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INDUSTRY TRANSITION– CHALLENGES FOR VALUE CAPTURE

Marta Najda-Janoszka¹

Abstract

The transition period in the industry life cycle induces a profound reconfiguration in the competitive landscape. A shift from an early, fluid state to a mature stage generates both strategic threats and opportunities for capturing value by incumbents as well as new entrants. Thus the challenge is to identify early harbingers of that transition in order to formulate an appropriate strategic response allowing for protecting and strengthening captured value streams. Existing gaps regarding causal explanations of industry transformation and the processual nature of value appropriation ignited the discussion presented in the article. The aim of this study is to enhance the understanding of the dynamics of the value capture process by examining the features of industry transition. A thorough review of the theoretical and empirical studies on the subject matter enabled formulation of propositions that refer to the problem of identifying the transition signals and relate the competitive dynamics of the transition period with the value capture practices.

Keywords: industry transition, industry life cycle, value appropriation, value capture.

1. Introduction

The transition from an emerging industry to a mature one induces a profound rearrangement in the competitive landscape. It is a critical period – hardly predictable but also highly demanding with regard to a time frame for reconsideration and reconfiguration of firms' strategic behavior. Industry transition challenges both the strategic structure and focus. When an industry enters maturity, a quite common observation is the slump of the once influential players. Hence, the managerial challenge refers to practices enabling successful capitalizing on the critical instability during a transition period in the life cycle of an industry. Meanwhile, there are substantial gaps regarding exploration of an ongoing industry transition, as presented lines of reasoning are practically based on retrospective data on industries that had already achieved the stage of maturity.

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Moreover, there is a paucity of studies that analyze value capture in terms of a process that extends beyond the mere point of transaction. Thus, to address those gaps, the aim of this article is to discuss the dynamic nature of the value capture process by examining the features of industry transition and thus provide a theoretical basis for the further empirical study. A thorough review of the theoretical and empirical studies on the subject matter enabled formulation of propositions that refer to the problem of identifying the transition signals and relate the competitive dynamics of the transition period with the value capture practices. In what follows, the article begins with a discussion on the problem of conceptual framing during the transition period in the industry development trajectory. Then, the focus is shifted towards strategic maneuvering performed in response to industry-transition triggers and aimed at receiving, protecting, and retaining value. The final section of the article presents conclusions and suggestions regarding future research.

2. Transition period in the industry evolution

In search for comprehensive explanations why some firms survive through time and others fail, many scholars have turned their attention to a cumulative change in industry characteristics. Extant research provides clear indications that the nature of industries evolves over time (e.g., Hannan & Freeman, 1989; Miles, Snow & Sharfman, 1993; Klepper, 1996; Audretsch, Houweling & Thurik, 2004; Cusumano, Kahl & Suarez, 2015). Broad theoretical considerations supported by prolific empirical investigations have confirmed that industry evolution is more than just statistics of firm entry, growth, and exit. Research on industry development produced a vast body of literature providing valuable insights into the dynamic interdependencies between environmental changes and firm's strategic choices. Although as pointed by Porter (1980) there is no uniform way in which industries evolve, and a review of seminal works shows a quite consistent picture of industry evolution pattern. Most of well documented longitudinal studies have analyzed regularities and irregularities in the trajectory of industry development by referring to the industry life cycle concept decomposed into emergence, growth, mature and decline stages (e.g., Abernathy & Utterback, 1978; Klepper, 1996; Miles et al., 1993; Anderson & Tushman, 1990; Peltoniemi, 2011). The extant scholarship supports the argument that different stages of industry life cycle represent different competitive conditions with earlier stages characterized by high product/technology variation, producer/market uncertainty and cost. While later ones are exhibiting decrease across these categories (Abernathy & Utterback, 1978; Anderson & Tushman, 1990; Miles et al., 1993; Peltoniemi, 2011).

