

Standards vs dominant design essay



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Despite that, standards play a relevant function as part of dominant designs. The first section of the paper underlines the background of both standards and dominant designs highlighting the different theoretical foundations they derive from, whilst the second part mainly focuses on the complementary role of standards and dominant designs. Practical evidences are provided in order to support this argument.

The last part of the essay discusses the implication in the market deriving from this distinct, still complementary, relationship between Dominant Designs and Standards. Other implications for corporate strategy are argued in the final part. L. Introduction THERE is a frequent overlap when people discuss the concepts of Standards and Dominant Designs. It is ordinary among managers, engineers as well as a narrow part of the economic literature that considers the concept of dominant design and technological standard as synonymous, or the same implications for the two terms.

Actually, the two notions derive from different backgrounds and fundamentals as well as lead to diverse consequences from the market point of view, the firms' performances and the management ones. The aim of this brief essay is trying to put in light these differences in order to avoid this common concentrations providing evidences that dominant designs and standards are complementary to each other rather than two substitutes. II. Background of Dominant designs and Standards Over time, several definitions have been provided in order to explain the essence of a dominant design (table I).

One cannot say there is a best concept and each of us might be more inclined to support one meaning rather than another one. However, considering this starting point, there is a common view regarding the Dominant Design: “ it can only be recognized post hoc based on subjective guidelines”. Henderson and Clark provided the best definition supporting this idea. They said “ A dominant design incorporates a range of basic choices about the design that are not revisited in every subsequent design” (M.

Henderson, Kim B. Clark, 1990). A dominant design is characterized both by a set of core design concepts - corresponding to the key functions performed by the product embodied in components - (Marbles, 1961; Alexander, 1964; Clark, 1985) and by a product architecture - defining the ways in which these components are integrated (Clark, 1985; Shall, 1986). A dominant design often emerges in response to the opportunity to obtain economies of scale or to take advantage of externalities (David, 1985; Arthur, 1988).

To provide an example: the dominant design for the car includes the fact that it used a gasoline engine to provide motive force. Once the dominant automobile design had been accepted, engineers did not reevaluate the decision to use a gasoline engine each time they developed a new design (Henderson, Clark 1990). Once a dominant design is established, the progress takes place on the initial set of components (within a stable TABLE I (source: Richard David Battle, 2013)

DOMINANT DESIGN DEFINITION Authors Abernathy and Turtleback (1978) Turtleback and Assure (1993) Turtleback (1994) Christensen, Sugarz, and Turtleback (1998) Cravings, Linen and Orangutans (2006) Definition of

Dominant Design A dominant design is a single architecture that establishes dominance in a product category. A specific path, along an industry's design hierarchy, which establishes dominance among competing design paths. A dominant design usually takes the form of a new product (or set of features) synthesized from individual technological innovations introduced independently in prior product variants.

The dominant design is the one that wins the allegiance of the marketplace; it's the one that competitors and innovators must adhere to if they hope to command significant market following. A dominant design is a product in a product category that gains general acceptance as the standard on technical features that other market players must follow if they wish to acquire significant market share. A dominant design emerges in a product category when one product's design specifications (consisting of a single or a complement of design features) define the product category architecture.

A particular product's design architecture as one that defines the specifications for the entire product category architecture) that are subjected to a sophistication and refinement process to get an overall improvement of the product/service/process. Many other concepts have been developed basically based on the previous sentence, and almost all of them highlight the same key features for describing a dominant design: the persistence of its architecture and its empirical essence which allowed it to take root on a wide range of sectors such as smoothness, automobiles, technologies, disk drivers and so on.

On the other side, the common adopted definition of standard underlines a technology universally approved and essential in order to develop a certain product. It is the result of innovation processes combining new features compatible with previous technologies. Standards can even generate terms for new compatibility systems and networks among products and/or procedures and/or associated complements. For such a reason the key feature for standards is interconnectivity since without it “ there is no need for standard” (Gallagher, 2007). A narrower field of implementation characterizes standards compared to dominant designs.

