

# ALL YOU NEED IS ... INNOVATION, OR NOT?

---

FRANCISCO JOSE MOLINA CASTILLO

MICHAEL A. STANKO

ROGER CALANTONE

[fjmolina@um.es](mailto:fjmolina@um.es), [mike\\_stanko@ncsu.edu](mailto:mike_stanko@ncsu.edu), [rogercal@msu.edu](mailto:rogercal@msu.edu)

*Universidad de Murcia*

*North Carolina State University*

*Michigan State University*

## RESUMEN

*Existing research offers managers limited guidance regarding how to successfully introduce a product that exhibits network externalities or substantial switching costs. In addition, little is known regarding the consequences of network externalities on short-term new product performance. Based on a study of 255 firms, the objective of this paper is to gain a deeper understanding of how to benefit from network externalities through product innovativeness and switching costs. Preliminary results of the research shows that both technological and market newness have an indirect impact on short-term new product performance through network externalities. Interesting recommendations can be obtained to increase short-term new product performance for products that exhibit network externalities or switching costs.*

## Palabras clave:

Innnovativeness, network externalities, switching costs, short-term new product performance.

## 1. Introduction

Recent research has shown that it is difficult to persuade consumers to adopt innovations, and it is getting harder all the time (Chakravorty, 2004). The number of new products launched each year have increased substantially, making consumers' decisions more difficult (Pae and Hyun, 2002). At the same time, as more markets are influenced by the presence of network effects, new products and service launches are increasingly ineffective (Lee and O'Connor, 2003a). Moreover, recent findings by Gourville (2006) reveal that innovative products fail at a stunning rate of between 40% and 90%. In fact, previous research regarding innovation's relationship with performance has been inconclusive - with linear, non-linear as well as non-significant relationships being shown by researchers. Managers need to rethink the way they bring innovations to market; two effects can be key to determining a product's diffusion. First, the impact that other products may have on the innovation and second, whether consumers will derive value from the innovation by interacting with other consumers. This phenomenon is known as network effects. The discussion of several outstanding questions regarding network effects may help scholars and managers better understand how to increase the chances of success for future new products.

First, most analyses of new product introductions have focused on the performance of the individual product itself (Henard and Szymanski, 2001). However, with the economy becoming increasingly interconnected, more products in high technologies industries exhibit network externalities (Stremersch et al., 2007, Srinivasan, 2008). Consequently, in these markets the utility of a product depends not only on its attributes, but also on the number of consumers by whom it is adopted and on the availability of complementary products (Basu et al., 2003). Studies on network externalities have focused on, among other things, demonstrating the existence of network externalities (Nair et al., 2003), the diffusion of innovations (Gupta et al., 1999), or product preannouncements (Farrell and Shapiro, 1988). However, despite such academics efforts, existing literature offers managers little guidance on network externalities' antecedents. Product innovativeness may be an important antecedent of network externalities as the introduction of new technology and new market needs into the new product could motivate other firms to develop complementary new products that in turn increase the final value of both products.

Switching costs also have a significant impact on the strategies managers should (and do) adopt (Eliashberg and Robertson, 1988), and on the resulting industry-related and competitive structures (Farrell and Shapiro, 1988). Given their importance, it seems natural that firms would want to manage their customers' perceptions of switching costs (Bell et al., 2005, Jones et al., 2002). However, it is possible that pursuing widely held "appropriate" launch strategies may, in fact, be detrimental to the marketplace performance of products with network effects (Burnham et al., 2003).

Finally, the existing literature offers little guidance on how to introduce successful products that exhibit network effects (Lee and O'Connor, 2003a). It is generally agreed that new products have a different impact in the short term than they have in the long term (Henard and Szymanski, 2001). According to Sahay and Riley (2003) it is important to pay attention to the short-term performance of the new products launched to the market in order to establish corrective measures or alliances with other firms with complementary new products.

Based on the gaps mentioned above, the goal of this research is to consider the effects of network externalities and switching costs on short-term new product performance. From a managerial point of view, this research provides valuable information on how to increase the effectiveness of product launch activities by considering the existence of other products on the market. Our study is organized as follows. We begin by presenting the theoretical background and hypotheses, after which we explain the research method and the test of our hypotheses. We conclude by discussing the academic and managerial implications of our findings.

