local and global levels influence one another through the assemblages of various materials. This local and global levels are made of "human elements (desires, pedagogical knowledge, attachments, intentions, etc.) and things (such as textbooks, laboratory equipment, assessment forms, policy statements, ..., databases)" (Fenwick and Edwards, 2010:102). This drives to the identification of what the Authors define "educational geographies".

Therefore, objects have their own spatializing force (McGregor, 2004). This means they are actively implicated into the construction and development of a certain social space, where each specific spatial arrangement has the power of limiting or encouraging different ways of working. Accordingly, "learning and knowledge are themselves

organizations of activity in time and space, by mobilizing and accumulating distant settings in central positions” (McGregor, 2004:262). This is even true if considering the phenomena of distant learning, e-learning, blended learning.

4.1.2. **Accountability of Heterogeneous Actors**

As in the case of practice implementations, education and learning projects need to account according to different conflicting interests. In this case, accountability occurs through different educational environments, such as tests, committees, records of assignments. Accordingly, ANT is useful for understanding what kind of connections assemble things and individuals, what subjectivities are translated by the emergent network, what and how objects are held together. In fact, accountability is made possible when parts of a system are made visible. A way to represent education and learning practices is through representational technologies, such as test results, individual learning plans, surveillance cameras, etc. (Rose, 1999 in Fenwick and Edwards, 2010).

ANT approach has been used to shed light on the complex negotiations of power, especially concerning how power circulates and what is enacted for this to happen. It contributes to consider all the things that have an active role in collaboration with human dynamics for power construction. In effect, things in the form of databases, texts or codes are all measures of educational and learning outputs, and they do have the power to govern the learning activity and its provision. Hence, ANT is particularly useful for conceptualizing spaces of evaluation. These also have the power to shape the practices of education and learning and forge connections among people and things (Hiller, 2007). When institutionalized, these spaces can become performance measurement systems, subjected to compliance or resistance. According to Fenwick and Edwards (2010), these systems can be considered both as mediators, or intermediaries. The firsts are human or non-human actants that actively work upon events and other entities, by forming links, inducing particular behaviors (and limiting others), interpreting actions. Examples can be: teacher guidelines, measuring instruments, databases, charts and grades. Intermediaries are human or non-human actants that transport a meaning without transforming it. Examples can be: individual’s reports, tests items (that translate learning practices into limited categories of learning). Nevertheless, both of them have the power to inscribe and mobilize individuals and materials.

Material interactions seem to have the capacity to shape students' and teachers' engagement and enrolment with knowledge and learning processes. In this sense, evaluation is made by objects that mediate its processes, which are the results of negotiations with teachers and learners.

4.2 Callon's Sociology of Translation

As both human and non-human actors engage in relationships, the Sociology of Translation (Callon, 1986) has the power to untangle this network of relationships through the analysis of interactions among actors. In doing so, it enables in following the negotiations from a multidimensional point of view, accounting for each actor within the network. It also allows to clarify each contribution in the birth, affirmation and implementation of the actor-network.

To provide a traditional reference to Callon's Sociology of Translation, I refer to his study of the scallops of St Brieuc Bay (Callon, 1986). In his research, he describes the way three marine biologists are trying to restock St Brieuc Bay for producing more scallops, by using the four moments of translation.

These processes have been analyzed by different Authors. To provide some examples, I already mentioned in the previous chapters the works of Luck (2008) and Prosander (2005). Prosander (2005) reconceptualized the moments by highlighting their major contents. Hence, we will have: 1) entering the obligatory point of passage; 2) forming a pact; 3) performing multilateral negotiations; and 4) finding the spokesman.

"Translation is not a unidirectional process. It is a process of mutual translation" (Luck, 2008:85). Artifacts both translate and are translated by the other actors.

Entering the obligatory point of passage means the mutual definition of the involved actants. It represents the point that needs to be traversed by an actant who wants to be a part of the net, where the point is lured by another actant who wants to become indispensable to the others (Callon, 1986). To do so, it must find ways for engaging actants willing to negotiate their interests by also benefiting from passing through the obligatory passage point.

Forming a pact represents what Callon (1996) defines forming a "Holy Alliance", in which an actant tries to lock other actants into their appropriate roles and thus, form a

power base for itself. The "Holy Alliance" indicates the role played by trust and loyalty, as fundamental components for building a successful network.

By performing various negotiations, an actant defines the different roles allocated to others, using diverse kinds of strategies (e.g. seduction, transaction and silent consensus) (Porsander, 2005). Despite the principal negotiation concerning the obligatory passage point, this category also refers to all the involved negotiations between the participants.

Finding the spokesperson means deciding who is going to speak in the name of the originated network, displacing the other actants' representations. To this regard, it is necessary to find a way to transform entities into artifacts, to make them easily transportable, reproducible and diffusible (Latour, 1993; Porsander, 2005). As a consequence, artifacts must be translated into reports, digital documents, pictures or verbal descriptions. In this way, the spokesperson can influence the entire actor-network, by highlighting the desired models to be used. Thus, the spokesperson is someone/something that has the possibility to fit better into the ideals of expertise (Peltonen and Tikkanen, 2005; Porsander, 2005).

At the end, inscription may occur. In the mobilization phase, the formed network gains acceptance by making durable translations. These translations become irreversible (or at least, stable and routine) if it becomes impossible to go back to a point where alternative possibilities exist (Callon, 1986; Callon, 1991; Walsham, 1997). Accordingly, it is possible to talk about inscription (Holmström and Robey, 2005). Its strength depends on the irreversibility of the actor-network into which they actors are inscribed (Hanseth and Monteiro, 1997; Luck, 2008).

In other words, it is necessary to refer to five further latent steps, of a recursive process of trial and errors (see for example Hernes, 2005):

- identification of key events;
- understanding of the ways in which events and results are connected over time;
- identification of actors and actants;
- distinction between actors and actants;
- achieving a level of saturation that can speak of an actor-network.

4.2.1. **The Moment of Problematization**

This moment can be analyzed when the researcher defines both the nature of the problem and the relevant actors to be followed. In order to assembling actors within a first idea of network, I must follow actors' goals in my study. Callon (1986) defines as an obligatory

passage point (OPP) everything an actor can utilize to reach her/his/its goals. In this first phase, Luck (2008:72) suggests “whoever gets to define the problem locates himself/herself as the heterogeneous engineer (HE), determining who and what the other actors are and claiming to know what they want”. In fact, it is the researcher, in the role of HE, who enrolls other actors by “translating what they want and by reifying this translation so that they no longer desire anything else that may be offered by a competing actor” (Luck, 2008:72; Callon and Latour, 1981). Hence, the OPP represents the condition when all the actors adhere to a certain network (by refusing others) in order to satisfy their interests. These interests are a fundamental part of the researcher’s study. Once they are made clear, the HE attributes them to each actor.

As well as the marine biologists managed to make indispensable their own program of investigation an OPP to other actors, they acted as HEs (Callon, 1986). Accordingly, they identified three actors: the scallops (*Pecten Maximus*); the fishermen of St Brieuc Bay; and their scientific community (Callon, 1986). Definition of the scallops took place by assuming that “they can anchor themselves and will ‘accept’ a shelter that will enable them to proliferate and survive” (Callon, 1986:205). Definition of the fishermen was demarcated as fishing the “scallops to the last shellfish without worrying about the stock” (Callon, 1986:204). The scientific community was defined as being “interested in advancing the knowledge which has been proposed” (Callon, 1986: 205). Notably, the HEs scientists also defined their own interests by presenting themselves as “‘basic’ researchers who ... [sought] to advance the available knowledge concerning [*Pecten Maximus*]” (Callon, 1986:205).

Definitions also cleared the interests and the agencies of the actors. Thus, the scientists wished to demonstrate that the scallops do anchor. Scallops aim to survival and self-subsistence. The fishermen aim to make their interests in doing their job. The scientific community aims at expanding scientific knowledge, in particular learning about marine science. Then, the OPP represented the path of action to satisfy actor’s interests (Callon, 1986).

To operatize the OPP, a researcher must account for the different ways actors follow their directions, set out alliances, and try to achieve their goals (Callon, 1986). Clearly, there cannot be a perfect condition, in which each involved actor can easily meet his personal interests. “The groups of actors must either change their direction and accept the OPP or they will not be able to achieve their long-term goals” (Luck, 2008:74).

Therefore, the moment of problematization is necessary to describe the system of associations among the actors, which are the results of their identities and interests. This system is, thus, a “Holy Alliance”.

4.2.2. **The Moment of *Interessement***

Interessement concerns the processes whereby actors take their roles within the network. In this moment, the researcher as a HE uses some strategies (or intermediaries) to identify her/himself within a reference context. As a consequence, she/he moves a step inside and between actors and their competing interests (Callon, 1986), with the aim of enrolling the actors into various roles within the actor-network.

During this phase, the HE *translates* other’s interests to his/her/their own interests (Luck, 2008). Thus, negotiations about the roles attributed to actors can take place until they are considered acceptable. In doing so, the researcher is able to enhance informant’s commitment to the research project.

Going back to Callon’s study (1986), the “archetype of the *interessement* device” used to interest the scallops were some bags containing a support for the scallop larvae to anchor themselves (Callon, 1986:209). This led to a confirmation of the validity of the previous moment of problematization (Callon, 1986). On the other hand, the scientists used different meetings, debates and graphs to convince fishermen’s delegates the scallops were heading towards extinction. Lastly, the scientific community was interested by the necessity to fulfill the lack of knowledge about scallops and their survival (Callon, 1986). All these processes served to make actors of the network follow the intended translation.

4.2.3. **The Moment of Enrolment**

As anticipated in the previous paragraph, this is the final goal of the moment of *interessement*. In other terms, when the moment of *interessement* succeeds, actors are enrolled within a network because they believe to achieve their own goals and accept their roles in relation to others’.

As Luck (2008) outlines, *interessement* and enrolment may occur simultaneously. Since enrolment is the “multilateral negotiations, trials of strength and tricks that accompany the *interessements* and enable them to succeed” (Callon, 1986:211), actors in the networks decide whether to accept certain conditions only if their interests are brought into play. The result will be a network in which competing interests were excluded, while

secure alliances among the actors are tight and maintained, possibly for as long as possible.

In Callon's (1986) study, enrolment was a set of strategies to define and interrelate the various roles and interests the HEs allocated to the actors. These strategies can be read in the previous paragraph. The moment of enrolment was the result of several multilateral negotiations during which the identities of the actors were determined and tested. To provide an example, at the beginning only few of the scallops attached themselves to the collectors. This drove the researchers to negotiate with other actors, such as: currents, parasites and other materials the collectors were made of (Callon, 1986). Once these negotiations were solved, more and more scallops attached to the collectors. Thus, changes in the devices were essential to increase the enrolment of the scallops. The transactions with the fishermen and the scientific community consisted in the demonstration the attached scallops did not attach themselves by accident, which was an evidence people could see with their eyes.

4.2.4. **The Moment of Mobilization**

In a later study, Callon (1991) described mobilization in terms of the convergence of the actors in the actor-network. In doing so, all the actors work together as one to achieve common and negotiated purposes. It represents the agreement among the final interests of all actors, and it moves towards irreversibility. Irreversibility is the extent to which an actor-network is able to return back to an earlier configuration of the association between actors (Callon, 1991). With this in mind, Callon (1991) also outlines that this state of stability is not fixed in time. It can be subverted at any time if one of the actors rejects the translation and steps outside of his/her/its designated role.

This is what Callon (1986) defines dissidence. It indicates the condition when alliances that previously hold an actor network together, can then be contested and subverted at any moment. Dissidence occurs when actors reject, or betray, an identity that they once accepted. The consequence is the dissolution of the actor-network.

Opposite to dissidence, there the concept of inscription. In line with Latour (1991), it means that aligned interests are inscribed into "durable material". Accordingly, the entire process of translation infers that a single actor assumes the interests embedded in other both human and non-human actors, which are willing to participate in the network. The interests it undertakes are represented in the inscriptions of the resulting artefacts. The

more the linked inscriptions, the more the final one is strong (Latour, 1991). Their power consists in the capability of making “action at a distance possible by stabilizing work in such a way that it can travel across space and time and be combined with other work” (Luck, 2008:81). Thus, black boxes emerge when “many elements are made to act as one” (Latour, 1987:131).

In the study of scallops in France, the moment of mobilization is achieved when the various actors “follow their representatives” (Callon, 1986:214). Once the representatives of the groups of interest became convinced that the scallops anchor, it was sufficient, without involving all the scallops, all the fishermen, all the exponent of the scientific community. The process of translation succeeded when three scientists were able to speak in the name of the scallops and fishermen, when presenting their scientific results to the scientific community of reference. Callon says this actor-network was mobilized, because before its multidimensional existence, the actors were “all dispersed and not easily accessible” (Callon, 1986:217).

4.3 Black Boxing

Black boxes are the result of a combination of elements, which can act as if they were only one (Latour, 1987). This process occurs after the entire process on translation, so that each association between elements becomes invisible (Callon, 1991).

As a result of translation, the black boxed actor-network is taken for granted, which is a way for it to stabilizing. The main reason for this stabilization relies just in the reduction of frictions, during the process of translation.

However, what should interest us, as researchers, resides inside the black box itself, since the associations become visible only when the black box is opened.

This process is often linked to technological implementations. A piece of technology can also become an actor of the network when an inscription of programs of action occurs. The result is an artifact that behaves as an actor, imposing its inscribing program of action on its users. “Examining the program of action of a technical artefact can serve as a means to identify inefficient, inappropriate or counterproductive linkages that may weaken an actor network” (Callon, 1991 in Luck, 2008:83).

As well as we can trace action programs, there are also conflicting interests to those of other actors within the actor network. If they attempt to influence other actors, they are

known as anti-programs (Latour, 1999). It recalls the principle of the mutual definition of the involved actants. People can change material artifacts to fit their purposes. Conflicting interests generate anti-programs (Latour, 1999). The consequence of the modification of one actor's enrolment in a network can possibly lead to the modification or disintegration of the network (Callon, 1986). At the same time, I will introduce the possibilities of compliant/non-compliant behaviors and aligned/non-aligned behaviors, as outlined before in this thesis.

Overall, the ability of inscriptions (and thus, translations) to persist across time and space is a significant aptitude assumed by an ANT-driven conceptual framework.

4.4 Research Questions

The aforesaid considerations lead to the formulation of the following research questions. Given the nature of qualitative research, they were open-ended, evolving and non-directional (Creswell and Poth, 2018).

I first developed a “central question”:

RQ1: How does ANT illustrate the network aspects of the CU?

Then, drafting this central question by triangulating the methods I wanted to apply, together with the theoretical gaps I wanted to fulfil, the resulting “sub-questions” arose:

RQ2: How do humans and non-humans act upon one another in ways that mutually transform their characteristics and activities in the CU?

RQ3: How do individuals and artifacts act and relate exerting their force to regulate, create or exclude forms of participations within the actor-network?

RQ4: How do individual and technical differences and interests influence the use of the CU?

RQ5: How do particular spatial arrangements encourage or constrain education and learning of the CU?

RQ6: What are the characteristics of the effective operating of a contemporary CU?

4.5 Conceptual Framework of the Research

As a part of preliminary step for the implementation of my research activity, I selected a conceptual framework to guide data collection and analysis. Given the nature of my investigations, I needed to frame my investigation by looking through the lens of

sociomateriality. In response to the emergence of several concerns related to my object of analysis – a modern Corporate University called TIM Academy –the conceptual framework represented by the Sociology of Translation (Callon, 1986) has been resumed from Actor-Network Theory.

There are many reasons why I chose to frame my study in this reference. First, at the ontological level, both human and non-human elements are put on the same level of analysis. In my opinion, an analysis to be complete cannot ignore the coexistence of both these components, as integral parts of any organization, starting from the micro level, up to the macro level.

Second, it focuses on interactions among actors rather than on the actors taken individually. This allows for examinations of the effects of relations and interactions rather than the causes.

Third, the four moments of translation guide the researcher to the detailed analysis of the interactions between the social and the material or technical dimension of reality. This translate both into the identification of relevant (or somehow silent) actors, and the recognition of intermediaries that influence and shape the actor-network under investigation.

Fourth, as ANT and the Sociology of Translation are “well positioned to support the production of a rich, thick description of the interactions between the people and the technology when tracing the dynamics of the socio-technical processes” (Luck, 2008:88), they will be capable of explaining in-depth what happened during the implementation and maintenance of the CU.

Fifth, ANT allows those interested to account for the analysis of the effectivity of the material networks of people, objects and technologies in determining the success of departments, and the necessity to rethink the signification of context (McGregor, 2004).

Sixth, an understanding of associations and relations within the actor-network can help in understanding how objects shape workplace learning, technology implementations and other activities, when they associate with human ideas, actions and meanings.

Figure 6 summarizes the conceptual framework.

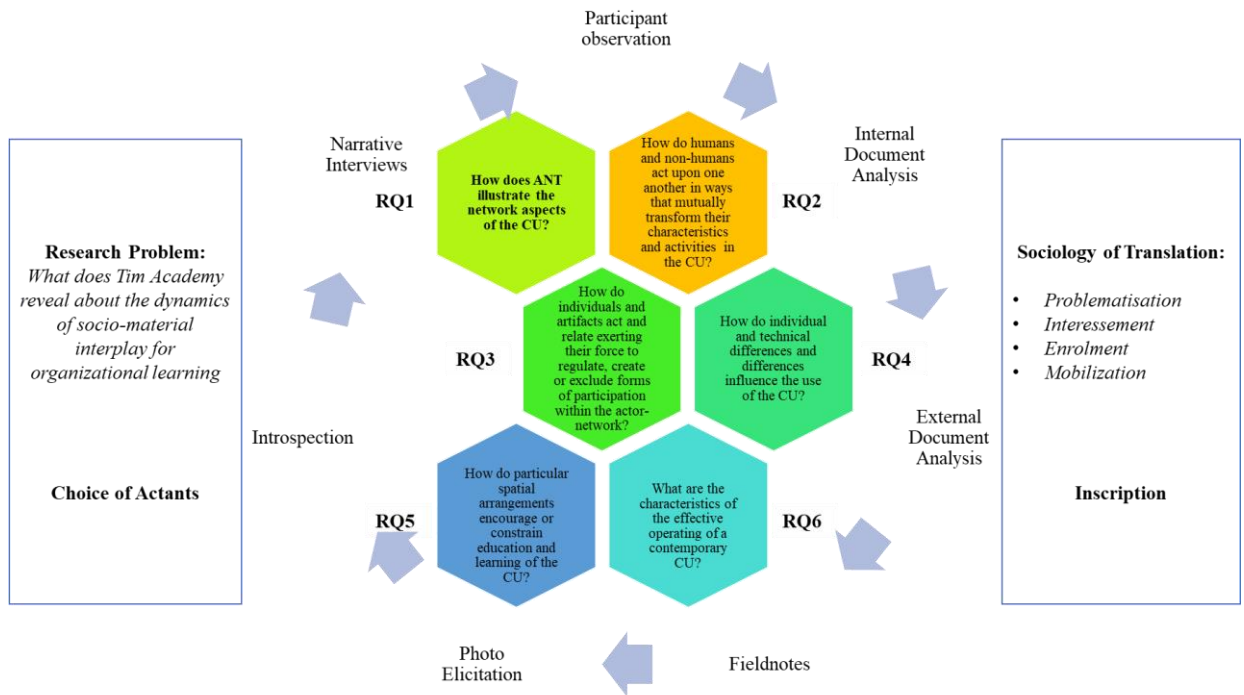


Figure 6: Conceptual framework. Source: Own Elaboration.

Chapter 5 - Research Methodology

Introduction

In line with the first section of this thesis, the positionality that guides my research action originates from sociomaterial theoretical orientations, ontologically embracing the idea of multiple realities. Multiple realities drove me to the study of material and human interactions from advancements in structuration theory and Actor-Network Theory. Alongside with Luck's (2008) position, my work deploys ANT as a conceptual framework, a research method and an analytical framework.

Consistent with the nature of this study I used an inductive logic, embracing an emerging design with dynamic and emergent procedures. This inevitably led me to review my research questions during the study, to better reflect the research problem.

The Actor-Network approach to reality also helped me in what Star calls "the ethnography of infrastructure" (Star, 1999). The same concepts were later adopted by Bruni in 2005, for shadowing a digital clinical records system, as a non-human actor. By defining the infrastructure as the set of relationships that links both people with several material artifacts I encountered, I then worked on my data.

The work was set up to follow all the connections between events or actions as soon as they were visible. With the aim of capturing most of the actual organizing directly in the field, several observations were made during the study (Porsander, 2005). Taking up the theoretical logic, it is possible to define actors those actants who acquire an identity by repeatedly doing the same actions with the same results. The stabilization of the connections between actors and actions gave birth to the resulting network. According to Callon (1986), this transformation can be characterized as a process of translation. This process will serve to demonstrate how separate actors that emerge from the construction of an action net, translate into a single actor-network.

Multiple methods of data collection are necessary to best answer the research questions. First, I started from some preliminary considerations. In line with Creswell and Poth's (2018) suggestions for research design, my research is not immune to an interactive design, rather than a deductive one. At most, I am mindful of the interconnectedness of the paths and the interactiveness of the design process of the study, as outlined following the principle of methodological congruence advanced by Morse and

Richards (2002) (Maxwell, 2013). At the same time, me, as a “multicultural subject” (Denzin and Lincoln, 2011:12), I do not distance myself from the background of organizational theories from which I am proving, but I promote a certain curiosity for the investigation of a deeper link between individual and organization, which prompted me to undertake this investigation.

Accordingly, I started from a period of 3 years in close contact with the company TIM S.p.A. This favored a slow process of naturalization (LaFramboise et al., 1993). This period for acculturation has been extremely functional not only for me, as a researcher, but also for the context as a whole in which I found myself acting, as well as with different informants.

Then, coherently with the emerging logic of my study, my research design was also emergent. For this reason, a two-kind of researcher introspection were undertaken (Gould, 1995; Wallendorf and Brucks, 1993). A first one to reflect on the process of acculturation, related both to the company and to my personal economic background. A second one, to enhance the efficacy of the iterative process of data analysis, with a view to stimulating the derived ethics.

The design of the research had to be clearly outlined within a research proposal, which, in turn, was shared with the target to which it was addressed. Traditionally, next to sharing a work plan, different ethical considerations emerge. Overall, ethical issues occur prior to conducting the study, during data collection, during data analysis and in reporting the data findings. Each consideration I pondered, are discussed in the following paragraphs.

After, I learned about people stories using a variety of narrative approaches. The reader will find further insights later in this Chapter (see Appendix A, Appendix B and Appendix C for related issues). Together with my personal investigation lens, I collected a variety of sources of data, such as: 1) data gathered from direct interactions with people, through narrative interviews; 2) data generated from artifacts, through direct interactions with things and direct investigation *in situ*; 3) data generated through passive interactions, from direct observations; 4) data collected from company documents; and 5) data collected from “the outside” world, such as the press review (see Appendix D for the observational protocol).

During the collection of stories, particularistic introspection in narrative form was applied with the informants, to stimulate contextualized experiences (Gould, 2012;

Wallendorf and Buck, 1993). This allowed a triangulation of introspective data, in the phase of data analysis (Minowa et al., 2012).

Moreover, I applied projective techniques by proposing two tests to people with whom I have interacted, exclusively for epistemic purposes. In particular, with a physical moodboard I collected both images I took from TIM website, pictures I took from my participant observation, and objects I wanted to focus on, which represented the sources of inspiration that the informants were asked to connect. I also asked each participant to make a list of *non desiderata* of their CU, which methodologically is defined the noteness.

To engage in meaning-making of the data, I analyzed the data through an iterative process, which led me to inductively define the themes, categories and codes, which will be represented in the subsequent subparagraphs.

Collecting good data takes a long time, which, in turn, decrease the possibility of authors' bias effects (Locke et al., 2010).

By working through multiple level of abstraction, I collected, organized and analyzed data by masking the name of people I interacted with, recognizing that “there are no right stories, only multiple stories” (Creswell and Poth, 2018:53) and with respect to multiple ethical issues. These processes are described in the paragraph concerning the strategy of data analysis.

