

Increasing returns and marketing strategy in the twenty-first century: Nokia versus Microsoft versus Linux

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Abstract

Purpose – The purpose of this paper is to develop further the concept of increasing returns in technology industries, including social and critical mass factors. The paper applies this framework to the twenty-first century with the example of the three-way competition among Nokia, Microsoft and Linux for the global mobile software standards competition.

Design/methodology/approach – A multidisciplinary and conceptual methodology was used, integrating theories from economics, marketing, technology, innovation, sociology and psychology.

Findings – The study finds that increasing returns frameworks need to combine technology as well as social and psychology effects to reflect the dynamics of global competition in the twenty-first century.

Originality/value – This paper illustrates how a multidisciplinary and integrated approach to analysing increasing returns and a critical mass framework can provide a richer and more holistic analysis of global competition, including Nokia, Microsoft and Linux, in the global competition for mobile software in the twenty-first century.

Keywords Rate of return, Marketing strategy, World economy, Mobile communication systems

Paper type Conceptual paper

An executive summary for managers and executive readers can be found at the end of this article.

Introduction

This article analyses the relationship between marketing and technology strategy and the framework of increasing returns (Arthur, 1994; 1996; Millar and Choi, 2003), with an application to the global technology standards competition (Glaum and Oesterle, 2005) among Microsoft, Nokia and Linux in the twenty-first century. Traditionally, technology licensing has been seen as a separate strategy to marketing, and for the purpose of extracting remaining value from a mature technology (Miller, 2003; Choi *et al.*, 1997; Dickson, 1992; Choi *et al.*, 2005; Kotabe *et al.*, 1996); technology licensing has been studied extensively in the international

business and marketing literature from the viewpoint of product life cycles and modes of entry into foreign markets (Glaum and Oesterle, 2005; Contractor, 1990; Davidson and McFetridge, 1985; Cavusgil *et al.*, 1993). The development of a client base can thus become an especially crucial element of marketing strategy in such industries (Kotabe *et al.*, 1996; Lee *et al.*, 1997) and the dynamic interaction and exchange between consumers and producers need to be analysed in more depth. Brian Arthur's (1994) framework of path dependency and increasing returns, helps to contribute a dynamic, and continuous interaction between consumers and firms in such marketing relationships.

In the twenty-first century an application to global competition (Glaum and Oesterle, 2005) is occurring in the area of "software standards" for mobile phones. This has become a global, three-way competition among Nokia, Microsoft and Linux, Open Source Systems. Three factors make this competition much more complex than the earlier competitions for technology and marketing standards in videos, Betamax versus VHS; personal computers, Apple versus Microsoft; and keyboards, QWERTY versus DVORAK. First, it is a three way competition and more complex relative to the earlier two way competitions for technology standards in the 1980s and 1990s. Secondly, it is a global competition including Nokia from Europe, Microsoft

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from the United States, and Linux systems, originally developed in Finland. Thirdly, Linux and Open Source Systems include the social complexities of the internet, and the notions of public goods (Von Hippel and von Krogh, 2003; Choi *et al.*, 2005).

The purpose of this paper is twofold. We apply the concept of “increasing returns” (Arthur, 1994, 1996; Choi *et al.*, 2005; Millar and Choi, 2003; Dickson, 1995) whereby success can often be dependent on achieving a sufficient mass of clients, which when reached, can lead to a further increase in clients. Within marketing, Dickson’s (1992) framework of competitive rationality, drawing on the Austrian School of disequilibrium in the market place, complements such ideas, and helps bridge the gap between evolutionary economics (Nelson and Winter, 1982) and marketing strategy. Secondly, technology licensing which can play a role in the diffusion of such systems of complementary products also has an important social and social groupings element.

Increasing returns and marketing strategy

A decade ago, Dickson (1995) in his review of Arthur’s (1994) book, in the *Journal of Marketing*, has discussed the importance of increasing returns to marketing strategy, and the need for marketing researchers to analyse increasing returns concepts. The concept of increasing returns in the context of marketing strategy competition shows that firms that are successful in an industry tend to become even more successful, whereas firms that are unsuccessful (Choi *et al.*, 2005; Miller, 2003) tend to lose further competitive advantage. The concept of increasing returns is a dynamic one and relies on the importance of positive feedback mechanisms, whereby an advantage or disadvantage becomes self-reinforcing. Recent industrial examples on the technological side of this phenomenon include the Apple versus Microsoft competition for computer software, and Philips and Sony’s Betamax versus Matsushita’s VHS competition in the video industry.