## 2. Conceptual background on network externalities

There is a growing body of literature on network externalities and its relationship with other variables. The concept of network externality has been studied mainly in relation to the presence of network effects (Nair et al., 2003), the nature of network effects (Katz and Shapiro, 1986, Shankar and Bayus, 2003), the role of network effects in diffusion (Gupta et al., 1999), the impact on pricing decisions (Ge, 2002, Xie and Sirbu, 1995), the establishment of standards (Farrell and Saloner, 1985, Besen and Farrel, 1994) antitrust policies (Liebowitz and Margolis, 1996) or consumer behaviour (Lee and O'Connor, 2003a).

Unfortunately, the term externality has been used in divergent ways in past research and many closely related terms have arisen as can be observed in Table 1. Economists have studied network effects for decades (Farrell and Saloner, 1985, Katz and Shapiro, 1986). For example, Coase (1960) and Liebowitz and Margolis (1994) describe the negative network externalities where the firms try to establish monopolistic practice to improve performance. Similarly, Langlois and Robertson (1992), describes the centralized and decentralized network externalities depending on the power a firm has to establish the rules inside the network. Shankar and Bayus (2003) refer to interactive network externalities when they are examined with relation to other variables such as price or advertising. However, academics generally agree in distinguishing two main types of network externalities: a) indirect network externalities and b) direct network externalities. Indirect network externalities analyze how the value of the product increases as the number of complementary products appear in the market (Riggins et al., 1994, Sheremata, 2004). On the other hand, direct network externalities analyze the increase in a consumer's utility from a product when the number of other users of that product increases. Direct network externalities are also known as positive network externalities (Liebowitz and Margolis, 1996), demand economies of scale (Katz and Shapiro, 1986) or massive adoption economies (Norsworthy and Lee, 1998). Liebowitz and Margolis (1994) also described the direct network externalities as the synchronization value. According to these authors, the autarky value is the value generated by the product even if there are no other users. In contrast, the synchronization value is the additional value derived from being able to interact with other users of the product.

**Table 1. Network externalities terminology**

<b>Terms used</b>	<b>Authors</b>
Negative network externalities	Hellos and Jacobson (1999); Liebowitz and Margolis (1994); Srinivasan (2008)
Centralized network externalities	Langlois and Robertson (1992)
Decentralized network externalities	
Interactive network externalities	Shankar and Bayus (2003)
Direct network externalities	Katz and Saphiro (1986); Lee and O'Connor (2003a); Shapiro and Varian (1999); Sheremata (2004)
Demand economie of scale	Katz and Saphiro (1986)
Positive network externalities	Brynjolfsson and Kemerer (1996); Hellos and Jacobson (1999); Liebowitz and Margolis (1994); Srinivasan et al. (2004); Xie and Sirbu (1995)
Indirect network externalities (demand and supply side)	Gupta et al. (1999); Nair et al. (2003); Shankar and Bayus (2003)
Demand-side indirect network externalities	Basu et al. (2003)
Supply-side indirect network externalities	Shurmer (1993)

