

## **High Tech Companies Continuously Innovate to Respond to Customer Needs: Market and Product Characteristics**

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### **Abstract**

In the 90s, with the birth of the information age, companies found themselves facing demanding challenges arising from requests from the market: more information, an increase in the quality offered, an increase in production and profits, market leadership and consumer orientation. Computers and high-tech products were created to be designed to meet this growing need for information on the part of businesses and society and consumers / users are looking today, as well as ten years ago, for the best way to select them. In the paper we will first focus on the concept of the High Tech market and then on the products that dominate this market

**Keywords:** High Tech, market, products

### **1. Introduction**

In the 90s, with the birth of the information age, companies found themselves facing demanding challenges arising from requests from the market: more information, increased quality offered, increased production and profits, market leadership and consumer orientation. Computers and high-tech products were created to be designed to meet this growing need for information on the part of businesses and society, and consumers / users are looking today, as well as ten years ago, for the best way to select them. They will go in search of products that give them the same feeling of safety that they look for in low-tech consumer products: well-known brand, ease of use, functionality, reliability, after-sales and assistance services. All this has created a new expectation in the market on the part of consumers which, given the nature of the highly competitive and constantly evolving technological market, is completely normal and to understand its conformation, it is necessary first of all to define what a product is. high technology. One of the many possible definitions of a high tech product was given by Gardner who says they are "*products that are the result of turbulent technology and which require substantial shifts in behavior of at least one member of the product usage channel*". But the term technology can be understood in such a vastness of meanings that it is not easy to coin a precise definition. To consider a high-tech product, the consumer must perceive it as innovative and consider it as something that leads to a change in their behavior. On the other hand, low-tech, low-tech products are those that are normally familiar and accepted by the user, who therefore do not change their model of use. Gardner himself conducted research based on the "theory of contingency", based on the comparison between marketing of high and low tech products. The theory on which this study is based argues that there is no universal set of marketing strategies that is feasible in all types of business or companies, but the strategies are different depending on the environment and market context. The results of this research, conducted on a hundred

American and Australian companies, show that the market environment for high-tech products has these traits:

- high product differentiation and high market growth rate
- short product life cycle
- ease of entry into the market
- high number of suppliers
- high involvement of the consumer in purchasing decisions.

Furthermore, the research has shown that high-tech marketing strategies have an impact on product performance, which is contingent on the technological context in which the company operates and in which the role of sales staff and commercial promotions becomes of great importance. Among the high tech products we can distinguish two categories: computers and IT products in general and consumer electronics. These two types of products are quite similar in terms of operational and problem management. A difference can be found in consumer marketing where it is first necessary to reach the mass audience in order to then create a strong brand awareness and stimulate demand. In computer marketing, on the other hand, it is first of all necessary to create a strong brand awareness and influence the experts in the sector, in order to subsequently reach the mass audience and thus stimulate demand. In the past, high tech marketing, in computer science in particular, was based on the persuasion of the consumer, who had to buy a computer in order to save time, better manage their data and their activities. Much emphasis came given to those technical characteristics of the products that could be translated into measurable benefits for customers, aimed at solving their problems. The marketing of IT companies has then evolved over time together with the market, adapting to the needs of consumers. The result of this evolution can be seen in the type of users to which these companies turn, ranging from freelancers who buy a computer to manage their business, to company executives who are looking for the best solutions to integrate with company management systems. The main feature that unites them is that both categories are users with a minimum of computer experience, they consider the technical differences not very relevant and in the products they look for reliability and the service that often accompany a well-known brand. One of the critical aspects of the work of marketing professionals operating in a technological market environment is understanding whether the technology inherent in the products sold by the company generates a unique demand or whether its nature will have an impact on marketing management. It is important to be able to identify the circumstances, which give rise to marketing problems, in which specific attention is required and for which it is necessary to develop procedures or models in order to help decision making. The experiments carried out confirm that the technological market is really an area in which a particular marketing approach is required, it has also been observed that the advanced technology and the technological aspects of a product are a characteristic, in significant increase, which affects on the way products are presented to the market. This is especially true in industrial marketing where the level of technology inherent in a product traditionally leads it to be considered of a higher profile in terms of importance. Two authors have attempted to discuss this problem, William Davidow and Regis McKenna. Both are market experts turned consultants, with important results behind them, providing a solid foundation for their proposals. Davidow's main contribution was intended to

