ARTICLE IN PRESS

Journal of High Technology Management Research xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Journal of High Technology Management Research

journal homepage: www.elsevier.com/locate/hitech

Competition among vortex firms: Marketing, R & D or pricing strategy

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ARTICLE INFO

JEL classification:
L1
L2
O3

Keywords:
Market share
Marketing
Technology
Pricing
Duopoly
Network effects

ABSTRACT

The mathematical model determines how firms can leverage their advantages to increase their market share. Represented as vortex, firms increase their market scope using: marketing expenses strategy, R & D expenditure strategy or price reduction strategy. For an overpriced good, the R & D strategy is required if sector marketing velocity growth is low otherwise the pricing strategy is suited. Conversely, for an underpriced good, the R & D strategy is used when sector marketing velocity growth is high, but when it is low, the pricing strategy is followed. Distance between firms, competitor marketing velocity and related services share contribute or limit these strategies.

1. Introduction

Firms may determine the best position for their products to better compete. However, this positioning depends first on product characteristics and second on perceptual attributes by consumers. Indeed, in product positioning and design, product characteristics affect perceptual attributes (Kaul & Rao, 1995). “Product attributes are abstract dimensions that characterize the perceptions that consumers have on a product” (Hadjinicola & Charalambous, 2013, p. 432) also referred as “wants satisfiers” (Shocker & Srinivasan, 1974). The price has also an impact on the perception of the attributes (Hauser & Simmie, 1981).

In product design, they analyze marketing and engineering functions by distinguishing horizontal attributes from vertical attributes. Consumer “taste” like color and shape are considered as horizontal attributes while product performance or “quality” is reflected in the vertical attributes (Lacourbe, Loch, & Kavadias, 2009). So, product characteristics reflect product technological aspects while marketing transforms these product characteristics into product attributes to influence consumer decision (Kaul & Rao, 1995). Indeed, they proposed to link marketing to R & D for successful innovations and products (Cordon-Pozo, Garcia-Morales, & Aragon-Correa, 2006; Fain, Schoormans, & Duhovnik, 2011).

It is important to be able to represent the good through its marketing, technological and price characteristics, in order to be able to determine when the marketing expenses strategy is efficient, when the R & D expenditure strategy is efficient or when the price reduction is efficient.

Determining the optimal price is also considered in product competitive positioning. Product pricing is analyzed from the standpoint of economies of scale (Hadjinicola, 1999), of competition in a multi-segmented market, (Choi, DeSarbo, & Harker, 1990,

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http://dx.doi.org/10.1016/j.hitech.2017.04.003

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Please cite this article as: ELASRI, K., Journal of High Technology Management Research (2017), http://dx.doi.org/10.1016/j.hitech.2017.04.003

1992), with market entry, and fixed and variable costs (Rhim & Cooper, 2005).

In product design, the price depends on the attributes selected in order to satisfy consumers. The optimal combination of attributes allows offering a product at the right price to attract consumers (Belloni, Freund, Selove, & Simester, 2008; Chen & Hausman, 2000; Michalek, Ebbes, Adiguzel, Feinberg, & Papalambros, 2011) by considering multi-segmented market (Schon, 2010).

Multi-segmented market are studied because consumers have not the same preference for quality but also not the same level of income (Gabszewicz & Thisse, 1979; Guseo & Guidolin, 2015). However, models become more complex as they focus on product portfolio (Cantner, Krüger, & Söllner, 2012; van der Vooren, Alkemade, & Hekkert, 2013) in order to offer different levels of the same characteristics (Saviotti & Pyka, 1995).

This is why in our study we associate the firm with a good rather than a portfolio of goods. The complexity of the study is reduced but our approach allows laying the foundations for an analysis concerning the relationship between price and the technology offered. Indeed, the firm positioning depends on the price of the good: the good is either overpriced (a high price compared to the technology offered) or underpriced (a low price compared to the technology offered).

To increase the (perceived) quality of a product, firms compete in price, advertising and R & D (Haverila, 2013; Matraves & Rondi, 2007). Moreover, the technical modification of existing products leads companies to reposition their products by other non-technical elements like marketing or pricing (Chanda & Aggarwal, 2014; Urbaniak, 2001). Controllable factors (Kaul & Rao, 1995) or “actionable” attributes (Shocker & Srinivasan, 1974) that allow repositioning are the result of R & D expenditure, marketing expenses and price. Which strategy should be then pursued to offer for sale a successful product based on firm assets?