Reciprocity is one the main characteristics that any researcher should consider when interacting with people lives. Accordingly, I tried to review how individuals -as single entities-, and the organization -as a whole only partially composed by individuals-, will benefit from my study, with respect of their professionalism (Creswell and Poth, 2018; Hatch, 2002; Weis and Fine, 2000).

To sum up, the research required multiple source of evidence. This triangulation ensures validity of data collection (Yin, 2009). Observations can offer some understanding of knowledge practices that were not easily accessible through interviews (Czarniawska-Joerges, 2007).

This Chapter starts by recalling ANT peculiarities for research. Then, the research design is modelled building on the Sociology of Translation (Callon, 1986). Afterward, data collection is discussed in detail, including different methods, techniques and the resulting data set for the research. The Chapter closes with a description of the strategies adopted for the analysis of the collected data.

5.1 The Story of ANT as a Research Method

Fundamental premises on ANT approach from its origins have been already discussed in the previous sections of this dissertation. Here, I will devote to summarize it from a methodological standpoint.

Researchers working with ANT approach accomplish their studies in different ways. Most of them use direct field observation and ethnographic approaches. Some examples could be: direct observation; fully immersed participant observation; systematic note-taking; video (or audio) recording; collection of documents; shadowing; semi-structured interviews; narrative interviews (Czarniawska, 2000; Fenwick and Edwards, 2010; Wax, 1971; Mishler, 1986; Roth, 1996; Vickers and Fox, 2005).

Latur (1999) provides an instruction for researchers dealing with humans when he writes: “actors know what they do and we have to learn from them not only *what* they do, but *how* and *why* they do it” (Latour, 1999:20, *emphasis added*). This means “looking down” into as many as possible material details, avoiding any pre-given distinctions between the individual and the environment (Law, 2004). Contingencies must be explored outside a given logic of emergence. Moreover, as Laurier and Philo (2003) explain, human talks are central for research activity. Furthermore, “it is the talk that occurs *within* the activity itself, talk that *is* activity” rather than talk *about* the activity (Fenwick and Edwards, 2010:154). What is important for the researcher is to not follow into privileging one activity or another (or point of view).

The ANT approach was hardly adopted in organizational studies (Czarniawska, 2004; Czaniawska and Hernes, 2005; Cooper, 1992; Nicolini et al., 2004; Vickers and Fox, 2010). Again, tracing connections can be done in different ways: by participatory observation, document analysis, case studies, in-depth interviews. Since ANT can be considered as an approach with a clear focus on connection between human and non-human entities, during the different stages of analysis, connections between different entities can be traced. Only traceable connections of the empirical data will be part of the description elaborated by the researcher.

The procedure starts with the identification of the object of inquiry. In ANTish terminology the process concerns the identification and choice of actants to follow. Then they are followed through a trajectory made of programs and anti-programs until the actants acquire a relatively stable character, becoming actors. In order to become actors,

their programs (or anti-programs in the case of stories of opposition) need to succeed in combating alternative programs. Accordingly, we might say that the alternative starting point is represented by the determination of assemblages to be studied. Common questions are: How assemblages became enacted? How do they keep going?

The success is reached with the formation and stabilization of associations, that give birth to networks of actants and, then, to actor-networks. This process of association in one single entity is made possible by translation (Czarniawska and Hernes, 2005). On the other hand, there are always networks and relationships that have to be excluded for some reasons. In conclusions, main questions concern: *where, how* and *with what effects* those assemblages are born.

The connections then lead to the creation of the entity under examination. Accordingly, after the RQs have been set, the first step is to choose a starting point (or entry point), which represents the actant where the research starts out (Dankert, 2017). That is, regardless the entry point, ANT studies first focus on the local and micro-activities of everyday lives.

Then, the researcher starts to explore the chosen actant, by unravelling all the potential human and non-human elements that relate to it. For ANT categories should not be taken for granted. This step is commonly undertaken with documental analysis, in-depth interviews and, possibly, through direct observation.

As I mentioned before, only actant who leave traces actually exist for ANT analysis. Therefore, they are part of the data. Notably, every actant which leaves traces must be regarded in the same manner. This means that though their substances are different, they must be described using the same vocabulary. Regarding the choice, one could refer to Law (2007) when reasoning about following and excluding. The Author distinguishes between two forms of absence: a) manifest absence; b) otherness. The first is explicitly acknowledged, although absent (e.g. previous experiences and educational background of a teacher). The second is unknowledge by actors, so that it can only be enacted by the researcher: for instance, things that seem obvious, things that are voluntarily left hidden.

The outcome of the fieldwork are connections between entities: it must be made explicit both how they are formed and what the effect of these connections are.

After a first phase of fieldwork, data analysis can start. In line with Dankert (2017:4), “if the goal is to develop a model, to learn something from the research or to make recommendations...there has to be a selection based on the issues that the research wants

to focus on". When using ANT, actors must be considered as the output of ongoing organizing, rather than the sources (Czarniawska, 2005). This means that involved entities need to be followed over a period of time, so that the subject can be approached through their lens. The more accurate are the details the researcher can identify and track, the more the opportunities to find out emerging configurations and knowledge through translations of the involved parties. As new actors/actants enter the analysis, connections can also change. As Fenwick and Edwards assert, "ANT approaches can actually assist the researcher to highlight what is being included and what is excluded in any focus of inquiry. Because an ANT sensibility helps to expose myriad trails and ties among all the minute objects, actions, texts and talk in activity, the researcher is forced to explicitly choose and declare which will be followed and which will be excluded" (Fenwick and Edwards, 2010:151). At the end, the researcher can show ANT-driven results and make considerations by going into existing knowledge.

5.2 Determination of Research Design: Looking through Callon's Categories of Translation

By considering the world as an emergent social process (Burrell and Morgan, 1979), and an extension of conscious and subjective experience with materiality, the research takes an interpretive stance to answer the RQs, as this approach offers rich insights into the phenomenon of study. The exploratory nature of this research, requires the use of an in-depth qualitative research methodology, in order to understand how entities under investigation create interrelated meanings by interacting.

The process of the emergence of an actor-network is described using the four categories introduced by Callon for translation (1986, 1991). As I mentioned before, Callon (1986) identifies four distinct processes of translation: 1) problematization; 2) *interessement*; 3) enrolment; and 4) mobilization. These processes have been taken by Prosander (2005) and conceptualized in: 1) entering the obligatory point of passage; 2) forming a pact; 3) performing multilateral negotiations; and 4) finding the spokesman. The construction follows a narrative approach through a chronological principle, based on the "before", on the "after", on the "then", on the "so that"; this allows to reduce and avoid chaos. Following what is suggested in Czarniawska, "a broadcast is constructed around three dimensions: the chronicle (what is happening), the mimesis (how does it

look, a dimension that allows the listener to construct a virtual picture of the events) and the emplotment (introducing structure which allows making sense of the events)” (Czarniawska, 2004b:9-10). Accordingly, “it is the mimesis, the how, that offers most clues as to the way events become connected with the help of an accessible repertoire of plots” (Czarniawska, 2004b:10), so that avoiding the black-boxing of the emplotment. By constructing a sequential order, the narrators implicitly produce a chain of causality and internal coherence, which justifies and attempts to explain the initial events according to the outcomes (Gherardi and Poggio, 2003).

In the mobilization phase, the formed network gains acceptance by making durable translations. These translations become irreversible (or at least, stable and routine) if it becomes impossible to go back to a point where alternative possibilities exist (Callon,1986; Callon, 1991). Accordingly, it is possible to talk about inscription (Holmström and Robey, 2005).

In order to do so, it is necessary to refer to five further latent steps, of a recursive process of trial and errors (see for example Hernes, 2005):

- identification of key events;
- understanding of the ways in which events and results are connected over time;
- identification of actors and actants;
- distinction between actors and actants;
- achieving a level of saturation that can speak of an actor-network.

Entering the obligatory point of passage (OPP) means that the interested actors mutually accept their own definitions within the network. It represents the point that needs to be traversed by an actant who wants to be a part of the net. In this moment, a Heterogeneous Engineer (HE) must find ways for engaging actants willing to negotiate their interests by also benefiting from passing through the obligatory passage point.

Forming a pact represents what Callon (1996) defines forming a “Holy Alliance”. Accordingly, each actant tries to lock other actants into their appropriate roles and thus, form a power base for itself. The "Holy Alliance" indicates the role played by trust and loyalty, as fundamental components for building a successful network.

By performing various negotiations, an actant defines the different roles allocated to others, using diverse kinds of strategies (e.g. seduction, transaction and silent consensus) (Porsander, 2005). Despite the principal negotiation concerning the obligatory passage point, this category also refers to all the involved negotiations between the participants.

Finding the spokesperson means deciding who is going to speak in the name of the originated network, displacing the other actants' representations. To this regard, it is necessary to find a way to transform entities into artifacts, to make them easily transportable, reproducible and diffusible (Latour, 1993; Porsander, 2005). As a consequence, artifacts must be translated into reports, digital documents, pictures or verbal descriptions. In this way, the spokesperson can influence the entire actor-network, by highlighting the desired models to be used. Thus, the spokesperson is someone/something that has the possibility to fit better into the ideals of expertise (Peltonen and Tikkanen, 2005; Porsander, 2005).

5.3 Data Collection: What Count as Data and Research Sampling

5.3.1. Gathering Documents

As anticipated in the introduction of this Chapter, I divided data collected from documents in two categories: 1) data collected from company documents; and 5) data collected from “the outside” world, such as the press review.

The organizational procedure document, published internally on the 19th of January 2016 and updated on the 16th of December 2016, was the guideline that allowed me to preliminarily identify some of the main actors (or groups of actors), for the subsequent analysis of the emerging TIM Academy actor-network. Beyond the explicit references made to the people physically and operationally responsible for the management of the process, and therefore, to their names, in the update of December 2016, there is a highlight of the functions directly involved in the Education process, concerning the operation of the TIM Academy.

The direct contact with some people inside the company also allowed me to have access and find documents used in the several meetings and presentations of the TIM Academy, from its beginnings up to those referring to the opening of the last physical locations around Italy. A total number of four Power Point and PDF documents were collected and analyzed.

Additionally, once I could log in into the online TIM Academy digital platform, I was able to download all the manuals related to its operation, from personal computers, to mobile phones and other devices, such as tablets.

Finally, I had access to the user manual for the so-called "Learning Social Network". This term refers to the online social platform provided by Oracle to TIM, through which

each user can collaborate instantly with multiple colleagues, share ideas, documents, textual content, photos and videos, to support training courses.

Regarding the collection of data from “outside”, a large number of articles from a press review was provided to me directly by a member of the Governance of the TIM Academy. I found other articles during the analysis. Out of a total of 11 articles provided by TIM, only one dates back to January 2016, six date back to April 5, 2016, the remaining 4 to January 6, 2016. Two items selected by the researcher date back to September 2017, 3 articles to 2018.

5.3.2. **Participant Observation with Humans and Non-Humans**

Direct observation and inspection were essential for enabling to engage in more effective discourse with organizational members and learn about all the actors’ concerns (Holmström and Robey, 2005). They were also useful for examining the functionalities of the online platform. The direct immersed participant observation is also supported by what can be derived from Boje (1991) and Czarniawska (2000).

Every organization has its own stories, whether they are internal or spread outside. The researcher, who wishes to analyse them in depth, will have the opportunity to do this by spending time within the organization, listening, reading and then reporting these stories, and their direct use in practice.

This type of research methodology is used when a researcher wants to observe a group to which she or he does not belong, without altering the behavior of the group because of her/his involvement (Jorgensen, 1989). In order to behave in a “natural” way, not only to have access to a greater amount of information, but also to be able to interpret and analyze them in the best possible way, the observer must immerse her/himself into the setting under observation.

Participant observation is more than gaining access into a social world, which is, in my case, the TIM Academy. It also means producing written accounts and description about the world under investigation (Emerson et al., 2001). Accordingly, I collected field notes while I was touching the tools, the artifacts, while I was visiting the settings, and while I was talking to different people. Field notes and direct observations were written immediately following each discussion, meetings and training sessions (Holmström and Robey, 2005). This is in line with the concepts adopted by Bruni in 2005, for shadowing a digital clinical records system as an interesting infrastructure. In the same way, I wanted

to immerse myself into the TIM Academy infrastructure, as an entire set of relationships that links both people with several material artifacts I encountered.

Thus, I started in 2016 with a long period for acculturation, which has been extremely functional not only for me, as a researcher, but also for the context as a whole in which I found myself acting, as well as with different informants. I met the TIM Academy before it saw the light. To be clear, when still many of its characteristics that have become definitive afterwards, still did not exist. Likewise, many of the ideas that circulated among the people close to me, who were taking care of the TIM Academy, have never been realized. However, I will also talk about this later in Chapter Six, since during the narrative interviews, several informants remembered how the project for the establishment of the TIM Academy was then changed in the course of its realization.

The abovementioned phase was a part of what Wallwendorf and Brucks (1993) called researcher introspection. Gould deepened the same technique in 1995, as I could say I have crossed a two-kind of researcher introspection. The first one drove me to reflect on the process of acculturation, related both to the company and to my personal economic background. The other one enabled me to enhance the efficacy of the iterative process of data analysis, with a view to stimulating the idea of derived ethics.

Accordingly, I collected a variety of sources of data, such as data generated from artifacts, through direct interactions with things and direct investigation *in situ*, through passive interactions. Despite a total amount of 12 pages of field notes, I also collected several pictures from different points of interests. In particular, I had the opportunity to take pictures of: 1) offices; 2) the online platform of TIM Academy; 3) the physical setting of TIM Academy located in Rome, its rooms, and all their related material features; 4) the TIM Factory located in Rome; 5) all possible online courses accessible on the TIM Academy digital platform.

Anonymization was ensured to all the participants.

5.3.3. Narrative Interviews

The collection of stories was carried out through the technique of narrative interviews. The strength of this type of interviews lies in their ability to stimulate the interviewee to tell stories of everyday-life, typically in the form of a story. This is the main difference between narrative interviews and structured or semi-structured interviews (Cortese, 2002; Czarniawska-Joerges, 1997; Gherardi and Poggio, 2003). The stimulus aroused by the

researcher pushes the interviewee to voluntarily tell his own story, placing particular emphasis on some events considered significant (Bruner, 1990; Czarniawska, 2004b). Normally, the product is a massive amount of data, based on real stories and not on categorizations, typical of the structure of traditional interviews.

However, it is also necessary to take account of the subjectivity imposed by the interviewee, in telling her/his own story. In the same way, the researcher has to consider the organizational context within which the story was born, developed and changed over time.

In line with the ANT approach, the analysis that I adopted does not look at the cause-effect concatenation, but at the frequent or usual regularities (Czarniawska, 2004b). Czarniawska (2004b) emphasizes that a researcher who wants to use this methodology will not go in search of general rules, but of connections between different elements of the narration, which will be attributed to a text co-produced by the author as well as by the writer. Not only that, “narrating is organizing, and although organizing is more than narrating, even that part of it that is non-narrative can become a topic of narration” (Czarniawska, 2004b:4). Hence, I first had to consider the possible influence exerted by the interlocutor, in the act of telling.

The techniques that can be used to analyze collected data can be multiple. In general, a realistic approach to narration as a representation provides only superficial results. For this reason, rather than wondering what, I wonder how (or the *mimesis*, as understood by Czarniawska, 2004b⁷), and why these events happened (questions typically representative of a structural analysis and contextual analysis, respectively). At the center of the analysis we find, therefore, the narratives as representative texts of social practices. The ways in which these practices are developed by looking at their construction and their coherence contribute to the definition of canonicity (Peltonen, 1999).

At the beginning of process of analysis, I tried to avoid producing fixed taxonomies or categorizations. Rather, some Authors outline that it is up to the researcher to maintain a holistic view of the whole story, respecting the story and the production of meanings by the interviewee (Gherardi and Poggio, 2003; Polkinghorne, 1995).

On the other hand, one of the cardinal principles of the approach adopted is *exotopia* (Sclavi, 2000). It consists in the interviewer's ability to maintain a status of otherness,

⁷ For the Author, the *mimesis* is just the “how”, “which offers clues as to the way events become connected with the help of an accessible repetition of plots” (Czarniawska, 2004b: 11).

exercising a sympathetic attitude, but without identification or empathy towards the interlocutor (Gherardi and Poggio, 2003).

The selection of the sample followed the two principles of maximum variability and contrast between variables. However, the choice was supported by a preliminary focus group lasting about an hour with two individuals in a privileged position for the discussion of the research. This phase led me to identify the categories of individuals to draw from, to conduct narrative interviews.

At the end, a total number of 15 individuals were identified, coming from different contexts and with different roles. As a researcher, I thought it would be enough to meet and talk to representatives of the four groups of: 1) teachers; 2) learners; 3) members of the IT function; and 4) members of the Education function. As I learned in the course of my fieldwork, I had a naïve vision of the CU I wanted to study. The roles in many cases were much less defined than I could imagine. To give just a non-exhaustive example, during the interviews some of those of the Education function, spoke to me of their experiences as learners and users of the TIM Academy. Accordingly, the initial idea to maintain an equal number of teachers and learners was ineffective and pushed me toward a sort of emerging categorization, supported by official internal documents of macro and micro design of the training process.

The resulting groupings were: 1) the so-called Governance of the TIM Academy; 2) Members from H.R. SERVICES srl. As the reader will discover further in this research, this division is not exhaustive with respect to the actors involved within the TIM Academy actor-network. Further explanations will be provided in Chapter Six.

The interviews were agreed through a preliminary check, which took place between the researcher and the persons responsible for supporting the study, belonging to the company in which it was conducted. Subsequently, a written email or telephone invitation was sent to each participant selected in the preliminary phase. As part of this contact, the general objectives of the research were briefly described. Thirteen profiles of the fifteen previously identified took part in the project.

The location where the narrative interviews took place varied. One interview was conducted at the informant's home. Two more in a meeting room, the same for both the informants, within the main office of TIM S.p.A, based in Rome. Two interviews took place in L'Aquila, where there is part of the offices belonging to H.R. SERVICES srl, the company of the Group which is responsible for the provision of training in TIM S.p.A.

Three interviews were held in the TIM Factory of Rome, a physical place where the company organizes both internal and external events, and which I will describe later. Two more interviews were held at informant's desk, located in the same building that houses the TIM Factory. Finally, I conducted three interviews at the TIM Academy headquarter of Rome, one in the interviewee's office room, and the other two in two different classrooms of the Corporate University.

All the narrative interviews took place between August 2018 and September 2018. Following the methodology, each interview started with an open stimulus, in which people were asked to tell their professional history and in particular their path linked to the TIM Academy. As previously indicated, subsequent questions have been asked during the interlocution, to facilitate any in-depth analysis on aspects of interest for research.

Each interview lasted from half an hour to more than one hour and a half, and all of them were fully recorded, after having obtained the consent of the respondents. The total duration of the interviews is 52 hours and 44 minutes, for a total number of 176 pages. The longest interview was 1 hour and a half long, while the shortest lasted about 37 minutes. Once collected, they were transcribed integrally and subjected to subsequent readings. They, they were all translated in English before proceeding with the analysis (Gherardi and Poggio, 2003). Personally, I tried to keep the time between each interview and its transcription as short as possible. This not only because the last part required the use of images and their related explanations, as required by the moodboard technique, but also for keeping alive the memory of the person while telling me what she or he had to say.

In proceeding, I have always kept in mind all the advice given in the table of Appendix A. Appendix B faithfully reproduces the document presented to each informant. It served as a trace for the narrative interview. In Addition, I applied projective techniques by proposing two tests to people with whom I have interacted, exclusively for epistemic purposes. In particular, with a physical moodboard I collected both images I took from TIM website, pictures I took from my participant observation, and objects I wanted to focus on, which represented the sources of inspiration that the informants were asked to connect. We talked about it for a long time together with everyone. Then each of the informants, having available white sheets and colored feathers, decided to arrange them to her/his liking. At the same time, they traced with me the story they had told me during the narrative interview. Some gave titles to the images, others only related them to each

other using the felt-tip pens, as I asked them. These images can be seen in Appendix E. I also asked each participant to make a list of *non desiderata* of their CU, which methodologically is defined the noteness.

Notably, there are no general predefined methods of conducting a narrative study, that represents an informal collection of topics instead (Creswell and Poth, 2018). This is best represented in Clandinin's statement: "I highlight narrative inquiry as a fluid inquiry, not as a set of procedures or linear steps to be followed" (Clandinin, 2013:33). However, I tried to provide careful information about the data collection processes and strategies for analyzing narratives.

During the collection of stories, particularistic introspection in narrative form (Gould, 2012; Wallendorf and Buck, 1993) was applied with the informants, to stimulate contextualized experiences. This allowed a triangulation of introspective data, in the phase of data analysis (Minowa et al., 2012). Again, anonymization was ensured to all the participants.

For more details about the characteristics of the interviewees, I invite the reader to consult the table in the next paragraph.

5.3.4. **Data Set**

Sharing the line of Laurier and Philo (2003), interviews alone are not enough to go deep into the analysis of what *is* work, *in the* work. For this reason, the Authors promote a transition from the concept of "participant observation" to that of "observant participation". This means avoiding to interpretively shaping the accounts.

Ambivalence into the analysis of the processes is important, preventing from any desire to seek and follow defined patterns or solutions. Each character will reveal to be ambivalent. In this way, different and multiple worlds can coexist and be highlighted, even if they live together into one single practice. Nay, different objects (or we might say, perspectives) of the same thing can be produced and reproduced in different assemblages (Law, 2004). ANT approach seeks to understand educational and learning practices as multiple ontologies and appreciating these differences. Its contribution lies upon finding the possible productive combinations.

Now I will show in Table 2 and Table 3 the complete data set for this research. In line with the study, both humans and non-humans are equally treated as source of data.

Table 2: Human Informants. Own Elaboration.

Informants	Socio-Demographical Data					Descriptive Data
Human	Sex	Age	Role in Company	Role in TIM Academy	Years of Service	
Gov_LL	F	49	Learning and Knowledge Management Specialist	Governance, Teacher/Trainer, Learner	23	Role overlap
Gov_EC	F	48	Knowledge Management Specialist	Governance, Knowledge Management Specialist. Learner	28	Role overlap
Gov_MP	M	48	Knowledge Management Specialist	Governance, Teacher/Trainer, Community Support, Learner	28	Role overlap
ITC_FZ	M	46	PM	Online Platform Administrator	24	
ITC_BP	F	50	Coordinator of the Multimedia Support Area	Coordinator of the Multimedia Support Area	21	
ITC_LDE	M	52	Coordinator of the System and Processes Area	Coordinator of the System and Processes Area	17	
T_DD	M	44	PM	Teacher/Trainer	19	
T_DS	F	51	PM	Teacher/Trainer	20	
T_SV	F	53	Teacher/Trainer	Teacher/Trainer	22	
T_OP	M	48	PM	PM, Teacher/Trainer	20	
T_GP	M	58	Head of the Telecommunications and Innovation Area	Teacher, Head of the Telecommunications and Innovation Area	31	Role overlap
AMM_RB	M	43	Data Analyst	Data Analyst	17	
AMM_MGG	F	55	Responsible for the Platform management and Delivery & Reporting Function	Responsible for the Platform management and Delivery & Reporting Function	31	

Table 3: Non-Human Informants-Documents. Source: Own Elaboration.