The relevant ones are for sure the electronic-based industries including computers, software, programming languages, and consumer electronics. Other critical debates about standards and dominant designs have been developed over time. There are two other aspects to take into account. The first one is about the level which they apply at (consequently the level of firm profitability) whilst the second is about the time frame where they can be recognized. To get the former statement the stress about the distinction between open standards (e. . Standard MPH created by ' SO) ND the close ones is required. While the first allows startups to quickly develop new products and services without employing a huge capital (I. E. These are technological solutions established for supporting the common interest), the latter requires the payment of licensing fees as they represent technological solutions deriving from the impetus of firms and market selection procedures (e. G. HTML standard markup language used to create web pages).

Therefore, although they might be controlled by single firms, Dominant Designs apply at industry level whereas standards may apply o a firm that

owns it (Immaturity's VS.), an industry, or another level of analysis (Gallagher, 2007). In this way, a single firm can have the control of standards and employ those in order to extract money advantages by using proprietary rents (e. G. The Dolly audio formats are standards controlled by a single firm, Dolly indeed). Secondly, standards have the advantage of being recognized before they are created.

As it is said in the beginning, the key aspect of a dominant design is its identification only post hoc which does not allow managers to act in advance and to predict what users might need in the near future. Standards, conversely, can be predicted before being established so that managers " can choose to use their standard strategically, as Gillette did in selling razors cheaply but blades dear" (Gallagher , 2007). III. Where do Dominant Design and Industry Standards derive from? The frequent misinterpretations about the common roots of D.

D and Standards might be originated even because the procedures where they derive from appear to be quite similar. Both are located inside the Abernathy and Turtlebacks Innovation Life Cycle but, despite that, there are still relevant differences. Everything starts from a radical genealogical innovation where uncertainty, from both the target and the technology point of view, is the dominant aspect. For such a reason a higher number of players including new entrepreneurial businesses appear in the market in order to experiment different design approaches.

In such a way, the market proliferates of multiple design combinations for absorbing numerous ideas from competing designs. After that, gradually, the

market same converges around the so called dominant designs. This second step, the transitional phase, in this sense, shifts competitive emphasis on product variety and starts setting up the rules of the game. Firms cease to invest in learning about alternative configurations of the established set of components.

Hence, the Dominant Design is the synthesis around the most popular solution emerging from the market competition and the re-combination of various design elements deriving from a varied range of producers. The main entrepreneurial interest is around the dominant design profile and because of that firms hardly explore out of this space. To provide an example: the typewriter appeared as dominant design in the beginning of the 18th century. The dominant design remained stable for decades to come but then, the new technology had a slow start: The first electrical model was introduced in 1906.

The word processor was the third wave developed a little faster: At the beginning of the 1970s, it appeared on the market combining the keyboard text-entry and printing functions of an electric typewriter with a dedicated processor for editing the text. However, to satisfy the need of the personal computer (PC), most business-machine companies stopped manufacturing the word processor as a stand-alone office machine. The PC is today's dominant design for writing, even though portable PC's, such as Laptops and Tablets have started to squeeze them out of the market.

Interconnectivity, on the other side is the main implication if one talks about standards. Consequently, once identified the network effects, a battle

for compatibility standards can occur. Interconnectivity can develop either with similar products or with complements (I. E. Standards allow products to interface with their supply of complementary assets). Understanding how firms usually choose and select the network of effects is the second key issue. To explain this concept, the brief explanation about two diverse standards typologies is provided.

Firstly, there are De Facto standards which are the result of a competition between standards promoted by a single firm or group of firms. They have achieved a dominant position by public acceptance or market forces (e. G. The QWERTY system became a De facto standard because it was successfully used on the early typewriters; The MP3 audio format started as an alternative to CD WAV for Internet music distribution, then replaced it De Facto standards, on the other side, have its own roots in some external forces on the market.

They are developed by external bodies such as ISO (Organization for standardization), CEN (European Committee for Standardization) and NBS (National Standards Bodies). Examples are HTML (computer file format) started as De facto (1993-1995) and became the De Facto standard (1995-present-day); PDF (computer file format) in 2005 became a De Facto standard as ISO 19005-1: 2005. Consequently, they automatically incorporate the combination of the features owned by dominant designs and try “ to have their intellectual property incorporated into the standard” (P.

