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A Consumer Perspective on Mobile Market Evolution

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1. Introduction

In 2006 we performed a wide research on consumer behaviour in the Italian mobile communication market (Mazzoni et al, 2007). Using a multidimensional segmentation framework (LAM model), we identified three demand clusters according to consumers' *lifestyles, use motivations* and *product attributes*. One of the main findings was that two clusters out of three were characterized by a propensity to an integrated and service-oriented use of mobile communication. In other words, some consumers conceived mobile phones not only as simple communication devices, but also like technologically advanced multipurpose tools.

Nowadays these results seem to foresee the increasing importance that services are assuming in consumers' preferences. Indeed, since 2006, many changes have occurred in mobile market, among them the *servitization* phenomenon, leading handsets manufacturers towards an extension of their value chain on service delivering. Mixing both good and service components in their offerings, they are integrating phone devices with numerous software applications.

While previous studies focus on the supply side of servitization, its implications on consumers is less investigated.

In this chapter we therefore aim at analyzing the impact of servitization on mobile phones demand and on the LAM model's three dimensions.

The chapter is therefore organized as follows. Firstly, we present the LAM multidimensional segmentation model and its theoretical rationale, contextualizing it within the current state of literature on the subject of market segmentation with particular attention to the system of used variables (section 2). Results of 2006 research are described in section 3. Industry evolution since that time and consequent changes in the mobile market value are pointed out in section 4. Basing on a literature review, we then focus on servitization, underlining its market and consumer implications (section 5). Finally, the effects of servitization on the LAM model's three dimensions are briefly considered (section 6). Conclusion brings some considerations about further research (section 7).

2. The LAM model

Market segmentation is an activity of demand analysis leading to the identification of different groups of consumers (*segments*) as much as possible homogenous internally and heterogeneous with each other with respect to some relevant variables/characteristics.

Since Smith's 1956 seminal article, it has become the subject of attention on the part of academia and firms, with a wide variety of topics being investigated, ranging from its conceptual basis to the methodology to be adopted (Dickson & Ginter, 1987; Fabris, 1972; Frank, Massy, & Wind, 1972; Green, 1977; Haley, 1968, 1971, 1984; Saporta, 1976; Wedel & Kamakura, 2003; Wind, 1978; Yankelovich, 1964).

The stream of research on market segmentation has its theoretical foundations in the reflections upon imperfect competition theorized in the studies of Edward Chamberlin (1933) regarding monopolistic markets and of Joan Robinson (1933) on 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 a differentiated supply, supposing that purchasers exhibit heterogeneous demand functions in relation to some significant variables (price sensitivity, interest in specific product attributes, brand notoriety, individual lifestyle and so on)¹.

Nowadays segmentation is well known for its different, and in some ways contradictory, approaches: on the one hand, the segment has become increasingly micronized and marketing increasingly personalised based on a fragmented consumer base (Collesei, 2000, 59); on the other, economies of scale are sought after on global markets, configuring transversal demand segments (Mazzoni, 1994) independent of the geographic location of consumers that belong to them².

In literature, since the works of Frank, Massy and Wind (1972) and Saporta (1976), the multiplicity of variables usable for demand segmentation has led to an array of taxonomies. A useful one is offered by Wedel and Kamakura (2003, pp. 7-16) who, basing on some previous classifications, distinguish *segmentation bases* (i.e., sets of variables used for market segmentation) according to their *generality/specificity* and *observability/non-observability* (Figure 1).

Segmentation bases are *general* or, on the contrary, *product-specific* when, respectively, independent or dependent on the characteristics of products/services and on consumption/purchase circumstances; moreover, they are *observable* if directly detectable or *unobservable* when they can only be deduced.

The adoption of different segmentation bases leads to the identification of diverse demand segments. According to Wedel and Kamakura (2003, pp. 4-5, 16), depending on consequent segment *identifiability* (i.e., ease of distinction among segments), *substantiality* (targeted segments must represent a large enough portion of the market), *accessibility* by means of promotional and/or distributional actions, *stability* in time, *homogeneous responsiveness* to marketing efforts and *actionability* (consistence with firm goals and core competencies), the

¹ From here the normative approach to segmentation, based on the premise that demand functions need to be interpreted and categorised (Dickson & Ginter, 1987) in the attempt to maximise the effectiveness of management intervention through companies' marketing mix politics, to which consumers react differently.