demonstrate the need to apply fundamental marketing concepts to the management of high tech products from their inception onwards. Although he has clearly shown how marketing applies in this field, the limitation of his work is that it adds little to the theoretical concepts found in many standard marketing texts. McKenna on the other hand, focuses on the communication strategies and tactics required for these types of products, and his work provides some compelling models and suggestions, but has a rather limited approach overall. A useful starting point for building a framework of the key marketing management problems of technology products is to focus on what circumstances and products are studied and what problems arise at the time of sale. At this juncture it is important to recognize that few products consist of a single technology, although there are exceptions, very often they are a mix of advanced, established and old technologies that together create the real product. But it is difficult to make a clear distinction between high-tech and non-high-tech products, purely in terms of the technology they incorporate. What is important to understand is whether these products are regarded as high tech by customers and suppliers and whether their level of technology is relevant to the estimation of behavior.

## **2. High Tech Markets**

There are many definitions of the expression high tech, but perhaps the most useful is the one that is based on the distinction between high and low technology products. This distinction is the result of two types of uncertainties that companies operating in this sector have to face: market uncertainties and technological uncertainties. The sources of these uncertainties are manifold: first of all, customers are unsure about the possible uses and benefits of a new technology. Consequently, it is difficult for them to perceive the benefits of a new technology such as broadband connection through optical fiber. In addition, the company cannot even predict exactly the size of the potential market for new technologies or their rate of diffusion, which makes it difficult to calculate an exact estimate of the profit potential of the new product or service to be introduced. Market uncertainties also concern the adaptation of the product or service to changes in technological standards and the resulting different variations in demand resulting from the adoption of these new standards. This is linked to another important source of uncertainty, in particular for corporate customers: technological obsolescence, ie the duration of the current technological standard. To give an example that makes this problem understand very well, when computers with 286 processors came out, the manufacturers had promised that the product would not be supplanted by new versions for a relatively long time, instead, with the release shortly after the 386, 286 soon became obsolete. Corporate customers, therefore, are often reluctant to make large investments in technology and tend to postpone the purchase until they are sure they can amortize the expense in a reasonable period of time. Furthermore, technological uncertainty is also due to an insecurity relating to the performance of the product or service whose performance does not always meet expectations. For this reason, customers are generally skeptical about new technologies and the enthusiasm that accompanies new products or services, so companies, before introducing others, must always ask themselves if they can satisfy the customer's needs better than their competitors and / or already existing. Finally, another reason for uncertainty is the reliability of the new technology. In this regard, it is essential for a company that offers high-tech products or services to guarantee the quality of the products /

