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## Multidimensional segmentation of the cell phone market: preliminary results of an empirical survey

Summary<sup>\*\*\*\*</sup> 1. Introduction 2. The three-dimensional segmentation model 2.1 Lifestyles 2.2 Use motivations 2.3 Product attributes 3. Segmentation bases of the model 4. Methods for applying the three-dimensional model 5. Research design 5.1 Construction of the empirical basis 5.2 Definition of the conceptual three-dimensional map 5.3 Focus groups 5.4 Questionnaire design and pre-testing 5.5 Data analysis 6. Results of the preliminary survey 6.1 Processing results by factorial and cluster analysis 6.2 Cluster interpretation

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## 1. Introduction

The theme of market segmentation is connected to theoretical reflections upon imperfect competition. In economic theory the moment of discontinuity as compared to the general equilibrium of perfect competition is marked by the configuration of systems in which firms stimulate the tastes of their potential customers through differentiated supply, supposing that purchasers exhibit heterogeneous demand functions in relation to some significant variables<sup>1</sup> (price sensitivity<sup>2</sup>, interest in specific product attributes, brand notoriety, individual lifestyle and so on).

From the mid-20th century onwards<sup>3</sup>, segmentation itself was the subject of attention on the part of academia and firms, with a wide variety of topics being investigated, ranging from its conceptual basis<sup>4</sup> to methodology, and to tests carried out on the concrete manifestations of consumption.

Contextualised within this line of research, our paper aims to apply a *three-dimensional segmentation model to the consumption of mobile phone services* in its twofold aspect: on the one hand, in terms of a “mobile telephone service” and, on the other, in terms of the “mobile phone product”. We are obviously dealing with two closely correlated markets, in that consumption of cell phone services can only occur through the twofold availability of service and product. The choice is justified due to remarkable market dynamics in recent years<sup>5</sup>, especially in Italy<sup>6</sup>, and the presumed congruence of demand characteristics with the methodological hypotheses underlying our research.

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<sup>1</sup> The *normative* approach to segmentation derives conceptually from the studies of Edward Chamberlin (1933) regarding monopolistic markets and of Joan Robinson (1933) on imperfect competition. It is based on the premise that demand functions need to be interpreted and categorised (Dickson-Ginter, 1988) in the attempt to maximise the effectiveness of management intervention connected with the company's marketing mix and to which consumers react differently. On the *normative* approach to segmentation see Casarin, 1990, 67 ff.

<sup>2</sup> The first applications of segmentation were made with *price discrimination* models, by which firms, exploiting the different price sensitivity of the various consumer classes, manage to maximise overall profits by means of retail price differentiation in the various segments (Wedel-Kamakura, 2003, 336).

<sup>3</sup> Conventionally, as regards the literature on segmentation, references start with the article by Smith published in the “Journal of Marketing” in 1956 (Smith, 1956).

<sup>4</sup> Segmentation is noted for its different, and in some ways contradictory, approaches nowadays: on the one hand, the segment has become increasingly micronized and marketing increasing personalised based on a *fragmented consumer* (for a definition see Collese, 2000, 59); on the other, economies of scale are sought on global markets, configuring *transversal demand segments* (Mazzoni, 1994) regarding the geographic location of consumers that belong to them (for the most recent studies on cross-national segments see Agarwal, 2003; Steenkamp-Ter Hofstede, 2002; Bolton-Myers, 2003; Aurifeille-Quester-Lockshin-Spawton, 2002; Hassan-Craft-Kortam, 2003).

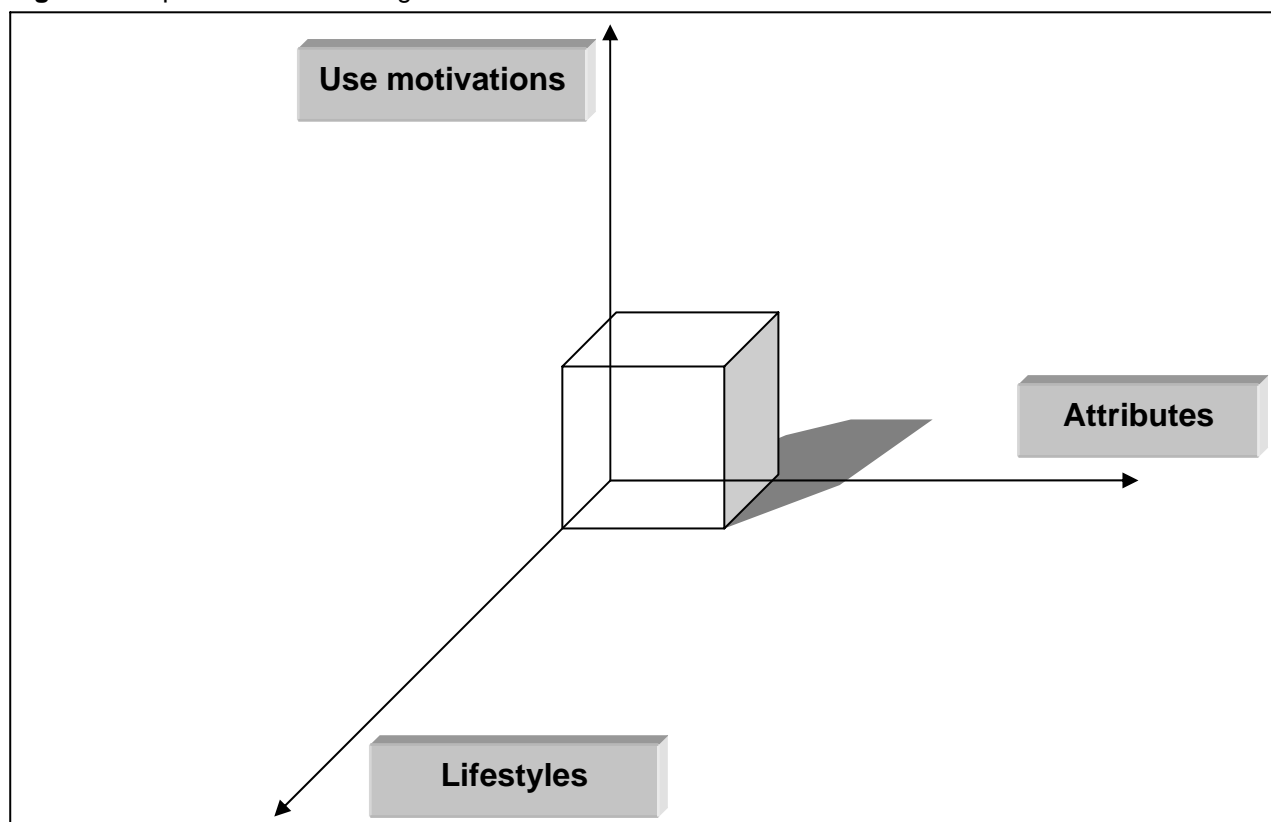
<sup>5</sup> In the 1<sup>st</sup> quarter of 2004 a billion mobile phones were sold worldwide (one every 6 inhabitants), a figure which is forecast to double by 2008 (Gerino, 2004a). Gartner Dataquest, which monitors market trends, estimates that, by the end of 2004, 2 million mobile phones will be sold daily (Carli, 2004).