² On cross-national segmentation studies see, among others, Agarwal, 2003; Aurifeille et al., 2002; Bolton & Myers, 2003; Hassan et al., 2003; Steenkamp & Hofstede, 2002.

efficacy of segmentation bases varies from *very poor* to *very good*. In general, the most effective bases are product-specific unobservable, although the interpretative capacity of segmentation analyses is improved by the combination of a number of different segmentation bases (Wedel & Kamakura, 2003, pp. 16, 341-342).

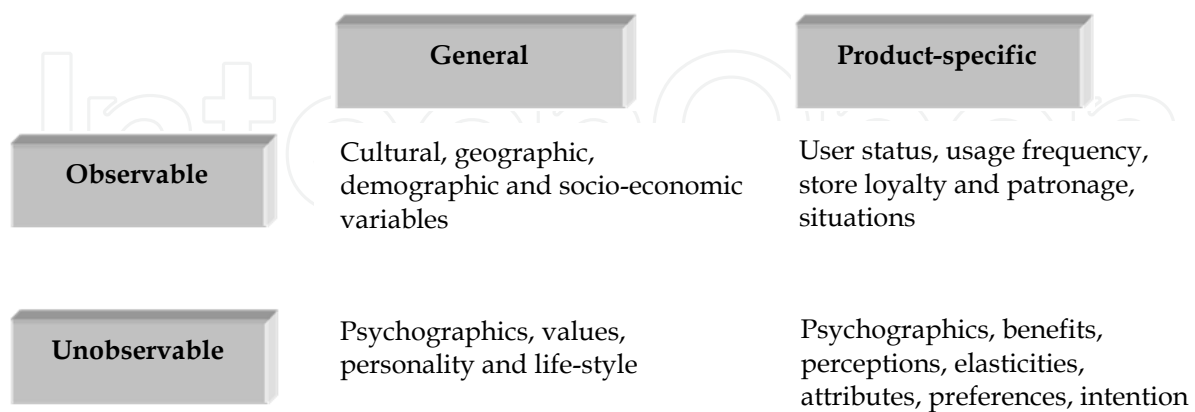


Fig. 1. Classification of segmentation bases (Wedel & Kamakura, 2003)

In 2006, in order to explore the Italian demand for mobile phones, we adopted a three-dimensional segmentation model, simultaneously using different segmentation bases.

The choice of the industry was driven by the fact that in the dynamic mobile telecommunication market firm competition is based on changes spurred by innovation, leading to a broad and varied offering of products (cell phones, smart phones and nowadays tablets) and services (from traditional voice services and common alarm, schedule, calculator and videogames functions to data management utilities and innumerable and constantly growing applications). More importantly, mobile telecommunication is one of the most surprising mass consumption phenomena of the last decades, which transversal diffusion has embraced all social classes. This is especially true in Italy, with the highest mobile penetration in EU (154,47% in 2009) and mobile voice traffic above the fixed one (53,3% vs 47,7% in 2009) (European Commission Digital Agenda Scoreboard, 2011)³.

The numerousness and heterogeneity of Italian cell phone users have therefore made mobile telecommunication an ideal market for the adoption of a multidimensional segmentation model based on the joint use of three dimensions: lifestyles, product/service attributes and use motivations (Mazzoni, 1995).

The *lifestyles* dimension gives general indications on values and psychological characteristics of individuals, besides providing socio-demographic indicators, spending behaviours and mass media exposure⁴. It aims at investigating 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.

³ Italy is a front-runner in mobile broadband penetration of dedicated data services, stood at 10,2% as of January 2011 (EU average at 7.2%) (European Commission Digital Agenda Scoreboard 2011).

⁴ The use of this dimension is fairly well-established both in literature and practice. Literature on lifestyles for market segmentation considerably developed in the 1970s (Gunter & Furnham, 1992; Kamakura & Wedel, 1995; Michman, 1991; Plummer, 1974; Wells & Tigert, 1971; Wells, 1974, 1975; Ziff, 1971 and some more recent works: Gonzalez & Bello, 2002; Vyncke, 2002; Yang, 2004).