services offered. For example, the competitive advantage in the offer of broadband connectivity can derive precisely from the offer of "guaranteed bandwidth", or a connection with predetermined data transmission speeds under which it is guaranteed that it will not go. This is synonymous with service reliability and at the same time differentiates the offer from the competition. The latter, in fact, in the broadband offer through xDSL, offers only a "best effort" service, that is a connectivity which, should the circumstances arise, can also go below the declared connection speed. The high tech market is, therefore, an environment with strong market and technological uncertainties. But another typical feature is a very short product life cycle. The life cycle, in fact, is shortened precisely by the continuous technological innovations that often make the previous version or all other versions of the product or service obsolete. Analyzing the life cycle of high-tech products and services, it can be seen how products based on new technologies meet customer resistance essentially in the early stages of the life cycle. In the stages of advanced growth or maturity, when the category is now established, the product / service has instead become familiar to the customer, therefore the marketing strategy tends to conform for all products, regardless of their technological level. Everett Rogers conducted an analysis on the reactions of private and corporate customers to new technologies, analyzing, in particular, the factors that influence their adoption rate. He identified five main factors that affect the consumer's purchasing decisions. A first factor is the "relative advantage", according to which a customer adopts an innovation only if he believes it represents an improvement over old products that meet the same need. Relative advantage can be expressed according to different parameters: economic, psychological (for example, benefits linked to status) or utilitarian. The relative advantage of an innovation, therefore, increases the acceptance and diffusion rate of technological innovation. A second feature valued by customers is the compatibility of innovations with existing systems, with their own values and ideas. A high degree of compatibility leads to faster adoption. Another factor that weighs in evaluations is the perceived complexity of innovation. It has a negative influence on the diffusion of the new product. Customers are more likely to adopt simple innovations rather than innovations that require many explanations relating to the use and benefits of the new product or service. For customers, then, the possibility of trying the product before purchasing is also important. With new technologies, there is a high degree of uncertainty about the correct functioning of the product and, in the case of services, the intangibility and testing characteristics inherent in this type of product make it almost impossible to make a pre-purchase evaluation. To overcome these difficulties, many high-tech companies carry out trial tests (the so-called beta tests) on the first versions of the product. To the most important customers, companies offer prototypes of the product, then asking them to communicate comments and any criticisms. The new services are thus tested by customers in realistic contexts. Finally, the observability of innovations is also important, that is, the degree to which a given innovation and the results it produces are visible from the outside. The five factors analyzed so far are the result of Rogers' research. There is, however, another element that exerts a profound influence on the adoption of new technologies: the existence of possible benefits of diffusion or network externalities. With them, the value of using many new products and services rises with the increase in the number of users. Applying this reasoning to the case of broadband communication through optical fibers, the benefits of owning a router connected to a fiber optic

network increase with the progressive expansion of the network itself and therefore with the increase of users. In this way, in fact, it will be possible that they can share among themselves all the services guaranteed by the data transmission speed on the fibers. The attractiveness of many products, therefore, is dictated by the number of people who already own them or use the service. Customers tend to react differently to the characteristics of innovations and perceived risks. For example, some customers seem to recognize the relative advantage of a technological innovation before others; or, some are willing to take risks, others are more cautious. In other words, customers adopt new technologies at different times. Furthermore, the rate of adoption of new technologies largely depends on the number of customers who welcome the innovation first. If this group grows, the likelihood that the technology will be adopted by a high percentage of potential users increases. If, on the other hand, the group remains limited, the technology is likely not to produce a successful product category. Everett Rogers, from studies on the product life cycle, has also developed a scheme for understanding this process called "diffusion of innovations". With it, the various categories of customers are divided according to the different stages of the life cycle of the innovations, assuming that the trend towards innovation is in any case distributed among the entire population like other human characteristics. Analyzing this scheme in depth, we can distinguish five kinds of users of new technologies: the first customers who adopt a new technology are the "innovators". These customers are strongly motivated to always be at the forefront; they are often tech savvy or passionate, eager to try new ideas, and willing to take risks. In addition, being interested in owning a new product first, they are almost insensitive to prices. This category of customers has a high value for the company, because it also helps to identify defects in new products or services. The next group is that of "initial adopters". These are customers who are usually not interested in technology per se, but who are able to recognize the value of the new product / service and the benefits it offers in a private or professional context. The importance of these customers for the high tech market lies precisely in their vision of the benefits offered by the product / service, in being far-sighted, becoming decisive for its success. A larger area of the market is that of the "initial majority". These buyers are interested in new technologies, but they wait to buy them to verify that it is not just a fad. They are extremely pragmatic customers. The value of this group of consumers for the company is quite obvious: it is a large group of customers, whose support is essential for the commercial dissemination of the product. Then there is the "late majority" which is a similar category to the initial majority, but proves to be more conservative and waits for the sector to be well established before making the purchase. These users expect the product or service to become an established standard and require a high level of support. Finally, there are the "latecomers", who are customers usually not interested in new technologies and are the last to make the purchase. These are extremely skeptical users, who are sometimes not convinced to buy even at this stage of the innovation life cycle. According to Rogers, the spread of innovation is influenced by the extent of the "contagion" from the first buyers, the so-called innovators or pioneers, who are the first to try the product or service. If they are satisfied, they spread a positive word of mouth to future users, who in turn will tell others about it, allowing, with the marketing efforts of companies, the spread of the product or service. Their success largely depends on the quality of this word of mouth. Furthermore, information disseminated by innovators and early customers can reduce the