<sup>6</sup> In Italy, in the first half of 2004, sales of Euro16.7 billion were achieved. Competition systems are highly dynamic, partly due to some technological changes and continuous shifting in the competitive chessboard. From the monopolistic position of TIM, which demerged from Telecom Italia in 1994, that introduced the ETACS system across the board, GSM technology became widely adopted. This has seen a system of competition based on an oligopoly in which Omnitel (1994) and Wind (1997) compete side by side. Now the third generation of mobile phones is being launched, with UMTS technology, whose frequencies have been granted under licensing after a state-organised competition, officially concluded on 10 January 2001. Among the firms that obtained licences, the lone survivor – alongside the three historical competitors, which in the meantime have undergone various organisational and ownership changes (Omnitel is now called Vodafone), - is H3G. Parallel with the development of technological systems there has been a widening of use functions, which has led firms to offer a broad set of new services (SMS, MMS, PC terminals, Internet connections, e-commerce, cameras, video cameras, diaries, palm tops, TV services, walkie-talkie, etc.). The combination of demand and supply dynamics leads us to consider the cell phone phenomenon as the country's way of making up for a series of missed opportunities, like those of the IT industry in the 1960s and 1970s or the chemical sector in the 1980s and 1990s (De Benedetti, 2002). Indeed, the development of mobiles enabled

## 2. The three-dimensional segmentation model

The segmentation model (Mazzoni, 1995)<sup>7</sup> that we apply below is based on the joint use of three dimensions: lifestyles, product attributes and use motivations. It aims to integrate analytical perspectives which are often used alternatively, one being based on subjective consumer characteristics and the other on benefits/attributes sought in the product<sup>8</sup>. The segment is described with the contemporaneous use of the three dimensions, such that it is defined by a solid geometric figure (a parallelepiped instead of a curve segment) as may be seen in figure 1.

**Figure 1.** Representation of a segment within the three-dimensional model



We will briefly recall the meaning of the three dimensions used.

### 2.1 Lifestyles

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the Information Technology sector to maintain its track record (0.1% growth in 2003 against 3.2% worldwide): without the performance of the cell phone sector, IT would have recorded a 2% decrease over the previous year (Gerino 2004b).

<sup>7</sup> Since 1995 the model has been applied to the tourist market (Nigro-Triunfio, 2001), to publishing (Mazzoni-Leone, 2001) and to the food market (Leone, in press).

<sup>8</sup> Analysis of the personal variables of the consumers and of benefits sought may be reported in relation to *build-up* or *breaking* segmentation criteria. In the former case consumer variables (age, gender, income, and so on) are observed, while in the latter the preferences of the individual in relation with the benefits sought in the specific product are studied (Valdani, 1995, 331-334).

The use of this dimension is fairly well-established both in the literature<sup>9</sup> and in practice<sup>10</sup>. Lifestyle is determined by a system of variables which comprises many elements: socio-demographic indicators<sup>11</sup>, values and socio-psychological characteristics of individuals, behavioural variables, consumption of products and services. Our aim is to study the individual's reference universe, so as to be familiar with his/her social values and his/her actual behaviour as a consumer and as a user of communication means.

## 2.2 Use motivations

It was deemed appropriate, in analysing product-specific variables inserted into the model, to differentiate consumer use motivations from the attributes preferred by the consumer in choosing the product, categories that generally remain confused in using segmentation analysis based on expected benefits<sup>12</sup>. Motivations represent needs that induce purchase and that explain the individual's consumption; they are closely connected to the product class and loosely related to the chosen brand/model. In Italy the use motivations of cell phone services (to which the application presented below is devoted) have progressively evolved: the basic functions of mobile phones exist alongside a series of motivations related to social identity and the value system of Italians. Thus functional benefits (mobility, convenience, traceability, rapidity) are joined by psycho-social benefits, related to self-gratification and to the connection with relevant social and professional groups (Costabile-Addis, 2002, 38). Particular mention should be made of the safety motivation which is based on both rational and emotional features. In this sense, according to recent theories (Di Gregorio, 2003), the mobile phone performs the function of *personal regulator of distance and separation*<sup>13</sup>.

## 2.3 Product attributes

Product attributes are the features of the product/service and mainly determine the selection among the various offers within the product class. They therefore affect the choice among competing product/services, and are closely connected to the action of brand positioning on the markets. In the case of mobile phone consumption, attributes should be studied in terms of both the portfolio of mobile phones available on the market and the service provider characteristics. Competition on attributes is based: a) on the development of technological systems; b) on the possibility of lowering the price of mobiles and service rates according to progressive service diffusion<sup>14</sup>; c) on the development of aesthetic attractors (design, colour, shape, etc.).

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<sup>9</sup> Much has been written about lifestyles, especially in the 1960s and 1970s. Amongst the main references see Wells 1974; 1975; Gunter-Furnham, 1992.

<sup>10</sup> In the USA, from the 1970s to the 1990s, research into lifestyles developed around the concepts of AIO - Activities, Interests and Opinions - (Wells-Tigert, 1971), LOV - List of values - (Kahle-Beatty-Homer, 1986; Kahle-Kennedy, 1989) and VALS<sup>TM</sup> - Value and Lifestyles - later evolving into the VALS2<sup>TM</sup> system (Kahle-Beatty-Homer, 1986, Novak-MacEvoy, 1990). Some studies researched the lifestyles of the European consumer (Homma, 1991; Winkler, 1991), while others referred to consumers from various countries worldwide (American Demographics, 1991). In Italy the most common profiles based on lifestyles are those of the "Sinottica" survey (Eurisko, 2003).

<sup>11</sup> Socio-demographic parameters alone prove insufficient, but they are very useful if used jointly with other variables.

<sup>12</sup> *Benefit segmentation* (Haley, 1968; 1971; 1984a; 1984b) identifies in sought-after benefits the variables that can best discriminate between heterogeneous consumer behaviour. Of the most recent contributions that use this approach, see Ratneshawar-Warlop-Mick-Seeger, 1997; Wu, 2001.

<sup>13</sup> As will be seen below, this motivation is also found among certain groups of the sample interviewed in the course of this research.

<sup>14</sup> Of great interest is the phenomenon of so-called *network economies*, typical also of Internet applications, which generate cost benefits linked to the progressive diffusion of services (and to the consequent familiarity with them) among a wide range of users.

### 3. Segmentation bases of the three-dimensional model

Prior to reporting the results obtained by applying the three-dimensional model to the cell phone market, it seems worth contextualising the model within the current state of the literature on the subject of market segmentation, with especial reference to the system of variables and methods used. This will be the aim of the present section as well as the next.

A recent classification (Wedel-Kamakura, 2003, 7 ff.) of the systems of variables used to generate segmentation bases proposes the matrix reported in figure 2.