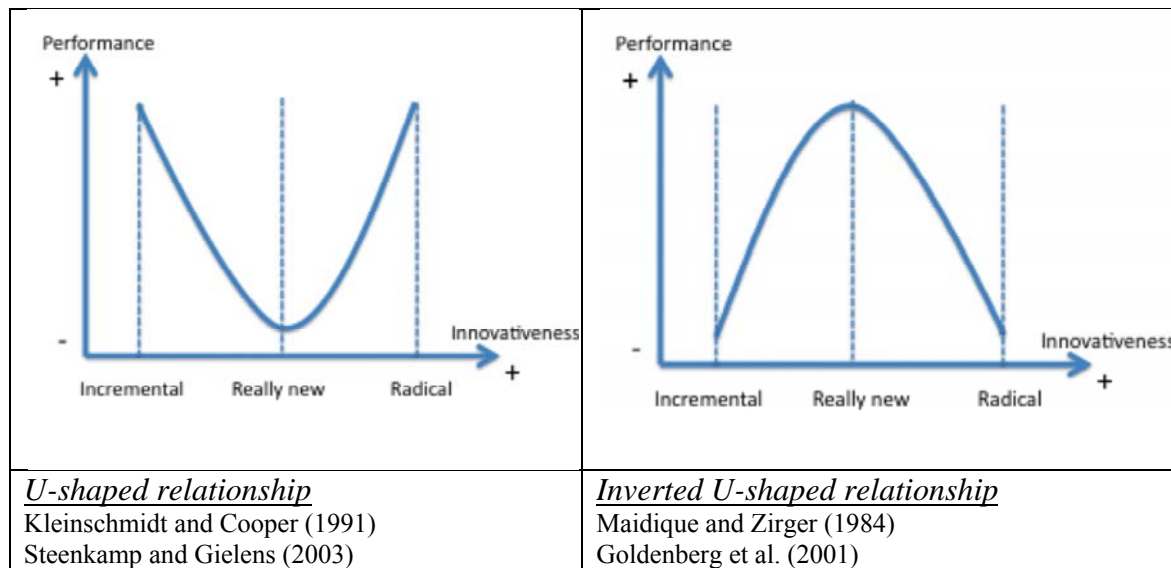
Independently of the terminology surrounding network externalities, it is generally agreed that the antecedents and consequences of direct and indirect network effects are quite different. However, despite past academic efforts devoted to the study of network externalities, little research has been conducted to examining the consequences of network externalities for new product launches.

### 3. Hypotheses

#### 3.1. Antecedents of network externalities

There have been many attempts in the extant literature to analyze the relationship between innovativeness and new product performance. Some of these argue a linear relationship, while others favor a non-linear relationship between product innovativeness and new product performance (Figure 1). Several authors, including Kleinschmidt and Cooper (1991) and Steenkamp and Gielens (2003) have suggested a U-shaped relationship, where higher levels of performance will be obtained through incremental or radical new products. In contrast, other authors, including Maidique and Zirger (1984) and Goldenberg et al. (2001), have proposed an inverted U-shaped curve, where higher levels of performance will be obtained with really new products.

**Figure 1. Innovativeness and performance**



However, such studies have not been conclusive and these scattered findings suggest that the impact of innovativeness on new product performance might be indirect. This latter approach is adopted, for example, by Calantone et al. (2006), who demonstrates that the collective and contrasting effects of familiarity and new product advantage may result in an apparent curvilinear relationship between innovativeness and new product success. Similarly, there is evidence to suggest that product innovativeness may impact new product performance indirectly through network externalities. According to Gemünden and Heydebreck (1992) innovation has to be viewed and understood in the context of their entire innovation network. Based on this idea and on the competence literature, Ritter and Gemünden (2004) describe two types of competences: technological and network competences. These authors examine the antecedents and consequences of both types of competences but do not get a deep understanding of their potential relationship. Evidence suggests that customers can favorably perceive the introduction of new technology in a new product, as a way of updating the product (Creusen and Schoormans, 2005).

**H1: Technological newness has a positive impact on indirect network externalities**

**H2: Market newness has a positive impact on indirect network externalities**

**H3: Market newness has a positive impact on direct network externalities**

#### 3.2. Consequences of network externalities

A network market is a market where the value of a product increases with the number of adopters (direct network externality) (Katz and Shapiro, 1986) or complementary products (indirect network externalities) (Basu et al., 2003). This means that, in network markets,

consumer utility depends not only on the product itself, but also on the network size or externalities with other products or users (Sheremata, 2004). Although these two types of network externalities have usually been analyzed separately (Gupta et al., 1999), they are closely related. Thus, if indirect network externalities exist in a market, the number of users may increase and the customer will experience higher value when interacting with other users of these products. Accordingly, we propose:

**H4: Indirect network externalities have a positive impact on direct network externalities.**

If there are no indirect network externalities, the perceived switching costs will be limited to the intrinsic characteristics of the product itself (Sheremata, 2004). By contrast, when customers buy a product in a market where there are indirect network externalities, the switching costs are not limited to the learning costs associated with the technology of the new product (Kohli, 1999). In these markets, customers also have to increase their knowledge with regard to operating the complementary products, and in the end the decision process will be more complicated (Katz and Shapiro, 1986). We propose:

**H5: The higher the indirect network externalities is, the higher the switching costs associated with a new product will be.**