Informants	Internal Docs	External Docs	Descriptive Data
Non-humans			
Org_Prod_Edu	X		Organizational procedure document. 16/12/2016
Int_Pres_Launch_Ppt	X		Presentation of the TIM Academy. Launch event-ppt presentation. 05/04/2016
Us_Man_OOP	X		User Manual for Online Open Courses. 2016
Us_Man_POP	X		User manual for online personal training. 2016
TA_Support	X		Upgrade Internet Explorer. 2016
Us_Man_OSN	X		Descriptive support guide to download, installation and use the Mobile Application of Social Network, which allows people to interact with their colleagues and create community to support training. 14/04/2016
Us_Man_LSN	X		Descriptive support guide to use Online Social Platform, which allows people to interact with their colleagues and create community to support training. 14/04/2016
TA_Model_Ppt	X		Ppt presentation of the TIM Academy Model. 2015
TA_IB_Ppt	X		Ppt presentation for the regional office of Bologna. 5/12/2017
LaPresse_Ext		X	Presentation of the TIM Academy: aim, organization, tools and first hypothesis of physical locations. 05/04/2016
Youmark_Ext		X	Presentation of the TIM Academy: aim, organization, tools and first hypothesis of physical locations
Italp_Ext		X	Presentation of the TIM Academy: aim, organization, tools and first hypothesis of physical locations. 05/04/2016
D_J_Ext		X	Presentation of the TIM Academy: aim, organization, tools and first hypothesis of physical locations with a focus on digital and social tools. 05/04/2016
Adnk_Ext		X	Presentation of the TIM Academy: aim, organization, tools and first hypothesis of physical locations with a focus on physical settings, online social tools and the Faculty of trainers. Extract of an interview with Ida Sirolli, Internal Head of Education. 06/04/2016
Corriere_Ext		X	Presentation of the TIM Academy: aim, organization, tools and first hypothesis of physical locations with a focus on physical settings, online social tools and the Faculty of trainers. Interview with Ida Sirolli, Internal Head of Education. 05/04/2016
Mediak_Ext		X	Presentation of the TIM and TIM Academy: aim, organization, tools and first hypothesis of physical locations. Focus on physical settings, the Faculty of trainers and external relations. 05/04/2016
MilFin_Ext		X	Presentation of the TIM Academy: aim, organization, and first hypothesis of physical locations. 05/04/2016
Punc_Ext		X	Presentation of the TIM Academy: aim, organization, online platform, external relations and first hypothesis of physical locations. 05/04/2016
Datast_Ext		X	Presentation of the TIM Academy: aim, online platform, external relations and first hypothesis of physical locations. 05/04/2016
ItFin_Ext		X	Presentation of the TIM and TIM Academy: aim, organization, tools and first hypothesis of physical locations. Focus on physical settings and external partnerships. 05/04/2016
Romao_Ext		X	Presentation of the TIM Academy: aim, organization, tools, contents, with a focus on physical settings, online social tools and the Faculty of trainers. Extract of an interview with Ida Sirolli, Internal Head of Education. 01/2016
IM_Ext_R		X	TIM Academy and digital competences. 5/02/2018
K4B_Ext_R		X	Massive Open Online Course on telecommunication. 28/09/2017
PMI_Ext_R		X	Presentation of the TIM Academy: aim, organization, tools, contents, with a focus on online social tools and the Faculty of trainers and external partnerships. 20/09/2017
Sole24ore_Ext_R		X	Lunch and aims of TIM Academy. 25/07/2018
Master_Ext_R		X	Relations with universities. 2018
TIM Academy Online Platform	X		Online platform tools and functioning
TIM_Website	X	X	All above

5.4 Strategy for Data Analysis

Data analysis is an iterative process, as data collection, analysis and writing are not separate steps, but they are interrelated (Creswell and Poth, 2018). Accordingly, I will recall Creswell and Poth's spiral image to describe the process of data analysis in qualitative research, as shown in Figure 7. Once the researcher starts with text or audio-visual materials, she/he starts a moving into analytic circles. At every circle of the spiral, the researcher uses analytic strategies, to produce some specific analytic outcomes.

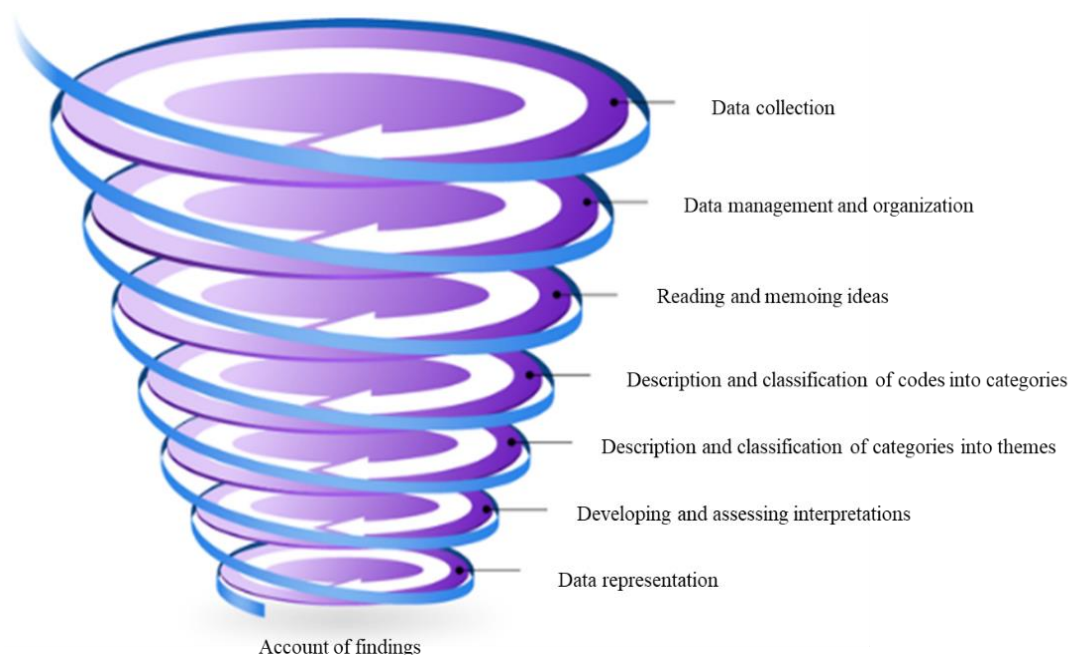


Figure 7: Data Analysis Spiral. Source: Own elaboration.

In this research, data were gathered in different ways, as outlined in the previous paragraphs. They were collected at different times, so that it was possible to trace the processes of translation and inscription. Maximum variation sampling was one of the sampling criteria I adopted. It consists in pre-determining criteria to differentiate certain groups of informants, then selecting others who emerge to be different. This strategy increases the likelihood that the outcomes will reflect dissimilar perspectives.

The second sampling strategy I adopted was the snowball, or chain. The purpose of this strategy is to identify cases of interests from people or settings and situations, which in turn, know other people/settings/situations that are information-rich (Miles and Huberman, 1994).

Finally, the stratified purposeful strategy allowed me to highlight subgroups, facilitating comparisons (Patton, 2002).

5.4.1. **The First Loop**

The first loop in the spiral means the researcher organizes collected data into different digital files and creates a file naming system in order to guarantee an easy location of materials into databases.

Despite organizing data for file storing purpose, I decided to select and save data according to different emerging groupings of actors. This allowed me to compare across multiple participants to the study. Moreover, the sampling was not limited to people, as outlined before. This is because sampling can change in qualitative studies, so that it can be at participant level, site level, process level or action level (Marshall and Rossman, 2015). Each of them needs to be identified. The method I selected to conduct the analysis was a hybrid method, meaning both digital and by hand.

5.4.2. **The Second Loop**

During the second loop, the researcher reads the transcripts several times. This allows building up a sense of the whole amount of data, without being involved in premature, meticulous, detailed codes.

I combined this process with notes and memos in the margin of transcripts, fieldwork and pictures. Accordingly, “written memos leading to code development, reflection over time, ad/or summaries across files of questions or project” are the analytic outcomes of strategies of reflective thinking (Creswell and Poth, 2018: 187). They are not mere summaries of the contents, but a first attempt to reach a higher level of analytic meanings (Miles et al., 2014). When choosing a level of memos analysis, I worked with segment memos and document memos (Creswell and Poth, 2018). The first captures the ideas derived from particular phrases and it is helpful to identify initial codes. The second catches concepts both from an individual file, and across multiple files. It allows for moving from codes to categories, and themes. I used content captions to help me in organising emergent ideas.

Accordingly, I first worked on reconstructing the TIM Academy as it works right now, to overcome limitations due to communication heuristics someone can find when limiting the analysis to reading internal and external official communication documents (or even the company website).

5.4.3. **The Third Loop**

The third loop concerns the description and classification of codes into categories of analysis. Before this moment started, I used the detailed description technique (Creswell and Poth, 2018). It means I described what I saw during the whole research *in situ*, as within the setting of the person and places. Each interview or observation helped me in screening what to focus on. Then I started with the process of coding, by trying making sense of the text collected from interviews, observations and documents. This is a central starting point for qualitative research. “Coding involves aggregating the text or visual data into small categories of information, seeking evidence for the code from different databases in the study, and then assigning a label to the code” (Creswell and Poth, 2018:190). Accordingly, I applied the lean coding approach to analysis. I started with 6 codes (initial codes) representing the six groups of actors of my study, then I reviewed my database several times until I ended up with a list of 21 expanded codes that match text segments. From these 21 expanded codes, I reviewed again the database and I worked on reducing and combining the into 7 categories. Then, I finalized the list of categories within a codebook, containing 3 themes. The codebook “articulates the distinctive boundaries for each code and plays an important role in assessing inter-rater reliability” (Creswell and Poth, 2018:190). This means it contains the code name, its definition, and an example of a segment of text.

The reader can find an example of my codebook in Appendix F.

5.4.4. **The Fourth Loop**

This loop concerns the description and classification of categories into themes. It represents the outcome of the abovementioned coding and categorization procedures. Accordingly, Appendix F provides an example for the theme “Anti-programs”. As themes represent broad units of information, I applied strategies similar to the ones I introduced before in this paragraph.

Hence, I embraced the following strategies for developing themes in my study (Creswell and Poth, 2018): a) I wrote memos about codes and categories when working with the data; b) I highlighted noteworthy quotes and related descriptions, keeping an eye on metaphors; c) I outlined recurrences and outliers in the data from summary statements to help me in finding patterns.

5.4.5. **The Fifth Loop**

The fifth loop involves interpretation, which is something that starts from the very beginning of development of codes, categories and themes, but with a further level of abstraction. In line with the formulation of this study, I combined results from the previous loop with the four moments of the Sociology of Translation (Callon, 1986). Chapter Six will be devoted to deepening this loop. Chapter Seven will focus on interpretations for implications.

5.4.6. **The Sixth Loop**

The final loop concerns the representation and visualization of the data. It means the researcher represents the data collected in texts, figures, pictures. For this step, I double-compared and checked the descriptive summaries from previous steps, with my raw data. Then, I linked them with my six research questions in order to highlight possible need for revisions. After, I asked feedback from one of my colleagues. She compared the raw data, the initial summaries and my hypothesis of representation, in order to provide an opinion without conditioning.

The reader will find the data representation further in this thesis.

Chapter 6 - Opening the Black Box

Introduction

This Chapter reveals the dynamics of the sociomaterial interplay of the TIM Academy Corporate University. Following the underlying logics of the four moments of translation (Callon, 1986), I opened the black box of the TIM Academy.

Simultaneously, the Chapter addresses the six-research questions of the study, namely:

RQ1: *How does ANT illustrate the network aspects of the CU?*

RQ2: *How do humans and non-humans act upon one another in ways that mutually transform their characteristics and activities in the CU?*

RQ3: *How do individuals and artifacts act and relate exerting their force to regulate, create or exclude forms of participations within the actor-network?*

RQ4: *How do individual and technical differences and interests influence the use of the CU?*

RQ5: *How do particular spatial arrangements encourage or constrain education and learning of the CU?*

RQ6: *What are the characteristics of the effective operating of a contemporary CU?*

The analysis I deployed conceptualized the TIM Academy as an actor-network. Hence, the Actor-Network Theory (ANT) lens helped me in identifying actors, interests, strategies, programs and anti-programs, and connections between events that assembled the abovementioned actor-network.

The first section introduces some first accounts of the TIM Academy actor-network.

After, the four moments from Callon's (1986) Sociology of Translation are presented. Meanwhile, the actors are unfolded as the result of the combination of all the strategies of analysis, presented in Chapter five.

The reader will find an evidence of the distinction that Callon traditionally identified between the phenomenon of dissidence and that of inscription. As a consequence, I will refer to two different moments of inscription that can be associated to an "*as-is*" TIM Academy actor-network and a "*to-be*" TIM Academy actor-network. The reason why I called the second TIM Academy actor-network a "*to-be*" actor-network is twofold. First, it is still being implemented, so it still generates great enthusiasm from everyone. Second,

given the changing nature inherent to each actor-network, the possibility that it will become a punctualized black box destined to persist for a long time, is not yet foreseeable.

The Chapter ends with the analysis of the TIM Academy as a punctualized modern Corporate University.

6.1 The TIM Academy Corporate University: First Accounts

“L’obiettivo è un po’ questo, quello che potrebbe essere uno scenario: un nucleo centrale che, tramite le relazioni, collega sedi fisiche, sedi virtuali e persone...”

“The goal is this, what could be a scenario: a central core that, through relationships, connects physical locations, virtual settings and people ...”.

ITC_BP, Multimedia Support Coordinator

September 2018

TIM Academy is the Corporate University of TIM S.p.A., one of the most important Italian telecommunication companies. Figure 8, Figure 9 and Figure 10 represent in order: 1) the main page of the TIM Academy Online Platform available for every person belonging to the company. One can only have access if she/he is a company member, with her/his own ID and password; 2) The TIM Academy logo, called the *knowledge tree* (l’albero della conoscenza, *original language*). It contains the three components of people, company and access/sharing; 3) A picture taken from the TIM Academy building located in Rome, Italy.

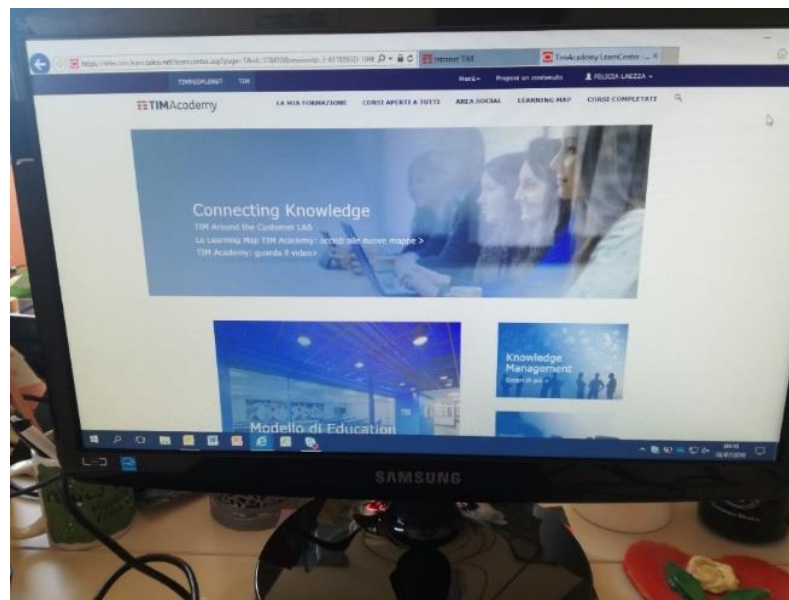


Figure 8: Main page of the TIM Academy Online Platform.



Figure 9: TIM Academy logo.



Figure 10: Collage of the TIM Academy building of Rome: inside and outside.

TIM Academy is conceived as a digital and physical learning place aimed at the developing of technological and business innovations, basing on people's knowledge, know-how and skills. It offers training courses in different innovative formats: Web Based Training, webinars, virtual learning, interaction and co-production of contents, training materials directly produced by owners of the contents and experiential courses, training on the job. At the same time, it allows for participating in workshops, seminars and internal learning tours with qualified teachers and testimonials.

“...per noi la TIM ACADEMY è un insieme di virtuale e fisico... perché noi siamo certi che il virtuale ci consente di fare alcune cose... ma siamo anche certi del fatto che sia necessario un incontro fisico... il giusto mix non può essere prestabilito, ma all’occasione devo cercare di modularlo”.

“... for us the TIM ACADEMY is a virtual and physical setting ... because we are sure that the virtual dimension allows us to do some things ... but we are also certain that a physical meeting is necessary ... the right mix cannot be fixed, but I have to try to modulate it, depending on the occasion”.

Gov_MP, Knowledge Management Specialist

September 2018

There are different ways of activating training processes through TIM Academy. Firstly, with your laptop on the online platform, which contains different modes of use, later described. In addition, you can take advantage of professional training through your computer, remotely connected to one of the TIM Academy's physical locations where a training course is provided. Via smartphone, where mandatory courses are 100% available.⁸ Finally, employees can go directly to one of the TIM Academy's physical sites, located throughout the Country.

Initially, the opening of 17 TIM Academy offices was hypothesized over the years. Since its launch to date, only 9 of these offices are operational and located in: Rome, Milan, Turin, Padova, Bologna, Naples, Palermo, Bari and Geneva.

The training offer is guaranteed by a Faculty of teachers composed by training professionals and employees who make their know-how and expertise available through classroom and virtual lessons, training on the job and learning-objects. More precisely, professional training is provided by a different company, but in any case, within the TIM Group, called H.R. Services srl. Alongside these professional trainers, TIM is working on developing an Internal Faculty, made of professionals from different functions within the company. Through the use of an online community:

“...stiamo facendo a questi colleghi il corso di formatori interno, proprio per dargli gli strumenti per farlo meglio [l’erogazione dei contenuti] ... questi docenti interni li stiamo formando essendo dentro anche persone di HR Services, nella community ci sono anche loro. Perché proprio l’idea è: abbiamo questa risorsa.”

⁸ Responsiveness is 100% guaranteed through the use of Chrome. Browsing in iOS is assured for Apple users.

“...we are giving these colleagues an internal trainers course, just to give them the tools to do it better [the delivery of contents] ... we are training these internal teachers working also with HR Services people, in the community there are also them. Because the idea is: we have this resource.”

Gov_EC, Knowledge Management Specialist

September 2018

Trainers in this Faculty are required to make available their know-how and their skills, to make others grow through highly sophisticated classroom lessons, videos and virtual classrooms. Thus, what emerges is the new figure of the Social/Digital Educator within the company. However, not everyone can have this role. In fact,

“La Faculty di TIM Academy è composta da persone di HRS e da persone della line che hanno mostrato interesse ad essere a loro volta formatori per i propri colleghi.

Siccome loro verranno qui e utilizzeranno le aule per fare lezione ai loro colleghi,

hanno fatto un processo di certificazione.”

“The Faculty of TIM Academy involves people from HRS and people from in the line who have shown interest in being trainers for their colleagues. Since they will come here and use the classrooms to train their colleagues, they have done a certification process.”

ITC_FZ, Online Platform Administrator

September 2018

To follow the continuous challenges, evolution of technologies, business models and processes, the Company wanted to use an Open Model of Partnership and Research involving universities, national and international research and training centers, peers, suppliers and vendors, start-ups and digital champions. In this way TIM Academy wanted to promote a contamination with different realities, offering the opportunity to confront and creating networking on relevant topics, through the organization of hackathons, workshops, seminars and thinktanks.

However,

“...pensiamo anche un po’ a quella che era la possibilità di coinvolgere persone dall’esterno, della possibilità di dare gli accessi agli esterni, che finora poi, per vari ordini di problemi, non si è potuta realizzare”.

“...let’s think a bit about what was the possibility of involving people from outside, the possibility of giving access to outsiders, which until now, due to various orders of problems, could not be achieved”.

Gov_LL, Knowledge Management Specialist

August 2018

“...la TIM Academy ha questa aspirazione, di diventare non la business unit che eroga formazione, ma... di creare quell’ecosistema di...deve: colloquiare con le università, colloquiare con i centri di ricerca, colloquiare insomma con il mondo anche delle aziende top, o per lo meno cercare di aprirsi e creare una relazione forte tale da capire, di essere un polo, un polo un polo integrato interno ed esterno...noi dobbiamo fare sistema rispetto ai nostri centri di ricerca interni, ai nostri formatori interni, e dobbiamo fare sistema anche verso l’esterno (le università, i centri di ricerca...noi adesso abbiamo dei contatti)”.

“... the TIM Academy has this aspiration, to become not a business unit that provides training, but ... to create that ecosystem of ... it must: talk with the universities, talk with the research centers, talk with the world even of companies top, or at least try to open up and create a relationship that is strong enough to understand, to be a center... an integrated internal and external center ... we must make a system with respect to our internal research centers, our internal trainers, and we must also become a system with the outside world (universities, research centers ... we now have contacts)”.

Gov_EC, Knowledge Management Specialist

September 2018

“...dovremmo cercare di cavalcare di più l’apertura al mondo, anche dalla nostra piattaforma...”

“...We should try to exploit more the openness to the world, even from our platform ...”

Gov_MP, Knowledge Management Specialist

September 2018

To date, the opening to the “outside world” is:

“...il terzo attore: c’è, ma non è ancora ufficialmente sviluppato”.

“...the third actor: there is, but it is not yet officially developed”.

Gov_EC, Knowledge Management Specialist

September 2018

Specifically, TIM Academy allows external trainers to enter in its Physical Settings, through the temporary authorization of a badge, provided by the PM of the external Faculty. However, some critical issues emerge when we move to the Online Platform, where some security policies are certainly more stringent.

The CU's offer is developed through five paths. First, a self-directed learning, open to everyone through the online platform, under the voice “*Corsi aperti a tutti*” (Open Courses), as shown in Figure 11. In this case, 59 courses out of a total of about 540 titles are usable by smartphones. However, the brief that can be read by moving the cursor on them, tells us that learners will have to agree with their supervisors, in order to define the time for accomplishing the courses, if it occurs during working hours.

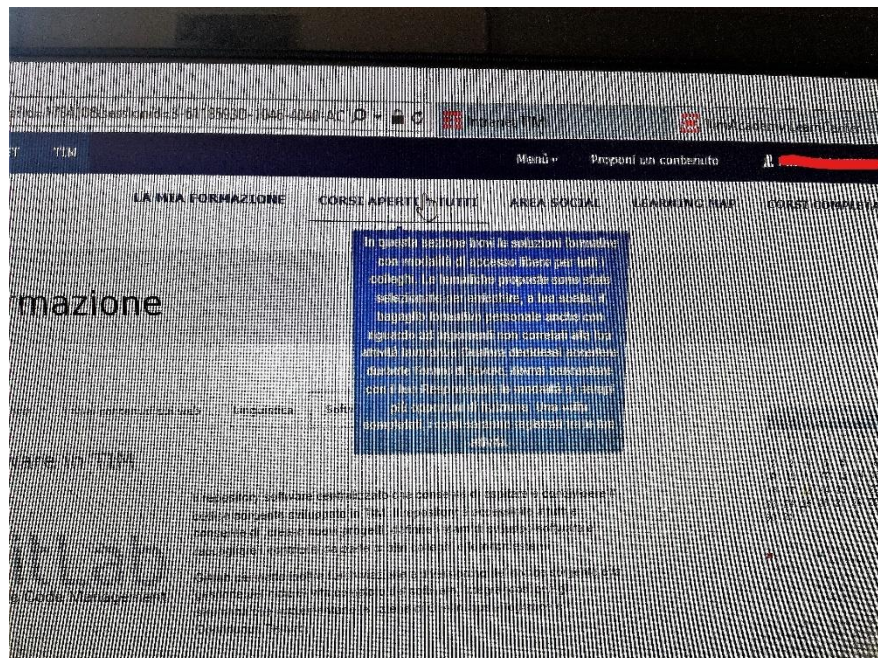


Figure 11: Open courses on the Online Platform of TIM Academy.

Second, the performance management, in which everyone will have access to an improvement plan defined by their manager. This happens in the process of evaluating individual people. There is a set of knowledge, skills and abilities that each person must be able to interpret and gain, in order to achieve her/his own objectives. In addition, an evaluation process periodically takes place during an annual meeting with one's leader. On that occasion, any learning gaps to be filled emerge, which end up in the performance system, which in turn translates into the training system. In that case, a system-driven evaluation of personal competences and skills is also possible. What emerge are the training needs of the individual, which are transferred to the “My Training” section, to

which each manager has access, for each of her/his collaborator. For this type of training, there is a control. This means that at least once a year the company checks whether that person, with the specific training needs to be fulfilled, has completed her/his course, identified with her/his own boss.

These courses are available both on the online platform⁹ of the TIM Academy, and in the physical classrooms scattered throughout the Italian territory. In both cases, training can be done through personal computers, thanks to digital interactive systems that connect people's company-computers with the classes, conceived as interactive physical spaces, of the TIM Academy. The main reason why this happens is that not everyone has the opportunity to move to one of the cities where the TIM Academy has its own physical space. Hence, in some cases learners can remotely connect to the training course using their own company-computer, except for compulsory courses, for which necessary physical attendance is ensured through employee transfers.

