

Integrating time and knowledge to understand organizational evolution: towards a conceptual framework

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Abstract

Purpose – How does the interaction between time and knowledge affect the evolution of organizations? Past research in organizational evolution has mostly investigated time and knowledge as two separate variables. In contrast, theoretical perspectives integrating these variables are still seemingly scant. The authors believe that filling this literature gap needs attention. Thus, this study aims to contribute by developing a conceptual framework.

Design/methodology/approach – This is a conceptual study. The framework is centred on the concept of “co-evolutionary time”, which the authors explain through a business example from the tourism industry. Supported by a narrative-based style, from a methodological point of view the framework is featured by the attempt to synthesize specific, extant literature into new theoretical development.

Findings – As its main theoretical contribution, the co-evolutionary time suggests how firms can adapt in a way that, from an evolutionary perspective, proves fitting both in terms of contents and methods, thus opening possibilities for new long-term social construction and reconstruction. As its main practical contribution, co-evolutionary time can constitute not only a temporary source of organizational success and competitive advantage but also an agent of enduring change and long-term business survival.

Originality/value – As its main novelty, the framework is developed through merging two literature streams. In particular, the authors first consider the literature about time, with a focus on its objective and subjective dimensions. The authors then consider the literature about organizational evolution, with a focus on the co-evolutionary nature of the firm/environment relationship.

Keywords Knowledge, Conceptual, Time, Management, Co-evolution

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1. Introduction

How does the interaction between time and knowledge affect the evolution of organizations? When studying the antecedents and outcomes of organizational evolution, management scholars substantially agree that time and knowledge play a key role (Mosakowski and Earley, 2000; Ancona *et al.*, 2001a; Kunisch *et al.*, 2017).

Past research in organizational evolution has, over time, mostly focused on investigating time and knowledge as two separate variables. On the one hand, for example, the “liability of newness” research stream (Stinchcombe, 1965) has studied time dynamics regarding the struggle for survival between new-born firms and their mature counterparts; on the other hand, in parallel, research on dynamic capabilities (Teece *et al.*, 1997) has progressively advanced the role of knowledge as the most significant capability influencing organizational competitiveness (Nonaka and Takeuchi, 1995; Grant, 1996). In this view, in substance, learning organizations (Senge, 1990) are those able to activate processes of exploration and exploitation of new knowledge (Zollo and Winter, 2002).

In contrast, however, scholars have devoted less attention to developing an integrated, theoretical perspective explaining why, how and when organizational adaptation and evolution ultimately result from the interaction between time and knowledge (Paniccia, 1999; Ancona et al., 2001b; Li et al., 2023). We believe that filling this gap appears important in the organizational evolution research field. For example, let us consider COVID-19; *ceteris paribus* in terms of time scarcity, only those firms able to appropriately combine time with knowledge have survived the disruptive environmental turbulence.

The above introduced, in this article, we seek to provide a theoretical contribution by putting forward a conceptual framework which, from a methodological point of view, is featured by the attempt to synthesize specific, extant literature into new theoretical development (Makadok et al., 2018; Thatcher and Fisher, 2022). In this regard, the structure of the article is as follows. In Section 2, firstly, we consider that literature about time which, focusing on its *objective* and *subjective* dimensions, has provided insights on how the interplay between these dimensions can improve the firm/environment/society relationship (Shipp and Jansen, 2021). Secondly, we consider the management literature about organizational adaptation (Sarta et al., 2021), highlighting how the perspectives about *co-evolution* (Sandhu and Kulik, 2019; Breslin et al., 2021) have reduced the long-standing dichotomy between environmental determinism and strategic voluntarism (Astley and Van de Ven, 1983; Hrebiniak and Joyce, 1985). Accordingly, in Section 3, we develop a framework centred on the concept of “co-evolutionary time”, which we explain through a narrative-based style (Cornelissen, 2017) featured by a business example from the tourism industry. In Section 4, we discuss the main theoretical contribution of this framework, while in Section 5 we combine a time management perspective with a firm’s life cycle perspective to prospect key avenues for research and practice. Section 6 concludes our work.

