Revisiting the Geography of Discontinuities in Clusters or How Leading Incumbents Can Eat the Cake and Have it Too

ABSTRACT: Considering that discontinuities in clusters and industrial districts (IDs) are *only* competence destroying and the local value system is *usually* dismantled constrain the perspective on the phenomenon and impede advancing it. I argue that discontinuities can: i) impact and destroy *only* specific capabilities without changing the entire value system, ii) drive *simultaneously* both competence-destroying and competence-enhancing and, iii) stimulate different responses by local incumbents, i.e. firm heterogeneity. Inducting from a longitudinal case study on an ID discontinuity by using mixed methods, results suggest that discontinuities can destroy local capabilities (competence-destroying) while preserving others in the value system (competence-enhancing), socially-thick networks as specialized complementary assets protect leading incumbents that show heterogeneously different responses, orchestrate local networks and drive them in different directions, even change. Collating different constructs (*the local value system, local leading incumbents' responses* and the *value of networks*) radical changes in IDs can be better re-elaborated and understood.

This study aims to re-examine the notion of discontinuities in clusters and industrial districts (clusters/IDs, hereinafter), challenging the predominant view of lock-in and inertia faced with discontinuities in clusters/IDs. Radical innovation[1], conceptualized in terms of technological discontinuities, consists of new engineering and scientific principles that incorporate new knowledge, opens new markets and usually destroy incumbents' capabilities (e.g. Ettlie et al., 1984; Anderson & Tushman, 1990). The framework, when applied to clusters/IDs[2] contextualizes technology change *geographically* (e.g. Grabher, 1993; Sull, 2001; Glasmeier, 1991; Belussi, 2010; Raffaelli, 2019). In contrast to the technology change literature, the clusters/IDs strand presents different nuances, such as the importance of social dimensions materialized in place-based institutions that contain socially-thick networks of production and

[1] In this paper, we use radical or discontinuities synonymously, albeit recognizing that slightly different nuances exist.

[2] I use the terms clusters and industrial districts synonymously, albeit there are differences, especially those referring to the social dimension of industrial districts (IDs). In this paper, we use cluster/ID without making a distinction between them.

innovation; moreover, it is assumed that gradual changes are supported, rather than radical ones (e.g. Grabher, 1993; Glasmeier, 1991; Robertson & Langlois, 1995; Pouder & St. John, 1996; Sull, 2001; Ozer and Zhang, 2015; Ostergaard & Park, 2015). I argue that knowledge of managing discontinuities at the local/regional space is very limited. Notwithstanding significant advances, I point out that the analysis of geographic discontinuities, however, is predominantly biased towards cases where the entire local value system is challenged and all local capabilities destroyed, such as in Glasmeier's (1991) study of the Swiss Watchmaking (Jura) cluster. Under these assumptions, considering that discontinuities or radical innovations in clusters/IDs are *only* competence destroying and the local value system is *usually* dismantled, the understanding of the phenomenon is limited, showing only lock-in and inertia. While I do not rule out this evidence, the assumptions used to frame the phenomenon, however, present limitations that justify my arguments within the clusters/IDs framework.

First, I posit that discontinuities in clusters/IDs can impact *only* specific capabilities of incumbent technologies without destroying the entire local value system. Put differently, discontinuities can be *simultaneously* both competence-destroying and competence-enhancing (see McKinley, 2022), affecting differently local capabilities and players in a focal geographically-bounded value system. As Rosenbloom and Christensen (1994) and Afuah (2000) point out, understanding technology change requires examination of the entire value system of an incumbent technology. Building upon this idea, I use the concept of local/regional value system to refer to the local collection of incumbent capabilities and technologies existing in a cluster/ID for a particular product or value proposition. I posit that a discontinuity can occur in some specific local incumbent capability that is destroyed, not necessarily destroying the entire local value system, nor all existing capabilities.

Second, the clusters/IDs literature does not address the *heterogeneity* of local leading incumbents' responses facing discontinuities in clusters/IDs. I introduce in the framework *hub firms* or leading incumbents that orchestrate local networks showing high degree of network closure with focal actor centrality. These local leading firms shape networks (Dhanaraj and Parkhe, 2006), especially in clusters/IDs (see Munari et al., 2012). Recent studies have theorized the importance of introducing the study of firms' heterogeneity in clusters (Grashof, 2021; Hervás-Oliver et al., 2023) and how local actors' innovation capabilities drive regional change into different directions (Zhang & Rigby, 2022): local actors can react differently faced with radical changes. While in the geography of innovation the unit of analysis is the cluster itself, it fails to detail and account for different incumbents' responses, as the main focus is on the meso-level. This approach, albeit useful, does not account for potential micro-level incumbents' heterogenous responses and even incumbents' survival in discontinuities, as it is showed in technology strategy literature (e.g. Tripsas, 1997), where incumbents' capacity to respond to disruptions is underestimated (see Bergek et al., 2013 and Berggren et al., 2015). I argue that this is one point neglected in clusters/IDs.

My argument is that, under this rationale, the framework for understanding radical changes in clusters/IDs can be re-elaborated by including different lenses in the analysis that potentially can facilitate a better analysis of the geography of discontinuities. For this purpose, my empirical setting is the discontinuity that occurred in the Castellon ceramic tile district (Spain), transitioning from mechanical to digital decoration of ceramic tiles from 1998 to 2015. I choose this setting because it underwent a major radical change. Specifically, I ask: what are the mechanisms at work in discontinuities in clusters/IDs? For this, I seek to understand the critical elements at play in discontinuities, considering the local value system and its capabilities, leading incumbents' heterogeneity and the

local networks at play. For this purpose, I engage in theory-building (e.g. Eisenhardt and Graebner, 2007) by utilizing a longitudinal case study research (1998-2023) and mixed methods. According to results, I evidence *how* both mechanisms, competence-destroying and competence-enhancing, occur in both focal companies and the local value system alike, firstly provoking inertia and, secondly, unexpected change, challenging established assumptions in the geography of discontinuities. Moreover, I show that socially-thick and geographically bounded networks function as specialized complementary assets[3], influence the value system and provide a more comprehensive explanation of geographically-bounded technology changes. I show how networks moderate timing and adoption of new technologies, highlighting also how community-level cognitive commitments embedded in those networks are manipulated by leading incumbents that navigate between inertia and change so as not to lose centrality: incumbents' responses to radical changes show heterogeneity.

My results answer the research question, showing that change in clusters/IDs can be better understood by identifying and concurrently analyzing three elements of discontinuities: *the local value system* (its preservation along competence-destroying and competence-enhancing tensions), *local leading incumbents* (their heterogenous responses and potential network manipulation) and the *power and value of networks* (their preservation of value and direction driven by leading incumbents). I contribute by extending the framework on the understanding of discontinuities in clusters/IDs (e.g. Glasmeier, 1991; Pouder & St. John, 1996; Sull, 2001; Ostergaard & Park, 2015), adding context and geographic nuances on technology change literature (e.g. Ettlie, Bridges & O'Keefe, 1984; Anderson & Tushman, 1990; Tripsas, 1997).

[3] We treat equally co-specialized and specialized complementary assets, as the distinction between them is not necessary in this analysis, for the sake of brevity.