The technology standards research, which is linked to the technology licensing literature within marketing such as Capon and Glazer (1987); Achrol (1991); Anderson and Narus (1990); Kotabe *et al.* (1996) have not analysed the more social components (Millar and Choi, 2003; Millar, 2004) of client base development and systems of components and products. Some of the earlier developments of the role of such social factors were analysed from a sociological perspective by Schelling (1971; 1978) in terms of the importance of client base in competition. Millar and Choi (2003), Arthur (1994; 1996) and Krugman (1996) have shown how increasing returns challenge one of the oldest concepts driving theories of market and industry competition, that of diminishing returns, where firms that become successful in markets reach limitations to their success (Glaum and Oesterle, 2005; Miller, 2003), replacing it with ideas of self-organization and the dynamics of positive and negative feedback mechanisms. Arthur (1994; 1996) has defined the differences between increasing returns and traditional economic analysis as the following:

... the assumption of diminishing returns: products or companies that get ahead in a market eventually run into limitations so that a predictable equilibrium of prices and market shares is reached ... increasing returns are the tendency for that which is ahead to get further ahead, for that which loses advantage to lose further advantage.

In contrast, our definition for the term critical mass based strategies is the following:

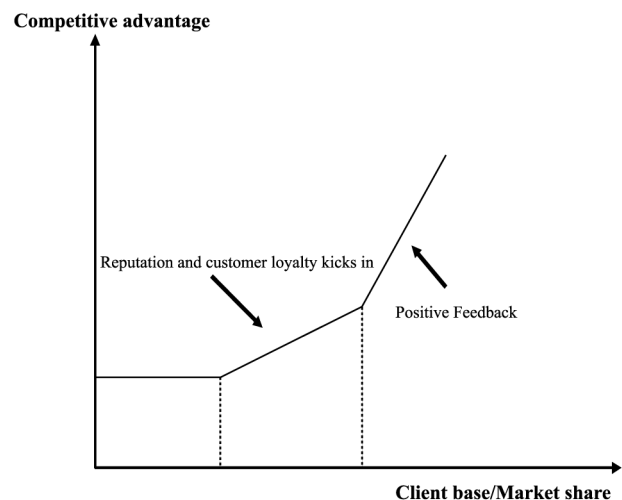
... critical mass strategy provides frameworks for analysing industry competition subject to increasing rather than diminishing returns. These frameworks are dynamic in nature, and believe in positive and negative feedback mechanisms especially in terms of social networks, which reinforce either existing competitive success or failure in industries.

This is shown in Figure 1.

There are at several differences in our critical mass approach relative to the broader increasing returns research in economics of Arthur (1994, 1996), Millar and Choi (2003), Miller (2003) and Krugman (1996). First our focus is on the implications of such effects at the firm level, such as the way critical mass points can be moved or shifted or changed through firm strategy. As also discussed by Dickson (1995), we believe that there is a need to analyse the narrower and marketing oriented issues such as distribution relationships, innovation, diffusion, new product developments. Secondly, we take into the account the important role played by social networks, and the interactions between firms within an industry, which helps to create the positive and negative feedback mechanisms crucial for increasing returns effects to exist (Choi *et al.*, 2005; Millar, 2004). In order to develop such a framework to marketing strategy, there is thus a need to analyse such issues as information diffusion, word of mouth, shelf space, switching costs, channel good will (Dickson, 1992; 1995).

Although the phenomenon of increasing returns and critical mass has been seen recently such as the competition between Apple and Microsoft in computer software, or between Philips/Sony and Matsushita in the video industry, the focus has been on technological standards and there has not been an analytical and conceptual framework to analyse this phenomenon and its relevance for marketing strategy. We believe that the phenomenon is crucial for analysing industries where there is interaction and “social communication” among customers. These interactions, if they reach a certain critical mass level, can in turn become self-reinforcing, leading to a rapid and exponential growth in sales and profits for such firms or coalitions of firms. Thus, there is a need to go beyond the purely technological issue of a firm’s strategy, and to combine it with the more social aspects of path dependency.