**Figure 2.** Classification of segmentation bases

	General	Product-specific
Observable	Cultural, geographic, demographic and socio-economic variables	User status, usage frequency, store loyalty and patronage, situations
Unobservable	Psychographics, values, personality and life-style	Psychographics, benefits, perceptions, elasticities, attributes, preferences, intention

Source: Wedel-Kamakura, 2003, 17

The matrix is structured in two dimensions: *generality/specificity* of the segmentation bases and their *observability/non-observability*. The segmentation bases are separated horizontally into *general* (independent of products/services and consumption/purchase circumstances) and *product-specific* (type of goods/services required and consumption/purchase circumstances); vertically, they are divided into *systems of directly measurable variables* (observable) or *those that can be obtained on the basis of deductions* (non-observable).

According to the study conducted by Wedel-Kamakura, classes of variables used respond differently to the criteria that are essential to effectively use segmentation. The criteria include: segment *identifiability*, *substantiality* (the targeted segments must represent a large enough portion of the market), *accessibility* by means of promotional and/or distributional action, *stability* in time, homogeneous *responsiveness* of the specific segment to marketing efforts, *actionability* (consistence with of the firm's goals and core competencies) (ibidem, 4-5). Wedel-Kamakura propose a detailed assessment of each segmentation basis for each of the effectiveness criteria (ibidem, 16), assigning a score to each system of variables used ranging from *very good* to *very poor*. The results show, for the above criteria, that greater effectiveness may be found in classes of *unobservable specific variables*, although this interpretative capacity is improved by the combination of a higher number of segmentation bases.

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The segmentation model proposed uses two of the four basic categories into which the matrix is subdivided<sup>15</sup>: lifestyles fall within *general, unobservable bases*, while attributes and motivations belong to *specific unobservable bases*.

If we evaluate the three-dimensional model on the basis of the parameters proposed by Wedel-Kamakura, *we may deduce that it should be very effective for all the criteria used*: such interpretative effectiveness is related to the use of unobservable, product-specific segmentation bases, but it is extended to the conjoint use of systems of variables belonging to several classes.

#### 4. "Methods" for applying the three-dimensional model

Wedel-Kamakura also propose a four-category classification of the techniques used to perform market segmentation (ibidem, 17 ff.). The matrix is reported in figure 3.

Figure 3. Classification of methods used for segmentation

	A priori	Post-hoc
Descriptive	Contingency tables, Log-linear models	Clustering methods: non-overlapping, overlapping, Fuzzy techniques, ANN, mixture models
Predictive	Cross tabulation, Regression, Logit and Discriminant analysis	AID, CART, Clusterwise regression, ANN, mixture models

Source: Wedel-Kamakura, 2003, 17

The two dimensions used in this case are: *a priori/post hoc* methods and *descriptive/predictive* techniques. As is well known<sup>16</sup>, approaches are called *a priori* when the number of segments is defined before the search process (for example in the case in which specific use classes are decided to be employed – e.g. strong/weak/non-consumer of the product), while in *a posteriori* (or *post-hoc*) methods there is no prior knowledge of the number of segments, which is determined by processing the results collected. As regards the second dimension of the matrix, *descriptive methods* analyse the associations between the systems of variables used, without distinguishing between dependent and independent variables, while *predictive methods* consider two systems of variables, one of which – independent variables – allows predictions to be made on the set of dependent variables.

<sup>15</sup> Actually, the model also uses the individual's socio-demographic data (general observable variables) which are not given here separately in that, as was stated above, they fall within the definition of lifestyle that we adopted (see note 11).

<sup>16</sup> See, amongst others, Green, 1977, 64.

For the second matrix, as for that reported in figure 2, Wedel-Kamamura also propose an evaluation of the effectiveness of the various methods. This evaluation is carried out with reference to the following criteria: *effectiveness for segmentation, effectiveness for prediction, statistical properties, application known, availability of programs*. For each of the methods a score for effectiveness is proposed for the above criteria (*ibidem*, 29), with a scale ranging from *very good* to *very poor*. The results of the analysis conducted by the two authors highlight maximum effectiveness for *post-hoc predictive techniques* (especially for mixture methods<sup>17</sup>).

The proposed three-dimensional segmentation model has up till now been implemented with descriptive *post-hoc* methods: the segments are determined a posteriori on the basis of the intersection between lifestyles-use motivations-product attributes, without it initially being possible to distinguish dependent and independent variables<sup>18</sup>, among these three dimensions. In particular, methods used up till now to define segment/parallelepipeds comprise non-overlapping clusterization techniques<sup>19</sup>, yet also fuzzy techniques may be attempted<sup>20</sup>. In the application below, as in the previous experiments with the model, classical *clusterization on a non-hierarchical basis* was applied (see section 5.5).

As regards the criteria proposed herein, clusterization techniques used up till now to *implement the model are among the most widely used* (for the criterion “application known” the score is “very good”), *due also to the greater diffusion of applicative statistical packages* (for “programs availability” the score is “very good”); *they are highly effective for segmentation* (this parameter is also adjudged to be “very good”) *but they do not allow forecasts to be made* (this parameter is given the score “very poor”, as are “statistical properties”). Future research should include the implementation of the model with predictive techniques, as suggested in the cited study.

## 5. Research design

The aim of our empirical research lies in the segmentation of cell phone consumption by applying a multidimensional segmentation model. Interesting results are expected from the analysis of consumption of this product/service: the great diffusion among very heterogeneous categories of individuals should impact significantly on the lifestyles dimension, while the fact that the product/service is frequently used, and that consumers express fairly precise, well differentiated expectations and preferences, should produce effective results in terms of use motivations and preferences referred to product attributes. The method adopted is based on a combined approach of standard and non-standard techniques<sup>21</sup> to retrieve information and analyse data. Opting to use, within the research itself, techniques from different approaches has become a well-established practice in the social sciences, even though there is not yet an epistemological perspective agreed upon by academics<sup>22</sup>. Besides, there is no single way of combining the various approaches; it is

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<sup>17</sup> For a detailed analysis of mixture models see Wedel-Kamakura, 75-144.

<sup>18</sup> Some methods that support predictive/post-hoc surveys, like conjoint analysis and componential segmentation (Green-De Sarbo, 1979; Green-Srinivisan, 1990; Green-Krieger, 1991) may be used on product-specific variables of the model.

<sup>19</sup> In clusterization based on non-overlapping techniques each individual may only be part of one segment, while in overlapping techniques they may be included in more than one segment (Wedel-Kamakura, 2003, 19-22).

<sup>20</sup> In fuzzy techniques, whether an individual belongs to one or more segments depends on the degree of the relationship with the characteristics of the same segment and is estimated by probability (*ibidem*).

<sup>21</sup> Standard techniques are based exclusively on the data matrix and on statistical techniques of data analysis; non-standard techniques adopt non-directive, biographical and hermeneutic approaches. The distinction between standard and non-standard techniques is an attempt to overcome the quality and quantity dichotomy (Marradi, 1996).

<sup>22</sup> The “Anglosaxon” school is very active on this front: this is attested by the various attempts to define and classify research designs that combine techniques and methods from different paradigms. One of the most

the subjective evaluation of the researcher in the specific situation that identifies the best relationship between the aims and the tools to be used to pursue them (Montesperelli-Diana, in press).