Third, employees can participate in training courses through the individual development modality. This modality contemplates two possible paths: a) the individual development plan might follow a career assessment, or 2) it might be chosen for career development needs. The way this process is delivered is similar to the one above.

Fourth, the corporate training plan, which measures the collective training needs of the business lines and staff functions for updating, creating and developing the necessary skills to implement the strategic guidelines of the Company. This is also the case of institutional courses, those mandatory for all, usually because of the regulatory obligations. In this case, each person directly receives a personal email. This email is sent by the Governance of the TIM Academy, who announces that the person has the obligation to attend and complete the indicated course. In the case of an online training course, a link to the online platform is also provided. Before the expiry date of the course, many emails are sent to remind those who have not yet done so, to complete the compulsory course. Generally, most of these courses are available online on the platform.

Last, the professional reconversion plan, that offers specific paths for updating professional skills, to guarantee the employability of employees on new professional roles of interest to the company. Typically, these courses are very role-specific. Hence, in many cases it is not possible to make them usable on the online platform of the TIM Academy.

⁹ As previously mentioned, mandatory courses can also be 100% accessed via smartphone. In the case of "Corsi aperti a tutti" (the open ones), the percentage of accessibility from smartphones is around 10%.

Figure 12 provides an example of professional role paths (red circle), available on the online platform of the TIM Academy. Offline training courses can be attended during traditional classes.



Figure 12: Professional learning paths on the Online Platform of TIM Academy.

All of the abovementioned paths can be accessed under the voice “La Mia Formazione” (“My Training”), if the training program is on the corporate online Platform, as shown in Figure 13.

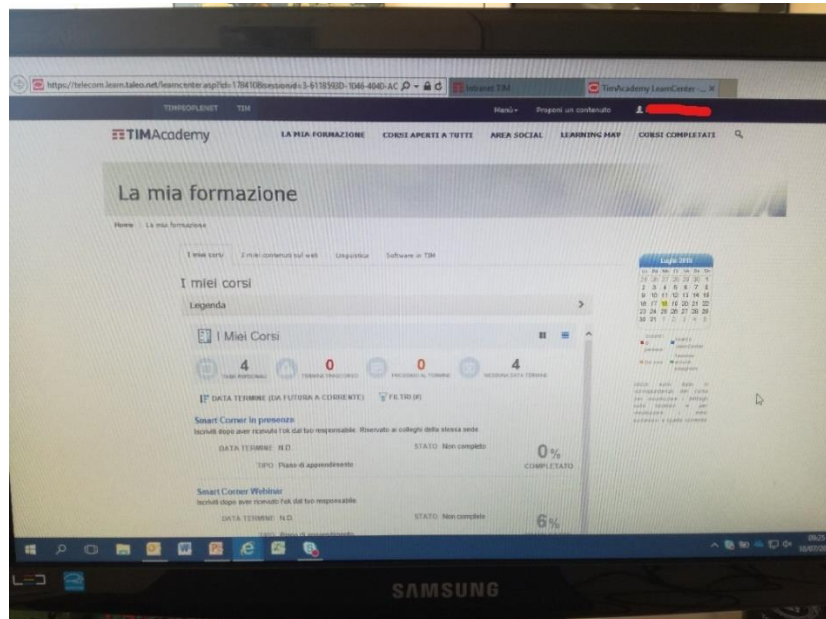


Figure 13: Personal learning programs on the Online Platform of TIM Academy, under “La Mia Formazione”.

“Offline” training programs take place in presence, in the physical settings of the TIM Academy. They are traceable differently, so that the learners do not have a complete full vision of them over time, while their supervisors do. Data discussion of the translation process will follow Callon’s (1986) four moments of problematization, *interessement*, enrolment, and mobilization.

6.2 Problematization of the TIM Academy

The success of this first moment of translation relies on whether the Heterogeneous Engineer (HE) is able to define the problem in a way the other actors will accept this definition and its related results.

To secure a common acceptance of the definition of the problem, the HE must be persuasive. In other words, the HE must convince all the actors that they all have some common interests, and that they will have to follow her/his solution to pursue these interests. This means they will all accept the same obligatory passage point (OPP).

Thus, other actors will enjoy the actor-network the HE wants to construct, finding this network advantageous compared to others (Callon, 1986).

This means the HE will fight against anti-programs that remove the actors away from the network she/he wants to create. When the HE succeeds, the OPP is also perceived as being indispensable by the other actors (Luck, 2008).

At the beginning of the translation process it was not easy to identify the OPP. A first document analysis of the internal documental data has directed me towards the identification of some actors and areas of major relevance, with reference to the TIM Education and Learning process. However, these documents were limited to describing, albeit in a detailed manner, the processes, while I was interested in the question, the problem, that the TIM Academy tried to solve with its birth. With a focus on the research problem¹⁰, I found the answer through the triangulation of the methodologies and techniques I explained in Chapter Five. A notable contribution came from narrative interviews, when asking the informants to tell me about the story of the TIM Academy. In a surprising way, each of them highlighted the crucial role of a subject in the creation of the TIM Academy actor-network: the head of the Education and Learning function.

¹⁰ *What does Tim Academy reveal about the dynamics of sociomaterial interplay for organizational education and learning?*

The problem the TIM Academy wanted to solve was:

“...volevamo creare un polo della conoscenza. In principio non sapevamo neppure il nome che le avremmo dato, anche quello era un progetto che avevamo avviato, ma non importava. Non doveva essere un’entità legale, quindi non la ritrovi né come funzione aziendale, né come società del Gruppo, ma come un’entità che vuole stare sopra. TIM Academy si è posta al di sopra dei vincoli...organizzativi dell’azienda, ed è più un concept che raggruppa diverse anime. Quindi per la conoscenza, indipendentemente dalla funzione, dal ruolo e da quant’altro, si contribuisce a questa cosa”

“...we wanted to create a knowledge center. In the beginning we did not even know the name we would give it, even that was a project we started, but it did not matter. It did not have to be a legal entity, a company function, nor a Group company, but an entity that wants to stay on top. TIM Academy placed itself above the constraints ... of the company, and it is more a concept that brings together different souls. So, you contribute for knowledge, regardless of function, role and anything else, to this thing”.

DS_T, PM and Trainer

September 2018

The idea and the implementation of all of this turned out to be possible thanks to the Head of the Education and Learning function’s work, who, at that moment, assumed the role of HE of the actor-network. The Organizational Procedure document (Org_Prod_Edu, 16/12/2016) became the formalization of the whole goal of the TIM Academy. Hence, it was used as the OPP in the form of immutable mobile, as a material inscription that was able to be mobile in time and space for defining the actor-network of the TIM Academy and attract its actors.

6.2.1. **The Actors...**

Here the reader will find the actors the HE wanted to include within the network by acknowledging her solution, to fulfill their interests.

All in all, a vast number of actants have been identified within the network. In line with what was stated in the previous paragraphs, however, the number of these actants has been reduced, to proceed with the analysis of key players, also defined groups of actors.

It follows a list of groups of actors, whose sources were not only narrative interviews with informants, but also the Organizational Procedure document (Org_Prod_Edu, 16/12/2016).

- The Governance;
- H.R. Services (HRS);
- The Online Platform;
- The Physical Settings;
- The Learners;
- The Line Managers.

The combination of these six groups of actors gave birth to a first idea of the TIM Academy actor-network. This means the mobilization of the TIM Academy actor-network worked, because these actors enrolled into the actor-network.

6.2.2. ...And Their Interests

The Governance needed to pen to paper its role into the Education and Learning Function, to affirm its role of coordinator in the process of modulating company training.

HRS wanted to affirm its role as Faculty (external faculty) of the TIM Academy, and its operational role in the corporate training process, going to define the tasks and the processes related to what belongs to it, in a contractual service relationship for TIM.

The Online Platform needed to modify the corporate training process. In the past, it was anchored to a traditional logic of learning, for which each employee, at the time of employment at the company, had to spend a period of about six months in L'Aquila, the city where the training campus of TIM was located. In that place, people attended frontal classes. At the end of the training period, the employees returned to their home office, with a wealth of knowledge they believed would use throughout their working lives, basing on their roles. Hence, the main goal of the Online Platform was to provide training not only from the user side, but also with reference to the methods of content delivery, the tools available to create the training courses and their delivery, integrating with the physical dimension.

The Physical Settings wanted to guide the training solution through the breaking down of space-time barriers in a highly functional perspective, and therefore integrating with the digital dimension of training.

The Learners wanted to benefit from their education and learning programs, without using too much of their limited time, possibly during working hours.

The Line Managers wanted to have a range of alternative solutions to offer to their employees, without having to spend too much time on their own.

With reference to these last two groups of actors, it must be said that a direct meeting with the researcher never happened. Specifically, some of the informants were listened to and commented on their own experiences as Learners. The reader must be aware of the possibility that what was reported, is the result of experiences mediated by the role covered by the informants. In the case of Line Managers, objectives, interests and strategies have been deduced by triangulating the totality of the narrative interviews with the participant observations.

The distinction between the groups of actors is not sharply defined. In the operational reality of the TIM Academy actor-network, some of the individual actors who are part of a group can simultaneously be part of another group. In the same way, the groups of actors are not exclusively part of the TIM Academy actor-network, but they can be part of other actor-networks inside and outside the company.

The OPP as a process identified by the HE to satisfy the actors' goals, needed to convince them to accept it, to align their behaviors, in order to have a stable, predictable network (Luck, 2008).

Figure 14 illustrates the moment of problematization of the TIM Academy actor-network, by highlighting the different interests of the six groups of actors.

In the left side of the image the reader can see the six actors. These actors wanted to reach their objectives, by pursuing their interests, represented by the squares in the right part of the figure. The HE also wanted to reach her interests and tried to convince the other actors to pass through the OPP, the square in the middle, to pursue successfully their goals. However, actors have different possibilities to accomplish them. First, they can behave in accordance to the role the HE attributes to them (by following the blue lines). Differently, they can have non-programmatic behaviors (by following the dashed blue lines). This second option would allow them to achieve their goals without having to cross the OPP.

Accordingly, actors must align their behaviors and perform as an *unicum* to follow the HE's program of enrollment.

This does not exclude the possibility that, in a second moment, one or more actors may have deviant behaviors, adopting non-aligned or non-compliant behaviors, or one of the possible combinations among them, as anticipated earlier in this dissertation. After all, the nature of the actor-network is changeable and temporary, and much of its success depends on the durability factor of the last moment of translation.

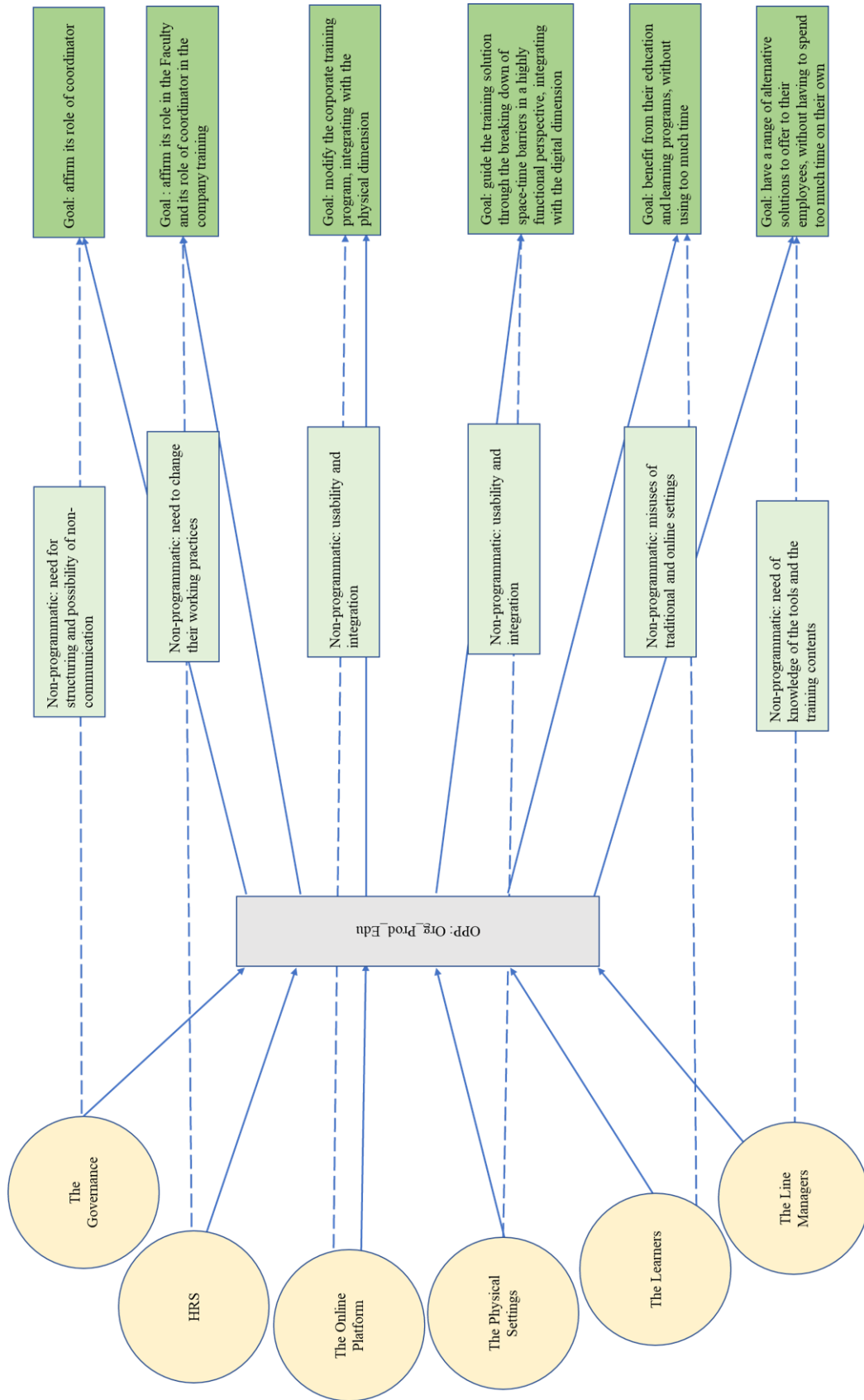


Figure 14: The first moment of problematization of the TIM Academy. Source: Own elaboration.

In the moment of problematization, the HE was able to:

- Persuade its reference function of Education and Training to assume the role of **Governance** of the nascent TIM Academy, without this role being recognized in the company organization chart;
- Convince **HRS** to take part in a process of transforming company training, which it already dealt with massively, through participation in various development and implementation projects of the numerous components that would characterize the new TIM Academy;
- Activate a call for tender through which Oracle and its **Online Platform** (Taleo) assumed the role of the online platform for the provision and use of TIM Academy's online education and learning programs;
- Activate the implementation plan for the **Physical Settings** that qualify for the corporate education and learning process, owned by TIM and recognized under the new TIM Academy logo;
- Start an internal communication program on a national scale, to engage the entire population of **Learners** within the nascent TIM Academy reality;
- Start an internal communication program on a national scale, to engage the entire population of the **Line Managers** within the nascent TIM Academy, so that they could understand their new role in the training of their subordinates.

The availability of internal financing was fundamental for this process to initiate.

I want to anticipate to the reader right away that adopting ANT means being aware of the fact that, within an organization, it would be possible to identify an infinite number of actors. This would lead to consider different translations, depending on the actors that the researcher voluntarily decides to follow for her/his analysis. After careful analysis, I personally came to this initial type of translation solution. However, in the failure to persist in the inscription of this first idea of actor-network, I then identified a second new OPP, for which only future investigations will tell us how much it will make the HE able to embed the actors of reference, within the TIM Academy actor-network.

6.3 *Interessement of the TIM Academy*

The second moment of the Sociology of Translation is called *interessement* (Callon, 1986). In this phase, intermediaries are used to entice the actors within the actor-network. In other words, in order to enroll the groups of actors into the TIM Academy actor-network, “various *interested* devices were deployed to interest the group of actors to align themselves with their goals” (Luck, 2008:172, *original emphasis*). In turn, this will avoid all potential other associations that could push actors to be attracted to other actor-networks. The result is a system of alliances (Callon, 1986).

This is the moment the HE has to define the roles of the other involved actors (Holmstrom, 2005). Moreover, relationships among the actors are confirmed with “a series of trials of strengths whose outcome will determine the solidarity” of the TIM Academy actor-network (Callon, 1986:207).

There are four typologies of intermediaries that can intervene in defining an actor-network: 1) literary inscriptions; 2) technical artifacts; 3) humans; and 4) money (Callon, 1991). According to the Sociology of Translation, these intermediaries can be used to interest the actor for enrolling into the TIM Academy actor-network.

Table 4 synthetizes the main intermediaries, divided per categories and group of actors.

Table 4: The Intermediaries of the Moment of Interessement.

Typology	Intermediary	Actors
Literary Inscriptions	- Org_Prod_Edu - Int_Pres_Launch_Ppt	Governance, HRS, Online Platform, Physical Settings, Learners, Line Managers
	- Us_Man_LSN	Governance, HRS, Online Platform
	- Us_Man_OOP - Us_Man_POP	Governance, HRS, Online Platform, Learners, Line Managers
	- Company Intranet	Learners, Line Managers
	- Paper records	Learners, Physical Settings

Technical Artifacts	- Company laptops	Online Platform, Physical Settings, Learners
	- TIM Academy classrooms	HRS, Physical Setting, Learners
	- Email	Learners, Line Managers
	- Smart Corner	Governance, HRS, Learners
Humans	- Technical & operational staff	HRS, Learners
	- Education & Learning function	Line Managers
	- Line staff	Learners, Online Platform
	- ITC_FZ	HRS, Online Platform
Money	- Travelling costs savings	Online Platform, Physical Settings
	- Contractual forms	HRS
	- Cost savings for renting outdoor spaces dedicated to company training	Online Platform, Physical Settings

6.3.1. The Literary Inscriptions Intermediaries

First, the HE used literary inscriptions to attract the group of actors within the actor-network. Accordingly, the document of educational organizational procedure (Org_Prod_Edu) served as OPP to define education and learning procedures and the main actors involved. In this way, a role was assigned to each of them, including non-human actors.

User manuals attracted all the groups of actors in different ways, so that each of them could understand and make use of the solution that best suited their needs.

The company Intranet is still the main source of engagement for Learners and Line Managers, with pros and cons, and the HE played a fundamental role in this sense. In fact:

“...l’unico veicolo [di comunicazione] è la intranet...”

“...the only [communication] vehicle is the intranet”

Gov_EC, Knowledge Management Specialist

September 2018

“sono molto contenta, la responsabile [Nome e Cognome], è riuscita a far mettere la TIM Academy nella prima pagina della Intranet...è tantissimo, perché io credo che il passaggio fondamentale fosse questo, a livello proprio visivo”

“I am very happy, the Manager [Name and Surname] has managed to get the TIM Academy on the first page of the Intranet...it’s a lot, because I believe that this was the fundamental step, on a visual level”.

T_SV, Trainer

September 2018

A last literary inscription the HE used as a device for *interessement* for the Learners and the Physical Settings were the paper records. Several informants defined these “tools” as not only traditional, but in some cases archaic. Yet, this is the only way the company is able to trace the offline training programs, at the moment.

“come segreteria amministrativa...iscriviamo i partecipanti al corso manualmente, in dei registri cartacei. Su questi registri si fa il consuntivo dei presenti/assenti e delle ore di formazione, e questo interessa alle persone, il tracciamento”

“as an administrative secretariat...we enroll the participants in the course manually, into some paper records. On these registers the balance of present/absent people is made, and this is of interest to the people, the tracking”.

AMM_RB, Data Analyst

September 2018

It is necessary to underline, however, that the paper tracing is also part of bilateral agreements in case some training courses are provided by third parties.

6.3.2. The Technical Artifacts Intermediaries

The technical artifacts the HE used to entice the Online Platform, the Physical Settings and Learners were the company laptops. Accordingly, employees can have access to their

online education and learning programs via personal laptops. These should not be confused with their home computers. Each of the Learners has her/his own company pc to access the Online Platform and the courses contained in it. This is what happens in the case of online courses, outside the Physical Setting circuit of the TIM Academy. Differently, when Learners get into a TIM Academy physical classroom they will find:

“...armadi blindati, che ospitano dei pc. Sono armadi particolari, dove dei pc sono collegati alla rete elettrica, ok? ... l’attivazione di questa rete elettrica avviene in degli orari prestabiliti, dalle 8 di sera alle 6 del mattino. Quindi, durante la nottata si alimentano. Nel momento in cui il docente fornisce al discende il pc, il pc è carico. In più, qualora il pc fosse utilizzato e si scaricasse, all’interno degli armadi blindati ci sono delle power bank, anche loro ricaricate”

“... armored closets, which house PCs. They are particular closets, where some PCs are connected to the power supply, ok? ... the activation of this electric network takes place at set times, from 8 pm to 6 am. So, during the night they are recharged. When the trainer gives the PC to the descendant, the PC is charged. In addition, if the PC was used and discharged, in the armored cabinets there are power banks, even recharged”.

Gov_MP, Knowledge Management Specialist,

September 2018

Figure 15 is a picture I took from my participant observation within one of the classrooms of the TIM Academy CU located in Rome. It shows the armored room with laptops and power banks. The reader will also notice the mechatronic opening of the handle.

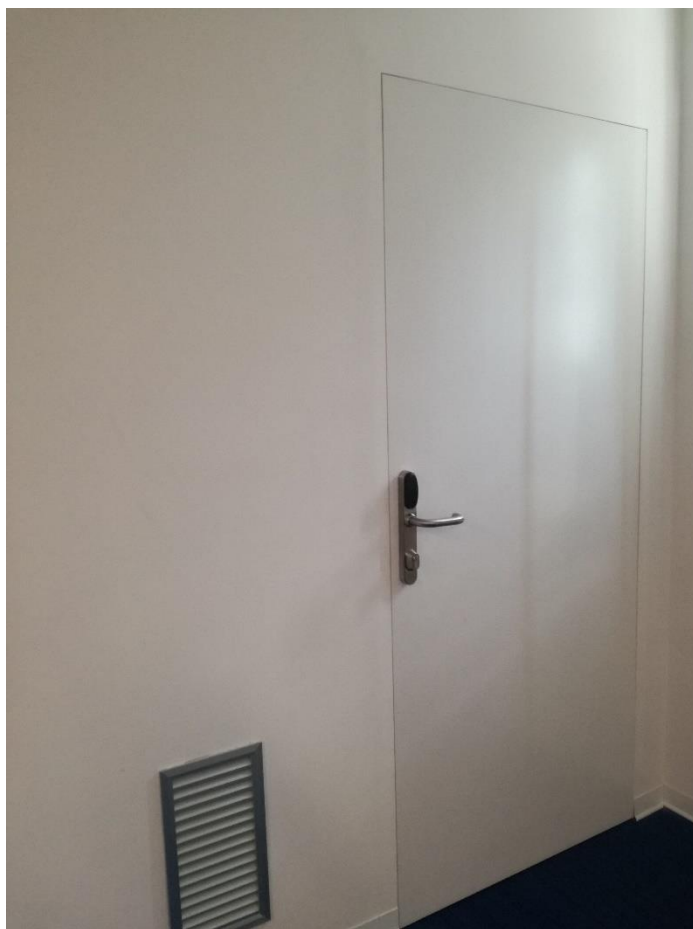


Figure 15: A room with armored cabinets containing laptops within a TIM Academy classroom in Rome.

The TIM Academy classrooms are probably the most successful *interessement* devices of the entire actor-network, despite still having some critical points highlighted by some of the informants. They cannot be conceived as traditional classrooms, although the type of training they can offer differs from what is online training, and it is often associated with a more traditional training concept.

The multimedia and multifunctional solutions these classrooms can offer are truly avant-garde in the national context of reference of the TIM Academy CU, which is the Italian context. For this reason, the HE, together with the project teams she wanted to build and follow, were able to plan and to offer a combination that would make it clear to all that:

“Questa soluzione, questa flessibilità, di clima e anche fisica, deve servire anche a questo: è un fattore abilitante”

“This solution, this flexibility, of climate and also physical, must also serve this purpose: it is an enabling factor”

ITC_LDE, Coordinator of the System and Processes Area

September 2018

First, thanks to the enabling technology that connects all the physical locations of the TIM Academy, all learners can follow the same training course at the same time, even if physically held in one of the offices in the cities I listed before. This type of “virtual presence” is possible because of some key actors. Each classroom is equipped with two 70-inch flat touch screens, all connected to each other and maneuverable through a tablet-type device, directly by the teacher. These screens can simultaneously project the same content, or two different contents, one for each screen. This possibility allows the lessons to be projected onto a monitor, possibly through slides; on the other screen it can appear both the image of the teacher who speaks, and that of the learners when they will do so.