Figure 1 Critical mass and positive feedback



Stages of critical mass marketing

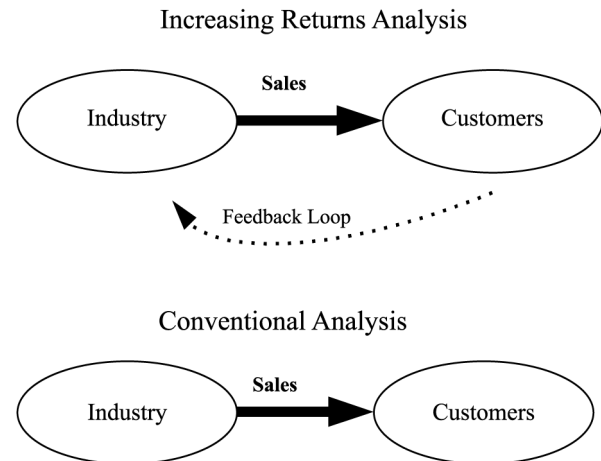
In many cases firms competing for critical mass are more market share than profit driven, showing the importance of aggressive market penetration and locking-in of distribution channels (Millar, 2004; Dickson, 1995). The profits arise at exponential, rather than linear rates at a later time, when the lock-in has been created; this has significant implications for a firm's marketing strategy when it is coordinated with the firm's other general decisions and strategies, such as rapid high return of profits to shareholders. The importance of such distribution lock-in, is depicted with Matsushita's marketing strategy of franchising its VHS and video technology to achieve critical mass in market share and so diluting its technology and revenue, while Philips and Sony kept their Betamax technology in house as to reap profits on a perceived superior technology. The distribution lock-in eventually helped Matsushita to dominate the whole video industry, with a product that is seen as lower in quality to Philips/Sony's Betamax technology. Another example is IBM vs Apple hardware, where IBM's PCs were cloned to numerous subcontractors and distribution channels, allowing Microsoft's software also to lock-in the market. In contrast, Apple, given its superior quality in hardware and software chose the traditional marketing strategy protecting its technology and focusing on profit rates, in turn becoming locked out of the market.

In today's environment of complementary technologies, systems (Glaum and Oesterle, 2005; Kotabe *et al.*, 1996), firms with high reputation or those that have achieved critical mass in one market try to create a "lock in effect" in other markets by bundling products or networks together and so closing out competition in more than one market. For example, most new IBM compatible computers sold today arrive with Windows 95 in a sense locking out any other type of product or system. This bundling phenomenon comes about in an attempt to reap increased market share based on complementary networks and reputation.

As market share or client base develop, reputation and customer loyalty begin to develop. As the client base reaches a certain critical mass point, the company or partnership or companies can experience "positive feedback", which in turn leads to an acceleration of sales and profits. Marketing theories are based on the inter-relations between a single firm and its customers, while strategy theories are based more on the inter-relations between different firms. Critical mass, on the other hand, is a function of marketing and strategy theories where it incorporates a firm's relations with its customers, social and technological feedback loops as well as with its environment of other firms. This is shown in Figure 2.

There are many elements that affect the point of critical mass. Determining its position and implementing a strategy to manipulate it is a complex and in many cases an elusive task. For example in the PC war, Apple in the 1980s was the dominant player in the PC market with the best hardware and software available. Its strategy was one based on in-house manufacturing and did not permit cloning of its products. On the other hand IBM and Microsoft's MS DOS, seen by many as an inferior product to that of Apple, was cloned more easily and so achieved a large client base resulting in critical mass and customer lock in. As a result IBM and Microsoft entered the domain of increasing returns while Apple did not. Today IBM compatible machines and Microsoft software dominate

Figure 2 Feedback loops and path dependency versus conventional marketing strategy



the PC industry. In the PC operating system war, although IBM and Microsoft are co-operating, IBM tries to build critical mass with its O/S2 operating system which is thought as superior to that of Windows, but fails as Windows has already achieved critical mass and consumer lock-in.

In the video wars, Philips/Sony's Betamax system was in many cases universally seen as the superior quality product, while Matsushita's VHS, though offered longer tapes, was seen as inferior, but was still able to dominate the industry. Again, an absolutely higher quality level was no guarantee of success in an increasing returns industry. Matsushita, knowing its product VHS was actually not as of high quality as Philips/Sony's Betamax, allowed cloning with a discounting distribution strategy to video stores, locking-in the distribution channels, while Philips/Sony kept their technology in-house with high prices as it was perceived by many to have had the best technology. Before Betamax could respond to VHS's increasing adoption rate and rapid development of a client base, VHS had already achieved critical mass and through increasing returns, dominated the market.