As its core theoretical contribution, our conceptualization of co-evolutionary time suggests how firms can adapt in a way which, from an evolutionary perspective, proves fitting both in terms of contents and methods, thus opening possibilities for new long-term social construction and reconstruction (Jansen and Shipp, 2019). This conceptualization, in parallel, also presents practical implications. In particular, if appropriately adopted, co-evolutionary time can constitute not only a temporary source of organizational success and competitive advantage but also an agent of enduring change and long-term business survival. In fact, we know that firms aiming to be competitive forces need to constantly verify whether they continue to behave as systems and whether their capabilities continue to be appropriate for survival and prosperity (Bansal and DesJardine, 2014; Barile and Saviano, 2018). To date, however, it is a matter of fact that competitive and/or environmental dynamics (e.g. COVID-19) provide firms with multiple challenges that are not always easily understandable. The effects of these dynamics result in disruption in terms of decision-making certainty, with organizational adaptation always appearing more difficult (Levinthal, 2021).

2. Theoretical background

Time is among our most precious instruments of orientation. This utilitarian conceptualization stems from considering that, by definition, thanks to every system of time orientation and measurement individuals are able to quantify their lives, give significance to their existence, and synchronize their activities within their social groups (Paniccia, 2002; Facer et al., 2021). Historically, this conceptualization has been of fundamental importance; it has revolutionized the ways through which time has been interpreted and organized, determining the separation between the temporality of ancient and modern societies, with the former centred on human beings and the latter on natural phenomena (Elias, 1991; Ancona et al., 2001a). Of course, the argument is also valid for firms as they comprise persons and effects.

From the beginning, we must acknowledge that, together with the *objective*, mechanistic dimension of time, its *subjective* (or socio-cultural) dimension (Shipp and Jansen, 2021) also exists. The relationship between the two is osmotic, as also highlighted by the sociological and biological research in the past century (Sorokin and Merton, 1937; Gurvitch, 1958; Coser and Coser, 1963). The objective time dimension has its theoretical roots in the mechanistic interpretation of the universe (i.e. time as objectively given) and is at the basis of Isaac Newton's *physical-mathematical* time. Specifically, time is intended here as an objective flux; it is linear, constantly progressing and follows the rules of mechanics, continuous and uniform motion. As such, objective time is not only univocally perceivable but also measurable through mathematical methods. The subjective dimension, instead, has its theoretical roots in Albert Einstein's relativistic conceptualization of time (i.e. time as subjectively perceived) and is at the basis of the sociological and biological approaches to time. In this socio-cultural perspective, time is an *experienced* flux, existing in the mind of who perceives and interprets it (hence, the qualitative perception of the temporal duration). Time expresses the change of social phenomena in relationship with others.

When osmotically adopting the two dimensions above, the firm's activities and processes flow orderly, synchronously and harmonically (Jansen and Shipp, 2019; Li *et al.*, 2023). Specifically, the osmosis between the two dimensions suggests that time is not only a (fruitless) mathematical succession, rationally conceived, of temporal units. Time, in contrast, is much more, being a critical succession of experiences which generates knowledge. Thus, we should pay attention not only to time as a quantity, measured by a clock but also to its quality, which is the *time of experience*, i.e. the time internally lived by individuals (Geiger *et al.*, 2021). The latter is a main learning source for persons, groups and even organizations. In fact, firms, as human beings, also hold a qualitative perception of time, which they live and use differently according to their needs, searching for the most fitting level of synchronization with them [1].

The physical-mechanistic time has always been fundamental to accomplish the regulation and synchronization of processes/activities both at intra- and inter-firm level. Typical of Taylor's (1911) Scientific Management, in the XX century, this objective time view has been a key driver of the firm's business model based on the assembly line. More recently, this view has also substantiated various perspectives; for example, the *time-based competition* has stressed the strategic value of speed (Stalk, 1988; Clark and Fujimoto, 1991), while *time management* has focused on the use of time as a skill to increase human and organizational performance (Malhotra, 2005; Claessens *et al.*, 2007). Subjective time, instead, becomes distinctive to orient the firm's dynamics because it provides a temporal connotation to the deepest needs deriving from the firm's – and its individuals' – emotional and cultural sphere. In this view, time clearly assumes a cultural aspect, distinctive for every firm, and thus represents a form of knowledge, which is key for strategic positioning. Hence, we argue that the objective time dimension proves functional to its subjective dimension in determining any firm/environment co-evolutionary relationship (Grodal *et al.*, 2015).

In our contemporary society, we normally try to connect what happens with other past, significant events impressed in our memory. Likewise, the history of a firm chronologically serves as a reference point for its memory (Kunisch *et al.*, 2017). History could not exist without a collective memory, and thus, it would not be possible to understand the succession of events and simultaneity. Firms, as human beings, could not evolve without a historical memory of themselves. In this regard, the need to emphasize the socio-cultural dimension of time does emerge: the set of behaviours towards past, present and future time is part of the firm's history. Hence, the concept of the *temporal perspective* derived from psychological and sociological research (Coser and Coser, 1963; Abualqumboz *et al.*, 2021) and, especially, the importance for the firm of its orientation to the future.