perceived risk of subsequent buyers. In this way virtuous communication mechanisms are triggered which are, at the same time, economical and effective. In particular, if you manage to involve companies with a bonus status, a good reputation, or in any case with a reputation for excellent internal management, this word of mouth will be even more useful. Their choices can, in fact, be taken into consideration by other companies that could imitate them. The word or example of a company known by name, size or ability is, therefore, fundamental and it would be useful for this type of target to be included in the penetration program of innovative companies. The effectiveness of word of mouth, therefore, poses a short-term problem, as it can guarantee good profitability without the burden of excessive communication costs, and in the medium / long term, precisely because it can help trigger connected reputation building processes. the status of the referring companies. In reality, the transition from one stage to another in the life cycle of innovation is not very fluid most of the time, much less in high tech markets. A first detachment occurs in the passage between the innovators and the initial adopters. The former have a certain "sense of adventure" and show a strong interest in technology, while the main interest of the latter lies in how the new technology can solve its problems. This fracture, therefore, manifests itself in a high-tech market when pioneering companies fail to convincingly show the benefits offered by the new technology. The second small discrepancy is found between the stage of the early majority and that of the lagging majority, that is, between pragmatists and conservatives. In this case, to overcome the gap between the two groups, the company must ensure that the technology is offered in an accessible and easily understandable way even for the public, which is not normally interested in technology. The most substantial rift, however, lies between the initial adopters and the initial majority: the latter, in fact, requires perfectly functioning products that bring an improvement to one's life or profit margins, all qualities that cannot be guaranteed. with certainty when introducing a new technology. The challenge therefore consists in moving a high-tech product from the initial market made up of enthusiasts of new technologies and far-sighted customers (initial adopters) to the large group of pragmatists. To attract their attention, the company must develop a specific application or a general strategic approach that meets the needs of a large segment of the same initial majority.

### **3. Segmentation and positioning in the High Tech markets**

The problem of the segmentation of the High Tech market is different depending on whether it is consumer markets or business-to-business markets. The criteria for segmenting consumer markets, as seen above, are various. Those most frequently adopted by high-tech companies are socio-economic criteria, criteria are on the life cycle of consumers (age in particular) and criteria on lifestyle. Segmentation is a particularly complex process when it comes to applying new technologies to existing products or services in mature markets. In fact, it is necessary to identify the applications in which the new technology offers an advantage. This means specifying why a potential buyer may prefer a new alternative to an existing one. It can be because the costs are lower, the performances are higher, the reliability is higher or even because it is carried away by fashion. Miller suggests distinguishing two stages to identify possible applications and target consumers: technology-based segmentation and behavior-based segmentation. The first begins with a small group of potential users who have been asked to identify the differences and

similarities between the old and the new solutions. The goal is to find a range of presumed applications. The next step is to adopt behavioral segmentation criteria. Starting from the previous analyzes, we try to find three or four groups of possible customers who have a similar behavior. Finally, the segments identified with these two criteria (technological and behavior-based) are combined to determine targets of potential customers and markets. The figure that follows the segmentation according to behavior criteria for the marketing of high tech products. Miller has three-factor indicators that characterize the marketing of high-tech products and services in the consumer market that relate specifically to behavior:

- 1) When buyers think technologies are similar, they are generally more inclined to compare products than when they are convinced that the differences between the two technologies are great.
- 2) When buyers are convinced that the technological change is intense, they put a strong effort in identifying alternatives, but they dedicate a short time to this research.
- 3) In general, the stronger the switching costs (i.e. the costs incurred to switch from one product / service to another), the less time is devoted to research.

If, on the other hand, the buyer is an organization, then he has more information on what the market offers and in particular on the evolution of technology. In this case, the criterion most frequently used to segment the markets of high tech products and services is based on the benefits that organizations expect from the product, the production process, the service. Customers can buy the same products for different reasons and then give a different weight to the services offered by those same products.