The original studies surrounding network externalities in the economic literature (Katz and Shapiro, 1986, Farrell and Shapiro, 1988) used a game theory-based approach in analyzing whether firms become monopolies or merely grow and stay dominant in markets due to network externalities. These studies pay special attention to the inefficiencies that these externalities generate (Liebowitz and Margolis, 1994). However, it is generally accepted that indirect network effects occur when the introduction of complementary goods increase as sales of primary good increases (Sheremata, 2004, Shocker et al., 2004). Based on this assumption, Lee and O'Connor (2003a) suggest that customer decisions in the short term will be influenced to a greater extent by the existence of indirect network externalities than by the product itself. Thus, we propose that:

**H6: Indirect network externalities have a positive impact on short-term new product performance.**

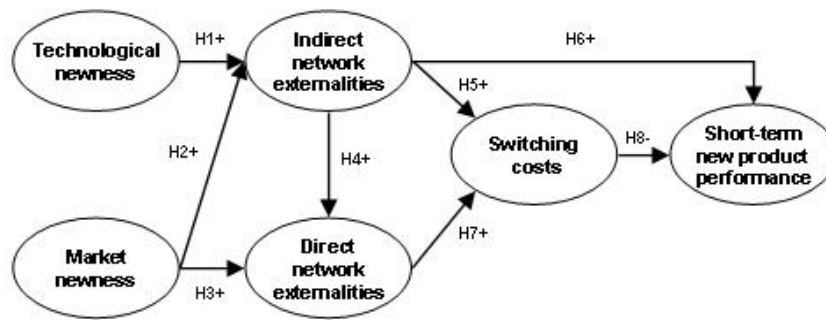
When a firm launches a new product when there are direct network externalities, different problems related to take-off may occur. Customers may be reluctant to buy the product because they are unsure how they will be able to interact with other customers (Ge, 2002). Thus, if there is no critical mass, there will be no perceived benefit from direct network externalities (Economides, 1996). Ultimately, this will mean that if direct network externalities are strong, the perceived switching costs associated with buying the product will be higher based on the higher level of knowledge and planning that customers will need. Therefore, we propose:

**H7: The higher the direct network externalities is, the higher the switching costs associated with a new product will be.**

Switching costs are defined as the one-off costs customers associate with the process of switching from one product to another (Sheremata, 2004). Switching costs need not be limited to objective, "economic" costs. When consumers simplistically state that "it's just not worth it" to switch providers, they may perceive impediments ranging from search costs, transaction costs, learning costs, loyal customer discounts, customer habit, emotional cost and cognitive effort, coupled with financial, social, and psychological risk on the part of the buyer (Fornell and Larcker, 1981). These costs may delay customer acceptance of the new product and in turn short-term new product performance.

**H8: Switching costs have a negative impact on short-term new product performance.**

Figure 1. Theoretical model



## 4. Methodology

### 4.1. Data collection and sample

Data used in this research was provided by a cross-sectional survey as well as a set of case studies. The initial sampling frame was obtained from a database listing the most innovative Spanish firms in different sectors: 28 - chemical products industry, 35 - machinery, 36 - electrical and electronic machinery industry and 37 - transport devices. Through a telephone presurvey, 1200 firms were identified. To be eligible, firms had to meet two criteria. First, they must have had developed and launched a new product in the last three years (Veldhuizen et al., 2006) and the product had to be in the market for more than 12 months to ensure that they had sufficient data on the product and on the resulting performance (Langerak et al., 2008). Data were collected through a web-based questionnaire. Non-respondents were called after two weeks to ask if they had received the questionnaire, and to remind them of the value of their input. In all, 255 questionnaires were returned, yielding an effective response rate of 21.25% which is consistent with that obtained in similar studies (Sivadas and Dwyer, 2000). We used Armstrong and Overton's (1977) time-trend extrapolation procedure to assess nonresponse bias. In comparing early (first quartile) and late (fourth quartile) respondents, no significant differences emerged in the mean responses on any of the constructs. To assess informants' quality, respondents indicated on a ten point likert scale (1 = "very limited knowledge," 10 = "very substantial knowledge") their degree of knowledge about the new product (Langerak et al., 2008) the new product development process and launching activities (Atuahene-Gima, 2005). The mean response were 8.46, 7.08 and 6.71, respectively, thus showing their knowledgeability on the new product selected. In addition, we used several procedures to empirically examine the possibility that common method bias obtained and threatens interpretation of our results: 1.) the Harman one-factor test, 2.) a confirmatory factor-analytic approach to Harman one-factor test, 3.) the Single method factor approach (Podsakoff et al., 2003), 4.) the analysis of the correlation between endogenous and exogenous errors and 5.) the analysis of the covariance matrix of between item errors.