This is also possible thanks to an important actor, a *s-object* in Bruni’s term (Bruni, 2005). Two cameras are positioned above the screens to frame the course participants. A camera is placed on the back of the room to frame the teacher. All of these are able to move following the voice of the person who is speaking at that moment. This allows you to enjoy a lesson remotely, as if everyone were inside the same room, and in a zero lane, in reference to the technicians responsible for filming. Figure 16 will show the abovementioned *s-objects*.



Figure 16: S-objects from a TIM Academy classroom located in Rome.

One last material actor for the provision and use of training facilities in the physical classrooms of the TIM Academy is the company badge. The badge must be used by the teacher to open each classroom and the armored room containing computers. Only those with an authorized company badge can act this way, whether they are internal to the Group or external. In this case, enabling temporary badges allows the entry to transitory external trainers.

In the case of the Online Platform, this issue deserves special attention, in reference to what was previously defined as the missing actor. Where the initial project of the HE provided for the opening to the outside world, this type of enrolment could not fully take place. The corporate constraints and operational restrictions have made alliances between the actors actually involved very strong, and have caused a partial exclusion from the actor-network of the “missing actor”. One of the reasons the informants highlighted several times refers to security logics. However, TIM Academy offers numerous MOOCs that are totally usable from the outside.

This kind of behavior is typical of every actor-network, and representative of the ability of each actor (human and non-human) to exert force not only on other actors, but also on the entire actor-network.

Emails acted as *interessement* devices for Learners and Line Managers. There is a twofold reason why this artifact seems to be so important for the TIM Academy actor-network. First, the average age of the employees of the company in question is quite high, so that people (in this case, Learners) would seem even more anchored to emails, as a tool associated to their mandatory training. Likewise, the time-factor plays a key role in the willingness to activate self-learning programs from learners, and in proposing or authorizing learning programs by Line Managers.

Last, the Smart Corners are one of the new formats that the company is using, as a bottom-up format. With the authorization of HE, its intuition was promoted by some employees who, while participating in a contest, thought to refer to the typical format of the Hide Park corners in London. Its implementation proved to be an interesting insight for the engagement of Governance, HRS and the Learners. In addition, the TIM Academy social area allows the Governance to keep open a channel of direct communication for all those who are interested in this format, and who are available to teach. Thanks to this intuition:

“loro si mettono davanti al computer, con le loro cuffie, fanno operazioni molto semplici per collegarsi alla webcam e così via...entrano a far parte di un database di docenti che formano, per così dire, la Faculty Interna”

“they [the Learners] put themselves in front of the computer, with their headphones, they do very simple operations to connect to the webcam and so on ... they become part of a database of teachers who form, just to say, the Internal Faculty”.

Gov_MP, Knowledge Management Specialist

September, 2018

6.3.3. **The Human Intermediaries**

With reference to humans in attracting the group of actors, the technical & operational staff was made necessary when, from the physical sites point of view, there was the need for a fixed presence who was able to cope with technical emergencies. Moreover, from an operational point of view in the field of provision and use of both offline and online training, the secretarial staff from HRS has assumed a greater role, also in reference to its resonance and outward recognition. This was a strong input that fostered HRS to become actively involved in the TIM Academy actor-network.

The Education & Learning function still acts as an intermediary to entice the Line Managers to enroll in the TIM Academy Actor-Network. As the reader can understand from the two-following *verbatim*:

“...grazie agli incontri fisici noi facciamo un rilancio, spiegando anche a quelli che non hanno potuto partecipare all'evento di lancio come è organizzata [la TIM Academy] ...che cosa consente di fare la piattaforma, perché altrimenti gran parte dei colleghi...non va a cercare i corsi a piacere che si possono fare, anche in accordo con i capi”

“...thanks to the physical meetings we make a raise, also explaining to those who could not participate in the launch event how it is organized [the TIM Academy] ...what allows you to do the platform, because otherwise a lot of colleagues ... do not go looking for courses they would like to do, even if in agreement with their managers”

Gov_LL, Knowledge Management Specialist

August, 2018

In reference to the relationship between the Line Managers and the online platform:

“Per i capi che vogliono indicare un corso per i collaboratori è un po' pensante, allora o ci chiamano e poi noi li indirizziamo, o glieli suggeriamo direttamente noi”.

“For the managers who want to indicate a course for employees it is a bit hard, then either they call us and then we direct them, or we suggest them directly to us”.

Gov_LL, Knowledge Management Specialist

August, 2018

Furthermore, at least once a year the Education & Learning function goes directly to the Line Managers of the company to ask for the training needs of the people. Doing so, a process of enrollment (subsequent moment of translation) of Learners and Line Managers is encouraged, with the hope that in the future they will become more and more self-directed. One of the arguments in support of implementing the TIM Academy actor-network was that it would follow and facilitate the pursue of the strategic objectives, reinforcing the good practices already existing before, but never formalized under a univocal way. Thus, this helped in:

“...avere una vision condivisa, una strategia legata alle necessità aziendali”

“...having a shared vision, a strategy linked to business needs”.

T_SV, PM and Trainer

September 2018

The line staff turned out to be an important device of *interessement* for Learners for a fundamental underlying reason: the TIM Academy has been structured in such a way as training can also be provided by those subjects who, traditionally, were limited to being the recipients of training. The specific name given to this artifact is Internal Faculty, with many initial confusions. They are therefore distinguishable from the External Faculty, which is, in fact, HRS. The Internal Faculty is composed of all those people who, despite having another job within TIM, lend themselves to training and dedicate time to prepare themselves, which often exceeds their working hours during the year. They normally do it because they are experts in the subjects they decide to tackle from time to time, but not all of them have the proper knowledge and skills to teach. For this reason, they have been included in a database of Internal Faculty, from which to draw if necessary, based on the strategic nature of the issues to be addressed. There are several ways in which they provide training. To name one, *ad hoc* testimonies contemplate a direct contact between the PM/teachers and internal trainers. In doing so, members of HRS use their personal contacts, and reach them with the help of a rather traditional artifact: the phone. As an

enabling factor, the idea that anyone, after an adequate training in the use of digital tools, can become what TIM (and the HE) has defined as a Social Digital Educator, has proved to be extremely stimulating for Learners, with a bit of amazement from some sceptics, who looked discouraged at the age-factor of the people inside the company.

Finally, the HE used a human actor I called ITC_FZ to attract HRS and the Online Platform within the actor-network. As I could learn directly from the interested subject, he is:

“...l’unico canale di ingresso per l’inserimento dei corsi in piattaforma”

“...the only entry channel for the inclusion of courses on the platform”.

ITC_FZ, Online Platform Administrator

September 2018

6.3.4. **The Money Intermediary**

The last typology of intermediaries that can intervene in defining an actor-network: is money (Callon, 1991). Accordingly, the HE promoted the use and the engagement of the Online Platform digital functions, together with the virtualized Physical Spaces, to meet stringent budget brakes, using the great travelling cost savings linked to the digital presence within the TIM Academy. The same reasons can be attributed to the role of rental cost savings as an intermediary.

“TIM in questo periodo attua anche una serie di azioni di contenimento dei costi. Per cui vengono ridotte le trasferte ai dipendenti e quindi si cerca sempre maggiormente di utilizzare il canale online piuttosto che quello frontale”

“TIM is also implementing a series of cost containment actions in this period. For this reason, employees’ transfers are reduced and therefore more and more are being sought to use the online channel rather than the traditional one”

ITC_FZ, Online Platform Administrator

September 2018

Lastly, the contractual forms as intermediaries for the *interessement* of HRS is an integral part of the contractual form that binds TIM S.p.A. to H.R. Services which, despite being a company of the TIM Group, remains legally independent and offers its services, subject to the underlying economic agreements.

Once “archetype of the *interessement* devices” are used to interest the groups of actors, the following moment is the moment of mobilization (Callon, 1986:209).

6.4 Enrolment of the TIM Academy

This is the final goal of the moment of *interessement*. It occurs when the moment of *interessement* succeeds and actors are enrolled in the actor-network because they believe they will achieve their own goals and accept their roles in relation to others'. After forming a pact, forming a "Holy Alliance" in Callon's words (1986), actors lock the others into their appropriate roles and thus, form a power base for themselves. The "Holy Alliance" indicates the role played by trust and loyalty, as fundamental components for building a successful network.

The two moments of *interessement* and enrolment may also occur simultaneously, since enrolment involves the "multilateral negotiations, trials of strength and tricks that accompany the *interessements* and enable them to succeed" (Callon, 1986:211). The result of several multilateral negotiations during which the identities of the actors are determined and tested is the moment of enrolment. Hence, when intermediaries attract actors in the actor-networks, actors decide whether to accept certain conditions if their interests are brought into play. By performing various negotiations, an actor defines the different roles allocated to others, using diverse kinds of strategies (e.g. seduction, transaction and silent consensus) (Porsander, 2005). Despite the principal negotiation concerning the obligatory passage point, this category also refers to all the involved negotiations between the participants.

This results in an actor-network in which competing interests are excluded, while secure alliances among the actors are tight and maintained for as long as possible. This means there is a need for developing practices to make the TIM Academy actor-network relatively stable.

Regarding the TIM Academy, this moment started when the six groups of actors appropriated the Org_Prod_Edu, and began working together to construct

"...un luogo fisico e digitale per lo sviluppo e condivisione delle competenze professionali, della leadership, del pensiero creativo, della strategia e dell'innovazione"

"...a physical and digital place for the development and sharing of professional skills, leadership, creative thinking, strategy and innovation."

Tim_Website.

April 2016

Once they appropriated the organizational document as an OPP, each group of actors started to negotiate its role. As before, also in this case the HE adopted different negotiation strategies, to which the respective groups of actors therefore took part. Table 5 shows some of the main strategies of negotiation used to enroll the six group of actors.

Table 5: Strategies of negotiation to enroll the six groups of actors.

Groups of Actors	Strategies of Negotiation	Verbatim
The Governance	<ul style="list-style-type: none"> - Launch event of the TIM Academy - Participation in the “cantieri”, working groups for the construction of the TIM Academy 	<p><i>“the launch was a moment of great thrust ... it was a very important presentation, in an external location dedicated to us, we had a lot of external guests, a fabulous organization and many perspectives... ”,</i> Gov_LL</p>
HRS	<ul style="list-style-type: none"> - Launch event of the TIM Academy - Participation in the “cantieri”, working groups for the construction of the TIM Academy 	<p><i>“From the historical point of view, we had the start, the launch of the TIM Academy in April 2016. TIM Academy was formally launched at company level with an event, and there we had a role because it was not born from scratch. It was born from an experience, previous years of collaborations and project teams”,</i> ITC_BP</p>
The Online Platform	<ul style="list-style-type: none"> - Public call for tenders 	<p><i>“...there is a tendering process, a supplier win. Maybe what you had found as being the best does not win and you find yourself having something</i></p>

		<i>that may be okay, but it's not what you thought at first”, T_OP</i>
The Physical Settings	<ul style="list-style-type: none"> - Choice to give new life to the ex-plants, key locations of the glorious past of the company TIM 	<p><i>“...the location is a special location. In Milan it’s in the Navigli district, at the beginning of the street there is the house where Alda Merini lived, so this is already an extraordinary fact... it is just a place of innovation for us ... That of Naples is beautiful because it is inside the business center ... Rome was an old central that we have revisited in its activities ... The headquarters of Bologna, below there are arcades, and they are often used as a dormitory ... Well, we gave back life to a space that we had lost... it was dead ... Gov_MP</i></p>
The Learners	<ul style="list-style-type: none"> - Launch event of the TIM Academy - Ad hoc training paths (e.g. DIGICOMP digital license; English language course with shared users, enabled for family members outside the company) 	<p><i>“TIM Academy wants to recognize you a status, and wants to make you an actor of the TIM Academy”, AMM_MGG</i></p> <p><i>“For the digital skills project we have done a blended course, because a part is with online training courses that still lead to a first certification</i></p>

	<ul style="list-style-type: none"> - access to MOOC on external e-learning platforms - access to the MIT 	<p><i>with open badge, following the DIGICOMP standard, so people are certified on the standard. Who gets the open badge then continues with a proper training, contextualized on the reality of TIM ... we have enrolled about 30 thousand people”, T_DS</i></p> <p><i>"We have many possibilities, not only with Coursera, we also have a link with the MIT, so it's a learning program that allows us to access documents, or to video... ”, Gov_LL</i></p>
<p>The Line Managers</p>	<ul style="list-style-type: none"> - Launch event of the TIM Academy - Informal annual meeting with the Governance for the tracking of training needs - HRO managers - Positioning of the TIM Academy banner on the Intranet 	<p><i>“...there was this launch very important and very engaging. So, referring to the launch that had been made a year before, we involved them in the launch of the physical sites”, Gov_LL</i></p> <p><i>“an illuminated manager goes here [on the online platform] and sees all this stuff, something interesting and then suggest it [to her/his subordinates] ... or we ask her/him "what kind of training needs do you have for your people?" and then we do the course”, Gov_EC</i></p>

The analysis of data collected through narrative interviews, document analysis and personal speaking during observations, outlined how the group of actors negotiated their enrolment. After, they worked for forming alliances with one other.

6.4.1. **The Governance**

The Governance identifies the training needs of the TIM population, and transforms them into requests (the brief) for the external Faculty of HRS, so that the PM/teachers can carry out the training projects.

“di fatto, è la governance di education che decide le macro-regole, noi li aiutiamo poi ad applicarle quindi a renderle operative a livello di progetto”

“in fact, it is the governance of education that decides the macro-rules, we then help them to apply them to make them operational at the project level”.

T_DS, PM & Trainer

September 2018

6.4.2. **6.4.2 HRS**

HRS is divided into three areas: one is the area of organizational behavior, one is dedicated to communication and innovative technologies, and the other is called systems and processes, which deals with issues ranging from economics, to security and the whole part of compliance and sales.

Once a training project has been commissioned, they work in project teams to provide training in the different modalities: in presence, online and blended. At the same time, HRS has taken on an increasing role in the administration of online and offline courses, from operational delivery to logistics and reporting.

6.4.3. **The Online Platform**

The Online Platform and the way in which it negotiated its entry into the TIM Academy actor-network is peculiar. Oracle won the tender for the provision of the online training platform, a platform called Taleo. At that point, the remaining groups of actors had to know it and adapt their contents to the features that the platform allowed to have.

The Online Platform necessarily imposed itself. This generated programmatic and non-programmatic commissions (see Figure 14 for a comprehensive view). As stated above, non-programmatic behaviors can in turn be of different types. In general, behaviors can be compliant and non-compliant, but also aligned and non-aligned. However, the hypothesis that these solutions can be combined is not to be excluded,

giving rise to situations of a compliant and non-aligned type, and aligned and non-compliant. The reader will better understand these issues in the next translation stage.

6.4.4. **The Physical Settings**

The Physical Settings were born with a strong enthusiasm on the part of everyone. TIM Academy is an innovative reality on a national scale, and the characteristics of the classrooms and spaces, at the level of digitization, interactivity, and modulation, have been received with amazement by all the groups of actors in the actor network.

“Non è solo lo spazio fisico che è asservito alla funzione formativa, ma anche lo spazio fisico, con un’idea ribaltata, può guidare la soluzione formativa, che al di fuori di questo contesto non sarebbe possibile”

“It is not only the physical space that is subservient to the formative function, but also the physical space, with a reversed idea, can guide the formative solution, which would not be possible outside of this context”.

ITC_LDE, Coordinator of the System and Processes Area

September 2018

6.4.5. **The Learners**

The Learners relate to TIM Academy in light of significant developments compared to the past. They have the opportunity to freely enjoy a considerable quantity of courses, enrolling themselves via Online Platform. They coordinate with their Line Managers in case they want to accomplish some online courses during the working hours. They are contacted directly by the Governance in the case of courses in attendance, but they have the opportunity to choose the mode of use that most suits them. In parallel, there is a need to save travelling costs. Those who do not have the opportunity to physically reach one of the TIM Academy offices located nationwide, can follow the course remotely on their personal PC. Moreover, where an employee is willing to contribute personally to corporate training, she/he can do so downstream from a training process that qualifies her/him for teaching, once she/he has agreed with the Governance the strategic nature of her/his initiative. In this way, Learners take an active role in the corporate training system.

6.4.6. **The Line Managers**

The Line Managers counted as being enrolled when they participate in a preliminary agreement to approve the ways and times of use of the training programs of employees under their control.

At the same time, they agree with the Governance regarding the emerging training needs during the year.

Moreover, a key-moment is represented by the performance management evaluation, through which the Line Managers actively participate in developing the training paths for their collaborators.

6.5 Mobilization

The last moment of translation is mobilization, when all the roles negotiated during the previous moment are activated and all the groups of actors work together within the actor-network. This means all the solutions to achieve actors' goals have gained consensus, alliances have formed, different identities are accepted and respected, and a relatively stable network of relationships has been realized. When the moment of mobilization succeeds, any tension between the actors is reduced, having already excluded from the network those who had divergent visions.

However, this set of relationships may be challenged at any time, questioning the possibility of the actor-network to survive over time. Callon would say: "Will the masses ... follow their representatives?" (Callon 1986,214).

During this moment, "only a few individual actors participate in the processes of translation leading to enrolment. These are the so-called spokespersons, which represent other actors in negotiations and thus translations. These actors can be elected representatives, but they can also merely claim to speak on behalf of other actors" and "just because a spokesperson is an officially elected representative, this does not mean that those who are represented will automatically follow this spokesperson. It is something that has to be observed, rather than assumed" (Røder, 2013:18-19).

Although TIM started working on the TIM Academy construction project since March 2014, the moment of mobilization cannot be attributed to the launch of the TIM Academy. At that time, in fact, only the Online platform was available for training. The moment of mobilization only begun with the entry of the Physical Settings.

Hence, education and learning in TIM Academy were mobilized as follows.

For compulsory top-down training courses, Line Managers make an interview with the Governance, which extrapolates the training needs for each function. These are entered manually into a document called EduMatrix. This matrix is implemented by HRS by using a dedicated online platform, basing on the specific content of a training request called “brief”, a project is assigned to one of the three different areas of competence. Subsequently, HRS selects a project manager, who will coordinate the implementation of the course at the macro-design level, in the role of designer and teacher. Subsequently, the PM/trainer asks for the availability of the classrooms, the activations of the sessions in webinars, and so on. To do so, she/he must contact the HRS administrative secretary team, located in a different location from headquarters in Rome. The administrative headquarters of HRS in L'Aquila, agree with the trainer and the Governance the availability for the course, issuing a project document containing the dates, times and methods of use. The budget allocated for the course must be approved. Once validated, participants are registered on paper records, courses in attendance can start, while those on the Online Platform must be loaded on the platform only after having sent them to ITC_FZ, as explained previously.

In any case, teachers should be contacted. These come mainly from HRS. In the case of a teaching session provided by the internal staff of TIM, in the role of the internal Faculty, the latter must be contacted by the PM/trainer of HRS. At the moment, about 400 people have been hired, selected through parameters refined over time and based on some final evaluations attributed to the single trainer at the end of the course. However,

“...non è ancora ben chiaro quale sia il meccanismo di ingaggio”

“...it is not yet clear what the engagement mechanism is”

T_GP, Trainer and Head of the Telecommunications and Innovation Area

September 2018

The current mode of engagement can be activated in two ways: 1) the requesting Line Managers know the training needs and their human resources; therefore, they make them available to people who voluntarily offer to do training; or 2) HRS trainers themselves have their own database built over the years through their personal knowledge, and contact by phone call those who will contribute to deliver the course. It is a complex mechanism, which should be facilitated through a means of integration. In fact, the actors themselves have shown to be aware of this necessity. Still,

“...la piattaforma non ci supporta in questo [processo] ...”

“...the platform does not support us in this [process] ...”

AMM_RB, Data Analyst

September 2018

The same is stated, regarding the reporting process. Also in this case, material artifacts play a fundamental role. There is a lack of registry integration between HRS databases and the Online Platform, so that it is often very difficult to enable all the Learners to enroll the desired volunteer courses, and it is impossible to show it directly to the Line Managers (who are the ones that should approve Learners' volunteer training programs). HRS registers again the participants on paper registers, on which the final presents/absents' balance and the hours of training is made, as a reporting phase.

As already explained in detail above, the trainers have access to the computerized classrooms through the use of their company (or temporarily enabled) badge. They are just enabled for the lesson day to open the mechatronic lock of the classroom, and allow the Learners to enter. The latter can follow the course because they were previously contacted by email from the HRS administrative secretariat. Inside the Physical Settings, the classrooms, they already have recharged company PCs available. Only qualified trainers can provide corporate PCs, because they are the only ones who can open the armored cabinet with the company badge. The ways in which physical spaces are connected were already widely discussed.

What happens in reference to online training is different, since the Learners have the opportunity to enroll voluntarily to the courses they prefer. On the other hand, delivery and reporting procedures remain the same in the case of compulsory courses, for which they also receive reminders. What amazed me in the course of my investigation is that no one but a couple of people were aware of the fact that Line Managers have access to the training of their subordinates, regardless of compulsory courses and those who periodically come granted with them.

As a result, after a period of mobilization the issues became very complicated when the remaining groups of actors of the TIM Academy actor-network come into contact with the current Online Platform. In fact,

“La piattaforma [online] è un elemento integrante, fondamentale, perché non puoi fare formazione digital se non c'è la piattaforma, sia per le persone che fruiscono del corso, sia per chi deve gestire il processo di formazione”

“The [online] platform is an integral, fundamental element, because you cannot do digital training if there is no platform, both for the people who enroll to the course, and for those who must manage the training process”.

AMM_MGG, Responsible for the Platform management and Delivery & Reporting

Function

September 2018

However, when talking about the Online Platform usability, almost all the informants stated:

“... è poco interattiva onestamente. Non è social. C’è un ambiente social, però non è immediato. Io credo che, come qualsiasi altro prodotto, si debba andare sulla semplicità. Quindi: togliere i bottoni, togliere i passaggi, essere immediata... il capo stesso che non è addetto ai lavori, probabilmente non riesce... dovrebbe essere particolarmente desideroso di farlo e capace di individuare i corsi.”

“... it's a little interactive honestly. It is not social. There is a social environment, but it is not immediate. I believe that, like any other product, one must go on simplicity. So: remove the buttons, remove the steps, be immediate...the Line Manager himself who is not employed, probably is not able...he should be particularly eager to do it and able to identify the courses”.

T_SV, PM and Trainer

September 2018

At the same time, the Learners often found some difficulties linked to the search engine. While in the past this functionality did not exist, to date it is possible to access it for the search for courses. However, not everyone knows the actual functionality of this service. It follows that in some cases, some people only look under “My Training” and mandatory courses. Even the Governance, that should fully follow the corporate training process, from the analysis of the learning needs to the communication and internal promotion of the entire range of courses available in TIM Academy, finds difficulties in integrating with the Online Platform, since it is not able to communicate with the company Intranet, which is the only vehicle for the promotion and communication of training courses.

This suggests that knowledge embedded in artifacts only partially derives from the designers’ vision of the world; thus, the meaning of the inscription changes as soon as relations in the network change and only alignment between all the involved parties

represents the “facticity” of the practice under analysis (Bruni et al., 2007). “Structures of technology use are constituted recursively as humans regularly interact with certain properties of a technology and thus shape the set of rules and resources that serve to shape their interaction” (Orlikowski, 2000:407).

Unlike what happens regularly in all the studies that apply the ANT, it is at this precise moment that non-programmatic behaviors emerge in TIM Academy. This happens because in the previous moment of translation, that of the enrolment, the Online Platform “imposes itself” by winning a public tender. In ANTish terms, it adopted a strategy of negotiation, rather than of seduction.

As a consequence, there was a moment when the Learners and the Line Managers decided to behave in a compliant and non-aligned behavior, shaping their roles with respect to those that HE had assigned them.