### 5.1 Construction of the empirical basis

The analytical unit of our research consisted of residents in Campania<sup>23</sup>, ranging between 14 and 65 years of age (this was the age class deemed the most sensitive to mobile phone use). Random sampling was used, without repetition, on a finite population. Sample size, amounting to **784** individuals, was established according to the formula reported by Ballatori (1998) and on the basis of a 3.5% margin of error. Sampling also took account of the distribution of population of the urban areas, gender and age of interviewees, insofar as they were likely sources of response heterogeneity. The fairly large sample size led us to choose the CATI (Computer Aided Telephonic Interview) technique to gather information.

### 5.2 Definition of the conceptual three-dimensional map

The most delicate step in the research procedure was the “operational definition”<sup>24</sup> of the model’s three dimensions: lifestyles, motivations and attributes. With the aid of a conceptual map (or macromodel)<sup>25</sup> for each dimension we selected indicators that were deemed the most valid<sup>26</sup>. Subsequently, the indicators were operationalized in order to release the first version of the structured questionnaire.

The indicators for attributes and motivations were diversified by cell phone providers and mobile phone (as product). Selection of the indicators for these two dimensions entailed no difficulty: there was rapid agreement amongst researchers on the choices to be made, the soundness of which was later confirmed by results.

As regards lifestyles, on the contrary, their multidimensional nature made it problematic to define them in operative terms. In the sociological and economic literature, there have been various specifications of this concept, consisting of hundreds of indicators, whose operative translation entails the creation of very long questionnaires which are incompatible with telephone interviewing. We thus decided to use a narrower basket of indicators that covered the more significant semantic areas for our survey.

To define lifestyles we considered:

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common classification makes a distinction between “mixed method designs” and “multimethod designs”. In the former, different techniques are incorporated within a single-method (standard or non-standard) research path. In this case, the techniques incorporated have an ancillary function to the main method and serve to provide the researcher with further information in order to fine-tune his/her research path. Multimethod designs, by contrast, adopt two or more different methods to study the same phenomenon. The methods chosen proceed in parallel fashion, each with its own logic, and reach results that will then be compared with triangulation procedures. The cognitive purpose is to achieve, by integrating different theoretical prospects, a broader understanding of the phenomenon in question (Bernard, 2000; Morse, 2003, 189-208). Our research design may be likened to “model1” in the classification by Steckler et al., that is an approach in which “qualitative methods are used to help develop quantitative measures and instruments” (Tashakkori-Teddlie, 2003, 213-214).

<sup>23</sup> The region of Campania has some characteristics that make it suitable for our research: according to ISTAT 2003 data, Campania is the second most populous region in Italy, as well as the youngest, and its five provinces have considerable social, economic and productive differentiation.

<sup>24</sup> The “operational definition” is a set of rules and conventions, following which each single state on a property is transformed into data. Consequently, the whole property is transformed into a variable (Marradi, 1987, 21-26).

<sup>25</sup> The macromodel is a scheme which is elaborated prior to the data collection phase. It includes and links all the concepts that make up the theoretical research model (ibidem, 86-89).

<sup>26</sup> Validity is the degree of semantic relationship between a concept and its indicator; it is based on the researcher’s criteria which are subjective and hence cannot be measured, at most only estimated (ibidem, 35-39).

- socio-demographic properties (age, sex, education level, marital status, family composition, employment);
- “mental” properties<sup>27</sup>, relating to the individual’s value universe; analysis of this aspect, besides using a set of items on values, was enhanced by introducing a set of indicators on needs, obtained from Inglehart’s<sup>28</sup> scale of materialism/post-materialism;
- exposure to means of communication (TV, radio, daily newspapers, periodicals, the Internet, cinema, theatre, books, etc.);
- main free-time activities (taking part in sports, going to concerts, pubs, restaurants, gyms, discos, etc.);
- consumption connected with the subject of our research (use of cell phones, use of computers, videogames, etc.).

### 5.3 Focus groups

After the first draft of the structured questionnaire, it was deemed appropriate to implement a non-standard technique for its optimal definition. Thus two focus groups were organised<sup>29</sup> which comprised 20 people in all, 10 per group<sup>30</sup>, selected on the basis of a consumer typology constructed on several salient criteria with regards to our research aims. The chief criterion was to split potential consumers along a continuum: at one end, there are those who make intensive, complete use of mobile phones (intensive use) and, at the other, those who limit their use to the straightforward call (basic use). In defining the types we also took account of socio-demographic properties, consumer attitudes and behaviour (age, social class, employment condition, propensity to technology).

Participants in the focus groups fall into one of the following four classes:

- *Anachronistic*: they use cell phones as a straightforward extension of the fixed phone, not bothering with all the functions or the added services;
- *Technological*: they are informed on all the novelties in the field of telecommunications and mobile phones;
- *Business*: they use cell phones as an indispensable tool for carrying out their work;
- *Standard*: they use cell phones as an aid to everyday tasks, in some cases also to provide evidence of status and belonging to a group.

The focus groups proved effective for gathering further information on research themes, especially to solve several methodological difficulties concerning the quantity of indicators chosen and their validity. The heterogeneity of the participants, of their knowledge of mobile phones and their personal experience contributed to fine-tuning our survey, increasing the standpoints from which to observe the phenomenon. Interpretation of the

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<sup>27</sup> Ricolfi uses the expression “mental properties” to stand for “opinions, attitudes, skills, preferences, values, assessments, perceptions, beliefs, expectations, images, representations, etc.” (1997, 3).

<sup>28</sup> The indicators are drawn from a famous study by the sociologist Inglehart on the value orientations of Western society: to our knowledge, they have never been introduced into the definition of lifestyles for the purpose of market segmentation. Thus, what is presented could be considered an original experiment, whose significance may be defined in its entirety only at the end of our research. Our preliminary results suggest that the indicators are useful for defining the individual’s value universe. Inglehart first proposed his scale in research in 1977 (see Inglehart 1983, 62 ff.) and then re-used the same method in time (see, amongst others, Inglehart, 1998).

<sup>29</sup> The focus groups were convened on the premises of Adacta International: the researchers were able to monitor the groups from an adjacent room arranged for this type of survey, from which they were able to watch without being seen so as not to disturb the normal interaction of the groups. The discussions, conducted by a moderator, were recorded and filmed with the participants’ consent.

<sup>30</sup> The number of participants was determined on the basis of guidelines found in the relevant literature. See, amongst others, Morgan, 1996, 129-152; Corbetta, 1999, 422.

discussions involving the two focus groups led us to draft a new version of the questionnaire.

#### 5.4 Questionnaire design and pre-testing

The draft of the questionnaire also took account of the need to insert a suitable number of cardinal variables to be able to subsequently use factorial analysis and cluster analysis. For this purpose, we decided to use a Cantril scale for most of the variables inserted in the questionnaire, aware of the possible biases that could be triggered<sup>31</sup>.

Special attention was devoted to the pre-testing phase, essential for evaluating the suitability of the questionnaire, to estimate the average length of an interview and detect any biases arising from the questionnaire, whether in its formal structure or in the semantic nature of the variables/questions used. If the aim is just to assess the weaknesses of a questionnaire, the pre-test may be conducted on a few dozen cases (Sheatsley, 1983, 226); in our case we preferred to conduct the preliminary survey on 100 individuals drawn at random from the population insofar as we also wished to test statistical procedures to implement the segmentation model.