Tidd, Bessant and Pavitt suggest a three-stage segmentation for high-tech business markets:

- 1) A segmentation based on the functions of the technology according to the different possible ways of using the product or service.
- 2) Segment the market based on the conduct of certain groups of customers driven by similar behavior, as occurs, for example, towards price or after-sales service.
- 3) Combine functional and behavioral segmentation in a single matrix in order to identify potential customers with their applications used (with similar technological functions) and their purchasing behavior.

Referring to the broadband market through optical fiber, or to a new high-tech service, and to the life cycle of innovations, we can say that it is placed in the range in which the diffusion of this service is mostly entrusted to innovators. and partially to the initial adopters. To penetrate this market, therefore, it is necessary to aim well at the target of innovators. For this purpose, the characteristics that most identify the innovative consumer segment are: high income, high level of education, young people, high social mobility, sense of adventure, great social participation, strong influence on the opinions of others. Some of these characteristics, such as income, are demographic and socioeconomic variables; others, such as social mobility, are not as observable and must be linked to demographic characteristics. It should be borne in mind, however, that innovators (as regards the consumer market) should be characterized and identified within each category, because there does not seem to be an absolutely generalizable figure of the innovator. In fact, a person could be, for example, an innovator for the purchase of a fiber optic connection and at the same time a laggard for the dishwasher market. In industrial markets, on the other

hand, innovators and early adopters are often referred to as "pioneers". Also for this group a characterization is anything but simple. However, rather than trying to define it on the basis of descriptors such as size or sector, in this case it is worth referring to two behavioral characteristics: first, pioneers have needs that are common to many other clients, only that they recognize them with advance compared to the rest of the market; furthermore, due to their positioning, the pioneers greatly benefit from the solutions to these needs. The companies that meet the first characteristic are important customers because they have the same needs as most of the other potential users. Unlike the latter, however, they have a greater tendency to innovation which pushes them to request new products or services before other companies. The second feature, on the other hand, is of commercial importance, because customers who derive an economic advantage from an innovation are encouraged to invest more to purchase it. Having said that, however, it should not be forgotten that segmentation criteria can quickly become obsolete, especially in highly dynamic sectors such as the high-tech ones.

### **Bibliography**

A.S.I.M. : *Risk management : a reader study*, Asim, New York, 1973.

Banks E.: *The simple rules of risk*, Willey 2002

Bernstein P.: *Against the Gods. The remarkable story of risk*, Wiley 1998.

Bertini U.: *Introduzione allo studio dei rischi nell'Economia Aziendale*, Pisa, Corsi, 1969.

Bertini: *Il governo dell'impresa tra "managerialità" e "imprenditorialità" in Scritti di Politica Aziendale*, Giappichelli, Torino, 1991.

Bertini: *Il sistema d'azienda*, Giappichelli, Torino, 1990.

Bertini: *Il sistema d'azienda*, Giappichelli, Torino, 1990.

Boniello C.: Business risk assessment and measurement tools: a risk that the company must manage for the success of the business *Journal of Advanced Engineering and Management Research* 2022 Vol.7, No. 02; p. 160-171 ISSN: 2456-3676.

Boniello C.: Business risk is a crucial node for the success of the business: Corsani's point of view *Journal of Advanced Engineering and Management Research* 2022 Vol.7, No. 02; p. 31-40 ISSN: 2456-3676;

Boniello C.: The Business Risk *International Journal of Advanced Engineering and Management Research* 2021 Vol.6, No. 05; p.29-36, ISSN: 2456-3676;

Boniello C.: The concept of the causes and effects of risk in some italian and foreign scholars of the twentieth century *Journal of Advanced Engineering and Management Research* 2022 Vol.7, No. 01; p.66-71, ISSN: 2456-3676;

Boniello C.: The Methodologies for identifying corporate risks *Journal of Advanced Engineering and Management Research* 2021 Vol.6, No. 06; p. 141-151, ISSN: 2456-3676;