Considering the nature of the topic being explored in this article, it is important to highlight that the transition stage from growth to maturity is widely recognized as a critical time in the industry life span, since it brings in a profound, discontinuous reconfiguration of the competitive landscape of a particular industry (Porter, 1980; Agarwal, Sarkar & Echambadi, 2002; Cusumano et al., 2015). In order to discriminate specific conditions indicating this transition period a deeper understanding of mechanisms that produce life cycle pattern is necessary. The state of the art suggests that no dominant evolutionary mechanism has emerged. Instead, there are three parallel research streams providing distinct, yet to a certain degree complementary, proposals namely: evolutionary economics, technology management, and organizational ecology (Agarwal et al., 2002), which are presented in (Table 1).

Table 1. Research streams on the industry life cycle concept

Research stream	Key mechanism of industry evolution	Main contributors
Evolutionary economics	Knowledge regime (properties of knowledge base for innovative activity) driving the cost-spreading effect and determining the minimum efficient scale barriers.	Audretsch (1991), Klepper (1996), Klepper & Miller, (1995), Malerba (2006)
Technology management	Technological developments (discontinuities) creating competition for dominance between multiple alternative product/technology designs	Abernathy & Utterback (1978), Anderson & Tushman (1990), Christensen, Suarez & Utterback (1998), Murmann & Frenken (2006),
Organizational ecology	Density of population (industry) enhancing its institutional legitimacy and facilitating competition over the same set of finite resources.	Hannan & Carrol (1992), Hannan & Freeman (1989), Wade (1995), Baum & Oliver (1991)

A thorough review of presented alternative understandings of mechanisms underlying the evolutionary pattern of industry life cycle, it enables identification of an appealing set of indicators informing about transition from an early stage of evolution to a fully mature form of an industry. Drawing on the illuminating insights provided by each research stream, table 2 presents those indicators together with the limitations of their applicability highlighted in the extant literature.

Transformation indicator	Main supporting works	Limitations	Main challenging works
Increasing share of process innovations enabling cost reductions at the expense of product innovations	Cohen & Klepper (1996)	Difficulties in discriminating between cost reduction and performance improvement innovations; in some industries, no shift in innovative activity occurs	Malerba & Orsenigo (1996); Filson (2001); McGahan & Silverman (2001);
Technological convergence facilitating emergence of a dominant design	Abernathy & Utterback (1978) Anderson & Tushman (1990) Suarez (2004); Suarez, Grodal, & Gotsopoulos (2015)	Some industries exhibit persistent coexistence of multiple designs. Dominant designs may emerge several times during industry life cycle	Srinivasan, Lilien & Rangaswamy (2006); de Vries, de Ruijter & Argam (2011); Murman & Frenken (2006)
Introduction by a single firm a new product that benefits from a large, unanticipated surge in demand – innovation shock	Argyres, Bigelow & Nickerson (2015)	A synthesis of fragmented, independently introduced innovations, narrow class of designs can produce a shift in competitive dynamics of an industry	Suarez & Utterback (1995); Teece (1986)
Shakeout while industry input is still growing	Abernathy & Utterback (1978); Klepper & Graddy (1990); Jovanovic & MacDonald (1994)	Not all industries experience shakeouts, their evolution can be driven by submarket dynamics	Klepper & Simmons (2005); Klepper & Thompson (2006)
Increasing concentration of resources in fewer large organizations	Utterback & Abernathy (1975), Aldrich & Pfeifer (1976),	Submarkets, persistently fragmented industries	Breschi, Malerba & Orsenigo (2000)
Increasing disintegration along the value chain	Stigler (1951)	The relationship between the industry life cycle and vertical integration is non-monotonic; the pattern of evolution of vertical firm structure depends on contextual factors – some industries exhibit persistence of integrated firms	Bigelow & Argyres (2008); Kapoor (2013); Helfat (2015)

Although the literature provides substantial support for identified indicators, numerous studies are emphasizing their conditional validity. Authors point to the existence of alternative evolutionary patterns where particular indicators appear in a modified way or do not occur at all (Table 1). Moreover, limitations highlighted by challenging research works are primarily related to specificities of given industries under investigation, e.g., industries with high R&D intensity, consumer goods industries, complex product industries, and service industries (Srinivasan et al., 2006; Peltoniemi, 2011). Hence, those limitations form an appealing set of boundary conditions for suggested causal relationships.