The firm's historical memory is strictly tied to its identity. As part of a community and even wider communities, first of all, firms need to build an identity, which they have to show to the environment to demonstrate distinctiveness; otherwise, they would become only a number. Being subjective, the nature of this effort is based on organizational reasons that differ from each other. Furthermore, this effort leads firms to behave subjectively in light of past/present/future events, which they interpret differently and live emotionally (Langley *et al.*, 2013). Thus, the mathematical measurement of time is no longer enough and the need for its qualitative contextualization also emerges. This means integrating, but not overcoming, the objective dimension [2].

Furthermore, concerning any firm's life cycle, we should also consider what is highlighted by the biological perspective when considering time in the evolutionary meaning of social phenomena. Specifically, thanks to this vision of time as an evolutionary factor *per se*, we can individuate the changing status of every phenomenon because of its shift from past to future (Geiger *et al.*, 2021). For example, this appears particularly significant when we consider how the processes regarding the management of cross-border knowledge work (Pereira *et al.*, 2023). Relatedly, this leads to carefully evaluate the implications, on firms' decision-making and actions, deriving from time irreversibility; for better or worse, what is decided and done ineluctably impacts the firm's life. In this regard, as recent research also suggests (Scuotto *et al.*, 2022), a key role is played by the leaders' behaviour; in fact, especially transformational leadership can prevent firms in general, and their employees in particular, from knowledge hiding.

Far from being an empty flux, the socio-cultural time produces effects; in other words, it is a creating agency, which transforms multiple biological, social and cultural processes. If we do not consider this key aspect, we cannot explain the relevant processes of organizational change.

2.1 Firms, environments and co-evolution

In natural sciences, *adaptation* is commonly considered the process in which living beings constantly search for survival. This survival can occur because some living beings, more than others, have (or implement) appropriate resources/capabilities; those living beings that successfully adapt then reproduce themselves and, as a consequence, evolve. Since the landmark work by Charles Darwin (1859), natural scientists have, for a long time, largely explained adaptation as a mostly deterministic (i.e. environmentally-driven) process. In other words, the environmental natural selection has been considered predominant against living beings, with adaptation largely seen as a process of (almost) pure *struggle for survival* (Hodgson, 2013).

In the management literature, when analysing the firm/environment relationship various well-known perspectives have *de facto* embedded determinism. As their main linking pin, these perspectives have substantially considered organizational adaptation as a process in which firms are *object* of the environment (Cafferata, 2016). Over time, however, various adaptation perspectives labelled as *voluntarist* (i.e. contrasting determinism) have also seen the light. In particular, the main linking pin between these perspectives has been their strong belief in the possibility of strategic free will, intentionality and proactivity (i.e. firms as a *subject* of evolution). Arguing that firms are mostly the expression of the subjective bounded rationality of their top decision makers, these perspectives have substantially maintained that firms can be/become also mostly independent of their context (Stoelhorst, 2008).

To date, the determinism/voluntarism dichotomy has been, with no doubt, significantly reduced (Levinthal and Marino, 2015; Sarta *et al.*, 2021), with various theoretical perspectives progressively developing a consensus in conceiving organizational adaptation as a firm/environment relationship based on *sense-making* (Weick, 1969) and

circularity (Benson, 1977). In this regard, the concept of *co-evolution* has emerged, over time, as the red thread among these perspectives. In natural sciences, co-evolution refers to the mutual evolution of two species of living beings and adheres to the following three principles (Janzen, 1980; Thompson, 1982): one species: one species (i) *specifically* determines the evolution of a genetic trait in one another, with this evolution being ii) *reciprocal* and (iii) *simultaneous*.