“...ci siamo resi conto che era come fare una gara di Formula 1 a piedi...per fare la gara non ti dico che devi avere la Ferrari, ma almeno una delle ultime dello schieramento la dovresti avere...”

“...we realized that it was like doing a Formula 1 race on foot ...I’m not telling you that you must have Ferrari to race, but at least one of the last cars on the grid...”.

T_OP, PM and Trainer

September 2018

This does not mean that the TIM Academy actor-network cannot have an inscription phase, but that as naturally happens for actor-networks, its balance is transitory and destined to break (Law, 1992). That is, sociomaterial networks emerge from continuous processes of ordering. Agency of actors (or groups of actors), as well as their coordination, is precarious. The inscription of different interests into agreements or formal contracts does not prevent possible opportunistic or non-programmatic behaviors, performed by one or more actors within the actor-network, and dissidence may occur (Callon, 1991).

As new technologies or other material artifacts might intervene, they also play a role in inscribing and enacting the interests of the actors. In the case of a CU like the TIM Academy, this situation might occur because of the introduction of a new organizational procedure, or the internal development of a new technological artifact, such as a new online platform for education and learning development and delivery.

In the light of what I described so far, the reader will understand the possibility of new further negotiations, resulting in the translation of a new configuration.

6.6 What about inscription?

Despite the original functioning of the TIM Academy actor-network has been described in the previous paragraph, this network of relationships was missing one of the fundamental characteristics for the inscription to be effective over time: durability.

Several critical issues emerged during my field research, during the shadowing of the Online Platform non-human actor, and during narrative interviews with the informants. At some point of the analysis, when listening to the stories of HRS and those of the Governance, what emerged was that in the shadows, behind the scenes I would say, there was a great change taking place. The Online Platform was undermining the balance of the TIM Academy actor-network, encouraging dangerous non-programmatic behaviors. Dissidence was weakening the first inscription of the TIM Academy actor-network, placing the HE in the condition of having to make structural changes. The possibility of acting against the non-programmatic behaviors of the groups of actors was possible starting to reason on a different inscription. In this regard, the so-called “*as-is*” TIM Academy actor-network will need to change into a “*to-be*” TIM Academy actor-network.

With the help of the “*as-is*” actor-network, the HE understood that she had to modify the OPP, in order to keep the “*to-be*” TIM Academy actor-network alive. As a first consequence, the backend processes (planning, management and control) and frontend (use of the training programs) will be integrated, respecting the pursuit of the objectives of each group of actors present in the TIM Academy Actor-Network.

The most interesting phenomenon in terms of ANT, is that the results of the two moments of problematization and *interessement* of Callon’s Sociology of Translation (1986) remain unchanged. What changed, is the absence of the Online Platform as an actor, from now on under the direct and joint development between the Governance and HRS, and the last two moments of enrolment and mobilization.

This is a contingent change. The OPP is changing from being the Org_Prod_Edu, to the New Online Platform. As the previous case, the reader must be aware of the abovementioned considerations about the groups of Learners and Line Managers.

Figure 17 depicts the new moment of problematization.

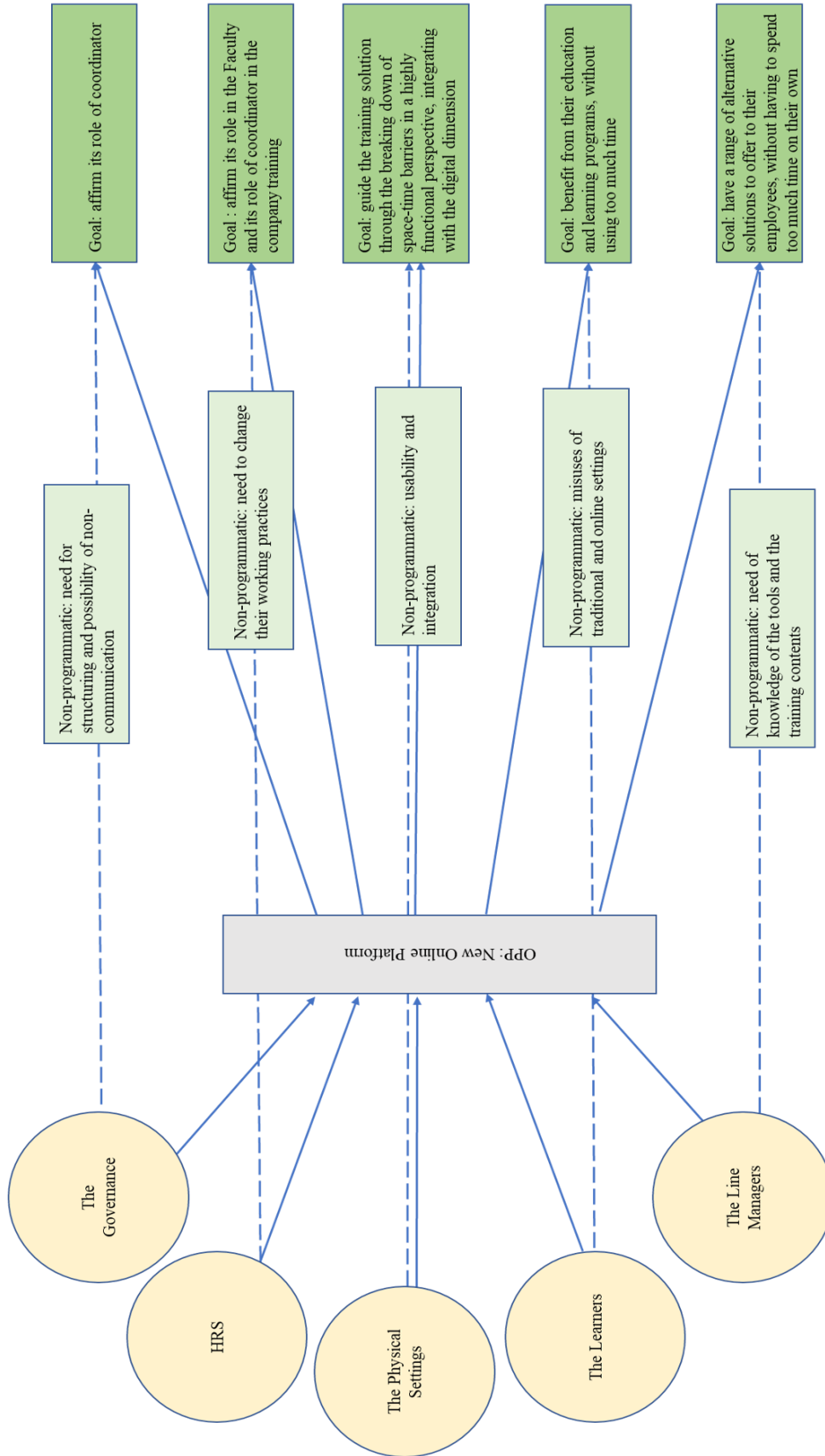


Figure 17: The second moment of problematization of the TIM Academy. Source: Own elaboration.

The moment of enrolment, when the groups of actors negotiate their own roles, and their roles in relation to the others, also changed.

Now it will be possible to expose how the relationships between humans and material artifacts can give life to a new configuration of the “*to-be*” TIM Academy actor-network.

The reader will be able to compare two different representations of the analyzed actor-networks, respectively the “*as-is*” network and the “*to-be*” network, in Appendix G. They represent the “anthropomorphising of objects in various organizing attempts and to ponder its consequences” (Czarniawska, 2005:10), with a focus on the relational links between objects (both those involved and those on which they impact), rather than on their ontology (Bruni, 2005). For the graphic representation I was inspired by Lena Prosander’s (2005) idea of analogy shaping.

6.6.1. Translation to Administration Practices

From the backend-point of view, and therefore what happens before the use of the training course, the system is *de facto* the same, with a different interface for Governance, for HRS, and Line Managers, who no longer need to communicate outside the same system. What was happening before was:

“Io, di HRS, ho il mio sistema, poi la Governance comunica con me attraverso la mail, attraverso la comunicazione dei documenti...”

“Me, at HRS, have my own system, then Governance communicates with me through emails, through the communication of documents...”.

ITC_LDE, Coordinator of the System and Processes Area

September 2018

Now, the lack of previous integration will be fulfilled. In a more distributed optics, the New Online Platform is totally integrable with other operation systems. Many of the intermediaries from the previous translation can disappear, for example, communication via email.

Translation into HRS administrative practices, in fact, involves the translation at organizational level of HRS itself. As I could record from one of the interviews:

“Faccio parte del gruppo delivery e in particolare seguo la parte del tracciamento e di reportistica della formazione. Però, nel gruppo delivery, al momento non si sa se continuerà ad essere in mano al delivery questa funzione o meno...”

“I am part of the delivery group and, in particular, I follow the part of training tracking and reporting. However, in the delivery group, at the moment we do not know whether this function will continue to be in the hands of delivery or not...”

AMM_RB, Data Analyst

September 2018

This is what the person responsible for the platform management and Delivery & Reporting function states about the translation of the HRS operation processes in the TIM Academy actor-network, concerning the introduction of the New Online Platform:

“ti cambia completamente il lavoro, perché da molte cose operative che devi fare oggi, passi a fare cose che comunque richiedono anche dei ruoli operativi, però sono spostate sulla comunicazione del progetto, sulla gestione...cioè, ti sposta proprio la tipologia di lavoro...”

“it completely changes your work, because from many operational things you have to do today, you go on doing things that also require operational roles, but they are moved on the communication level of the project, on its management... that is, it just moves you to a different type of work ...”.

AMM_MGG, Responsible for the Platform Management and Delivery & Reporting Function

September 2018

The new translation of the TIM Academy actor-network, then, positively affects the relationships between the Groups of Actors and artifacts included into the backend processes. In addition, it allows to overcome the overlap of roles, allowing the traceability of the actions of all the components, both human and non-human, of the actor-network. The results of translation are exhaustively summarized in the following *verbatim*:

“I Line Manager faranno il colloquio o manderanno le specifiche per le loro esigenze [alla Governance], e le metteranno in questa Matrix che si troverà lì [nella nuova piattaforma]. Non si chiamerà più Matrix, ma insomma, analisi delle esigenze, è quella. Da quella, la Governance individuerà le esigenze dell'anno, farà una sua analisi di efficientamento, perché se tu [Line Manager] mi fai una richiesta e io [Governance o HRS] faccio la stessa richiesta, le posso unire e mettere insieme. [La Nuova Piattaforma Online] ottimizza quindi il tutto e permette di definire quello che è il piano di formazione...dell'arco temporale. Quel piano di azione...è all'interno della piattaforma, e su quello vengono "staccati", diciamo, i brief, che sono delle richieste

che arrivano a noi di HR Services. Quindi, la richiesta arriverà a noi, e si porterà dietro tutto il sistema di classificazione che era stato ragionato prima dai Line Manager e dalla Governance della Corporate. Quindi, noi quelle classificazioni le vedremo. Anzi, poi ne aggiungeremo altre, e quindi si compone una descrizione del progetto mano a mano che va avanti nelle sue fasi di implementazione. Quindi, HRS poi lavorerà da quel momento in poi per attivare una serie di altri percorsi all'interno della piattaforma che servono a: aprire il progetto, assegnargli tutti i parametri economici...Una volta fatto il piano economico, passa a un processo di approvazione dei costi, quindi passa alla Governance, che se dice che gli sta bene...e dice che il progetto ce lo paga, e si parte con la realizzazione. Una volta che si parte con la realizzazione, si passa a fare una pianificazione operativa, quindi tutte le date, tutti i corsi, se i corsi sono online si creano tutti gli accessi del corso online, si pubblica il corso online...si può creare un ambiente di condivisione di contenuti e di approfondimento legato a quel progetto formativo, una community che scambia informazioni...Stesso discorso per le aule fisiche, tutto sarà gestito all'interno di un unico ambiente, superando tutti i vincoli legati alle mail, le telefonate, i fogli di carta...”

“The Line Managers will do the interview or send the specifications for their needs [to the Governance], and they will put them in this matrix that will be there [in the new platform]. It will not be called matrix anymore, but in short, analysis of the needs, it' is the same. From that, the Governance will identify the training needs of the year, they will make an analysis of efficiency, because if you [Line Manager] make me a request and I [Governance or HRS] do the same request, I can merge and put them all together. [The New Online Platform] therefore optimizes everything and allows defining what is the training plan ... during the time frame. That plan of action ... is inside the platform, and it's inscribed on the document they "detached", let's say, the brief, which is the request that come to us, as HR Services. So, the request will come to us, and will carry with it all the classification system that had been reasoned first by the Line Managers and the Governance. So, we will see those classifications. Moreover, we will add others, and then a description of the project is composed as it goes on in its implementation phases. Therefore, HRS will work from that moment on, to activate a series of other paths within the platform that are used to: open the project, assign all the economic parameters to it...Once the economic plan is done, it goes on to a process of approval

of costs, then it passes to Governance, which if it accepts it...it will pay for the project, and we'll start with the realization. Once you start with the implementation, you go on to make an operational planning, with all the dates, all the courses, whether the courses are online, all the accesses of the online course are created and the online course is published ... you can create a sharing environment for contents and deepening, linked to that training project, a community that exchanges information...The same goes for the physical classrooms, everything will be managed within a single environment, overcoming all the constraints related to email, phone calls, sheets of paper...".

AMM_MGG, Responsible for the Platform Management and Delivery & Reporting

Function

September 2018

6.6.2. Translation to Education Practices

The previous Online Platform only managed the provision of training. Until now, everything traveled by “analog”, including artifacts such as phones, computers, emails. Thanks to the new translation, the whole flow of transmission of training needs, planning and control of the education supply, will be all within a single environment, perfectly integrated with all the other settings (both physical and digital), which previously communicated exclusively by means of non-aligned material artefacts, with numerous cases of role overlaps between actors of the actor-network.

In practice, the partition linked to the translation of the education practices is managed by the backend part of the New Online Platform.

“Con questa nuova piattaforma, vedi? Si parte direttamente dalla richiesta della Corporate University...queste sono proprio le richieste che loro [la Governance] fanno dei fabbisogni formativi, anche in accordo con i manager di linea. Da questo, è tutto dentro un unico sistema, dal fabbisogno poi dopo passi a quello che...noi chiamiamo brief. Vai al progetto; il progetto si costituisce delle sue diverse fasi: macro-progettazione...e quindi viene approvato direttamente dal committente. È tutto dentro un unico sistema. Sono tutti degli step di workflow dove c'è un contatto diretto e guidato, soprattutto, dalla piattaforma”

“With this new platform, you see? It starts directly from the Corporate University request, these are precisely the requests that they make of the training needs, according to the Line Managers as well. From this, it's all within a single system, from the need

then you can go to what...we wall call the brief. You go to the project; the project is constituted of its different phases: macro-design...and therefore it is approved directly by the client. It's all in one system. These are all workflow steps where there is direct and guided contact, above all, from the platform”.

T_DD, PM and Trainer

September 2018

And then,

“...abbiamo messo sotto un algoritmo che fondamentalemente va a studiare quello che è il tuo comportamento di apprendimento. Io ti do un paniere, poi sulla base di quello che tu poi effettivamente fruisci, vedi, commenti, condividi, ti do anche la possibilità di aggiungere tu direttamente i contenuti, consigliare a un collega un contenuto... Naturalmente, sulla base di tutto quello che è il tuo comportamento dentro questa sorta di Social Network dedicato, la tua bacheca si aggiorna. Fermo restando che poi ci sarà anche una parte più formale, dove daremo noi dei percorsi prestabiliti, tutto su una logica poi di verifica sempre dell'apprendimento...Non devo essere io a formarti e vedere poi dopo i tuoi progressi. Io ti devo suggerire un percorso”

“...we put an algorithm under it that basically goes on to study what your learning behavior is. I'll give you a basket, then, based on what you actually enjoy, see, comment, share, I'll give you the opportunity to directly add to the contents, recommend a content to a colleague...Of course, basing on what is your behavior inside this sort of dedicated Social Network, your bulletin board is updated. Notwithstanding that there will also be a more formal part, where we will give some pre-established paths, all based on a verifying logic for learning ... I do not have train you and then see your progress. I have to suggest a route”.

T_DD, PM and Trainer

September 2018

While in the past, education practices could not control possible content overlaps, because of a lack of integration,

“la nuova piattaforma aiuterà anche in questo. C'è tutta un'area che abbiamo progettato e che stiamo poi realizzando per gestire questi aspetti. Perché spesso si rischia di andare sugli stessi temi su persone che, per esempio hanno fatto una formazione interna...”

“the new platform will also help in this. There is a whole area that we have designed and which we are then building to manage these aspects. Because often we risk going on the same issues with people who, for example, have done internal training ...”.

T_OP, PM and Trainer

September 2018

Also, at the coordination level between HRS and the Learners who decided to share their knowledge through interventions in the classroom or Smart Corners,

“Non c’è mai stata una regia. Uno dei temi che stiamo cambiando della piattaforma è anche questo, su ci stiamo lavorando, stiamo cercando di integrare un minimo. Prima per questa formazione ti arrivava anche con un foglio di carta su cui c’era scritto che Mario Rossi aveva fatto un corso dal giorno x al giorno y. Poi quali erano gli argomenti, quali erano i contenuti no”

“There has never been a direction. One of the issues that we are changing of the platform is also this, we are working on it, we are trying to integrate a minimum. Before, for training you also came with ... a sheet of paper on which it was written that Mario Rossi had taken a course from day x to day y. Then, you didn’t get what were the topics, what were the contents”.

T_DD, PM and Trainer

September 2018

6.6.3. Translation to Physical Settings

Adopting an ANT approach, however, does not mean focusing more on material artefacts. In fact, the human component for the inscription result remains preponderant in the TIM Academy actor-network.

“Avendo lo spazio fisico TIM Academy, ha rafforzato lo spazio TIM Academy online, perché si rafforzano e perché noi [HRS], come addetti ai lavori li rafforziamo”
“Having the TIM Academy physical space, has strengthened the TIM Academy online space, because they are strengthened and because we [HRS], as insiders, strengthen them”.

T_SV, PM and Trainer

September 2018

The results of the analysis, however, confirm that material engagements act together with other forces to regulate (by excluding or inviting) all the different forms of

participation (Fenwick, 2014; Waltz, 2006). To provide an example, the simple lack of the enabled corporate badge, serves to exclude people from accessing the classrooms or to the use of corporate laptops. This is a typical example of mutual translation. It means that artifacts both translate and are translated by all the other actors.

The physical spaces will continue to be used exclusively by qualified subjects, using the company badge. However, the “*to-be*” TIM Academy actor-network will facilitate the booking, management, analysis and reporting systems, by excluding some material artifacts from the network, such as sheets of paper.

In line with Bruni et al. (2007), knowledge embedded in artifacts only partially derives from the designers’ vision of the world, and the meaning of the inscription changes as soon as relations in the network change. It is the result of possible alignments between all the involved parties and “facticity” of the practices for which the artifacts are made. This has some important implications on the new ways of training. Learning practices will be also translated in the following paragraph.

6.6.4. Translation to Learning Practices

Translation to new learning practices highlights the shifts on the frontend-side of education and learning in the TIM Academy actor-network.

In this case, the technique of the moodboard I used during the narrative interviews, combined with shadowing the non-human actor of the Online Platform, helped me in understanding the role of the New Online Platform as an OPP.

Learners will have to change their practices by enhancing their use of the New Online Platforms in the direction of adaptivity. Their learning models will be translated in a new more flexible way and:

“...andare sempre più verso un modello di adattività della formazione, con contenuti che hanno sempre più una dimensione più piccola. Bite-size...cioè i contenuti di qualsiasi formato, brevi, che puoi fruire comunque con qualunque device, in qualsiasi momento. Quindi per esempio, stai in macchina e hai tutta una sezione di podcast che ti puoi mettere in autoradio e che ti puoi ascoltare. Stai a casa, ti arriva una notifica di un nuovo articolo...questi strumenti che abbiamo a disposizione ti permettono di rendere la formazione come un qualcosa di continuo nella tua vita lavorativa”

“...going more and more towards a model of adaptive training, with contents of an even smaller size. A bite-size...that is, the contents of any format, short, that you can

use anyway with any device, at any time. So, for example, you're in the car and you've got a whole podcast section that you can put in your car radio and you can listen to it.

If you stay home, you get a notification of a new article...these tools that we have available allow you to make training as something continuous in your working life”.

T_DD, PM and Trainer

September 2018

The time-factor played a decisive role in the translation to learning practices, in combination with the interactivity of the New Online Platform tool. Previously, the access and use of the training contents could not be integrated (or it was difficult to integrate) with other devices. This implied the need to use a computer as the only tool available to enjoy full-training for Learners (with some virtuous exceptions regarding English language courses and mandatory courses).

Through the New Online Platform, it will be possible to overcome these constraints, for example using a smartphone, as previously mentioned regarding education practices. This, combined with a new conception of bite-size training content, will enable Learners to take advantage of the training content in a more flexible way, overcoming those organizational and temporal constraints, that made the “*as-is*” TIM Academy actor-network a farraginous and fragile system of relationships.

Overall, the TIM Academy five learning paths from Chapter One will be now actionable. Hence, the self-directed learning will be open to everyone, as well as usable through different access channels, in addition to the traditional presence or company laptops. The individual development plan, through which each person can participate in training courses following an assessment or for career development needs will follow a content-driven logic for each of the learners. The performance management path, in which everyone will have access to an improvement plan defined by their line manager, will be displayed in a way that learners will understand the contribution of each of their progress to the competences’ coverage for their personal growth. The corporate training plan, which measures the collective training needs of the business lines and staff functions for updating, creating and developing the skills necessary to implement the strategic guidelines of the company, will be favored by the integration of the infrastructure of the CU, through which the actors involved will be able to interact. The professional reconversion plan, that offers specific paths useful for updating professional skills to guarantee the employability of employees on new professional roles of interest to the

company, will be also implemented through the integration of the actors, managed in a single environment.

6.7 A Punctualized Modern Corporate University

Once the punctualization occurs, it “converts an entire network into a single point or node in another network” (Callon, 1991:153). This means that the TIM Academy Corporate University can be able to behave as one single actor in the education and learning processes within the company.

Based on the analysis made so far, the punctualized TIM Academy CU can be counted among the third generation of CUs (Walton, 1999). An advanced use of technology for education and learning activities, the ownership of technology-generated elements for learning programs, and the integration between employees’ learning paths and the company strategic objectives, are all present in the inscription of the TIM Academy.

In reference to Fresina’s (1997) work, the TIM Academy CU is a combination of the three hypotheses prototypes of CUs. First, it aims to reinforce corporate culture, behaviors and competitiveness. Second, it supports and manages strategic changes. Third, it is conceived to drive and shape TIM’s future directions. To provide an example, here is what an informant says about one of the TIM Academy strategic initiatives:

“30 mila [dipendenti] sono stati convocati e stanno partecipando. E più di 6 mila già hanno preso l’open badge, quindi sono numeri importanti e entro quest’anno porteremo in aula 4 mila persone...quindi sono numeri che danno l’idea dell’interesse che c’è su un tema attuale come quello delle competenze digitali, visto che TIM vuole diventare una DIGITIM, e la TIM Academy in questo caso serve perché puoi fruire di tutta la parte online in autonomia”

“30 thousand [employees] have been called and they are participating. And more than 6 thousand have already taken the open badge, so they are important numbers and by this year we will bring in the classroom 4 thousand people...so they are numbers that give the idea of the interest that there is on a current topic like that digital skills, since TIM wants to become a DIGITIM, and the TIM Academy in this case helps because you can enjoy the whole online part independently”

T_DS, PM & Trainer

September 2018

Following Lui Abel and Li's (2012) approach to the analysis of corporate universities, it is finally possible to summarize both the characteristics of a punctualized modern CU, as the TIM Academy is, and the facilitating processes for the CU operations. The Authors call them *functional profiles* (Lui Abel and Li, 2012). The reader will find a comprehensive check list I used to synthesize the results of my analysis in Appendix C.

6.7.1. **The TIM Academy Organizational Profile**

The organizational profile is composed by four dimensions: a) strategy and mission; b) governance; c) structure; and e) stage of development. Strategy and mission refer to the aim of the CU to “determine the focus of resources, programs, initiatives, and staffing regarding learning and development efforts” (Lui Abel and Li, 2012:106).