As to the other two model dimensions, unlike the traditional benefit segmentation (Haley, 1968, 1971, 1984) as well as some more recent works (Ratneshwar et al., 1997; Wu, 2001), we distinguish between *product/service attributes* preferred by consumers and individuals' *use motivations*. Indeed, the two dimensions give different information: *use motivations* represent needs that induce purchase while *attributes* are indicative of the characteristics of the product/service that influence consumers' choice among the various models and brands in the market.

As consumer segments are described through the contemporaneous use of the three dimensions, they will be graphically identified by a parallelepiped (Figure 2).

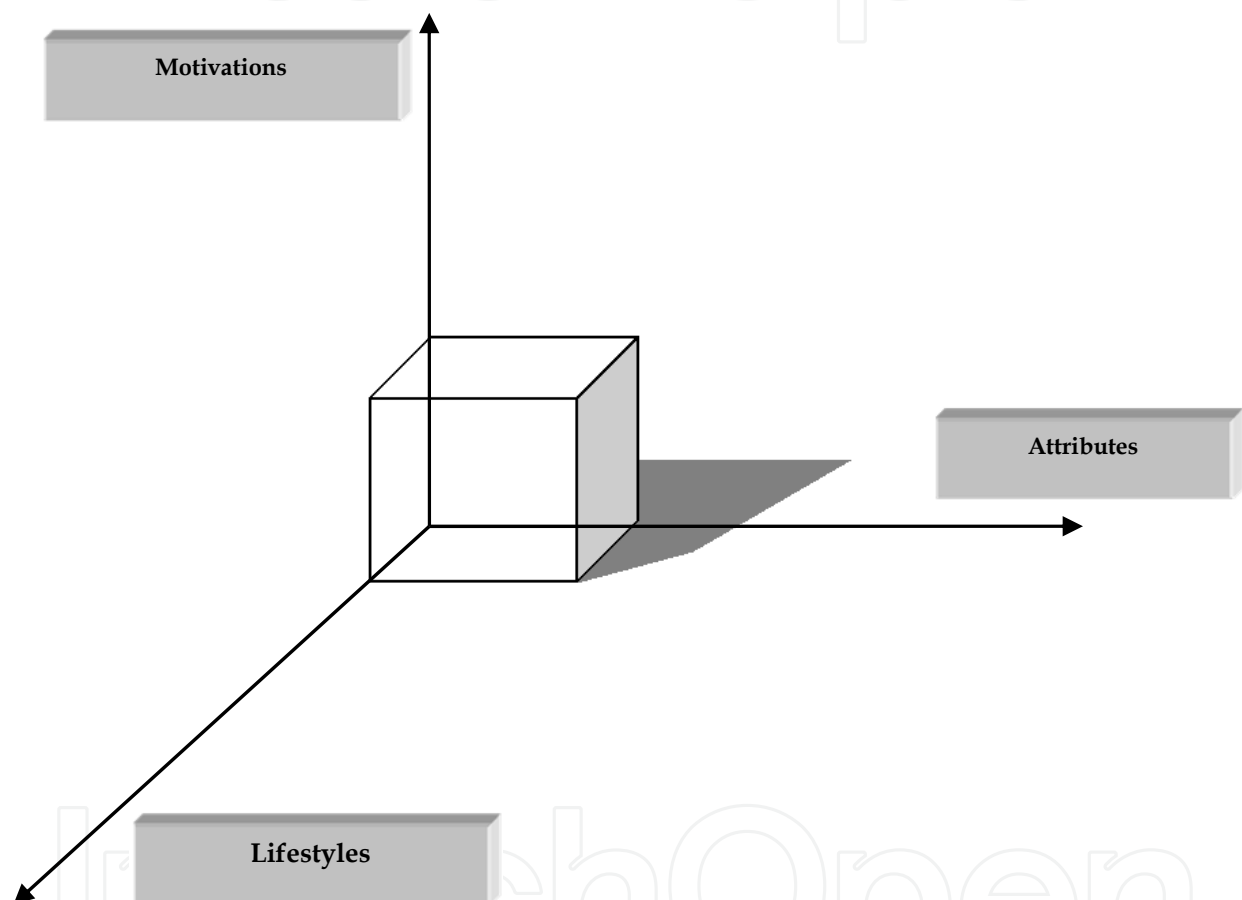


Fig. 2. Representation of a segment within the LAM model (Mazzoni, 1995)

The *LAM model* (lifestyles-attributes-motivations) aims to integrate analytical perspectives which are often used alternatively, one being based on subjective consumer characteristics and the other on the benefits/attributes sought in the product.