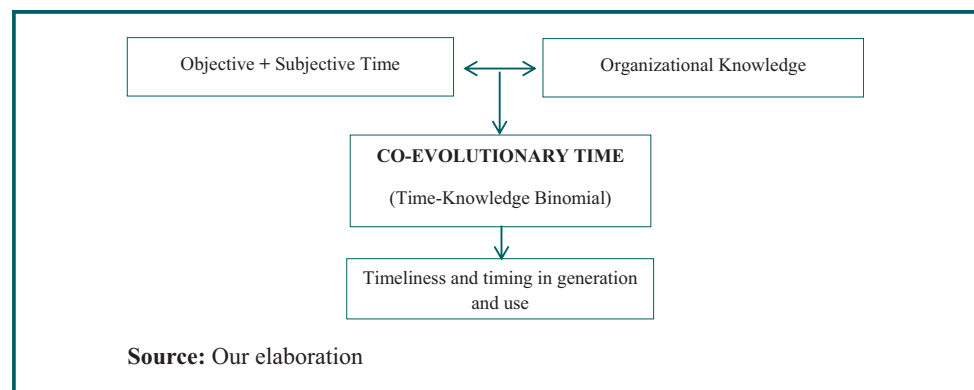
Conceptualized, at the beginning, as the combined effect of firms' proactivity and environmental determinism (Lewin and Volberda, 1999), in the management literature co-evolution has gradually given birth to different theoretical developments (Spisak et al., 2015; Breslin et al., 2021) and empirical analyses (Avila-Robinson et al., 2019; Sandhu and Kulik, 2019). In particular, the study by Langton (1984) of the pottery industry in the UK is one of the first analyses embracing co-evolution, whose adoption has then become prosperous from the 1990s. With this prosperity being seemingly consolidated to date (Abatecola et al., 2020a), co-evolution has been used to study a number of competitive dynamics, such as those regarding innovation (Volberda et al., 2014), trust (Weber, 2017), industrial emergence (Murmman, 2013) or ecosystem legitimization (Thomas and Ritala, 2022). While heterogeneity has also regarded the industrial contexts under investigation, homogeneity has mostly constituted the research methods, among which qualitative inquiries have largely prevailed (Van Driel et al., 2015; Abatecola et al., 2022).

3. Towards a co-evolutionary perspective on the time/knowledge relationship

Integrating the objective and subjective dimensions of time conceptually allows reaching a strong nexus between time and knowledge. In other terms, we argue that the subjective time dimension is a form of knowledge enriching of meaning its objective dimension (Jansen and Shipp, 2019; Shipp and Jansen, 2021). This conceptualization, however, still remains generally tied to sociology. Going beyond, if we associate time, in its double objective/subjective dimension, with organizational knowledge (Polanyi, 1967; Del Giudice and Maggioni, 2014), we obtain what we call here "co-evolutionary time" (or "time-knowledge binomial", see Figure 1).

In Figure 1, we show co-evolutionary time as the expression of the dialectical relationship between different and multiple cultural values, which substantiate the firm's existence through its development (Cafferata, 2016; Paniccia and Baiocco, 2021). In other terms, co-evolutionary time is the organizational knowledge that, embedding organizational learning (Senge, 1990; Jansen and Shipp, 2019), is enriched by the characteristics of

Figure 1 Co-evolutionary time: a conceptual representation



timeliness (i.e. rapidity) and *timing* (i.e. punctuality), which means by a future-oriented temporal perspective (Conte *et al.*, 1998; Ancona *et al.*, 2001a).

The temporal perspective substantiates the mode through which individuals and organizations relate to their past, and to their future, beginning from their present. Thus, the firms' ability to learn heavily depends on the orientation of their temporal perspective to the present, past or future (Paniccia and Leoni, 2019; Abualqumboz *et al.*, 2021). When oriented to the future, this perspective leads to pro-active behaviours, which also result key for organizational competitiveness (Golinelli, 2010; Kunisch *et al.*, 2017). The importance of the temporal perspective emerges when we consider the challenges associated with the firm/environment dialectical relationship (Ancona *et al.*, 2001b; Sarta *et al.*, 2021). In fact, we know that, to increase their competitive positioning, firms need to be perceived as a functional component if compared to other market, and non-market, forces (Simone *et al.*, 2021). To this end, during their life cycle firms need to activate specific capabilities, aimed not only at reinforcing their "how to do" but also at generating (Nonaka, 1994), and subsequently sharing (Malhotra, 2005; Scuotto *et al.*, 2022), new knowledge. All these actions need to strengthen their systemness (Cafferata, 2016; Barile *et al.*, 2017). In doing so, firms must focus on their knowledge base, thus addressing the what, how and when questions (Shipp and Jansen, 2011; Langlely *et al.*, 2013).