Social herding and networks

Another factor that can lead to the development of critical mass and increasing returns effects is the way information is communicated within the market. One key way information is diffused in the markets especially in information based products is through, "word of mouth" communication, through social and community networks. As discussed by Millar and Choi (2003), Millar (2004) and Dickson (1992; 1996), in terms of marketing strategy such communication effects need to be analysed along with issues such as shelf space, switching costs, good will. There are several existing works that have emphasised the information acquisition process and set out to integrate such work with the research on decision making, competition and communication. For example, Griesinger (1990) shows that interpersonal and non market resources often play an important role in decision making and information acquisition. Reed and DeFillipi

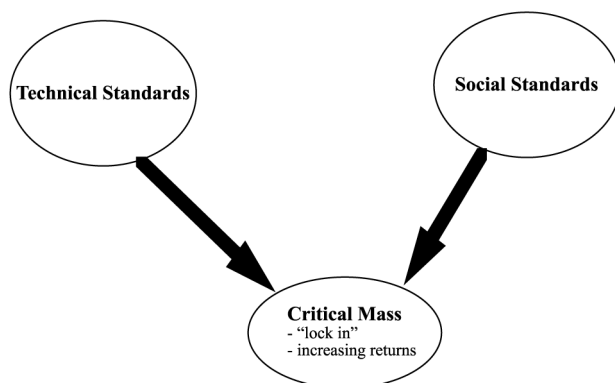
(1990) and more recently, Choi *et al.* (2005) have discussed informational ambiguity and how to use it to develop competitive advantage.

Herding occurs when a consumer's choice depends on the decisions of others, helping to accelerate the process of critical mass buildup, social lock-in effects and increasing returns (Millar, 2004; Millar and Choi, 2003). Such effects may be linked to technological lock-in for industries such as computer software, or separate from technology in other industries. The classic case of consumer herding is fashion. In this industry choice is by definition, dependent on what is in vogue. Such herding, or concentration, in buying behaviour also occurs for a particular product or the output of a specific firm. In these cases brand or market images are built on the choices made by others. The information acquired by customers depends on their observation of others as customers or potential customers. Service providers with a large clearly identifiable client base in the market have, we would argue a clear competitive advantage, because their client based serves as a, signal (Choi *et al.*, 2005; Miller, 2003; Spence, 1973) of quality in the market.

This process may determine if one or the other network will acquire momentum and be successful by achieving critical mass. Reinforcing feedback loops are the main underlying forces that drive increasing returns. As we mentioned earlier, there are two main types of feedback loops: technical and social feedback loops. Katz and Shapiro (1994); Farrell and Saloner (1985) have analyzed the technological aspects especially in terms of economics of standards and regulation. Our focus in this paper is on the more social aspects of networks, feedback loops, and critical mass formation (Choi *et al.*, 2005). This is shown in Figure 3.

Most individuals are expected to know very little about the whole environment and the way it operates. As a result individuals respond to an environment that consists of others responding to their environment (Schelling, 1978; Millar and Choi, 2003; Millar, 2004). This leads to a belief that in many cases individuals locate themselves voluntarily in some pattern that does not necessarily possess apparent advantages even for the individuals who by their own choices form the above pattern. This herding or tipping phenomena is hard to explain especially when one assumes that an individual is "rationale" and has clear motives and objectives. This irrationality leads to unintended and unanticipated consequences as the aggregate of individual behaviour leads to uncanny results

Figure 3 Critical mass: technological and social standards



that one is unable to predict from the aggregate of individual motives and objectives.

The social feedback loop is a process whereby firms and customers subscribe to a network, not because of their individual assessment of the innovation's efficiency or returns, but because of a bandwagon pressure caused by the sheer number of firms and individuals that have already adopted the same network (Millar and Choi, 2003; Millar, 2004; Abrahamson, 1993; Tolbert and Zucker, 1983). Herding occurs when a consumer's choice depends on the decisions of "others" (Choi *et al.*, 2005). It claims that sheer numbers of firms and customers adopting a network in the early stage, creates a pressure causing others to adopt this network in the latter stage (Abrahamson, 1993). One way to analyse the framework of critical mass management is to compare the main drivers of such a strategy to the more traditional industry analysis and ideas of competitive strategy. This is noted in Table I.

Critical mass management provides a more dynamic analysis of markets and industries firms must constantly assess the various positive as well as negative feedback mechanisms (Choi *et al.*, 1997). These feedback mechanisms can be driven by technology standards, as well as by more psychological and social network effects.