#### 5.5 Data analysis

Data analysis was carried out by using the data matrix and an EDS-type approach, aiming to explore, describe and summarise the data, without *a priori* formulation of hypotheses obtainable from empirical results (Di Franco, 2001, 13-30)<sup>32</sup>. Below we describe the techniques applied on the preliminary sample, whose results are reported in sections 6.1 and 6.2. These techniques will in future be applied to information obtained from the whole sample.

*Factorial analysis* was applied to the three dimensions of the model to search for latent factors that summarise the variables, thereby minimising the loss of information. Factorial analysis was followed by *cluster analysis*, required to group cases in relation to previously identified factors.

The first step of any data analysis process, however, must be to study the frequency distributions, the contingency tables and all the characteristic values of monovariate and bivariate analysis. Attentive descriptive analysis provides the foundations on which to build subsequent multivariate analysis. Calculation of the means, for example, was useful for selecting variables for factorial analysis, besides pointing to the probable presence of *response-sets*<sup>33</sup> in some groups of questions. Indeed, preliminary results of factorial analysis on the three dimensions, despite showing interesting factors, were adversely affected by the systematic tendency of many interviewees to always give too high or too low scores. Accordingly, cluster analysis on these factors proved of low utility.

A data deflation procedure was thus needed to eliminate the bias<sup>34</sup>. The basic assumption of deflation is that the average of the scores assigned by an interviewee to every individual item of a group of questions represents his/her propensity to give high, medium or low

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<sup>31</sup> The use of long sets of questions, always conducted in the same fashion, may lead to biases in interviewee responses, such as the *response set*: the interviewee always chooses the same category, irrespective of the content of the question.

<sup>32</sup> The EDS approach differs considerably from the "modelling" approach, in which the researcher empirically tests the variables on which he/she has already constructed his/her set of hypotheses.

<sup>33</sup> See footnote 31.

<sup>34</sup> Deflation is a technique applied to eliminate the systematic tendency on the part of interviewees to use scales with broad fields of variation in a distorted fashion. The name comes from the analogous procedure used by economists to reduce the influence of prices from their estimates. The technique is similar in all respects to standardisation, the only exception being that, while standardisation is applied on variables – that is, on the columns of a data matrix– deflation is applied to the rows, that is, to cases (Marradi, 1987, 58).

scores. For each set of variables<sup>35</sup>, the value expressed by each case on individual items was subtracted from the mean, obtaining a score that is closer to the interviewee's "real" assessment. The value thereby obtained was then divided by the standard deviation, also to eliminate the tendency to use a more or less broad range of scores. Deflation had the beneficial effect of reducing the componential weight of the less significant variables, providing more interpretable factorial solutions. In particular, deflation removed the variables that were of little importance for our interviewees, but that with a non-deflated factorial would have affected factor composition<sup>36</sup>.

After deflating the matrix, factorial analysis was applied to each of the model's three dimensions to obtain factors that would summarise the groups of variables considered. The factor loadings enabled us to understand which variables best represent, semantically speaking, the factors extracted<sup>37</sup>.

While for attributes and motivations we performed only one factorial analysis, for lifestyles three were necessary: the first on the values and needs dimension; the second on the exposure to means of communication (media use); finally, the third involved factors extracted with the two previous factorials.

The variables derived from factorials on lifestyles were subjected to non-hierarchical cluster analysis, with K-means algorithms and calculation of the Euclidean distance. This multivariate technique aims to assign the cases of the data matrix to a restricted number of groups, maximising homogeneity among the cases falling within the groups and the heterogeneity among the cases in different groups. The result of the cluster was the creation of three groups into which the matrix cases were subsequently aggregated.

Analysis of variance within the factors extracted from the other two dimensions (attributes and motivations) was performed on the three groups. Comparison of means on the standardised scores for each factor indicated – on selecting the higher mean scores – which attributes and motivations most characterise the three clusters. The segments were thus defined on the basis of lifestyles and described on the basis of attributes and motivations.

## 6. Results of the preliminary survey

As stated above, the results presented in this section concern the pre-test. Interpretations must thus be considered only preliminary, insofar as they are susceptible to variations due to the addition of new data. The research plan and the relative results will be able to be evaluated definitively after application of multivariate analysis techniques to the whole sample.

The segmentation inquiry conducted so far has led to the identification of three demand segments for mobile phones. Here we overlook the survey conducted on demand for cell phone services. To outline the profile of those belonging to the various segments, we analyse below the results of factorial analysis applied to the deflated matrix, performed separately on each of the model's three dimensions (lifestyles, attributes, use motivations), and those of *cluster analysis* performed only on the lifestyles dimension.

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<sup>35</sup> The sets of variables are the basis for the three dimensions of the segmentation model.

<sup>36</sup> For example, among cell phone attributes the possibility of playing with videogames has a very low mean, about 2.5 on a Cantril scale that goes from 0 to 10. Thus, interviewees did not consider it an important attribute. However, factorial analysis on the non-deflated matrix returned a factor in which this attribute had a high componential weight.

<sup>37</sup> It may be hypothesised that the variables with higher factor loadings best represent, in semantic terms, the factor extracted. Those with lower values should be eliminated as they have little validity. It is also important to consider factor score coefficients, which are calculated after factor loadings, and serve to weight the variables to eliminate their semantic overlapping. They constitute the net semantic contribution of each indicator to the representation of the concept (Marradi, 1987, 73-78).

## 6.1 Processing results by factorial and cluster analysis

In relation to *use motivations* that make interviewees purchase mobile phones, principal component analysis - with Varimax rotation – supplied the factors described in table 1, for which the following terms were chosen: *sense of belonging*, *distance control* and *relational*.

**Table 1.** Factors summarising the “use motivations” dimension

	Sense of belonging	Distance control	Relational
Because I like being trendy	0.845	0.063	0.023
Because it makes me feel part of a group	0.723	0.333	-0.162
To communicate with my family	-0.526	0.591	-0.255
Because it makes me feel safe	0.131	0.472	-0.466
To send text messages	-0.078	-0.096	0.734
To communicate with my friends	-0.330	0.111	0.728
To enjoy myself	0.156	-0.025	0.448
For the accessory functions	-0.283	-0.654	0.073
Because I'm interested in advanced services	0.010	-0.745	-0.112
For work	-0.495	0.054	-0.577
To save on calls to mobiles	0.078	-0.069	-0.073

The solution obtained explains 51% of total variance. The first factor is positively correlated with “trendy” variables (0.845) and “feeling part of a group” (0.723). It was termed “sense of belonging” in that mobile phone use seems to respond to a need to conform to the reference *clan*. The second factor, correlated positively with the motivations “communicate with family” (0.591) and “it makes me feel safe” (0.472), was defined as *distance control* in that it responds to the need to feel able to stay in touch with others (especially with one’s nearest and dearest) irrespective of where we are. The third factor, *relational motivations*, is so called because it correlates positively with the motivations “send text messages” (0.734), “communicate with friends” (0.728) and “enjoy oneself” (0.448).

