

## *Evolutionary and Ecological conceptualization of dynamic capabilities: Identifying elements of the Teece and Eisenhardt schools*

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### **Abstract**

Research on dynamic capabilities has been one of the most prolific research streams of the last two decades. Peteraf et al. (2013) show that the research stream has suffered from a divide into two schools: One school following the conceptualization by Teece and colleagues and another school following the conceptualization by Eisenhardt and Martin. In this study, we discuss the implications of this divide. At the core, we argue that the two schools do not agree how evolutionary theory is implicated in dynamic capabilities. This disagreement has consequences for the empirical assessment of dynamic capabilities. We argue that the concept of Eisenhardt and Martin would benefit from a more ecological oriented empirical assessment whereas Teece conceptualization focuses on the entrepreneurial role of top management teams.

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### **ADVANCING DYNAMIC CAPABILITY RESEARCH THROUGH EVOLUTIONARY REASONING**

Evolutionary theory has laid the foundations for the development of dynamic capabilities (Arndt, Pierce, & Teece, forthcoming). The triad of variation, selection, and retention is a powerful paradigm that helps to explain the emergence, development, retention, and replacement of dynamic capabilities (Helfat & Peteraf, 2003). However, despite dynamic capabilities being an inherently longitudinal construct, much research has used cross-sectional inquiries.

In this research note, we aim at refining some arguments made by Galvin, Rice, and Liao (2014) regarding inquiries that advance the evolutionary nature of dynamic capabilities. Although Galvin, Rice, and Liao (2014) make an important step with their study toward establishing an evolutionarily informed research agenda within the dynamic capability literature, we also note that the article would benefit from a clear separation of convoluted conceptual framings and empirical operationalization. In both existing conceptualizations of dynamic capabilities (according to Teece, Pisano, & Shuen, 1997 and Eisenhardt & Martin, 2000), evolutionary elements play a primary role; only the emphasis of different elements differs. These points need to be taken into account and resolved when applying a Darwinian framework to dynamic capabilities, as Galvin, Rice, and Liao (2014) suggest.

We make three contributions in this research note. First, we expand the study by Galvin, Rice, and Liao (2014) by clarifying the evolutionary elements of dynamic capabilities and how they are implicated in existing frameworks describing dynamic capabilities. By no means has the literature ignored the evolutionary paradigm implicated in dynamic capabilities. However, we agree with Galvin, Rice, and Liao (2014) that there is no common understanding of the evolutionary paradigm that may be the origin

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for some confusion around dynamic capabilities (e.g., see Arend & Bromiley, 2009). Second, a more thorough investigation of the variation–selection–retention paradigm leverages our further arguments regarding a separation of the frameworks by Teece, Pisano, and Shuen (1997) and Eisenhardt and Martin (2000). Although the two frameworks feature some commonalities and may have some common ground, they are based on different evolutionary approaches. This observation has theoretical and empirical implications. Third, we suggest that the empirical inquiry of Galvin, Rice, and Liao (2014) would have benefited from a different level of analysis. We argue that the level of analysis may be different for each framework and that this difference needs to be taken into account for a meaningful analysis. Galvin, Rice, and Liao (2014) use the firm level of analysis, but really test ‘best practices’ in the sense of Eisenhardt and Martin (2000). We suggest that for these best practices the unit of analysis should be oriented toward the industry level following a population ecology approach.

The remainder of this research note proceeds as follows. In the next section, we introduce dynamic capabilities as an evolutionary concept. We show how the different evolutionary elements variation, selection, and retention are implicated in dynamic capabilities. Then, we discuss the differences and inconsistencies between Galvin et al.’s theoretical analysis and their empirical investigation. Finally, we illustrate how these insights can inform future research and an evolutionary-driven research agenda.

## THE VARIATION–SELECTION–RETENTION PARADIGM AND DYNAMIC CAPABILITIES

Dynamic capabilities follow an evolutionary tradition (Agarwal & Selen, 2013). Peteraf, Di Stefano, and Verona (2013) identify two distinct schools of dynamic capabilities. Both schools identify dynamic capabilities as a source of competitive advantage. Although the Teece, Pisano, and Shuen (1997) school shows how idiosyncratic dynamic capabilities lead to sustained competitive advantage, the Eisenhardt and Martin (2000) school argues that dynamic capabilities often appear in the form of best practices, change the form in which they become observable in moderately and rapidly changing environments, and lead to temporary competitive advantage only. Both concepts build on evolutionary elements.

In their seminal article, Zollo and Winter (2002) describe the variation–selection–retention logic of the knowledge evolution cycle. Herein, variation describes a firm’s externally and internally stimulated exploration processes. Selection refers to the evaluation of new opportunities that are the result of variation and includes a firm’s power constellations and legitimization processes. Retention includes diffusion (replication) and learning processes through rolling out solutions to address and exploit opportunities. In doing so, Zollo and Winter (2002) expand the Teece tradition of studying idiosyncratic processes at the firm level. However, they also confirm one of the key differences between the Teece tradition and Eisenhardt and Martin (2000) tradition. The degree of environmental change alters the emphasis of the evolutionary elements. According to Eisenhardt and Martin (2000), in moderately changing environments the emphasis is on variation, whereas in rapidly changing environments the emphasis changes to selection. In such environments, dynamic capabilities degenerate to simple rules rather than more complex decision-making processes as the benefits of knowledge retention become increasingly transient.