Because of the reasons above, if properly handled, co-evolutionary time adds value to the firm's knowledge, thus strengthening what the firm "can do" and, at the same time, orienting it towards what it "could do" (Conte *et al.*, 1998; Claessens *et al.*, 2004). Co-evolutionary time can, thus, provide a significant contribution to the firm's competitiveness and can make the firm/environment co-evolutionary relationship virtuous (Busseniers, 2017; Breslin *et al.*, 2021), as we illustrate through the following example from the tourism industry (Paniccia *et al.*, 2010).

3.1 An example from the tourism industry

A so-called "widespread hotel" based in Italy (Abruzzo region), Sextantio *Albergo Diffuso* was founded in 1999 as the consequence of a break through entrepreneurial idea by the Italian-Swedish entrepreneur Daniele Elow Kihlgren. The aim of Kihlgren, in particular, was to use the medieval village "Santo Stefano di Sessanio" (Gran Sasso mountains, province of L'Aquila), which was facing abandonment, as a hotel. To do so, vacant historic buildings scattered throughout the village were renovated, carefully respecting their historic features and also providing them with current comforts.

The main innovation of Sextantio is not only the fact that medieval buildings were turned into authentic hotel rooms and suites to accommodate tourists; it is also, and especially, the business concept of the "widespread hotel", where service and innovation go hand-in-hand both in terms of real estate and tourism. In fact, Kihlgren conceived Sextantio as a means to create a context of experience by enhancing the historical real estate heritage of the area, thus responding to the growing tourism demand for experiences of immersion and involvement in authentic settings. To date, after two decades from its inception, the village of Santo Stefano di Sessanio is characterized by a "high degree" of tourism development, in terms of accommodation offering, tourist flows and intensity of the value chain as a whole (ISTAT, 2022). Therefore, Sextantio can constitute one representative evidence of a firm embedding the co-evolutionary time construct. In Sextantio, the objective and subjective dimensions of time have translated into *timeliness* and *timing* in learning from the internal and external environment (Paniccia *et al.*, 2010). This has led to different, intertwined benefits, such as the inception of the novel idea, the business attractiveness and the triggering of dynamics of virtuous, inter-systemic co-evolution at the local level. In sum,

Sextantio has realized a treasured, pioneering project for the tourism ecosystem, at both economic and cultural levels.

For the tourism industry, Sextantio has represented a new way of doing business, in that it has constituted an innovative hospitality model strongly rooted in the local socio-economic and natural context. Local identity and culture, in turn, have been embedded in the tourism offering. Firstly, tourists are accommodated in 29 authentic rooms situated in medieval buildings; refurbished to become real homes, many aspects of these buildings, such as walls, rooms, doors and windows, furniture and installations, differ from those usually found in traditional accommodation firms. Secondly, tourists are given the opportunity to live authentic experiences thanks to the revitalization of local traditions made possible through the engagement of the community. Examples of these experiences include tours to heritage attractions, shopping at native arts and crafts workshops and dinners in restaurants serving typical dishes. In sum, Sextantio's visitors can indeed dive into the local culture of Abruzzo, by experiencing the life of the area and realize sensations nurtured by its attractive, pure identity.

The entrepreneurial idea behind Sextantio already benefitted from considering the subjective dimension of time, used to understand the emerging needs of tourists, which required new types of experiences. Furthermore, after Sextantio's foundation, which expertly joined *timeliness* and *timing*, Kihlgren followed a business style that explored new territory; this style rose from a holistic culture including, on the one hand, attention to the social aspects and, on the other hand, business efficiency. The idea has also seemingly benefitted from a dialectical, co-evolutionary relationship with the environment. It was then rapidly transformed into a realistic plan, that anticipated possible competitors in the area and was realized at the right time with regard to the needs of the (mostly foreign) tourists. All this has determined a huge impact within the tourism industry because of two intertwined reasons, i.e. Sextantio's rooms are located in a big space and Sextantio, in turn, raises the value of this space from a human, historical and artistic perspective. In this respect, it is also worth noticing that Sextantio was one of the first widespread hotels to be created in Italy. Over time, the number of these hotels in Italy has gradually increased ([Paniccia and Leoni, 2019](#)), with about 250 counted, at the end of 2021, by the observatory of the *Alberghi Diffusi Italian Association*. To date, to implement widespread hotels by using historic villages abandoned (or at risk of abandonment), many Italian regions are also drawing from a specific financing initiative (i.e. "Bando Borghi") of the National Plan for Recovery and Resilience ([Italian Ministry of Culture, 2022](#)).