Strategic management calls for a timely response to changing circumstances (D'Aveni, 1994; Christensen et al., 1998; Najda-Janoszka, 2016a) in order to capitalize on merely momentary windows of strategic opportunity. Thus the main challenge relates to a proper identification of possible early signals of the shift in the industry of competitive dynamics. A review of extant literature on the industry life cycle leads to a conclusion that provided causal explanations of transformation are based on retrospective data on industries that had already achieved the stage of maturity. Hence, having a detailed, fine-grained map of previous decisions and their consequences it is quite viable to trace back initial triggers and build the causal logic of the subsequent development trajectories. The perspective dramatically changes when it comes to discriminate harbingers of an ongoing industry transformation. It has been observed that the pace of changes shaping the evolutionary pattern of industries is accelerating and thus further shortens the time for sensing and seizing opportunities before the occurrence of a shakeout (Agarwal et al., 2002). Moreover, it is practically infeasible to determine in a precise and comprehensive way competitive ramifications for recently introduced innovations of various types. The recognition becomes susceptible to flaws as the assessment involves forecasts and estimation, which can be easily confounded due to inability to foresee and account for all possible developments in technology, market conditions, and institutional arrangements (de Weck, Eckert & Clarkson, 2007). Existing studies confirm that industry peculiarities emerge in due course of its development. Hence, as pointed by Klepper & Simons (2005) it might not be an appropriate stand to try “to attribute shakeouts to any one stream of technological developments.” Thus, taking into account that the task of identifying the transition period of the industry life cycle is characterized by a high level of uncertainty, its performance should be based on a very cautious recognition of industry specificity beforehand.

Proposition 1: It is a set of correlated signals rather than a single indicator that informs about an ongoing transition in the industry life cycle.

3. Strategic opportunities and strategic responses

The transition period in the industry life cycle generates both strategic threats and opportunities for capturing value by incumbents as well as new entrants. A strategic attempt to effectively exploit changes in the environment need to be supported by inevitable modifications in deployed patterns of action. Actions undertaken by companies during that period shape a new competitive landscape with shifted or completely rearranged areas of market dominance. This competition on product and factor markets determines “the slice of the pie one gets to keep” (Afuah, 2014, p. 156). Given that the extant management literature underlines the fact that the logic of value distribution may or may not follow the rules governing the value creation process (Najda-Janoszka, 2016a; Brandenburger & Nalebuff, 1996), introduced lines of strategic maneuvering aimed at capturing and retaining extracted value streams should not be analyzed in terms of extrapolation of activities performed within the value creation process (Pitelis, 2009). Value appropriation requires completely different kinds of knowledge and capabilities developed across organizational functions (Fischer, 2011; Pitelis, 2009). Value capture involves a multilevel, complex pattern of actions that extend far beyond the single point of transaction (Coff, 2010). Hence, firms facing industry-transformational pressures toward change they need to respond by altering or introducing new ways for receiving, protecting, and retaining value i.e., extend, modify, retrench, or cease utilized compositions of isolation mechanisms² (Katkalo, Pitelis & Teece, 2010; Najda-Janoszka, 2016b). Such line of reasoning complies with the dynamic capability-based approach to value appropriation initially proposed by Coff (2010) and further developed by Najda-Janoszka (2016a, 2016b). Understanding value appropriation as a process involving complex action patterns, which can be a subject to reconfiguration due to environmental triggers, provides a proper departure point for exploring linkages between industry transformation signals and firm’s strategic response regarding value capture practices.

Strategic options for companies have been discussed depending on the type of the signals being identified. A vast majority of works refer to the emergence of a dominant design while elaborating on the issue of strategic repercussions of industry evolution from an early to a mature stage. It has been argued that a dominant design shifts the competitive dynamics by rearranging innovative efforts along already developed, predetermined main patterns and leaving the space for improvements at the peripheries/components of the leading architecture (Christensen, et al., 1998).