### 4.2. Measures and validation

Our multi-item scales were taken from earlier studies. To measure technological newness and market newness, we adopted the approach suggested by Danneels and Kleinschmidt (2001), consisting of three items each. According to Srinivasan et al. (2008), there is no well-established way to measure network externalities. Therefore, based on several contributions of the literature including Lee and O'Connor (2003a), Sahay and Riley (2003) and Shocker et al. (2004) we have proposed a total of two items to measure the indirect network externalities. With regard to direct network externalities, we also reviewed the work by Sahay and Riley (2003) and Pae and Hyun (2002), and finally a scale with three items was developed. An important discussion is being conducted concerning switching costs (Burnham et al., 2003), there are different points of view with regard to this variable (Jones et al., 2002). However, we have decided to adopt the proposal by Kohli (1999), which measures switching costs from a managerial point of view. Finally, to measure new product performance, we reviewed recent studies (Huang et al., 2004, Veldhuizen et al., 2006) and four measures that focus on strategic

performance were identified. In order to focus on the short-term we rely on the approach based on the product life cycle previously employed by several researches such as Lee and O'Connor (2003b). Therefore, to measure the short-term new product performance, respondents were asked about results from the first two stages of product life cycle (introduction and growth stages). In addition, based on the approach by Sahay and Riley (2003), respondents were presented with a definition of the life cycle to aid in their decision, and both the questionnaire and the covering letter asked the respondents to answer the questions in the short term (introduction and growth phases).

## 5. Preliminary results

To refine our measures, we conducted a confirmatory factor analysis (CFA) using LISREL 8.8 to determine the validity and reliability of our measures. As can be observed from Table 2, the results of the six factor model provided an acceptable fit ( $\chi^2(120) = 221.27$  CFI=.96 RMSEA=.05 RMSEA Range= (0.04;0.07)). The factor loadings of each individual indicator on its respective construct were statistically significant ( $p < .001$ ) establishing convergent validity. Since our research contains several multi-item reflective scales, we investigated the psychometric properties of these measures through the composite reliability index (Bagozzi and Yi, 1988) and the average variance extracted index (Fornell and Larcker, 1981). Both indexes exceeded the recommended benchmark of .60 and .50 respectively. Evidence of discriminant validity among the dimensions was provided by two different procedures recommended in the literature as follows: 1) the 95% confidence interval constructed around the correlation estimate between two latent variables never includes value 1 (Anderson and Gerbing, 1988). 2) the comparison of the square root of the AVE (diagonal in Table 2) with the correlations among constructs (i.e., off-diagonal elements) reveals that the square root of the AVE for each component is greater than the correlation between components, in support of discriminant validity (Fornell and Larcker, 1981). These findings provide evidence of discriminant validity among the components and the constructs. Overall, the results obtained from these tests provided evidence reliability for reflective constructs. The hypotheses will be subsequently tested using a structural model and the analysis of alternatives models will be conducted in order to test whether network externalities fully or partially mediate the effect of technological and market newness on short-term new product performance.

**Table 2. Descriptive and measurement statistics for reflective constructs**

	Mean	SD	SCR	AVE	1	2	3	4	5	6
<b>1. Technological newness</b>	5.55	2.39	.87	.70	.84					
<b>2. Market newness</b>	4.38	2.54	.90	.74	.45**	.86				
<b>3. Indirect network externalities</b>	4.94	2.43	.88	.78	.20**	.20**	.88			
<b>4. Direct network externalities</b>	4.75	2.42	.80	.57	.20**	.32**	.31**	.76		
<b>5. Switching costs</b>	3.89	2.16	.82	.60	.23**	.25**	.22**	.31**	.78	
<b>6. Short-term product performance</b>	6.60	1.55	.84	.58	.01	.02	.16**	.08	-.18**	.76