It uses three out of the four basic categories into which matrix in Figure 1 is subdivided: lifestyles are *general unobservable bases*, individual's socio-demographic data - falling, as stated above, within the definition of lifestyle that we adopt - are *general observable variables*, finally attributes and motivations dimensions are *product-specific unobservable bases*.

An evaluation of the LAM model based on the parameters proposed by Wedel and Kamakura, leads to the consideration that it should be an effective model for demand

segmentation. Its interpretative effectiveness is related not only to the use of unobservable product-specific segmentation bases, but also – as already said – to the joint adoption of different variable sets.

Table 1 shows the effectiveness of segmentation bases according to Wedel and Kamakura's six evaluation criteria, on a five-point scale ranging from very poor (--) to very good (++), thus highlighting the efficacy of the proposed model on all parameters (see boldface). Indeed, LAM model's general segmentation variables (lifestyles dimension) – in particular those observable (i.e., socio-demographic data) – are effective with respect to identifiability, substantiality, accessibility and stability parameters, while those product-specific and unobservable (i.e., attributes and use motivations, falling under the voice "benefits" in Table 1) lead to the identification of responsive and actionable consumer segments.

Variables/Criteria	Identifiability	Substantiality	Accessibility	Stability	Responsiveness	Actionability
1. General observable	++	++	++	++	-	-
2. Product-specific observable						
Purchase	+	++	-	+	-	+
Consumption	+	++	+	+	-	+
3. General unobservable						
Personality	±	-	±	±	-	-
Lifestyles	±	-	±	±	-	-
Psychographics		-	±	±	-	-
4. Product-specific unobservable						
Psychographics	±	+	-	-	++	±
Perceptions	±	+	-	-	+	-
Benefits	±	+	-	+	++	++
Intentions	±	+	-	±	-	++

Table 1. Evaluation of segmentation bases (Wedel & Kamakura, 2003)

3. An application of LAM model on mobile communication market

The LAM model has been applied in several empirical studies covering different markets (Mazzoni, 1995; Mazzoni & Leone, 2001; Mazzoni, 2006; Mazzoni et al., 2007). Here we briefly synthesize the results of an application of the model to the analysis of the consumer behavior in the Italian mobile telecommunication market in 2006. This short summary is useful because the methodological path and the results of this application will be the starting point for the further research developments that will be discussed at the end of this chapter.

Multidimensional segmentation of mobile market was pursued using a post-hoc and descriptive segmentation method: *post-hoc* means that "the type and number of segments are determined on the basis of the results of data analyses" (Wedel & Kamakura, 2003, 17), while *descriptive* refers to the analysis of "the associations across a single set of segmentation bases, with no distinction between dependent or independent variables" (*ibidem*).

One of the most significant features of our research design was the choice of a mixed method approach (Cresswell, 2003; Tashakkori & Teddlie, 2003): this relatively new methodological perspective aims at widening and, possibly, enhancing the analysis of a phenomenon by integrating both quantitative and qualitative techniques to collect and analyze data (Bernard, 2000; Morse, 2003, 189-208).

The mixed method research design of our research could be described as a *model 1* design (Steckler et al. 1992) or a *sequential exploratory design* (Cresswell, 2003): in our research, qualitative data collection and analysis precedes the quantitative ones, and the results of the former are used to develop measurement tools to be applied in the latter.

Put specifically, data collection was accurately performed through a sequence of: focus group, pre-test and CATI survey.