2 Tangible and/or intangible barriers preventing replication of a particular behavior of a given firm (Rumelt, 1984)

The emergence of a dominant design accelerates industry exits of unsuccessful innovators providing alternative solutions or those failing to expand cost-efficient production scale along the emergent product architecture (Suarez, 2004). Hence, the strategic task involves detecting early signals indicating potential convergence toward architectural standardization. Observed tendencies toward certain regularities in component types, interfaces, arrangements that span across leading competitors might form a pattern for the development of a dominant design (Christensen, et al., 1998). The extant literature confirms that the emergence of a dominant design is not a discrete event but a process that evolves over the years (Anderson & Tushman, 1990; Baum, Korn & Kotha, 1995; Christensen et al., 1998; Murman & Frenken, 2006). During that process, incumbent firms, as well as new entrants, encounter a window of strategic opportunity to capture value by enforcing own solution as a dominant product architecture, imitating emerging architectural propositions, conforming to an emerging standard early enough to pre-empt scarce resources and capitalize on a growing market acceptance, or repositioning to a distant niche with sufficient residual demand (Suarez, 2004; Srinivasan et al., 2006; Van de Kaa, 2011; Argyres et al., 2015). However, considering strategic maneuvering during the transition period in the industry life cycle; it is important to highlight that it has been observed that dominant designs have not emerged in all product categories (e.g., video game consoles). Thus, despite expectations, some markets may not coalesce around one compromised dominant design. It brings in another essential conclusion drawn from empirical investigations that it is not necessarily a technological excellence that drives the emergence of a dominant product architecture (Tushman & Rosenkopf, 1992; Murman & Frenken, 2006; Suarez, 2005). Hence, the analysis of technological forces in the environment should not overtake the discussion centered around strategic management and managerial decision making (Argyres et al., 2015).

The exploration of the transition period in the industry life cycle, from the strategic management perspective, has provided useful and illuminating insights into the conditions affecting the response aimed at strengthening and protecting value streams in the competitive landscape of an industry. A study of Argyres et al. (2015) investigated strategic repositions introduced by the innovation shock, i.e., “introduction of a pioneering new product design by a single firm, the demand for which surges in an unanticipated way” (pp. 216-217). According to authors, a dominant design is an endogenous outcome of the innovation shock. Strategic maneuvering observed after the innovation shock tends to gravitate towards “an architectural similarity of products within each industry segment” (p. 221).

Therefore, early signals of industry transition, strategic reshuffling can be identified in a considerable time before any product/technology convergence initiatives. The time duration depends on the comparative costs of adjustments of firms operating in a particular industry, which in turn is determined by internal resources and capabilities, internal organization structure and incentives, relationships with external parties. Provided insights shift the accent from participating in convergence process toward strategic positioning (imitating, repositioning, exiting, entering) right after the arrival of the innovation shock that precedes standardization initiatives.

Other studies building on the premise that a dominant design may not necessarily emerge in each industry discuss factors that can facilitate the probability and the time of a dominant design emergence, and thus shape the scope for decision making (Srinivasan et al., 2006; de Vries et al., 2011). First of those factors is the appropriability regime reflecting the extent to which innovators can be protected from imitators and encompassing the nature of the core knowledge underlying the innovation and the institutional protection of the intellectual property (Teece, 1986). According to Teece (1986) who coined the term, a tight appropriation regime, although a quite rare phenomenon, is the most desirable one, because it provides sufficient conditions for capturing at least some proportion of the value generated by innovation. On the other hand, Srinivasan et al. (2006) and de Vries et al. (2011) argue that it hampers the emergence of a dominant design, as it supports the development of localized monopolies. Thus, it suggests that a strategic attempt to enforce own solution to become an industry-wide standard complies more with a weak appropriability regime, which enables knowledge sharing and industry-wide learning effects. Such conclusion can be related to the observed phenomenon of know-how externalization under the open innovation paradigm (Chesbrough, 2006). Considering the problem of value capture, it is important to emphasize that the open innovation model does not imply externalizing all the assets. Instead, a given firm needs to develop a coherent strategy for protecting and sharing its proprietary components. Such a strategy can be based on a concept of a modular system of knowledge introduced by Baldwin & Henkel (2015).