To determine the right strategy, the profit maximization should be the logical objective criterion but models opt for sales, revenue and market share since it is easier to gather data (Chanda & Das, 2015; Kaul & Rao, 1995). Indeed, to use profit maximization, costs of various product have to be assessed, both variable and fixed costs but also costs linked to product characteristics (Kaul & Rao, 1995). In this sense, the increase in the market share of the firm was retained as the objective pursued by the firm, reflecting the effectiveness of marketing, R & D and pricing strategies.

Another difficulty faced by firms is that perception and preferences are different among consumers. In a multiattributed perceptual space, an ideal point characterizes the most preferred combination of attributes (Carroll, 1972) while a vector characterizes various preferred combination of attributes (Carroll, 1980). Besides, these preferences are difficult to obtain since information concerning consumers distribution is imperfect and costly (Bonein & Turolla, 2009) and laborious to assess a priori by firms (Anderson, De Palma, & Thisse, 1992).

In product positioning, many authors have assumed a uniform distribution of consumers in one or in multiple dimensions (D'Aspremont, Gabszewicz, & Thisse, 1979; De Palma, Ginsberg, Papageorgiou, & Thisse, 1985; Eaton & Lipsey, 1975; Economides, 1984; Hotelling, 1929; Shaked & Sutton, 1982). In these models of spatial competition (Hotelling, 1929), consumer location indicates consumer preferred attributes. The consumer will then buy the product for which the distance between the perceptual attributes and preferred attributes is the lowest. It is this last assumption of consumer location that we have made in our model in order to represent consumers preferences.

However, products position on the space of characteristics change over time. To relax price competition, products have to be located sufficiently far from each other, that is maximum differentiation (D'Aspremont et al., 1979; Shaked & Sutton, 1982). Differentiating their products, firms reduce competition by searching for market niches but limit their market share (Bassi, Pagnozzi, & Piccolo, 2015).

While generally in these models, firms locate first their products and then compete simultaneously on price (Economides, Howell, & Meza, 2002; Götz, 2005; Lambertini, 2002; Neven, 1987), few have tried to analyze a successive product positioning and price changes (Anderson, 1987; Fleckinger & Lafay, 2010; Lambertini, 1997; Prescott & Visscher, 1977). Indeed, “the design of the product is far less flexible than its price” (Fleckinger & Lafay, 2010).

Also, through the R & D expenditure, firms not only improve their good but move away from their competitors and thus reduce the competition. In this way, as a result of their R & D efforts and the reduction of competition, they are less competing on price.

To gain market share, firms make advertising and/or R & D expenditure (Matraves & Rondi, 2007). Product repositioning is possible thanks to the introduction of a new characteristic (Anderson et al., 1992). Entrants move their position while incumbents reinforce their position (Fontana & Nesta, 2006).

Two alternative R & D strategies can be developed, either “escalation” by investing in few technologies or “proliferation” by investing in a wide range of technologies (Matraves & Rondi, 2007). Escalation is chosen when products are close substitutes leading to more concentration (Matraves, 1999; Sutton, 1998).

Firms introduce successful products thanks to the experience and the capabilities from R & D (Mitchell, 1989; Teece, 1986) but also from marketing (King & Tucci, 2002; Klepper & Simons, 2000) since advertising can expand the demand or change customer preferences between products (Bloch & Manceau, 1999).

Indeed, by representing firms as vortex, they can widen their vortex thanks to marketing expenses and catch more customers. However, this enlargement will be robust enough to withstand competition if the knowledge core resulting from R & D is broad.

Besides, network effects concern many industries if not all. The benefit in using a good or a service increases as it is more and more purchased or used by other consumers generating network externalities (Farrell & Saloner, 1985; Katz & Shapiro, 1985). In the global economy, platform markets that benefit from network effects are for instance container shipping, credit cards, travel reservation systems, video games (Eisenmann, Parker, & Van Alstyne, 2011) but also computers, cell phone services and video-game consoles (Tseng & Wang, 2011).

A broad range of businesses has been reconfigured as platforms (Parker & Van Alstyne, 2000; Rochet & Tirole, 2003;

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