As a result of my investigation, a clear vision and mission for supporting learning performance in the company is well defined:

“...è nata [la TIM Academy] per avere una vision condivisa, una strategia legata alle necessità aziendali...”

“it was born [the TIM Academy] to have a shared vision, a strategy linked to the needs of the company...”-

*AMM_MGG, Responsible for the Platform management and Delivery & Reporting
Function
September 2018*

Moreover,

“Le finalità principali delle attività di education sono:

- rafforzare le skill manageriali a vantaggio dell'evoluzione strategica dell'azienda nei prossimi anni;*
- accrescere le competenze individuali e collettive necessarie per competere nei nuovi scenari di business, con particolare focus su skill specialistiche a presidio dell'evoluzione dell'offerta "core" e dei nuovi servizi;*
- supportare i piani di sviluppo e favorire l'empowerment delle persone;*
- accompagnare e supportare la trasformazione della cultura e dell'identità organizzativa.”*

“The main purposes of educational activities are:

- strengthening the managerial skills to the advantage of the strategic evolution of the company in the coming years;*

- *increasing the individual and collective skills necessary to compete in the new business scenarios, with particular focus on specialized skills to monitor the evolution of the "core" offer and the new services;*
- *supporting the development plans and encourage people's empowerment;*
- *accompanying and supporting the transformation of culture and organizational identity”.*

Org_Prod_Edu,

December 2016

The role of the Governance is crucial, since it ensure alignment to organizational purposes and business strategies. In the same document we can read that the Governance of the TIM Academy:

“è owner del processo delle attività di education di tutte le funzioni aziendali. garantisce il governo dei processi attivando il piano di education aziendale, effettuando analisi del mercato della formazione, definendo le linee guida, le procedure, i KPI ed i sistemi a supporto e gestendo le relazioni con le funzioni aziendali per le attività...Garantisce inoltre le attività di progettazione formativa di lungo termine ed a carattere strategico, nonché un costante monitoraggio dell'efficacia ed efficienza dei processi gestiti.

“is the owner of the education activities processes for all company functions, it guarantees the governance of the processes by activating the corporate education plan, carrying out analysis of the training market, defining the guidelines, the procedures, the KPIs and the supporting systems and managing relations with the company functions for the activities...It also guarantees the long-term strategic planning activities, as well as a constant monitoring of the effectiveness and efficiency of the managed processes”.

Org_Prod_Edu,

December 2016

The structural dimension has undergone an evolution during the translation process. From a previous decentralized structure, the TIM Academy was born with the aim of linking the preceding distributed decision making, among the main actors. Then, since the learning function grew in complexity and its infrastructure evolved through many dimensions I discussed above, the TIM Academy CU evolved toward a centralized structure, to overcome role overlapping, process efficiency, and cost management.

Regarding the stage of development, it is possible to collocate the TIM Academy within expansion/growth stage of life cycle. Despite having only two years of existence, the TIM Academy already has its programs and documented standards.

“La TIM Academy è abbastanza giovane... sta nascendo negli ultimi periodi...la fase di realizzazione di questo processo è in divenire”

“The TIM Academy is quite young ... it was born in the last periods ... the phase of realization of this process is in progress”.

T_OP, PM and Trainer

September 2018

However, according to Lui Abel and Li (2012), it has not yet reached a stage of maturity, being in the “growth” phase, where it will gain sufficient external industry recognition. A possible motivation for this condition might be traced back to the lack of complete openness to the outside. As some informants regarding openness:

“è ancora talmente tanto recente”

“it’s still so recent”.

Gov_LL, Knowledge Management Specialist

August 2018

6.7.2. The TIM Academy Learning Delivery Profile

Regarding the learning delivery profile, I found only two dimensions the TIM Academy Corporate University still does not cover. First it does not evaluate the learning programs by measuring ROI for learning efforts. However, intermediate and final tests are provided for each kind of learning programs. Second, it does not extend the learning programs, by offering training paths to external parties, with some interesting exceptions. For example, friends and family members of employees may have access to various training paths, while MOOCs are open to the outside. Some informants attribute this last result to issues related to privacy and corporate security, although they all wish to open up to the outside world.

All the other dimensions are covered and implemented through different learning programs.

6.7.3. The TIM Academy Operational Profile

The operational profile articulates into two main dimensions: a) financing sources; b) technology usage and implementation.

Accordingly, the TIM Academy CU is full finance by the company Group. Alongside the necessity of reducing costs, the technology usage and implementation of the punctualized/inscribed TIM Academy CU allows greater flexibility to customize the content of learning programs. This is made possible with the New Online Platform:

“...abbiamo messo sotto un algoritmo che fondamentalmente va a studiare quello che è il tuo comportamento di apprendimento. Io ti do un paniere, poi sulla base di quello che tu poi effettivamente fruisci, vedi, commenti, condividi, ti do anche la possibilità di aggiungere tu direttamente i contenuti, consigliare a un collega un contenuto...”

“...we put an algorithm under it that basically goes on to study what your learning behavior is. I'll give you a basket, then, based on what you actually enjoy, see, comment, share, I'll give you the opportunity to directly add to the contents, recommend a content to a colleague...”.

T_DD, PM and Trainer

September 2018

6.7.4. The TIM Academy Partnership Profile

This profile articulates into four dimensions: a) partnership with business unit; b) partnership with human resource management; c) partnership with academia; and d) partnership with vendors/outsourcing.

All the above-mentioned dimensions are respected in reference to the new inscription of the TIM Academy, with an exception due to privacy issues related to partnerships with vendors. In fact, the CU align its learning initiatives with the need of employees, line managers, and the company as a whole.

It represents the result of collaboration between the four actors: the Governance, HRS, the Physical Settings, the Learners and the Line Managers. They all co-design appropriate learning programs based on the working practices identified during this chapter.

Chapter 7 - Conclusions and Implications of the Research

Introduction

Drawing on Actor-Network Theory (ANT), this thesis translates the emergence of a Corporate University (CU) actor-network, the TIM Academy, through the application of Callon's Sociology of Translation (Callon, 1986). This also helped in exploring, describing and understanding the experiences related to the education and learning phenomena of all the actors (both humans and non-humans) of the company under investigation. The results also highlighted the relevance of artifacts for organizing activities. Moreover, the study led the researcher to outline the typical characteristics of a punctualized modern CU, as a result of the combination of different frameworks of analysis.

To do so, multiple methods and techniques needed to be applied. The result was two-trials moments of inscription, which drove the Heterogeneous Engineer to rethink the combination of the nodes within the network and their relationships, in order to succeed in the punctualization of the CU.

The choice of deploying ANT as a conceptual framework, a research method and an analytical framework relies both in the conceptualization of the ANT approach and in empirical evidence.

ANT creates a foundational for regarding objects as legitimate actors in organizational studies, with the aim of tracking everyday materiality (Thompson 2015). Generalized symmetry is the ontological principle that ANT adopts, equalizing both human and non-human elements in constructing a network (Latour, 1987). Given the huge number of actors that can be considered, the researcher can look at network builders as the primary actors to follow, in an attempt to open the black box of the phenomenon of interest. Hence, the researcher aims to study associations between heterogeneous actors, by tracing and understanding how things come together and manage to grasp and produce "agency effects". In this process of combination, knowledge is generated, and things "change and shape human intentions, meanings, relationships, routines, memories" (Fenwick and Edwards 2010:6). Organizations are considered as assemblages of heterogeneous social, material and practices (Bruni, 2005). It means there must be a link between education and

sociomaterial world, where the personal and the social cannot be separated from things in all educational endeavors. Material artifacts can shape workplace learning, technology implementations and all the other activities when they associate with humans, actions and meanings. They act and relate exerting their force to regulate, create or exclude forms of participations within networks

Given the nature of the abovementioned approaches, I started from the following research problem: *What does Tim Academy reveal about the dynamics of sociomaterial interplay for organizational education and learning?* Then, I overarched a central question: *How does ANT illustrate the network aspects of the CU?*

During the investigation, the many translations that occurred revealed the agency effects of both human and non-human actors to shape the TIM Academy Corporate University actor-network.

The first section of this Chapter presents the research answers. In the second section, contributions to theory are expounded. After, I will provide several implications for practice. In the last section, the Chapter explores and suggests some future research and challenges.

7.1 Research Answers

To facilitate the reader in understanding this section, the research questions are shown below:

RQ1: *How does ANT illustrate the network aspects of the CU?*

RQ2: *How do humans and non-humans act upon one another in ways that mutually transform their characteristics and activities in the CU?*

RQ3: *How do individuals and artifacts act and relate exerting their force to regulate, create or exclude forms of participations within the actor-network?*

RQ4: *How do individual and technical differences and interests influence the use of the CU?*

RQ5: *How do particular spatial arrangements encourage or constrain education and learning of the CU?*

RQ6: *What are the characteristics of the effective operating of a contemporary CU?*

To answer these research questions, I started from sociomaterial theoretical orientations, to ontologically embrace the idea of multiple realities. Alongside with Luck's (2008) position, I deployed Actor-Network Theory as a conceptual framework, a research method and an analytical framework. This allowed me to account for both material and human interactions.

Then, I first discerned between actants and actors of the network I wanted to study. Actors represent those actants who acquire an identity by repeatedly doing the same actions with the same results, in order to satisfy their own purposes. The stabilization of the connections between actors and actions result in a network. According to Callon's (1986) Sociology of Translation, this transformation can be studied as a process. First actors are single entities with their own characteristics and objectives. Then, with the intervention of a Heterogeneous Engineer, these actors are attracted into a network, with the promise that only by being part of it, they will reach their goals, with a view to mutual benefit. The actors start a series of negotiations, until they reach agreements that they consider satisfactory to become part of the network. All this translates into numerous changes between (and inside) the parties involved, whether they are human or material.

Consistent with the nature of this study, I used an inductive logic which, in turn, inevitably led me to review my research questions during the study to better fit the research problem, by embracing an emerging design with dynamic and emergent

procedures. The research was set up to trace all the connections between people, objects, events and actions as soon as they were visible, with the aim of capturing most of the actual organizing. In this regard, several observations were made during the study directly in the field (Porsander, 2005).

Multiple methods of data collection and analysis were necessary to best answer all the research questions. Accordingly, a period of 3 years of naturalization and acculturation favored a functional approach between me, as a researcher, the context of the company TIM and the informants (LaFramboise et al., 1993). Simultaneously, a two-kind of researcher introspection were undertaken in order to enhance the efficacy of the iterative process of data analysis, with a view to stimulating the derived ethics (Gould, 1995; Wallendorf and Brucks, 1993). This allowed me to account for five different sources of data: 1) data gathered from direct interactions with people, through narrative interviews; 2) data generated from artifacts, through direct interactions with things and direct investigation *in situ*; 3) data generated through passive interactions, from direct observations; 4) data collected from company documents; and 5) data collected from the outside, such as the press review. During the collection of stories, particularistic introspection was applied with the informants, to stimulate contextualized experiences (Gould, 2012; Wallendorf and Buck, 1993). This allowed a triangulation of introspective data, in the phase of data analysis (Minowa et al., 2012). In addition, two projective techniques were used with the informants for epistemic purposes. A physical moodboard for visual elicitation inspired the informants to connect humans, materials and events. The technique of noteness also drove each participant to make a list of *non desiderata* of the TIM Academy CU.

Working through multiple level of abstraction, I collected, organized and analyzed data by anonymizing informants' names. To engage in meaning-making of the data, I analyzed the data through an iterative process. This led me to define the themes, categories and codes inductively. This ensure validation to the study and accuracy of the findings, by also considering fairness in representing different views, raised awareness and relationships with informants (Lincoln et al., 2011). Hence, reciprocity was considered when interacting with people, with the attempt to review how individuals, and the organization -as a whole only partially composed by individuals-, will benefit from my study, with respect of their professionalism (Creswell and Poth, 2018; Hatch, 2002;

Weis and Fine, 2000). This triangulation also ensured validity of data collection (Yin, 2009).

ANT and the process of translation fostered mapping the trajectories of association between people, material objects, technology, ideas, administration practices and education and learning practices. Those that were previously considered multiple networks were then translated into a single network: the TIM Academy Corporate University actor-network.

Starting from a preliminary conceptualization of a HE, heterogeneous groups of actors have been attracted, deploying different strategies, towards the attempt of establishing agreements and relationships between the actors. The analysis revealed her actions to act as first intermediaries to enroll actors inside the network.

“I colleghi e [Nome e Cognome dell’HE] sono andati in America...avevamo l’opportunità di fare qualcosa di nuovo, di progettarlo al meglio e sapendo cosa il mercato offre, la letteratura, ok? ... e quindi c’è stato tutto un grande lavoro di analisi, dove faticosamente, perché non è stato facile, abbiamo capito le differenze tra: la business unit interna, la school, le academy. Le ha capite [l’HE] andando a vedere cosa facevano in America...Microsoft, Google, i top insomma...abbiamo fatto interviste... ecco, allora a quel punto abbiamo capito le differenze proprio a livello di impostazione concettuale, che poi è quella che ti guida. E quindi la TIM Academy ha questa aspirazione...”

“The colleagues and [Name and Surname of the HE] went to America...we had the opportunity to do something new, to design it better and knowing what the market offers, the literature, ok? and so there was a great job of analysis, where we hardly worked, because it was not easy, to understood the differences between: the internal business unit, the school, the academy. She understood [the HE] them going to see what they did in America...Microsoft, Google, the tops...we did interviews...then, at that point we understood the differences in terms of conceptual definition, which then it's the one that guides you. And so, the TIM Academy has this aspiration...”

Gov_EC, Knowledge Management Specialist

September 2018

After, both humans and non-humans acted upon one another. First, a literary inscription, namely the Org_Prod_Edu, imposed itself as on OPP for the six groups of actors. Accordingly, the interests of different actors were emergent effects of the

sociomaterial processes of organizing education and learning practices inside the company. ANT allowed to focus on how existing interests have been translated into something different, as a result of interactions across a network of human and non-human actors.

Once the moment of problematization succeeded, first associations showed the group of actors exerting their agency to align their characteristics and objectives. Humans and material artifacts also played a fundamental role in negotiating their positions, as shown in Table 5 (see Chapter 6), when employed as devices of *interessement*.

The moment of enrolment confirmed the roles of the different group of actors in the first attempt of punctualizing the TIM Academy actor-network, and mobilization was achieved when all the six actors accepted them and started to work as one single entity. Technologies and material artifacts influenced particular patterns of behavior of human actors. A definition of *s-objects* was chosen to describe the ability of artifacts of exerting force on humans, also influencing the use of the TIM Academy Corporate University. The findings revealed how educational and learning practices and thus, knowing, are influenced by the performativity of things. Accordingly, observing a *s-object* means “looking at the relations of which it is part, the contexts in which it is located, the practices that construct it socially and the other s-objects that cross its trajectory” (Bruni, 2005:362). At the end of the process, if relative stability can be achieved, the actor-network is black boxed. In this case, the Governance, HRS, the Online Platform, the Physical Settings, the Learners and the Line Managers behaved as *unicum* in a first “*as-is*” inscription.

However, human interests are not stable or pre-existing empirical realities. The design of a combination between humans and material artifacts will never be singular, but rather a temporary assemblage. In answering the research questions, the researcher who undertakes the long journey of ANT cannot fail to consider the notion of participatory design. The TIM Academy is embedded with social meanings, which served to facilitate certain types of interaction which constricted its space within certain spaces. The possibility to account for the analysis of the effectivity of material networks of objects and technologies, in determining the success of departments and the necessity of rethinking the signification of context, revealed different ways in which particular spatial arrangements encouraged and constrained education and learning practices of the TIM Academy actor-network (McGregor 2004). Alike Law’s (1992) study of educational

technology, materialities are active constructors of relationships and interactions, as well as the spatial configuration of the network they belong to. Contexts are materially constructed through this heterogeneous production that involve humans, things, structures. Organizing is a network effect, and “ANT explores how organizations keep themselves in place” (McGregor 2004:353). In this case, the classrooms and the Physical Settings in general revealed themselves to participate actively in the ongoing creation of the CU.

"Avendo lo spazio fisico TIM Academy, ha rafforzato lo spazio TIM Academy online, perché si rafforzano e perché noi [HRS], come addetti ai lavori li rafforziamo"
"Having the TIM Academy physical space, has strengthened the TIM Academy online space, because they are strengthened and because we [HRS], as insiders, strengthen them".

T_SV, PM and Trainer

September 2018

The ownership of the Physical Settings of the TIM Academy was a further enabling factor for the construction of the actor-network. As long as training settings were rented at other locations, both teachers and learners claimed to feel like “guests”. The awareness of being in a physical space of TIM, however, has meant that those places were associated with business training and knowledge. Not only that, the technological-material characteristics of the rooms have made the classrooms different from the traditional training spaces. They are not just classrooms in the strict sense, but:

"luoghi di ritrovo, luoghi di scambio"

"meeting places, places of exchange".

T_DS, PM & Trainer

September 2018

In this sense, special arrangements encouraged education and learning. As a result, the physical space was both an enabler of the education and learning function, and a guide for new education and learning solutions.

The same enabling capacity was not found in the analysis of the Online Platform. The large amount of critical issues associated with it highlighted in Chapter 6 has meant that, at a certain point, most of the actor-network’s human and material actors began to adopt voluntarily non-programmatic and dissident behaviors. A noticeable result is that the analysis of joint design between developers and users alone is not enough, when applying

ANT. In terms of organizational analysis, the technological tool negotiated with all the other actors, both humans and non-human, to have room for action, and eventually affirms itself. In the case of the Online Platform of the TIM Academy Corporate University, joint design failed to integrate and regulate relations not only with people, above all the Learners and the Line Managers, but also with all the other platforms and information systems involved in processes of development, provision and traceability of training.

Therefore, the HE intervened to support the survival of the CU actor-network, by modifying the original OPP into a new one: the New Online Platform. Its integral capacity has been discussed in the previous Chapter. Accordingly, it makes it possible to strengthen a second TIM Academy actor-network (which I called the “*to-be*” actor-network), making it less vulnerable to acts of dissidence. The reader will find a graphical representation of the two different inscriptions in Appendix G.

As a result:

“Le relazioni sono diventate trasversali perché... le relazioni sono tra i docenti e i loro strumenti, le competenze, le persone e... l'aspetto fisico e l'aspetto tecnologico, per arrivare, diciamo, alla soluzione ultima e...l'ambiente e le persone”

“Relationships have become transversal because...relationships are between trainers and their tools, skills, people and... the physical aspect and the technological aspect, to get, let's say, the ultimate solution and... the environment and the people”.

ITC_LDE, Coordinator of the System and Processes Area

September 2018

Overall, ANT illustrates the network aspects of the TIM Academy Corporate University, where constant interactions among human and non-human actors are constantly challenged by organizational actors. Despite this research answers to the question of identifying typical characteristics of a contemporary CU at the end of Chapter Six, the researcher or the practitioner must be aware of the dynamic nature of networks. If it is valid for technologies, then it is possible to resume Latour (1996:86) and adapt his statement to this reference context, to affirm that: for education and learning, “every day is a working day”. Only in this way, it will be possible to reach the result of the context analyzed here, where the HE managed to define an assemblage of relationships that one of the human informants proudly defined:

“[un assemblaggio] celebrativo di un luogo in cui si genera valore. Se dovessi avere un’immagine io metterei un’immagine delle cose preziose, dove si depositano le cose preziose, che può essere anche un barattolo, non lo so, però pieno di cose preziose”

“[an assemblage] celebrating a place where value is generated. If I had an image I would put an image of precious things, where precious things are deposited, which could also be a jar, I do not know, but full of precious things”.

T_SV, PM and Trainer

September 2018

7.2 Contributions to Theory

Since the boundaries between the social, the material and technology are dissolving, ANT regards the technological and material artefacts as being designed and changed by social actors who are engaged in it, without discarding the possibility for social actors themselves to be also changed through the diffusion of technological or material artifacts. (Holmström and Robey, 2005). Hence, materials have the capacity to enroll into actor-networks (Callon et al. 2002; Holmström and Robey 2005; Norén and Ranerup 2005).

Materiality has been widely investigated by organizational and management research, albeit the way in which the social and the material are constitutively entangled has long been underestimated. Moreover, the aim to show how knowledge is generated through the processes and effects of assemblages must lead researchers to investigate learning, as not simply an individual or cognitive process, nor a social achievement, but as a network effect (Fenwick and Edwards, 2010).

As shown in this study, there is an underlying link between education and the sociomaterial world, as the personal and the social cannot be separated from things in all educational endeavours. This defines learning and education as the result of a set of technological and material artifacts that are continually shaped, distributed, employed and managed within organizations. In ANTish terms, objects have the agency to shape workplace learning, technology implementations and all the other activities when they associate with human actions and meanings. This means that material artifacts, can exert their force to regulate different forms of participation inside a network, by including or excluding different actors. One actor will join the network if and only if her/his/its own interests will be safeguarded, in relation to all other actors. Alternatively, the actor can

choose to leave the network, or negotiate her/his/its position by exercising her/his/its strength on the remaining actors.

Without focusing on what things mean, but on what (and how) they exert their agency, ANT investigates their results into an identifiable assemblage: an actor-network, which is not agentic itself, but is an effect of associations. Diversely from Social Network Analysis, ANT does not represent the study of the individual actor or the social; it aims at accounting for a real essence of society and nature (Latour, 1996b). Instead of starting from social or natural universality by analyzing local contingencies, it starts from irreducible and unconnected localities, which somehow end into temporary commensurable connections. As a consequence, to study actor-networks means to abandon mathematical properties (those typical of SNA) and shift from static topological properties to dynamic and ontological properties of networks (Latour, 1996b). “ANT's key contribution is to suggest analytic methods that honor the mess, disorder and ambivalences that order phenomena” (Fenwick and Edwards 2010:1).

Despite the massive increase in literature on the role of technology and its use for educational purposes, particularly within educational contexts, these gains seem to focus exclusively on measuring the effect of implementations of technological tools. In addition, most of the studies continue to focus on school settings, neglecting those places that have become fundamental for company training, which are now spreading all over the world: Corporate Universities (CUs). The training paradigm of CUs is not simply training, but rather that of learning, conceived as a long-term process, in which the relationship between the individual and the organization is continually redefined in a partnership logic to activate learning opportunities and processes. Technological sophistication, therefore, favors that process of lifelong learning, which has become crucial for every company.

Often, CUs are realities that take the form of structures separate from the company to which they belong. They devote themselves to the provision of training services, through innovative organizational models. Therefore, they are entities devoted to the strategic development of the individuals and the overall organizational learning (Allen, 2002; Iannotta et al., 2016). That is, learning is not only a human activity undertaken within physical classrooms, but it can also happen in different sites (Bell, 2010; Iannotta et al., 2016). The blurred boundaries between education, business and educational institutions contributes to the rise of CUs (Taylor, 2010). Their sophistication makes an extensive use

of ICTs, creating new opportunities for the development of education and learning processes and spaces of interaction (Homan et al. 2005).

With the study of multidimensional networks, material artifacts can be moved inside traditional social networks. As a consequence, they will become endogenous variables. In turn, organizations can be considered as assemblages of heterogeneous social, material and practices (Bruni, 2005).

This study meets the need to overcome “the blindness toward the question of how educational practice is affected by materials” (Sørensen, 2009:2). At the same time, it sets the ground for an in-depth analysis of knowledge generation, “that is so often missed in studies of learning” (Fenwick and Edwards, 2010:29). Assuming that sociomateriality is an unavoidable approach for a complete study of the organization as a whole, one must acknowledge its limited capacity to provide guidance in specifying how researchers can represent sociomaterial relations empirically (Contractor et al., 2011). Hence, I ontologically embraced the idea of multiple realities from sociomaterial theoretical orientation, while employing the study of material and human interactions from advancements in structuration theory and Actor-Network Theory.

ANT allows for analyzing these assemblages by looking at how they are created, destroyed by counter-networks, or black boxed. In the processes and effects of assemblages, knowledge is generated. By opening a black box, the researcher is able to investigate the different ways in which a variety of social and technical elements are associated, in a possible durable whole (Callon, 1991; Cressman, 2009).