A twenty-first century example: software standards competition for mobile phones: Nokia versus Microsoft versus Linux

A global competition has begun for the software standards for mobile telephones. Various global stakeholders are involved in this competition including telecom operators, hardware integrators, software manufacturers, hardware manufacturers. The complexities of this competition to the earlier standards competitions of Apple versus IBM, Betamax versus VHS is threefold. First it is a three way competition among Microsoft, Nokia and Linux. Nokia's competition also includes the consortium of mobile handset manufacturers, Symbian; Linux also refers to the open source software phenomenon (Choi *et al.*, 2005; Von Hippel and Von Krogh, 2003). Secondly, the competition is global, involving American, European and increasingly the global internet, through open source software. Thirdly, the involvement of the world wide web in open source software and Linux systems (von Hippel and Von Krogh, 2003) further emphasises the social and community aspects of this competition for the software standard for mobile phones.

One key difference among the three competitors is that Nokia (Symbian) and Linux are following an "open system" to the competition, allowing potentially closer sharing and collaboration with other companies. Microsoft is following a relatively closed system approach in order to apply the Windows standards in personal computers to mobile phones. There are numerous stakeholders involved including hardware and software manufactures. In terms of collaboration within the three competitors, the open systems approach of both Nokia (Symbian) and Linux (Open Source Software) allows a potential partnership between Nokia and Linux.

Table I Critical mass versus conventional marketing

Conventional marketing strategy	Critical mass marketing
Diminishing returns, successful products or firms eventually run into limitations in their success within the market, eventually creating a stability in the market	Increasing returns, successful products or firms that are ahead tend to gain further competitive advantage; unsuccessful products or firms suffer further losses and competitive disadvantage
Predictable equilibrium, with market shares being relatively evenly distributed among several firms; profits may then become a key element of competitive strategy	Unpredictability and instability, with market shares and the total market being potentially dominated by one or certain coalition of firms; client base and market share strategy may become crucial
More applicable to traditional, manufacturing industries, especially in industries where the initial R&D spending is not high relative to variable, unit costs, making it easier to optimise firm strategy	More applicable to knowledge, information based industries, and in high technology industries such as pharmaceuticals, aerospace, computers, where the initial R&D spending is very high relative to variable, unit costs
Firm strategy is static, with independent strategies for different situations and changes; industry and market conditions are analysed with history playing only a minor role in future firm strategy	Firm strategy is dynamic, and path dependent, with positive and negative feedback mechanisms; this reinforces past firm strategies as a driver of successful future strategy
Investments in quality and technology will be highly correlated with market success; higher quality products will often be guaranteed to lead to competitive advantage	Higher quality and technology alone do not guarantee market success, if other firms have already reached, "critical mass" and locked-in the market, i.e. VHS vs Betamax; Microsoft vs Apple
Consumer demand in markets is relatively separated from supplier strategies in industries, with industry conditions being the main driver of a firm's competitive strategy	Demand in markets and strategies in industries become closely linked as "critical mass" is developed by technology standards as well as social network effects in consumer demand

Managerial implications

The purpose of this paper was to develop the ideas of increasing returns to analysing marketing competition in industries where critical mass matters. The concept of critical mass seems especially relevant for the turbulent, disequilibrium driven industries of today, where technology standards as well as social networks play an important role in competitive strategy. But critical mass management is also relevant for any high technology industry such as aerospace, pharmaceuticals, computer software and hardware, telecommunications equipment, where initial R&D costs are large relative to variable unit production costs, where exponential success can be created for certain firms.

In the twenty-first century a similar global competition is growing in the area of software standards for mobile phones. The purpose of this paper was to illustrate the global three-way competition among Nokia, Microsoft and Linux Open Source Systems for the standard in mobile phone software. We believe that critical mass concepts analysed in this paper, which integrate technology and social effects of standard making, provide various insights for competitive strategy in today's global information and knowledge driven environment. First by including the positive and negative feedback mechanisms, the critical mass approach adds to the important reality issue of dynamics in strategy, and the path dependency effects of how past firm behaviour can be an important factor in future firm strategy. Secondly, as communication costs decrease rapidly, firms and customers tend to communicate much more than in the past. This means that psychological and sociological network effects become a more important component of business success; critical mass shows how such social networks can reinforce a firm's past successes or failures. And thirdly, we shed some light on the continuing debate between the classic marketing question about the importance of market share versus profits (Buzzell and Gale, 1987). Critical mass or market share especially at the early stages of a firm's strategy may be crucial for long term competitive success.