As regards mobile phone *attributes*, principal component analysis - with Varimax rotation - generated three factors, which were termed *price/diffusion*, *ease of use* and *functionality* (table 2).

**Table 2.** Factors summarising the “attributes” dimension

	Price/Diffusion	Ease of use	Functionality
Price	0.529	-0.051	0.032
Diffusion among acquaintances	0.487	-0.135	-0.023
Screen visibility	-0.104	0.716	0.231
Simplicity of use	0.401	0.631	-0.051
Handiness	0.115	0.602	-0.222
Battery length	0.057	0.201	0.628
Durability	0.194	0.049	0.598
Quantity of accessories available	-0.240	-0.207	0.468
Presence of other functions	-0.586	-0.104	-0.087
Notoriety of the mobile phone brand	0.281	-0.523	-0.150
Availability of technologically advanced services	-0.571	-0.246	-0.056
Aesthetics	-0.263	-0.268	-0.296
The possibility of personalising the mobile phone	-0.300	-0.357	-0.403
The possibility of play with videogames	0.027	0.046	-0.642

The solution explains 40% of total variance. The first factor, *price/diffusion*, underlines the preference given to attributes connected to mass market characteristics: “price” (0.529) and “diffusion among acquaintances” (0.487). The second factor was given the name *ease of use* insofar as it is positively correlated with attributes linked to easy, immediate use of the mobile: “screen visibility” (0.716), “simplicity of use” (0.631) and “handiness” (0.602). The third factor was summarised under the title of *functionality* in that it was positively correlated with attributes which stress the importance of efficiency: “battery length” (0.628), “durability” (0.598), “quantity of accessories available” (0.468).

Finally, as regards the **lifestyles** dimension, principal component analysis was carried out in two phases.

First, we derived separately the factors concerning:

- exposure to mass media (TV, radio, daily newspapers, periodicals, the Internet, cinema, theatre, books, etc.);
- value universe and needs of individuals.

Then, data on the factors thus obtained (that explain, respectively, 51% and 62% of total variance) were jointly processed and three new factors were identified. These three new factors represent the lifestyles, namely *Conformist*, *Committed* and *Progressive*. Table 3 thus summarises these three factorial analyses: that of media use produces four of the seven factors listed in the first column (media exposure of a simple nature, with external contact, for information purposes, of individual and reflective nature); analysis of the value universe and needs generates the other three factors listed in the first column (basic values, well-being, social participation/environmental protection). In the last three columns, there is the result of factorial analysis performed on the factors emerging from the first two; in other words the results are combined from media exposure and values/needs. These three last factors (which explain 67% of total variance) represent the lifestyles derived from the preliminary sample.

**Table 3.** Factors comprising the “lifestyles” dimension

	<b>Conformist</b>	<b>Committed</b>	<b>Progressive</b>
<b>Media exposure of a simple nature (TV and sports newspapers)</b>	<b>0.760</b>	0.022	0.051
<b>Basic values (physical safety, work, family)</b>	<b>0.519</b>	-0.561	0.007
<b>Media exposure with external contact (theatre and cinema)</b>	-0.012	<b>0.661</b>	0.047
<b>Media exposure with information purposes (the Internet, periodicals, non-sports newspapers)</b>	0.097	<b>0.645</b>	0.306
<b>Well-being (economic security and personal success)</b>	0.492	<b>0.482</b>	-0.297
<b>Media exposure of individual and reflective nature (radio and books)</b>	-0.232	0.087	<b>0.664</b>
<b>Social participation and environmental protection (social commitment and equality, solidarity, respect for the environment, love of country)</b>	0.261	0.148	<b>0.797</b>

We used the term *Conformist* to define those who had a “media exposure of a simple nature (TV and sports newspapers) (0.760) and who attach prime importance to “basic values” of physical safety, work and family (0.519). The *Committed* are individuals with a media exposure in locations outside the domestic and working environment - theatre and cinema - (0.661) or “with information purposes” (the Internet, periodicals, non-sports newspapers) (0.645) and have “values related to well-being” - economic security and personal success (0.482). The *Progressive*, finally, have media exposure of individual and reflective nature connected with reading books and listening to the radio (0.664) and show “great interest in social participation and environmental protection” (0.797).

The last factors obtained (which explain 67% of total variance) represent lifestyles found in our sample. They were subjected to cluster analysis so as to make cases fall within a single lifestyle, thereby avoiding overlapping. We thus formed three demand segments, which were named using the features that characterised their lifestyles (Conformist, Committed and Progressive) and which were connected to prevailing motivations/attributes for those belonging to each lifestyle. In other words, the segments were designed by using lifestyles as a discriminating dimension and attributes and motivations as descriptive dimensions.

Table 4 reports the features of the segments<sup>38</sup>, described according to the three dimensions; below, for the sake of interpretation, we will add socio-demographic information gathered from the questionnaires.

**Table 4.** The segments according to three-dimensional analysis

		USE MOTIVATIONS			ATTRIBUTES		
		Sense of belonging	Distance control	Relational	Price/Diffusion	Ease of use	Functionality
LIFE- STYLES	Conformist	0.1609	0.0550	-0.2545	0.1995	-0.0088	-0.1710
	Committed	-0.2184	0.2171	-0.0422	0.0400	0.1662	-0.2757
	Progressive	-0.1498	-0.1604	0.2361	-0.2152	-0.0354	0.2484