Although Teece, Pisano, and Shuen (1997) rely on the idea of Nelson and Winter’s evolutionary theory that is routine based, Eisenhardt and Martin (2000) refer to dynamic capabilities as best practices implicitly differentiating between firm internal selection and industry-level selection and retention processes. In this perspective it is not the dynamic capabilities that are the source of sustainable competitive advantage, but the outcome of applying ‘best practices’ in idiosyncratic ways (Eisenhardt & Martin, 2000: 1110). Hence, firms that develop or quickly adopt best practices and are able to apply them to their idiosyncratic resource endowments are likely to gain temporary advantages over their rivals.

## THEORETICAL AND EMPIRICAL ADVANCES OF DYNAMIC CAPABILITIES THROUGH A DARWINIAN PERSPECTIVE

Core to this research note is the discussion of dynamic capabilities as idiosyncratic routines on the one hand and best practices on the other. Understanding evolutionary fitness is an important part of dynamic capability research. Alleviating the dynamic capability perspective from the burden to explain sustainable competitive advantage makes room for a more substantial analysis of how evolutionary theory explains dynamic capability application in (re)configuring the firm's resource base. Understanding variation requires an outcome-independent conception of dynamic capabilities (although the hope would be that they are overall performance enhancing as Ambrosini & Bowman (2009) argue). In the sense, we interpret Eisenhardt and Martin in this research note, research on dynamic capabilities should not be focused on performance, but survival as a dependent variable. Curiously, Galvin, Rice, and Liao (2014) note that performance is an unsuitable dependent variable, but chose to use it despite their sample having the size and longitudinal character needed to dig deeper (see e.g., Wei & Lin, 2015).

Consider the variation–selection–retention framework introduced by Galvin et al. and the levels of cause and effect (dependent variable). According to the authors, variation as an outcome of dynamic capabilities appears in both environment and firms. Dynamic capabilities 'drive' variation at the firm level, and firms coevolve with the market or industry, as they create and drive environmental variation. In such a setting, the order and direction of cause and effect remain unclear. Particularly, the empirical setting leaves open many questions regarding a (quasi-experimental) setting to better test dynamic capabilities. This, however, was the aspired goal of this article and the origin of the claim that general Darwinian evolution might impact the way the research on dynamic capabilities can progress.

Our criticism is also manifested in the way Galvin, Rice, and Liao (2014) operationalize dynamic capabilities. First, instead of survival, the authors study firm performance. It would have been interesting to see differences between the 75% survivors and the 25% nonsurvivors in the original ABS sample. Second, as independent variables the authors chose to study 'capability development' and 'market development.' The authors *de facto* study 'best practice' and exclude internalization processes that would reflect the idiosyncratic character of routines. For us, it becomes clear that the study could have benefited from a best practice view rather than the attempt to tie the analysis to idiosyncrasies for which neither the theoretical framing nor the data are well suited. Third, we note that Galvin, Rice, and Liao (2014) use sales growth in order to reflect selection processes. However, we argue that market development (e.g., market expansions through best practices) rather reflect retention in an evolutionary sense than selection.

Overall, we find several indicators that Galvin, Rice, and Liao (2014) conceive dynamic capabilities in a tradition that tries to explain competitive advantage originating from firm heterogeneity and market imperfection – which the authors claim not to pursue.

We suggest that in order to contribute to a theoretical foundation and the empirical assessment applying an evolutionary perspective of dynamic capabilities, the variation–selection–retention framework should be consistently applied to one school of dynamic capabilities. We suggest that analyzing 'dynamic capabilities as best practice' as survival (on the routine, firm, and industry level) seems to be a more promising approach in understanding firms' resource alteration decision and processes.

## CONCLUSION

In this research note, we argue for a population ecology perspective of dynamic capabilities applying the framework of Eisenhardt and Martin (2000). Such an approach has the potential to advance the field and break out of the current most salient weaknesses in this literature (see also Galvin & Arndt,

2014). Namely, the theoretical framing in this literature is convoluted by two different schools and the often cross-sectional empirical settings hardly allow meaningful analysis.

If dynamic capabilities are both ‘best practice across firms’ and firm routines, then dynamic capabilities are subject to variation–selection–retention at both levels: the individual firm level and the industry level. We suggest that entrepreneurial actions of firms, that is, their management teams, trigger variation and thereby evolution (O’Shannassy, 2014). In this understanding, industry evolution is driven by firm evolution, which is driven by entrepreneurial management teams that opt for variation. New market offerings either exploit existing opportunities or create opportunities. Our claim is that a dynamic capability perspective – especially when studying dynamic capabilities empirically – needs to clarify the theoretical conception of dynamic capabilities and the level at which the evolutionary mechanisms are studied.

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