- Boniello C.: The success of the company through the knowledge of business risks Journal of Advanced Engineering and Management Research 2021 Vol.6, No. 06; p. 58-67, ISSN: 2456-3676;
- Boniello C.: The treatment of business risk has always been an important element for the life of the company: some techniques for dealing with risks and arguing their negative effects on the company Journal of Advanced Engineering and Management Research 2022 Vol.7, No. 02; p. 172-185 ISSN: 2456-3676.
- Borghesi A.: *La gestione di rischi di azienda*, Padova, Cedam, 1985.
- Carter R.L.– Doherty N.A.: *Insurance and risk retention*, Handbook of risk management , Kluwer-Harrap Handbooks, London, 1974-1984.
- Cassola C.: *Il rischio e l'organizzazione dell'industria moderna*, Milano, Sandron, 1926.
- Chessa F.: *La classificazione dei rischi e il rischio d'impresa* in Rivista di Politica Economica , Fascicolo II Roma 1927.
- Crockford G.N.: *An introduction of risk management*, Woodhead-Faulkner, Cambridge, 1980.
- Crockford G.N.: *The bibliography and history of risk management : some preliminary observations* Geneva Papers, n.23, 1982.
- Crockford G.N.: *The changing face of risk management*, Geneva Papers, n.2, 1976.
- Culp C.: *The risk Management process*, Wilwe, 2001
- De Finetti B.: *Il rischio e le decisioni economiche*, Rivista Bancaria, Milano 1953.
- Di Cagni P.L.: *Il sistema aziendale tra rischio d'impresa e rischio economico generale*, Cacucci, Bari 2002
- Fazzi R.: *Il contributo della teoria delle funzioni e dei rischi allo studio dei comportamenti imprenditoriali*, Corsi, Pisa, 1957.
- Ferrero G.: *Impresa e Managment*, Milano Giuffrè, 1987.
- Forestieri G. (a cura di) *Risk management, Strumenti e politiche per la gestione dei rischi puri dell'impresa*, Egea, Milano, 1996;
- Galbraith I.K.: *L'età dell'incertezza*, Mondatori, Milano, 1978.
- Green P. – Tull D.S.: *Research for Marketing Decision*, Prentice – Hall, Englewood - Cliffs, N.J. 1966-1975.
- Greene M.R.-Serbein O.S.: *Risk management: text and cases*, Reston Publishing Co.,Reston1981.
- Head G.L.: *Continuing evolution of the risk management function and education in the United States*, Geneva Papers, n.23, 1982.
- Hesponse R.F. – Strassmann P.A.: *Stochastic tree analysis of investment decision* , Management Science, vol. 11, n°10.
- Knight F.H.: *Rischio, incertezza e profitto*, La Nuova Italia, Firenze 1960.
- Knight F.H.: *Operational Risk*, Willey, 2001

- Leinter F.: Die Unternehmungsrisiken, Berlin, 1915.
- Leti G.: *Statistica descrittiva*, il Mulino, Bologna, 1983.
- mendenhall W., reinmuth J. E., beavere R. J., *Statistic for Management and Economia*, Belmont, Duxbury Press, 7th ed., 1993,
- Misani N.: *Introduzione al risk management*, Milano, EGEA, 1994.
- Mongoldt H.: Die Lehre von Unternehmerrgewinn, Leipzig, 1855.
- Oberparleiter K.: *Die Bedeutung des Grosshandels und seine Funktionen im osterreichischen Wirtschaftsleben*, Wien 1955.
- Oberparleiter K.: *Funktionen und Risiken des Warenhandels*, Wien 1955.
- Sadgrove K.: The complete guide to business risk management, Gower, 1977
- Sassi S.: *Il sistema dei rischi d'impresa*, Vallardi, Milano 1940.
- Schroech G.: Risk management and value creation in financial institution, Wiley, 2002
- Shimpi P.A.: *Integrating Corporate Risk Management*, New York, Texer, 2001
- Smullen J.: *Risk Management for Company Executives*, Financial Times/Prentice Hall, 2000.
- Zappa Gino: *Il reddito di impresa*, Milano, Giuffrè, 1950.