## 6.2 Cluster interpretation

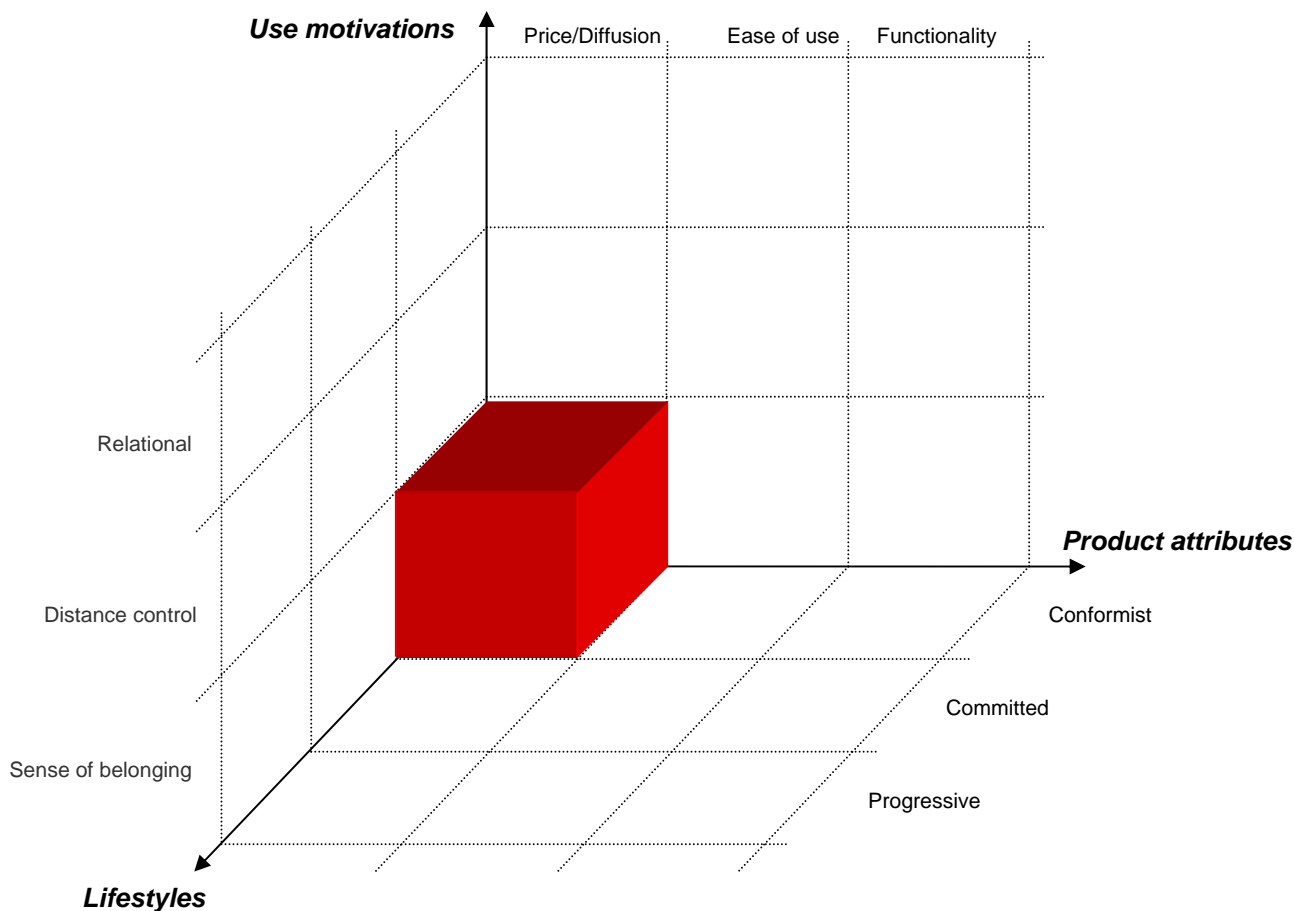
The **Conformist** segment (42.9% of interviewees) is characterised by individuals – with equal numbers of men and women, married and otherwise – with a broad age distribution, generally low education level (primary, lower secondary and upper secondary) and self-employed (non-professional), employee or housewife. The individuals belonging to this cluster, represented in figure 4, display basic values (physical safety, work and family) and media exposure of a simple nature (chiefly TV and sports newspapers). They use a mobile phone mainly to satisfy **a sense of belonging**, tied to fashion and the desire to be part of a group and, as regards attributes, they pay particular attention to **price and product diffusion**. Thus the purchase of a mobile phone on the part of the Conformist appears to respond above all to the purposes of ostentation and the need to conform to the group besides the need to use it as a tool of communication *in se*. The Conformist may well show great sensitivity to mass information and a propensity to repeat the purchase even when his/her “old” mobile is in good working order.

The segment of the **Committed** (16.3% of interviewees), described in figure 5, consists mainly of middle-aged married men (older on average than the other two segments) who attribute particular importance, among the “value” aspects, to well-being (economic security and personal success). The segment has a media use with information purposes

<sup>38</sup> As was stated in section 5.5, analysis of variance was applied within factors taken from the “attributes and motivations” dimensions in order to gauge which characterise most the three clusters. There being no relative indexes but only absolute numbers, with a view to identifying use motivations and attributes characterising the three customer segments, we consider the highest scores obtained by the various factors for each group.

(reading non-sports newspapers and periodicals as well as using the Internet) and with outside contact (theatre, cinema)<sup>39</sup>. The Committed are usually highly educated, in some cases with postgraduate qualifications, and are mainly self-employed (presumably freelance professionals) and, in second place, employees. They purchase a mobile phone especially for **distance control**, that is to communicate with their families, and for a sense of security arising from the chance to stay in touch with others. For them, the mobile appears to perform the function of distance regulator and separation moderator (in line with what was reported in section 2.2).

**Figure 4.** Three-dimensional representation of the *Conformist* segment



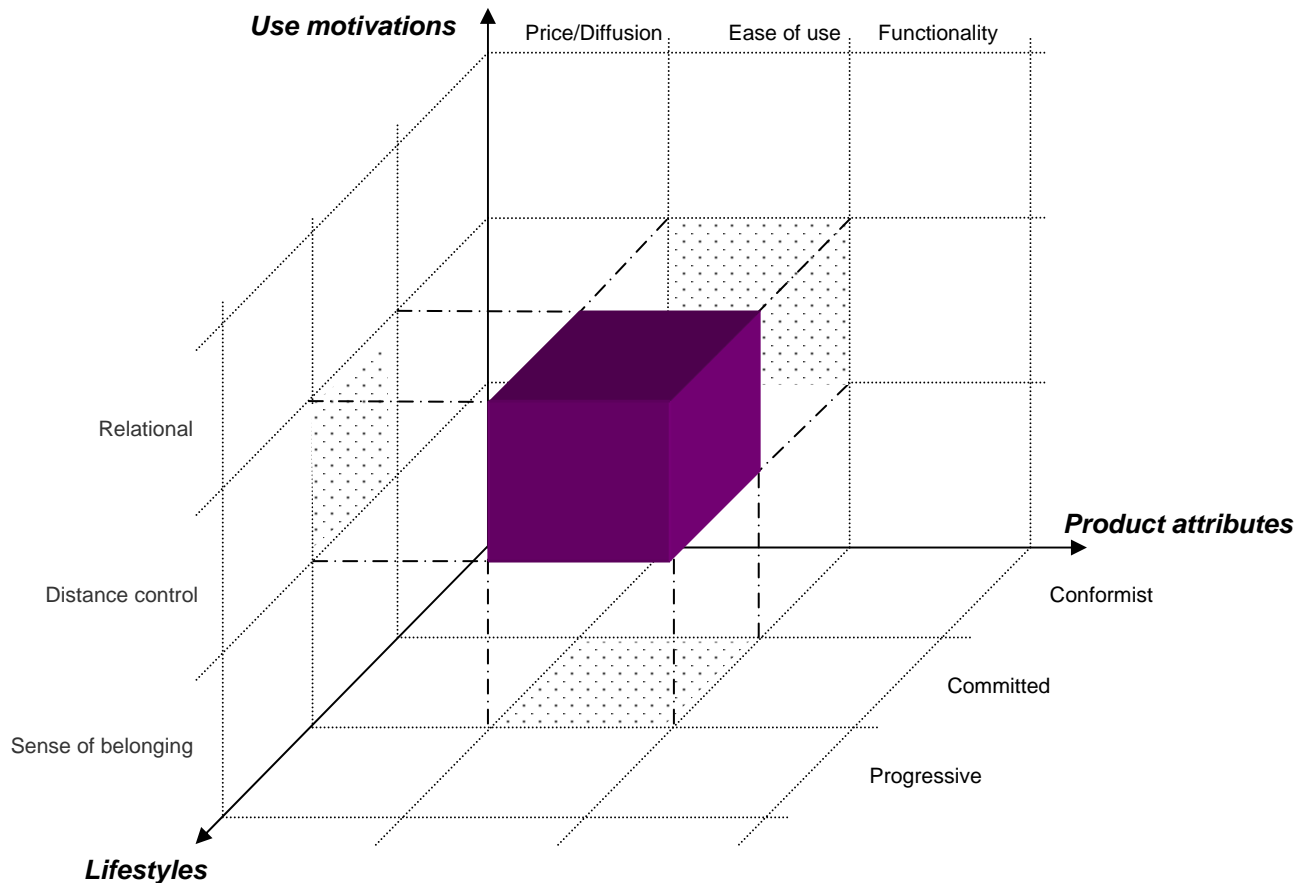
The attitude towards the decisive attributes in terms of choice is in line with what is stated above. Indeed, the Committed give particular importance to the mobile's **ease of use**, that is to all those product features that ensure easy, immediate use (simplicity of use, handiness and screen visibility).