Notes: Mean = the average score for all items included in this measure; SD = standard deviation; CR = composite reliability; AVE = average variance extracted; n.a. = not applicable. The numbers on the diagonal are the square root of the AVE. Off-diagonal elements are correlations among constructs.

a Scale composite reliability (SCR) ( $q_c = (A_{ki})^2 \text{ var}(n) / [(A_{ki})^2 \text{ var}(n) + A_{hii}]$ ; (Bagozzi and Yi 1988))

b Average variance extracted (AVE) ( $q_c = (A_{ki})^2 \text{ var}(n) / [(A_{ki})^2 \text{ var}(n) + A_{hii}]$ ; (Fornell and Larcker 1981))

## References

- ANDERSON, J. C. y GERBING, D. W. (1988). "Structural equation modelling in practice: A review and recommended two-step approach", *Psychological Bulletin*, Vol. 103, n° 3, pgs 411-423.
- ARMSTRONG, J. S. y OVERTON, T. S. (1977). "Estimating nonresponse bias in mail surveys", *Journal of Marketing Research*, Vol. 14, n° 3, pgs 396-402.
- ATUAHENE-GIMA, K. (2005). "Resolving the capability-rigidity paradox in new product innovation", *Journal of Marketing*, Vol. 69, n° 3, pgs 61-83.

- BAGOZZI, R. P. y YI, Y. (1988). "On the evaluation of structural equation models", *Journal of the Academy of Marketing Science*, Vol. 16, nº 1, pgs 74-94.
- BASU, A., MAZUMDAR, T. y RAJ, S. P. (2003). "Indirect network externality effects on product attributes", *Marketing Science*, Vol. 22, nº 2, pgs 209-221.
- BELL, S. J., AUH, S. y SMALLEY, K. (2005). "Customer relationship dynamics: Service quality and customer loyalty in the context of varying levels of customer expertise and switching cost", *Journal of the Academy of Marketing Science*, Vol. 33, nº 2, pgs 169-183.
- BESEN, S. M. y FARREL, J. (1994). "Choosing How to Compete: Strategies and Tactics in Standardization", *Journal of Economic Perspectives*, Vol. 8, nº 2, pgs 117-131.
- BRYNJOLFSSON, E. y KEMERER, C. F. (1996). "Network Externalities in Microcomputer Software: An Econometric Analysis of the Spreadsheet Market", *Management Science*, Vol. 42, nº 12, pgs 1627-1647.
- BURNHAM, T. A., FRELS, J. K. y MAHAJAN, V. (2003). "Consumer switching costs: A tipology, antecedents, and consequences", *Journal of the Academy of Marketing Science*, Vol. 31, nº 2, pgs 109-126.
- CALANTONE, R., CHAN, K. y CUI, A. S. (2006). "Decomposing product innovativeness and its effects on new product succes", *Journal of Product Innovation Management*, Vol. 23, nº 4, pgs 408-421.
- CHAKRAVORTY, B. (2004). "The New Rules for Bringing Innovations to Market", *Harvard Business Review*, Vol. 82, nº 3, pgs 58-67.
- COASE, R. (1960). "The Problem of Social Costs", *Journal of Law and Economics*, Vol. 3, nº pgs 1-44.
- CREUSEN, M. E. H. y SCHOORMANS, J. P. L. (2005). "The different roles of product appearance in consumer choice", *Journal of Product Innovation Management*, Vol. 22, nº 1, pgs 63-81.
- DANNEELS, E. y KLEINSCHMIDT, E. J. (2001). "Product innovativeness from the firm's perspective: Its dimensions and their relation with project selection and performance", *Journal of Product Innovation Management*, Vol. 18, nº 6, pgs 357-373.
- ECONOMIDES, N. (1996). "The economics of networks", *International Journal of Industrial Organization*, Vol. 16, nº 4, pgs 675-699.
- ELIASHBERG, J. y ROBERTSON, T. (1988). "New product preannouncing behavior: A market signaling study", *Journal of Marketing Research*, Vol. 25, nº 3, pgs 282-292.
- FARRELL, J. y SALONER, G. (1985). "Standarization, compatibility and innovation", *Rand Journal of Economics*, Vol. 16, nº 3, pgs 70-83.
- FARRELL, J. y SHAPIRO, C. (1988). "Dynamic competition with switching costs", *Rand Journal of Economics*, Vol. 19, nº 1, pgs 123-137.
- FORNELL, C. y LARCKER, D. F. (1981). "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18, nº 1, pgs 39-50.
- GE, D. (2002). "Value pricing in presence of network effects", *Journal of Product and Brand Management*, Vol. 11, nº 3, pgs 174-185.
- GEMÜNDEN, H. G. y HERDEN, P. H. Y. R. (1992). "Technological interweavement: A means of achieving innovation success", *R&D Management*, Vol. 22, nº 4, pgs 359-377.
- GOLDENBERG, J. y MAZURSKY, D. R. L. Y. D. (2001). "The idea itself and the circumstances of its emergence as predictors of new product success", *Management Science*, Vol. 47, nº 1, pgs 69-84.
- GOURVILLE, J. T. (2006). "Eager sellers and stony buyers: Understanding the psychology of new product adoption", *Harvard Business Review*, Vol. 84, nº 6, pgs 99-106.
- GUPTA, S., JAIN, D. C. y SAWHNEY, M. S. (1999). "Modelling the evolution of markets with indirect network externalities: An application to digital television", *Marketing Science*, Vol. 18, nº 3, pgs 396-416.
- HELLOFS, L. y JACOBSON, R. (1999). "Market share and consumers' perceptions of quality: When can firms grow their way to higher versus lower quality", *Journal of Marketing*, Vol. 63, nº 1, pgs 16-25.
- HENARD, D. H. y SZYMANSKI, D. M. (2001). "Why some new products are more successful than others?", *Journal of Marketing Research*, Vol. 38, nº 3, pgs 362-375.