A. David and S. Foray, 1990). On the other hand, considering the De facto standards, “ the need for co- specialization between them and/or their

complements, cannot easily incorporate or discard different combination of formats” (Gallagher, 2007). As a consequence, firms must keep providing their own supply of complementary assets making difficult the combination of their interfaces from rival standards (e. G. Immaturity’s VS. VS. format won over Sonny’s Beta format but it did not incorporate any technical aspects of the Beta format).

Therefore, when managers are facing the decision whether to generate a new standard or not, they should pay attention to the intensity of network effects. When a potential huge number of users of the product is perceived, then the standards are largely accepted and necessary; if not, standards are basically necessary and they cannot help the firms to overcome the network effects lining in the sector where they operate. IV.

Complementary Role of Standards and Dominant Designs A complementary aspect of Standards and Dominant Designs should be highlighted, as a confirmation of the thesis that the two concepts cannot be considered as substitutes. In the very beginning it is essential to emphasize the fact that while a dominant design is being determined through a broad range of elements, standards and their relevance are dependent essentially on the current or expected role of network effects.

There is a risk of overlaps, as one or more standards can be embraced within a dominant design (C. Hill and G. Jones, 2004). A wide range of dominant designs encompasses mundane standards, as, for instance, screws or electrical wiring. Another type of standards is the one that serves as a central feature of the dominant design, as MS-DOS was for the IBM PC.

Shortly, standards turn increasingly relevant elements of the architecture of a dominant design when network effects exist. Besides, standards can observe a varying stage of impact on an industry.

There could be observed core standards, integral for the industry's reduces to enable the functioning, and, from the other side, standards that are simply a component - necessary but mundane - of the design, for instance an electric voltage. Core standards usually give rise to "standards battles", which in the modern times rage on at every junction of technological change. The most notable example was the battle of dominance between the Betamax and the VHS format of videotape recording.

Currently, the fight for dominance between the Blue-ray and HD DVD high-definition disc formats is heating up. A lot of money is at stake in any battle of standards. However, a much more common concept is the component standards that are basically standardized products, which are part of another product. A series of examples shows that many standards can start as core standards in their own industry before turning components in other industries. Regarding the component standards, the needs of the product so that it can function, have to be taken under examination by the managers.

Questions pointing at the user adoption occupy an almost irrelevant position in this case. An example that might be given is the case of the electrical transmission standards in various countries. Irrespectively of the amount of products Apple sells, those cannot be changed. It is the company in position to verify the conformity of its products to those existing standards, and not vice versa. It is worth saying that component standards are characterized by

a relative durability. Obviously, the component standards appear frequently beneficial, as they make the adoption easier.

The incorporation of the QWERTY keyboard into the personal computer may be a simple example. It facilitated significantly its adoption. Moreover, thanks to the shift from the traditional historical keyboard to the QWERTY one the pool of typist could have been expanded (M. Trips, 2003). The obvious implication that derives from these considerations is that while developing incremental or radical innovation to products, their comprised standards may be more relevant in comparison to their architecture. The cassette tape players may be a good example to consider.

Their design and function has observed a relevant evolution since their beginnings. Despite of that fact, the interconnectivity standard of the tape's formation and the way of interfacing with the player has remained unchanged. V. Practical examples stressing standards distinction with dominant design and its Complimentary Role The Figure 1 presents the potential degree of integration between dominant designs and standards. The range varies from core, through component to no standards being comprised in dominant designs.

The top part of the figure embodies the products where standards were most relevant. This occurs basically when there is a direct relationship between the core products. In such cases, the standard is central to the dominant design and network effects contributed significantly to the adoption of the dominant design. Some products' or processes' interconnectivity needs may

be not as high as those embraced in the first group of integration. However, they still require standards for essential complements.

Two industries that may serve as an example, in which core products would have a very low value without essential complements, are the electrical distribution and satellite radio. In this group of interconnectivity degree, standards become less critical, but still important, for dominant designs.

Another group of products comprises those that may contain standardized components but they are primarily dominant designs rather than standards.

FIGURE 1 (source: Scott Gallagher, 2007) DEGREE OF INTEGRATION BETWEEN DOMINANT DESIGNS AND STANDARDS

Product/Industry	Standards	Essential Components
Direct Connection Telephones ; Facsimile Machines	Important	Essential
Electrical Distribution ; Satellite Radio	Important	Essential
Home Video Games Personal Computer Operating systems	Lesser	Components
Video Cassette Recorders	Lesser	Essential
Sonny's Walkway & Apple's pod	Lesser	Components
Dodge All Steel Body, Xerox	NO STANDARDS	No
standards Women's Clothing	The Dodge all-steel closed body could be a good example. There was clearly a dominant design, adopted by the entire automobile industry.	