Those belonging to the **Progressive** segment (40.8% of interviewees), represented in figure 6, are mainly young unmarried students, especially women, who state they attribute maximum importance to values of social participation and environmental protection (social commitment and equality, solidarity, respect for the environment and love of country). They have an individual, reflective exposure to the media (reading books and listening to the radio).

<sup>39</sup> In this segment many subjects stated that they consistently often went to restaurants.

They use a mobile mainly for **relational purposes** (sending text messages, communicating with friends and enjoying themselves) while, among attributes, they give great importance to product **functionality** (battery length, durability, number of accessories available).

**Figure 5.** Three-dimensional representation of the *Committed* segment

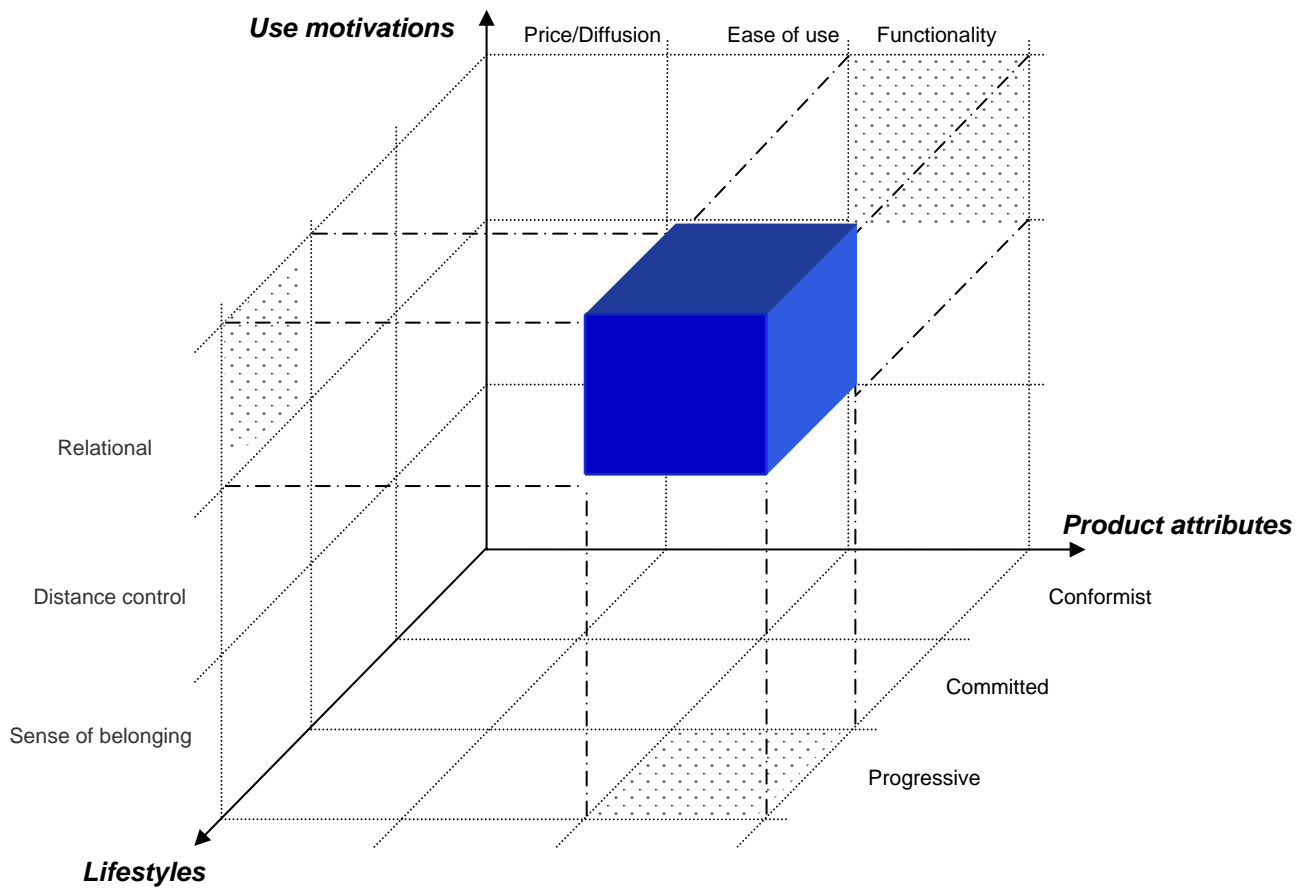


Mobile phones do not appear to represent for the Progressive a means of belonging to a group nor an element of distinction or status symbol, but simply a useful tool for socialisation, communication and entertainment.

As already stated, our research is still to be completed and thus the results reported above should be considered preliminary. They are nonetheless able to suggest managerial implications linked to the model presented. Indeed, our analysis identified three demand segments, outlining types of mobile phone users and representing, if projected to the whole reference universe, a valid starting point for selecting target groups, positioning the brand and carrying out marketing policies. Rather, it may be stated that the three-dimensional model not only supports the segmentation process in the strict sense, but also anticipates many of the elements that are required for the subsequent processes of positioning and implementation of marketing policies<sup>40</sup>.

<sup>40</sup> The segments do not exist in reality, but are created to develop strategies able to best satisfy consumer needs and maximise company sales (Wedel-Kamakura, 2002, 182). From a broader epistemological

**Figure 6.** Three-dimensional representation of the *Progressive* segment



Once the various demand segments have been identified on the basis of information received, the firm identifies the target segments, given its aptitudes and strengths. For each segment, having carried out an analysis of competition, the firm defines how positioning its offer in the consumer's mind: with the use of the prepared model, this positioning action is oriented by the responses already received in terms of chief motivations and preferred attributes. Moreover, the concrete achievement of positioning by means of marketing mix policies will be facilitated by information received from applying the model: it provides interesting indications on product and advertising policies (the firm knows the motivations and attributes of its target and is informed on the target preferences about means of communication), on distribution policies (lifestyle, in the part devoted to consumer behaviour, allows identification of retail outlets frequented by target consumers) and on pricing policies (price sensitivity and willingness to pay for the specific product are examined through analysis of the attributes while information on spending capacity may be found in the analysis on lifestyles).

standpoint, the firm that implements segmentation activates part of the environment according to the way it is viewed by the firm itself (Mazzoni, 2002, 93).

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