If we consider the evolution of Sextantio, the first significant effect of Kihlgren's action, in terms of combining time with knowledge, was that of buying the buildings in the borough, and refurbishing them through technology while preserving their original features as much as possible; in fact, this was considered as a necessary condition to ensure high-quality hospitality. To this aim, Kihlgren opportunely found the necessary financial resources by selling family property and land and started an important cooperation with local stakeholders, these including the municipality and facility providers. In the end, he was able to avoid a mix of styles, such as the use of non-mediaeval furniture, in the refurbished buildings. In parallel, restoring all the genuine particulars in the historical buildings also requested eliminating later architectonic components, substituting those lost with similar components available in the same area and reinstating very specific components thanks to the support of the most cutting-edge technologies. This endeavour is the first indication of one business having a temporal perspective that looks to the future through a strong sense of timing. Indeed, thanks to these two characteristics, Sextantio grew rapidly and steadily and became a real attraction, mostly for foreign tourists. This approach has been also maintained over time, as indicated, for example, by the recent implementation, during COVID-19, of all the necessary requirements to propose long-stay offerings for remote working.

One of Sextantio's distinctive capabilities from the start, the embedding of co-evolutionary time gradually, but increasingly, progressed. In particular, clear signals of the extraordinary ability of double (i.e. objective and subjective) synchronization with the environment can be demonstrated by the timeliness and timing with which (even radical) changes were successfully implemented into the hotel's operational structure, so as to meet the new conception of the widespread hotel. On the one hand, the firm's management proved its ability to tune in to its internal and external time schedule; this allowed Sextantio to plan, with timeliness and timing, the changes to the original business structure. The firm, on the other hand, showed an extraordinary ability to schedule time within its operational structure, thus making the implementation of the management's plans actually possible.

4. Discussion

What theoretical contribution can our co-evolutionary time conceptualization, and associated example from the tourism industry, offer to the study of organizational evolution? When assuming a time management perspective (Claessens *et al.*, 2007), we argue that co-evolutionary time prevents firms from *adapting* too late or too quickly, i.e. in a way which provides an evolutionary *fit* both in terms of contents and methods (Jansen and Shipp, 2019). In fact, when searching for their optimal adaptation, firms need to consider not only their current but also – and especially – their future competitive positioning (Ancona *et al.*, 2001a; Claessens *et al.*, 2004). In turn, the future competitive positioning depends on the firms' capacity to act with *knowledge* and *timeliness* in their present to build their future *at the right time* (Conte *et al.*, 1998; Ancona *et al.*, 2001b). In particular, we claim that the right time is that moment in which the awareness of events and their effects on the firms' behaviour is the highest. As a consequence, the right time implies synchronization. Otherwise, firms would suffer the risk of planning projects potentially too anachronistic on the one hand, or too futuristic on the other (Shipp and Jansen, 2011; Kunisch *et al.*, 2017).

If well managed, co-evolutionary time is useful in two ways: it is not only a source of organizational success and competitive advantage but is also an agent of change and business sustainability (Bansal and DesJardine, 2014). In this regard, as the evolutionary dynamics explained through our business example from the tourism industry have highlighted (Paniccia *et al.*, 2010), the interaction between time and knowledge can innovatively contribute to create business value, especially when appropriately managed from a systemic perspective (Cafferata, 2016; Barile *et al.*, 2017). In particular, the example of Sextantio has shown the (sometimes) significant impact of the time-knowledge binomial on the virtuous co-evolution of a firm with its environment (Phillips and Ritala, 2019; Abatecola *et al.*, 2020b). When considering the strategic positioning and behaviour of Sextantio, subjective time has been clearly significant; its history itself suggests that it is the contemporaneous awareness of the socio-cultural dimension of time, on the one hand, and the more instrumental role played by the mechanistic dimension, on the other hand, that has given birth to firm/environment virtuous co-evolutionary processes (Paniccia *et al.*, 2010; Leoni and Cristofaro, 2022). Sextantio has not only been able to plan innovative projects compliant with the evolving tourism industry but also to implement them timely and without losing its most vivid identity.