Undoubtedly, capturing value in a weak appropriability regime is quite difficult due to imitation practices (Najda-Janoszka, 2012) or a lack of contractual definition of compensation for releasing knowledge under the open innovation paradigm (Najda-Janoszka, 2016a; Najda-Janoszka, 2016c). But in case of a successful promotion of developed standard, a firm may enhance its strategic position to appropriate most of the created value.

However, in order to achieve that it has to account for the influence of the second factor, the network effects, defined as dependence of a customer's utility from a product on the number of other users (direct network effects) and/or

availability of complementary products (indirect network effects) (de Vries et al., 2011). As pointed already by Teece (1986) when the underlying technology is inherently easy to replicate and legal protection mechanisms are ineffective or purposively not reached for (open innovation), then the opportunity for capturing at least a positive fraction of created value depends on the access to complementary assets. Moreover, due to substantial, irreversible investments that raise the risks for the engaged party, the control over complementary assets gains in importance with more asset specialization. In weak appropriability regimes owners of co/specialized complementary assets are expected to capture the lion's share of the value generated by the innovation (Ceccagnoli & Rothaermel, 2008). While investigating the relationship between services and evolutionary patterns in manufacturing industries Cusumano et al. (2015) observed that the variation in competitive dynamics along with the industry life span, encourages investments in a specific kind of services at different times. During the stage of ferment developing "adopting services," which significantly extend the product functionality (e.g., customization), may help boost a new market by lowering the level of product/technology uncertainty. A shift to transitional period, as products become more reliable, better understood and less variable allowing for a more standard implementation, quite clearly favors investments in "smoothing services" that enhance exchange between a focal firm and its customers without altering the product functionality, e.g., financing, warranty and insurance offering, maintenance, technical support. Hence, authors claim that the way firms combine services with their products may facilitate establishment of a dominant design, e.g., services as product subsidy in the presence of network effects (Cusumano et al., 2015). Nevertheless, it is worth noting that although most studies confirm that strong network effects positively affect the probability and the time of emergence of a dominant design (Srinivasan et al., 2006), there are some investigations that point at the "excess inertia," driven by a "wait and see" attitude of customers and providers of complementary goods, which may substantially delay the emergence of a dominant design (e.g. Gupta, Jain & Sawhney, 1999).

According to reviewed theoretical discussions and empirical investigations, value capture practices of firms operating during the transition period of the industry life cycle reach beyond the narrow, protective approach focused on raising and maintaining strong barriers to imitation. Some studies confirm that it is the strategic approach that gains importance. Firms tend to use those protection mechanisms as means for direct creation of value and as strategic tools that enable competitive position enhancement.

Proposition 2: As industry undergoes transformation from an early to a mature stage of development, the value appropriation process is characterized by a more intensive utilization of the strategic rather than protective function of isolation mechanisms.

4. Conclusions

In search for a better understanding of the competitive dynamics and shifts in value capturing action patterns during the transition stage of the industry life cycle, this study brings in two important proposals guiding further theoretical and empirical research. The first one should enhance evaluation of the industry's current stage of development by allowing for anchoring various markers of industry-transition. From the strategic management perspective, it is of great importance to move forward from retrospective analyses to a comprehensive assessment of ongoing transformational processes. Hence, deciphering reshuffles in competitive conditions along the evolutionary trajectory of an industry should enhance the understanding of the dynamics process. The second proposal emphasizes the processual nature of value appropriation and thus allowing for longitudinal studies focused on evaluating decision patterns formed by strategic responses to industry-transition triggers. A deep insight into those decision patterns would shed more light on the problem of path dependency, inertia experienced by firms at subsequent stages of industry evolution when a strategic repositioning could be a viable option for value capture.

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