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Executive summary and implications for managers and executives

This summary has been provided to allow managers and executives a rapid appreciation of the content of this article. Those with a particular interest in the topic covered may then read the article in toto to take advantage of the more comprehensive description of the research undertaken and its results to get the full benefit of the material present.

Your organization has a better product than your competitors have. It is technically superior and competitive on price. Consequently sales success is assured. Result? Happy company, contented employees and delighted shareholders.

How wrong can you be? Wasn't the Betamax video recorder considered superior to the VHS rival which came to dominate the market?

How many of us familiar with the "QWERTY" keyboard even know about the supposedly superior "DVORAK" keyboard whose supporters insist is more comfortable and efficient to use than the much older "QWERTY"? No prizes for guessing which system dominates the market.

Despite current advertising campaigns by Apple suggesting PC users are missing out on the delights of a better product, that they should spend less time troubleshooting and, instead, "get a Mac and get your life back", we all know how Microsoft and Apple fared in the battle for the mass market in personal computers.

Just a few examples of how the assumptions of conventional marketing strategy can be thrown off course when the realities of critical mass marketing demonstrate their powerful effects.

Realities such as social communication among customers which, if they reach a critical mass level, can become self-reinforcing and help the company to "lock out" competitors.

Then there is "herding" whereby a consumer's choice depends on the decisions of others, helping to accelerate the process of critical mass build-up, social lock-in effects and increasing returns. It is argued that service providers with a large, clearly identifiable client base have a clear competitive advantage, because their client base serves as a signal of quality in the market.

Conventional marketing strategy says that: investments in quality and technology will be highly correlated with market success; higher quality products will often be guaranteed to lead to competitive advantage. Whereas critical mass marketing dictates that: higher quality and technology alone do not guarantee market success, if other firms have already reached, "critical mass" and locked-in the market.

Conventional marketing strategy says: firm strategy is static, with independent strategies for different situations and changes; industry and market conditions are analysed with history playing only a minor role in future firm strategy. On the contrary, critical mass marketing dictates that: Firm strategy is dynamic, and path dependent, with positive and

negative feedback mechanisms; this reinforces past firm strategies as a driver of successful future strategy.

Conventional marketing strategy says: diminishing returns, successful products or firms eventually run into limitations in their success within the market, eventually creating a stability in the market. While critical mass marketing claims: increasing returns, successful products or firms that are ahead tend to gain further competitive advantage; unsuccessful products or firms suffer further losses and competitive disadvantage.

A twenty-first century version of the "Apple versus Microsoft" and "Betamax versus VHS" paradoxes is the global competition between Microsoft, Nokia and Linux Open Source Systems for the software standards for mobile phone, with the involvement of various global stakeholders including telecom operators, hardware integrators, software manufacturers and hardware manufacturers.

This three-way competition involves American, European and increasingly global players through open source software. The involvement of the internet further emphasises the social and community aspects of this competition for the software standard for mobile phones.

One key difference among the three competitors is that Nokia (Symbian) and Linux are following an "open system" to the competition, allowing potentially closer sharing and collaboration with other companies. Microsoft is following a relatively closed system approach in order to apply the Windows standards in personal computers to mobile phones. There are numerous stakeholders involved including hardware and software manufactures. In terms of collaboration within the three competitors, the open systems approach of both Nokia (Symbian) and Linux (Open Source Software) allows a potential partnership between Nokia and Linux.

Chong Ju Choi *et al.* say that, although the phenomenon of increasing returns and critical mass has been seen in the Apple/Microsoft and VHS/Betamax examples, the focus has been on technological standards and there has not been an analytical and conceptual framework to analyse the phenomenon and its relevance for marketing strategy.

They say: "We believe that the phenomenon is crucial for analysing industries where there is interaction and "social communication" among customers. These interactions, if they reach a certain critical mass level, can in turn become self-reinforcing, leading to a rapid and exponential growth in sales and profits for such firms or coalitions of firms. Thus, there is a need to go beyond the purely technological issue of a firm's strategy, and to combine it with the more social aspects of path dependency."

The concept of increasing returns in the context of marketing strategy competition shows that firms that are successful in an industry tend to become even more successful, whereas firms that are unsuccessful tend to lose further competitive advantage. The concept is also a dynamic one and relies on the importance of positive feedback mechanisms, whereby an advantage or disadvantage becomes self-reinforcing.

(A précis of the article "Increasing returns and marketing strategy in the twenty-first century: Nokia versus Microsoft versus Linux". Supplied by Marketing Consultants for Emerald.)