Again in terms of time management (Jansen and Shipp, 2019), and well beyond the strict velocity for *variety*, the time awareness and competence not only allow minimizing the learning times from the environment but also increase their punctuality (Del Giudice and Maggioni, 2014; Zhang *et al.*, 2022). This facilitates the critical translation of the cumulated knowledge into capabilities, not only resulting appropriate in terms of contents but also resulting as promptly activated, thus ultimately competitive (i.e. able to address the real pressures and expectations that are external/internal to firms). From this perspective, we argue that *no knowledge, and no subsequent action, has a value out of time*: competitive firms osmotically and harmonically combine time with knowledge in their strategy

(Abualqumboz *et al.*, 2021). Consequently, speed should not be considered through a mechanistic vision of system flexibility. Conversely, “the time of speed” becomes instrumental to the knowledge needs deriving from competitive dynamics, facilitating the systems’ necessary synchronization to the external/internal pressures (Cristofaro, 2022; Baiocco *et al.*, 2023). Hence, our conceptual shift: from one time perspective oriented to the present, i.e. the speed for variety relating to the so-called *time-based competition*, to one time perspective oriented to the future, which we call here the *time-based competitive knowledge*.

By enriching firms, the time/knowledge interaction also ameliorates the firm/environment co-evolution (Cafferata, 2016; Paniccina and Leoni, 2019). This interaction facilitates developing and punctually exploiting the capabilities embedded in any organizational system. What firms are able to do in the present (i.e. through their already existing capabilities), and, even more, what they could do in the future (i.e. through capabilities to be created), depend not only on the punctuality but also on the learning timeliness (McCarthy *et al.*, 2010; Zhang *et al.*, 2022). The lack of a future-oriented time perspective can even challenge the wise use of the basics of management, both in public and private organizations.

To understand the above, let us consider that any firm’s life cycle is composed of irreversible and cumulated processes (i.e. *temporal sequence*) and of intertwined (i.e. *interdependence*) and differentiated (i.e. *time flexibility*) events. As explained, we thus come back to the concept of time as a dimension that is evolutionary in its inner nature. Because subjects, and not only objects of their evolution (Lewontin, 1983; Cafferata, 2016), when firms interpret and manage time in the function of their capabilities and opportunities, they also determine the further evolution regarding how to understand and manage time itself (Geiger *et al.*, 2021). This is especially the result of cognitive selection processes aimed to individuate those ideas potentially appropriate to address emerging needs. Again, in the case of Sextantio, without doubt these processes tailored the development of the circular, dialectical relationship between the firm and its socio-economic environment. This means that Sextantio consciously chose to progressively enter a co-evolutionary process based on the importance, of its innovative business model, for the cultural and economic development of the tourism industry at both national and local levels (Paniccina *et al.*, 2010). In this regard, Sextantio’s experience seemingly suggests that a firm’s structural capability to meet the environmental demands is not sufficient, *per se*, to create value through innovation. In this regard, the appropriate systemic governance of the territory seems even more important; this governance not only requires an adequate strategy and time schedule but also – and especially – the capability of triggering a co-evolutionary relationship with the territory based on the integrated perception of time and knowledge (Busseniers, 2017; Breslin *et al.*, 2021).

5. Implications for research and practice

Our conceptualization of co-evolutionary time in this article, as also discussed above, can stimulate (at least) the following entrepreneurial and managerial implications. Embracing co-evolutionary time can facilitate the cultural conditions to: a) rapidly and punctually anticipating the environment through catching all the (strong or weak) useful signals; b) providing firms with the prospective synchronization to environmental turbulence through recognizing both the internal resources/capabilities and external opportunities/threats; c) increasing the organizational knowledge base to implement structural change appropriate in/with time; and d) acting within a time horizon coherent with the planned changes. In doing so, firms can transfer comprehensible stimuli to the environment, which, in turn, can also induce other competitive forces to improve.

In doing so, firms can transfer comprehensible stimuli to the environment, which, in turn, can also induce other competitive forces to improve.

Of course, the implications highlighted also open the room to a number of potential avenues, which the current research in, and practice of, organizational evolution could try to address in the future. Considering an average firm's life cycle (i.e. birth/introduction, growth, maturity and decline), we outline these avenues below.

Firstly (and related to the firm's birth/introduction stage), how can co-evolutionary time help understand Stinchcombe's "liability of newness" (1965), i.e. – as already mentioned in the introduction to this article – the *struggle for survival* featuring most of the start-ups? In this regard, we not only agree with those scholars ([Soto-Simeone et al., 2020](#)) who argue that, to date, core analyses are required to comprehend what firm- and/or industry-related characteristics can properly combat this (still widely observed) liability. In particular, we also put forward that specific studies would be useful to assess in what cases time is beneficial or detrimental to the survival probabilities of new-born firms. In this regard, similar to the initial work by [McCay \(1959\)](#), recent reviews have evidenced that some "aspects of time management, including time assessment, setting goals, planning, prioritising and monitoring, [...] seem to affect outcomes positively" ([Claessens et al., 2007](#), p. 272). Thus, our notion of co-evolutionary time developed in this article might contribute to this understanding, especially when high growth start-ups, such as gazelles or Unicorns, are the object of investigation ([Aldrich and Ruef, 2018](#); [Cristofaro et al., 2023](#)).