A possible modality to open a black box was provided by Callon in 1986, which is Sociology of Translation. Through a long process of negotiations and alliances between actors, that Callon divides into four moments (deepened in the previous Chapters), a more or less stable network can be formed. When translations become stable, inscriptions or punctualizations may occur. As a result of analysis of this research, the phenomenon of mutual translation occurred. This means that researchers must account for both human and non-human actors when trying to translate the design of an education and learning actor-network, such as a CU. Then they must be aware of the fact that different actors, or group of actors, have different power. Through the investigation of these power relations, researchers will be able to accept the capacity of material artifacts and non-human actors to shape other actors' behaviors. This contributes also in understanding phenomena of

transformations and technological implementations inside organizations not only *ex ante*, but also *ex-post* the constitution of an actor-network.

Nevertheless, it is still a difficult task to understand and appropriate an ANT logic. This is because there are no real manuals of reference, but only debates and reflections on it, or empirical contributions that devote little space to the deepening of methodological aspects. The situation is then further complicated when a researcher wants to get her/his hands in the dough. This study aims to be a contribution from this point of view, and to provide the researcher -or whoever is interested in the subject- a track on which to trace her/his research.

This study contributes to the advancement of knowledge with further progress. In his *Sociology of Translation*, Callon (1986) does not consider the possibility of keeping a network alive by modifying the OPP. Instead, in this case, it was the foresight of the HE to understand the sociomaterial changes that were taking place, which kept the TIM Academy CU alive, by changing the OPP. This decision seems to be also able to prevent further moment of dissidence, and to strengthen the relations among the actors.

The conceptual framework developed in this study also allows to account for multiple transformations that education and learning encounter within organizational settings. Accordingly, this research contributes to the theoretical advancement on knowledge management. Knowing is the result of the enactment of connections among different things continually performed, while evaluation of learning concerns how knowledge circulates to enroll, mobilize and stabilize in spaces of multiplicity and uncertainty within particular practices (Fenwick and Edwards, 2010). Therefore, this work also contributes to show how ANT can serve as a valid framework, to complete and integrate both the social learning theory and the sociomateriality perspective. Organization theory will benefit from this study, by looking at the organization as a heterogeneous set of humans and non-humans, both capable of exerting power, in a continuous process of modelling and adaptation.

Furthermore, by conceiving knowing as a result of the enactment of connections among different people and things continually performed, the theme of lifelong learning can be studied and promoted.

7.3 Implications for Practice

The four moments of translation not only can drive the researcher to investigate an actor-network of interest, but also practitioners would benefit from it to elaborate on negotiations, power relations, transformations and processes of change that occur within their organizations.

ANT aims to understand how local and global levels influence one another, by looking at both humans and objects. The latter can act and relate exerting their force to regulate, create or exclude forms of participations within networks. As a result, objects have their own agency and can influence human actions. This agency is also a result of negotiations and consequent assemblages of people, objects and technologies.

From an organizational and managerial point of view, this can have some relevant implications. First of all, the possibility to account for the analysis of the effectivity of the material networks of objects and technologies in determining the success of organizational initiatives, process changes, new organizational implementations, and so on. This will allow us to overcome an outdated concept of objects as mere products of human design, or as empty tools advancing educational practices and performance (Waltz, 2006).

If we shift these considerations to the sphere of education and learning, managers will understand how materialities are not empty tools, but active constructors of relationships and interactions between and with people, as well as the spatial configuration of the network they belong to. However, particular attention must be paid to cases where there is a discrepancy between the results deriving from data collection, and the objective reality that one intends to study. Specifically, where the results of the triangulation between what is reported in the narrative interviews and the participant observations are not coherent with the reality, the recipients of the research will be able to draw important implications. The first, and most important, concerns the possibility of thinking or re-thinking a massive campaign of internal and external communication, to fill any information asymmetries and to align the knowledge of such a powerful tool, such as the one under examination.

This thesis provides an empirical investigation on how contexts are materially constructed through this social and physical heterogeneous production of spaces that

involve humans, things, structures, actions and ideas, by conceiving the organization as a network effect (McGregor, 2004).

In line with Gherardi (2001), the TIM Academy CU actor-network showed how education and learning practices and devices enable the construction of a representational system that can be used to analyze the organizational processing of knowledge: the Corporate University of TIM S.p.A.

On the empirical level, these findings are not to be underestimated. In an era where problem-based solutions and experiential approaches to professional learning are increasingly encouraged, there is a necessity of investigating multiple perspectives and ontologies, in order to achieve a certain degree of coherence. By doing so, companies will be able to adopt new ways of involving, connecting and interesting individuals, with the aim of stimulating personal learning and development. This study offers a multi-step approach to explore in-depth the underlying practices and changes of a modern CU, both in human terms and in material terms; and therefore, in organizational terms. Moreover, it reveals the dynamics of sociomaterial interplays that are involved in the implementation of a new educational structure.

Additionally, lifelong learning is fundamental for the full development of all workers. Participation in lifelong learning programs not only facilitates the acquisition and/or updating of knowledge and skills, but also of counteracts their obsolescence over time. In understanding in detail what contributes to the training and learning processes, all the people involved will benefit from this approach.

The approach has also another important strength: it allows for understanding the underlying reasons behind the enforcement of standards and knowledge, by making them visible.

On the one hand, the researcher or the practitioner will be able to connect the empirical observations of actors involved, by redefining their roles in the organization. In this way, they will derive and advance joint understandings of the roles that humans and non-humans, such as technologies, play in the enactment and maintenance of the CU.

On the other hand, by adopting a sociomaterial perspective managers should encourage both trainers and learners to recognize those material details that tack together their practice, knowledge and environments (Fenwick, 2014). That is, learning occurs as a result of a situated performance of a practice inside a network of human and non-humans, symmetrically associated in an ongoing enactment. Consequently, they will

become aware of the reasons why material artefacts influence their processes of education and learning (limiting or favoring them) and the reasons behind the stabilization of some practices over others, together with possible correlated problems, in the case of non-programmatic behaviors.

From a physical and material standpoint, this study highlights the spatializing force of objects within the CU. Artifacts such as company laptops, company badges, emails, cameras, are implicated into the construction and development of the education and learning space. The simple implementation or negotiation of a convenient space for training and learning, does not ensure the maintenance of the technical artifact. In order to be able to affirm itself within the network, it must be able to forge alliances and relationships with all the other actors of the network. Spatial arrangements demonstrated to exert power of limiting (after the first moment of mobilization), and encouraging (after the second inscription and punctualization) training and learning behaviors. These results will support in managing the phenomena of distant learning, e-learning and blended learning. Moreover, this study reveals the importance for managers to focus on a broader level of organizing and structuring their initiatives. To recognize and value such intervention is an effort with a very high “return on investment,” both for the practitioners themselves and for the organizations that may benefit from such insights. If insufficient attention is given to artefacts and intermediaries, the network risks to break down.

In this sense, both human and non-human actors have power and actively build organizational configurations. Once these concepts are understood, each new implementation can be carried out strategically and must be accompanied by flexible practices and policies, in turn capable of progressively generate implementations with emerging changes.

7.4 A Look at Future Research

In this final section, some recommendations for further research are explored.

Overall, it is possible to borrow Bruni’s (2005) consideration and adapt it to this context of analysis: the Corporate University (understood in all its materiality) has become a constitutive element of expertise and a fundamental knowledge incubator in the company I had the opportunity to analyze. All its materiality, thus, constitutes its infrastructure, understood as a relational process of specific organizational practices. This

reason can equally be extended to virtual settings. Any kind of *a priori* judgements regarding the relative significance and combination of social and material aspects do not have real meanings, and learning is an activity distributed between humans and non-humans (Bruni et al., 2007). Their jointly structure is the result of an ecology of people, materials and symbols. Hence, the CU is what makes the company a learning organization.

The stability of the CU depends on every actants and actors who participate in it, and their narratives of translation. If these translations succeed, the CU can become black boxed.

A first research advancement could derive from keeping on monitoring and assessing the network composition after the first period of introduction of the New Online Platform, within the company of reference. Will the missing actor be able to fully join the TIM Academy actor-network? If so, with what consequences?

A second interesting research path would be the attempt to study in parallel a dominant network and its counter-network, which, as far as I know, has never been done.

Third, this research focused on the TIM Academy actor-network, studying it in the location from which all of its story has begun. This allowed the researcher to come into direct contact with the first promoters and users of the CU. However, I think it would be interesting to study the stories of sociomaterial dynamics that take place in settings other than the territories in which the TIM Academy actor-network has its main locations and activities.

Finally, academic research could benefit from a comparative analysis between different typologies of CUs. To provide an example, different interplays between human and non-human actors may occur by comparing different generations of Corporate Universities, as well as for CUs belonging to different lifecycle stages.

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Appendix A

Basics Steps for Eliciting Narrative Interviews

STEPS	RULES
Preparation	Exploring the field Formulating exmanent questions
Initiation	Formulating initial topic for narration Using visual aids Using projective techniques
Main Narration	Not interrupting Using non-verbal encouragements to continue storytelling Waiting for the coda
Questioning	Using “What happened then?” questions Not expressing opinions and attitude questions Not arguing on contradictions Not using why-questions Moving from exmanent into immanent questions
Concluding Talk	Stop recording Why-question allowed Memory interview guide immediately after interview

Table 6: Basics Steps for Eliciting Narrative Interviews. Source: Jovchelovitch, S., Bauer, M.W. (2000). Narrative interviewing.

Appendix B

Interview Guide

Guide	Notes	Min.
1) Time of Interview		
2) Date		
3) Place		
4) Interviewer		
5) Interviewee		
6) Description of the project		
7) Questions: <ul style="list-style-type: none"> - Would you tell me the story of your relationship with Tim Academy? - Would you tell me one or more crucial events related to Tim Academy? - Could you tell me what you think about the Tim Academy infrastructure? 		
8) Demographic Data <ul style="list-style-type: none"> - Sex - Age - Role in Tim 		

<ul style="list-style-type: none">- Role in Tim Academy- Years in Tim		
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Table 7: Research interview guide. Source: Own elaboration.

Appendix C

CU Items Checklist

Functional Profiles	Sample Statements	Processes	Notes	Min
Organizational Profile	A clear vision and mission for supporting learning performance in our organization	Strategy/Mission		
	A well-defined strategy for executing the company's learning function	Strategy/Mission		
	Governing board is active in promoting the corporate university internally and externally	Governance		
	Governing board is involved in advising direction for our operational and strategic goals	Governance		
	Centralized vs decentralized models in terms of workflows and authority relationships	Structure		
	Life-cycle stage in terms of size, years in existence, processes and recognition	Stage of development		

Learning Delivery Profile	Provides skill-based and/or job-based programs customized for specific business units	Curriculum		
	Provides competency-based curricula for entry-level employee learning	Curriculum		
	Provides competency-based curricula for executive-level leadership development	Curriculum		
	Offers learning programs that focus on developing a common corporate vision, corporate citizenship, and/or corporate culture	Curriculum		
	Offers workplace learning development programs to employees (i.e. coaching initiatives, mentoring programs, job rotation, etc.)	Curriculum		
	Programs target specific employee groups (internal audience, in broad terms)	Learner Population		

	Extends learning programs offering to external parties	Learner Population		
	Evaluates learning programs by distributing reactions questionnaires to participants at the completion of the learning programs	Evaluation		
	Evaluates learning programs by measuring and testing participants on new knowledge and skills at the completion of the learning programs	Evaluation		
	Evaluates the transfer of learning to the job role/tasks sometime after the completion of the learning programs	Evaluation		
	Evaluates learning programs by measuring organizational-level results and/or impact to the business units	Evaluation		

	Evaluates learning programs by measuring ROI for learning efforts	Evaluation		
	Works together with the line managers to determine requirements and design learning programs	Working w/Business Units		
Operational Profile	It is founded or it has financial autonomy	Financing Sources		
	Uses a comprehensive LMS	Technology		
	Supports learning programs via online (distance learning) technologies to employees	Technology		
Partnership profile	Outsources the design and/or the delivery of classroom-based learning programs	Outsourcing		
	Outsources various online learning programs	Outsourcing		

	Outsource infrastructure technology needs	Outsourcing		
	Partners with academic universities for credit and/or degree programs	Academia		
	Partners with academic universities for customized design and/or delivery of non-credit leaning programs	Academia		
	Partners with academic universities for faculty exchange and/or faculty development programs	Academia		
	Partners with Corporate HR to analyze employee development needs for new learning programs	HRM		
	Partners with Corporate HR to develop reward systems that recognize employee learning accomplishment	HRM		

	Creates learning programs aligned with Corporate HR Performance Appraisal Processes	HRM		
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Table 8: CU items checklist. Source: Own Elaboration. Adapted from: Lui Abel and Li (2012).

Appendix D

Observational Protocol

Date:	
Length of Activity:	
Descriptive Notes	Reflective Notes
1) General:	...
2) Layout: <ul style="list-style-type: none"> - Offline dimension - Online dimension 	...
3) Pictures <ul style="list-style-type: none"> - Offline dimension - Online dimension 	...
4) In-depth descriptions <ul style="list-style-type: none"> - Offline dimension - Online dimension 	...
5) (Sketches)	...

Table 9: Observational protocol. Source: Own Elaboration.

Appendix E

The Moodboard

These are the images and pictures I have submitted to all the informants. We talked about it for a long time together with everyone. Then each of the informants, having available white sheets and colored feathers, decided to arrange them to her/his liking. At the same time, they traced with me the story they had told me during the narrative interview. Some gave titles to the images, others only related them to each other using the felt-tip pens, as I asked them.



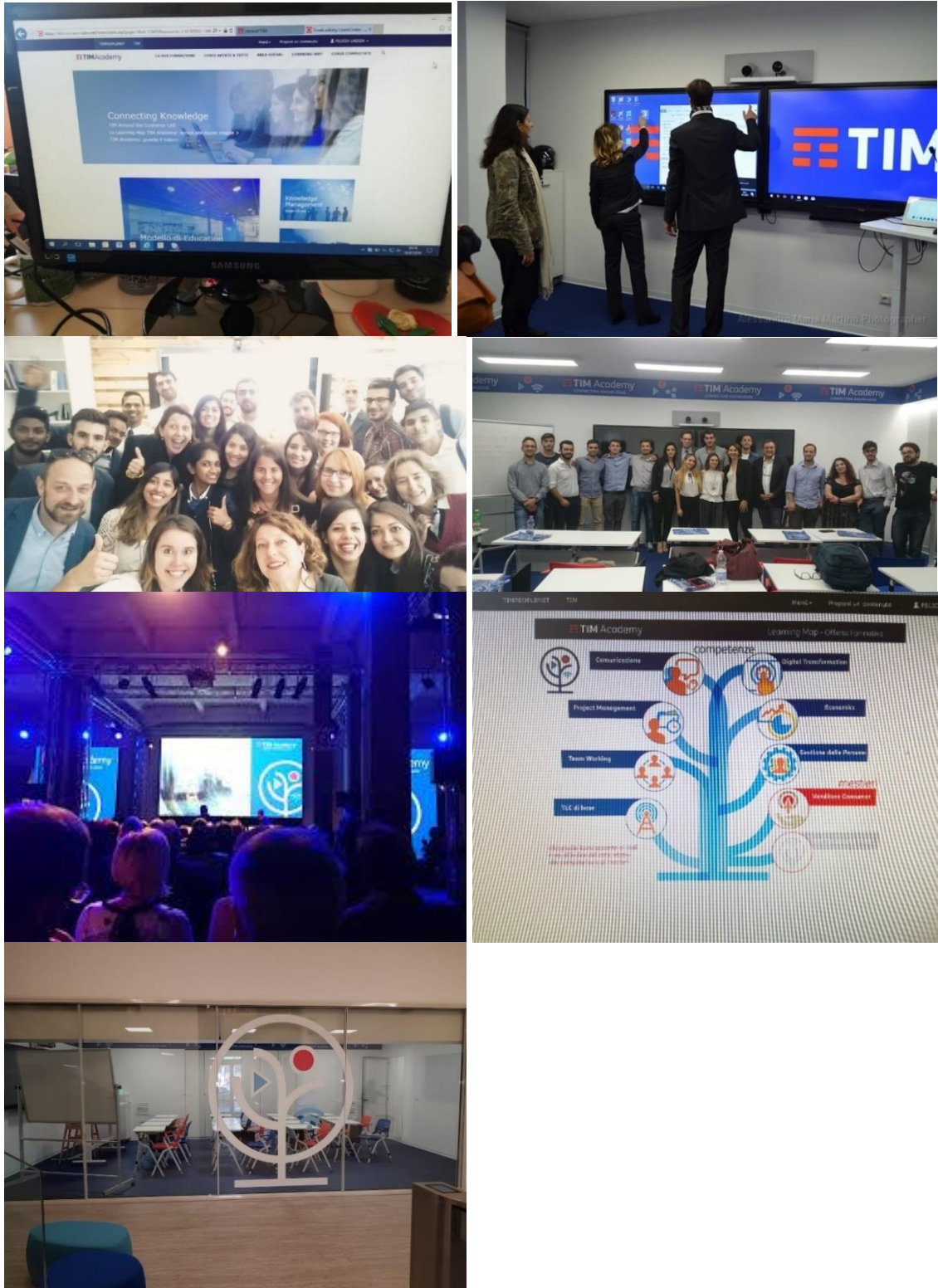


Figure 18: Pictures for the moodboard technique.

Some of the informants decided to exclude some figures, sometimes because some of them were quite similar, or because they thought they were irrelevant, according to their stories.

Figure 19 provides an example of the outcome of one of the informants' moodboard:



Figure 19: Example of one the informants' moodboard.

Appendix F

An example of codebook for theme “Anti-programs”

Table 10 shows an extract of the overall codebook, used to guide the researcher in analyzing the data.

Alongside the columns of themes, categories and codes, it is useful to provide a definition of the reference category. For the sake of completeness, text segments from different narrative interviews have also been reported.

This procedure was useful across all the loops of the data analysis process presented in Chapter 5.

Themes	Categories	Codes	Definitions	Segments of text
Anti-programs	Internal Communication	Ineffective communication	Any evidence referring to internal communication of TIM Academy functioning	“We should somehow spend much more time to make these [initiatives] known...how many contents there are at the disposal of colleagues, then just the tool...yes, because here there are so

		Effective communication		<p>many contents usable for all and we should be good at communicating the existence [of these possibilities], even of more than what we do now”.</p> <p>“...there was this moment of launch, very important and very engaging...so much that when we had to launch the physical settings we recalled to people the memory of the launch event that was done a year before”.</p>
	Role overlap	Discomfort	Any evidence referring to role overlaps in the education and learning process	<p>“...we, together with governance...in fact, it is the governance that decides the macro-regions, but we then help [the governance] to apply them and to make them operational at the project level”.</p> <p>“You completely change your work, because</p>

		Autonomy		from many operational things you have to do today, you go on doing things that still require operational roles, but they are moved to the communication of the project, on the management of these communities for example, that is, you it changes the type of job...even the type of service, yes...with the overcoming of some overlapping of roles”.
	Usability	Friendly	Any evidence referring to online and offline usability of TIM Academy facilities	“...many things are not really user friendly, that is to launch a course you have to make two thousand clicks...so now we are working on it...it will be something much closer to what we are used to...more interactive, more user friendly”.
		Unfriendly		

Table 10: An example of codebook. Source: Own Elaboration.

Appendix G

A graphical representation of the “*as-is*” TIM Academy actor-network and the “*to-be*” TIM Academy actor-network

Anthropomorphising is a phenomenon that can occur when constructing an actor-network (Czarniawska, 2005; Prosander, 2005). Here I will use the analogy of body for shaping the relational links between actors, both humans and objects. The lines between the actors represent the connections that link them. In both cases, the positioning of the actors is not random. Clearly, these graphic representations are not exhaustive of all the actants encountered during the analysis. However, they provide a comprehensive picture of the major results.

When looking at the “*as-is*” TIM Academy actor-network (Figure 20) in the next page, in the head there is the HE, as the creator of the entire actor-network. The bust is represented by the Org_Prod_Edu, as the first OPP. Without a solid structural system, the network is not able to support, so in place of the feet there are the Physical Settings and the Online Platform. Everything is moved by the legs, in whose places there are the Governance and HRS. The hands, represented by the Learners and the Line Managers, move as a consequence of the relationships between the remaining actors and the material artifacts connected to them.

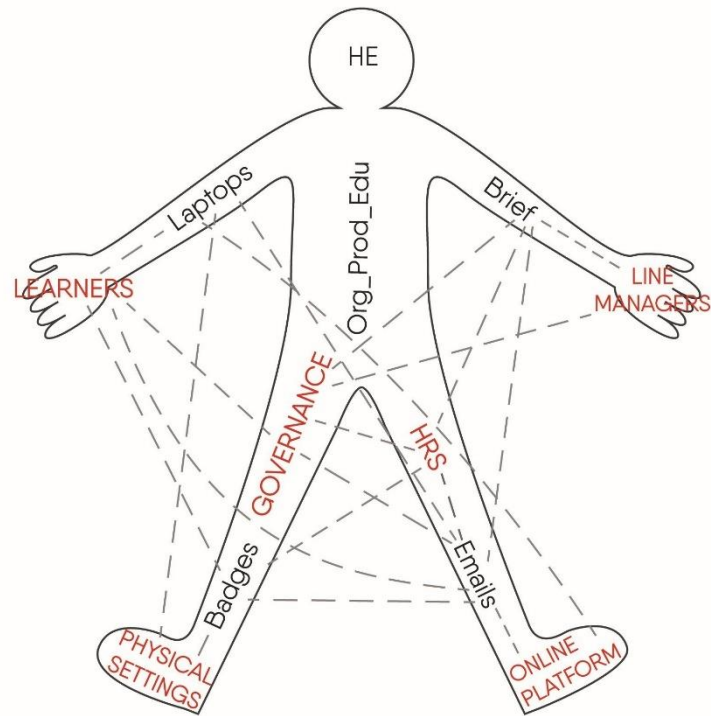


Figure 20: The “as-is” TIM Academy actor-network. Source: Own elaboration.

Figure 21 illustrates the “to-be” TIM Academy actor-network. In the head the reader can still find the HE, as the creator and maintainer of the whole actor-network. The New Online Platform replaced the first OPP in the trunk. The Governance and HRS still maintain the positioning of the legs, as the source of movement of the actor-network. What supports the network are now the Physical Settings and Learners, having to take the proactive role of generators and promoters of contents. The Line Managers maintained their original position. Instead, active material artefacts of the network changed. To provide an example, the Learning Algorithm represents the shoulder to lean on for developing education and learning paths, according to the different modalities that were outlined in the previous Chapters. Finally, the reader will notice that the figure has a broken arm. It represents the difficulties related to openness to the outside world, the missing actor nominated by more than one informant.

This representation confirms the temporary nature of actor-networks, since the company hopes for the full entry of the missing actor. This will clearly lead to consequences on the final representation of the actor-network, and therefore, on its punctualization.

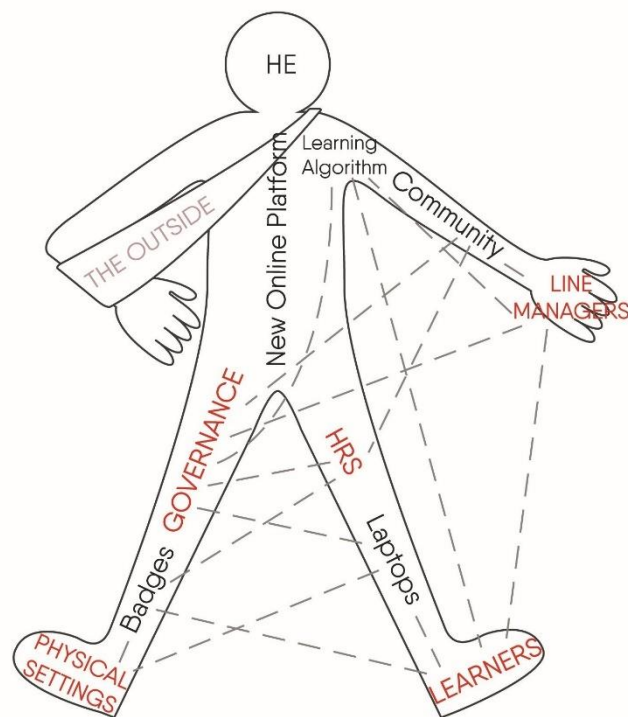


Figure 21: The “to-be” TIM Academy actor-network. Source: Own elaboration.