Its value to a consumer, however, at any specific point in time was independent of the amount of other consumers that adopted it. Its adoption, therefore, was more a function of its advanced price/performance frontier, rather than interoperability issues (O. M. Turtleback, 1994; A. Phillips, 1971).

The component standards were not significant in determining the adoption of the design, but it is not to say that standards were not present at all as

components in these designs. The final group is comprised of some dominant designs or products that do not embrace standards at all, even from the component point of view.

Women's clothing could be an example, as each designer has the faculty to determine independently, for example, the size listed on a garment. VI.

Implications from Dominant Designs and Standards As a result of these differences, the implications observed in the market, after the establishment of standards and dominant designs, are diverse too. There are four main different implications perceivable in the market and those can be summarized, in turns, in four key words: a) Shocks in the industry; b) Firms monetary performances; c) Effects on firms operating in the market; d) Role of complementary assets.) It has been observed that a dominant design allows an industry to take roots in the market and spread itself on it, while standards usually produce disruptive effects Roding the industry itself. To provide evidence: the diffusion of MPH standard permitted " the invasion of the music industry by computer makers like Apple" (Gallagher, 2007). B) The " sales take off" effect is the one visible in an industry where a dominant design has just emerged. Connected to this phase, there is another relevant consequence that is a downfall in the number of competing firms.

The main explanation, why this occurs, lies in the fact that there is a strong focus of firms' attention on process innovation once a dominant design takes roots in the industry. Certainly, firms leave behind them the researches for product innovation orienting them towards the process innovation. In such a way, the level of rivalry runs up leading consequences on the " price battle". Here, companies owning weaker dominant designs, few resources as well as

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the lack of tools for shifting their designs into the dominant ones, are forced to drop out of the industry.

On the contrary, standards never lead to these crucial effects (such as “ sales take off) even though other several impacts have been observed (e. G. Firms frequently are obliged to deal to one another to survive). The triumph of Immaturity’s video home system (VS.) format over Sonny’s Bateman is a classic example of the imposition of a standard’s agreement. Immaturity’s victory has been attributed to the presence of complementary products, such as videotape rentals, and its ability to ramp up production to build installed base.

This success led to a rapid disappearance of Sonny’s Bateman, as the installed base of VS. rapidly expanded. The tendency for markets to pick one standard over the other is referred to as tipping. Although there may be monetary advantages on the creator of dominant design side, this effect does not always find practical evidence. The early movers can obtain advantages only to the extent that create switching costs, or create a positive reputation “ while limiting the problems of inertia and free riders” (M. B. Lieberman and D. B. Montgomery, 1988).

Consequently, advantages from dominant designs can be absorbed by firms in spite of not being the dominant design creators damaging the latter while standards show an opposite impact on the first movers. They are beneficial and more valuable and may consist in profitable returns. The explanation is contained in the fact that standards embrace a way to preempt assets through the use of patents or copyrights for instance. Moreover, referring to

the interconnectivity among products, how devices connect often derive from learning by users. The most representative evidence is the IBM and Microsoft case.

Despite IBM introduced the dominant design in the personal computer industry, it is Microsoft the company which is still gaining the benefit as Microsoft's operating system is incorporated in that dominant design. C) Standards rarely generate firms decrease as dramatic as dominant designs do. As it has been explained above, the number of competing firms significantly decreases once the new architecture entrenches itself while the agreement on standards do not even such a strong influence. D) The diffusion of complementary assets has been perceived stronger when one deals with standards.

The adoption of co-specialized complementary assets is quite strong in the case of standards and the main reason is the interaction required among diverse assets. Hence, the interaction represents the key strategy all managers should look at in order to adopt a successful, or at least competitive, corporate strategy. Apple, for instance, in order to stimulate the sales of its 'Pods, handles its tunes music service as "a break-even operation". Dominant designs, on the opposite, do not imply the sole employment of implementers co-specialized aspects, and not even by investing huge money resources on that.