Secondly (and related to the firm's growth stage), what is the relationship between Stinchcombe's "imprinting" hypothesis (1965) and co-evolutionary time? Imprinting, as known, substantiates the tendency, for evolving firms, to maintain their inner identity and most vivid features over time, especially when identity and features have constituted key survival determinants in the earliest stages of the life cycle ([Simsek et al., 2015](#)). To date, we know that imprinting *matters* in organizational evolution. However, and again assuming a time management perspective, we still only know a little about how imprinting specifically (and eventually differently) relates to the dialectical combination of the objective and subjective dimensions of time, i.e. – as developed in this article – to our notion of co-evolutionary time.

Thirdly (and related to the firm's maturity and decline stages), what is the role of time in general, and co-evolutionary time in particular, in determining the processes of organizational failure? Investigating around the antecedents and, especially, time dynamics of organizational failure has always attracted management scholars ([Josefy et al., 2017](#)). Only a few corporate crises, as known, occur all of a sudden; conversely, in many cases crises are the extreme result of profitability deterioration ([Hambrick and D'Aveni, 1988](#); [D'Aveni, 1989](#)), definitely amplified by the occurrence of an internal (i.e. firm-related) or external (i.e. environmentally driven) *triggering* event ([Hambrick and D'Aveni, 1992](#)). However, little is still known about why (and how) this event leads the shift from the status of decline to that of crisis; relatedly, little is still known about whether this event is eventually also related to inappropriate time management skills. Thus, our notion of co-evolutionary time, we believe, can help shed some light on this.

6. Limitations and conclusions

In this conceptual article, we have developed the concept of co-evolutionary time to address the lively question of how time and knowledge can affect the evolution of organizations. Through an exemplification from the tourism industry, we have used a narrative-based style ([Cornelissen, 2017](#)) to highlight the most vivid characteristics of our concept. We have then elaborated in terms of theoretical contribution, and have subsequently prospected implications for research and practice.

From a methodological point of view, and as its main novelty, we have developed our framework through merging two literature streams, i.e. the *objective/subjective* dimensions of time on the one hand, and *co-evolution* on the other hand. In parallel, with this constituting a possible limitation to the framework, we acknowledge that our conceptualization of co-evolutionary time has been mostly related to firms as units of analysis. We thus advance here that expanding this conceptualization at both micro and macro levels could be prospectively useful also from a time management perspective (Wright, 2002; Shipp and Jansen, 2021). In fact, this expansion would support recent definitions of time management as “behaviours that aim at achieving an effective use of time while performing certain goal-directed activities” (Claessens *et al.*, 2007, p. 262), with the systemic equilibrium between and among this individual/group activities constituting the core of any high-performing organization (Golinelli, 2010; Cafferata, 2016).

In conclusion, we believe that, if properly managed, the notion of co-evolutionary time presented can result useful to advance the study of the firm/environment relationship. In particular, co-evolutionary time claims that, if neglecting a future-oriented time perspective, firms can hardly adapt, even if they have their own set of knowledge. This opens, at least, a couple of final, intertwined contributions to theory. The *first* contribution is of a cognitive-temporal nature: strategy requires knowledge which, in turn, physiologically loses value as time passes. During any firm's life cycle, knowledge needs to be generated and re-generated through collective learning processes, which result appropriate also from a time perspective. Likewise, the *second* contribution is of a behavioural-temporal nature: strategy is the result of multiple programmed and emergent actions. These, in turn, need rationalization and coordination.

Notes

1. To explain better, when agreeing on a meeting, we could simply use the objective time dimension saying: “Let's meet at 4 pm”. Alternatively, however, we could also use the subjective dimension saying: “Let's meet at the end of the conference”. In this way, we would emphasize the link between our scheduled meeting event and another social event, i.e. the conference, especially if the latter owns significance for us beyond the pure numerical expression of time.
2. For example, mathematical time is still key in strategy, although also shows limits; in fact, managing time implies dividing labour, thus assuming a subjective perspective itself (e.g. the amount of time for individual workloads, single tasks, etc.). Firms rarely perceive time as homogeneous and uniform; in contrast, they continuously evaluate it qualitatively.

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