- HUANG, X., SOUTAR, G. N. y BROWN, A. (2004). "Measuring new product success: An empirical investigation of Australian SMEs", *Industrial Marketing Management*, Vol. 33, nº 2, pgs 117-123.
- JONES, M. A., MOTHERSBAUGH, D. L. y BEATTY, S. E. (2002). "Why customers stay: Measuring the underlying dimensions of services switching costs and managing their differential strategic outcomes", *Journal of Business Research*, Vol. 55, nº 6, pgs 441-450.
- KATZ, M. L. y SHAPIRO, C. (1986). "Technology adoption in the presence of network effects", *Journal of Political Economy*, Vol. 94, nº 4, pgs 822-841.
- KLEINSCHMIDT, E. J. y COOPER, R. G. (1991). "The impact of product innovativeness on performance", *Journal of Product Innovation Management*, Vol. 8, nº 4, pgs 240-251.
- KOHLI, C. (1999). "Signaling new product introductions: A framework explaining the timing of preannouncements", *Journal of Business Research*, Vol. 46, nº 1, pgs 45-56.
- LANGERAK, F., HULTINK, E. J. y GRIFFIN, A. (2008). "Exploring mediating and moderating influences on the links among cycle time, proficiency in entry timing, and new product profitability", *Journal of Product Innovation Management*, Vol. 25, nº 4, pgs 370-385.
- LANGLOIS, R. N. y ROBERTSON, P. L. (1992). "Networks and innovation in a modular system: Lessons from the microcomputer and stereo component industries", *Research Policy*, Vol. 21, nº 4, pgs 297-313.
- LEE, Y. y O'CONNOR, G. C. (2003a). "New product launch strategy for network effects products", *Journal of the Academy of Marketing Science*, Vol. 31, nº 3, pgs 241-255.
- LEE, Y. y O'CONNOR, G. C. (2003b). "The impact of communication strategy on launching new products: The moderating role of product innovativeness", *Journal of Product Innovation Management*, Vol. 20, nº 1, pgs 4-21.
- LIEBOWITZ, S. y MARGOLIS, S. (1996). "Should Technology Choice Be a Concern of Antitrust Policy?", *Harvard Journal of Law and Technology*, Vol. 9, nº 3, pgs 83-318.
- LIEBOWITZ, S. J. y MARGOLIS, S. (1994). "Network externality: An uncommon tragedy", *Journal of Economic Perspectives*, Vol. 8, nº 2, pgs 133-150.
- MAIDIQUE, M. A. Y. ZIRGER B. J. (1984). "A study of success and failure in product innovation: The case of the U.S. electronics industry", *IEEE Transactions on Engineering Management*, Vol. 31, nº 4, pgs 192-203.
- NAIR, H., CHINTAGUNTA, P. y DUBÉ, J. (2003). "Empirical analysis of indirect network effects in the market for personal digital assistants", *Quantitative Marketing and Economics*, Vol. 2, nº 1, pgs 23-58.
- NORSWORTHY, R. y LEE, Y. (1998). "Returns to scale and network effects", *Lally School of Management and Technology, Troy, NY (Working Paper)*, Vol., nº.
- PAE, J. P. y HYUN, J. S. (2002). "The impact of technology advancement strategies on consumers' patronage decisions", *Journal of Product Innovation Management*, Vol. 19, nº 5, pgs 375-383.
- PODSAKOFF, P. M., MACKENZIE, S. B., LEE, J. y PODSAKOFF, N. P. (2003). "Common method biases in behavioral research: A critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 20, nº 5, pgs 879-903.
- RIGGINS, F. J., KRIEBEL, C. H. y MUKHOPADHYAY, T. (1994). "The Growth of Interorganizational Systems in the Presence of Network Externalities", *Journal of Management Science*, Vol. 40, nº 8, pgs 984-998.
- RITTER, T. y GEMÜNDEN, H. G. (2004). "The impact of a company's business strategy on its technological competence, network competence and innovation success", *Journal of Business Research*, Vol. 57, nº 5, pgs 548-556.
- SAHAY, A. y RILEY, D. (2003). "The role of resource access, market considerations, and the nature of innovation in pursuit of standards in the new product development process", *Journal of Product Innovation Management*, Vol. 20, nº 4, pgs 338-355.
- SHANKAR, V. y BAYUS, B. L. (2003). "Network effects and competition", *Strategic Management Journal*, Vol. 24, nº 4, pgs 375-384.

- SHAPIRO, C. y VARIAN, H. R. (1999). "The art of standards wars", *California Management Review*, Vol. 41, n° 2, pgs 8-32.
- SHEREMATA, W. A. (2004). "Competing through innovation in network markets: Strategies for challengers", *Academy of Management Review*, Vol. 29, n° 3, pgs 359-377.
- SHOCKER, A. D., BAYUS, B. L. y KIM, N. (2004). "Product complements and substitutes in the real world: The relevance of other products", *Journal of Marketing*, Vol. 68, n° 1, pgs 28-40.
- SHURMER, M. (1993). "An investigation into sources of network externalities in the packaged PC software market", *Information Economics and Policy*, Vol. 5, n° 3, pgs 231-251.
- SIVADAS, E. y DWYER, F. R. (2000). "An examination of organizational factors influencing new product success in internal and alliance-based processes", *Journal of Marketing*, Vol. 64, n° 1, pgs 31-49.
- SRINIVASAN, R. (2008). "Sources, characteristics and effects of emerging technologies: Research opportunities in innovation", *Industrial Marketing Management*, Vol. 37, n° 6, pgs 633-640.
- SRINIVASAN, R., LILIEN, G. L. y RANGASWAMY, A. (2004). "First in, First out? The effects of network externalities on pioneer survival", *Journal of Marketing*, Vol. 68, n° 1, pgs 41-55.
- STEENKAMP, J. E. M. y GIELENS, K. (2003). "Consumer and Market Drivers of the Trial Probability of New Consumer Packaged Goods", *Journal of Consumer Research*, Vol. 30, n° 3, pgs 368-384.
- STREMERSCH, S., TELLIS, G. J., FRANSES, P. y BINKEN, J. (2007). "Indirect network effect in new product growth", *Journal of Marketing*, Vol. 71, n° 2, pgs 52-74.
- VELDHUIZEN, E., HULTINK, E. J. y GRIFFIN, A. (2006). "Modeling market information processing in new product development: An empirical analysis", *Journal of Engineering and Technology Management*, Vol. 23, n° 4, pgs 353-373.
- XIE, J. y SIRBU, M. (1995). "Price competition and compatibility in the presence of positive demand externalities", *Management Science*, Vol. 41, n° 5, pgs 909-926.