In the first research stage, two focus groups were organized, each with 10 participants selected according to their socio-graphic characteristics, their phone usage, and their propensity to use technological devices. The qualitative analysis of focus groups interactions allowed research group to gather important methodological information about the unit of analysis⁵ and the variables to be inserted into the conceptual map of the research and therefore in the questionnaire. In particular, qualitative analysis confirmed some preliminary hypotheses of research group about the future development of Italian mobile market. In fact, in the first five years 2001-2005, Italian companies operating in mobile market pushed towards the integration of video and mobile communication, offering products (mobile phones) and services that should have fostered the diffusion of mobile TV and videophone calling. But they were pointing at the wrong target: Italian consumers did never fully appreciate video extension of mobile communication. From the analysis of focus groups emerged that customers considered videophone calling too invasive, while mobile TV was seen as not very useful, uncomfortable and too expensive. Besides, the integration of mobile communication with the Internet and online services were in the embryonic stages at that time, so even if research group recognized this integration as a possible development of mobile communication, it was decided not to analyze it in depth.

The use of mobile phone as sort of personal computer was taken into account by researchers too: "using mobile as a palmtop", a name that sounds anachronistic now, was one of the items to be rated by respondents as a motivation to use mobile communication. However, even in this case, researchers decided to limit the items related to this potential palmtop use of mobile phone, considering the state of art of mobile technology and its market penetration at that time. Moreover, as pointed out by qualitative analysis of focus groups interactions, using mobile phone as a palmtop was perceived by consumers as limited to certain categories of people, i.e., manager or business men, a very different situation from the current state of play of mobile market, characterized by the increasing diffusion of smartphones and mobile devices (see section 4).

So researchers' considerations about the too early stage of the integration between mobile communications and other media were supported both by qualitative and quantitative data analysis. However, in light of the fast changes in mobile market during the last five years, the integration between mobile communications and the Web has to be considered one of the starting point to redefine the multidimensional segmentation model that will be discussed in section 7.

⁵ At the beginning of the research process, research unit analysis was thought to be made up of people aged at least seventeen. Qualitative analysis showed that people begin to use mobile communication much earlier.

All the suggestions emerged from focus group analysis led to a preliminary version of the questionnaire that was administered as a pre-test on 100 people, randomly extracted from the research population. The size of the sample is unusually large for a pre-testing: according to literature a few cases could be sufficient (Sheatsley, 1983, p. 226). This large pre-test sample was chosen in order to have sufficient data to perform a reliable multivariate analysis and evaluate correctly the goodness of the techniques used in the segmentation procedure. Pre-test results gave other indications to refine the choice of variables.

The result of this mixed research process was an accurate variables' selection for each dimensions of the LAM model, product attribute, use motivation and lifestyle. These variables were then operationally defined into the items of the final version of the questionnaire, administered with the CATI (Computer Aided Telephonic Interview) technique.

The variables of attribute and motivations dimensions (Tables 2 and 3) were measured with a Cantril scale technique, while the multidimensional nature of lifestyles dimension required a more elaborate operational definition (Table 4).

variable	operational definition and description	measurement
	<i>interviewees were asked to specify the importance attached to each attribute</i>	
<i>economic</i>		
price	price of mobile phone	
promotion	promotional offers	
tariff	cost of calls and other services	
<i>physical</i>		
handiness	convenience for cell phone use	
battery life	duration of cell phone battery	
screen visibility	quality of cell phone display	
durability	solidity of cell phone over time	
signal reception	quality of signal reception	each variable is measured using a Cantril scale
<i>aesthetical</i>		
aesthetics	cell phone design	
personalization	possibility of personalising the mobile phone with covers, ring tones, etc.	
brand reputation	mobile phone brand reputation	
<i>technological</i>		
advanced services	availability of technologically advanced services (data management, Internet, etc.)	
accessories	quantity of available accessories (earphone, speakerphone kit, etc.)	
other functions	availability of other functions (photos, music, videophone, etc.)	

Table 2. Description of *attributes* variables (Mazzoni et al., 2007)

variable	operational definition and description	measurement	
	<i>interviewees were asked to specify the importance attached to each motivation</i>		
<i>relationships</i>			
family	It allows me to communicate with my friends		
friends	It allows me to communicate with my family		
SMS/MMS	I use it to send SMS/MMS		
entertainment	I use it to entertain myself (music, games, photos, Internet, etc.)		
<i>affiliation</i>			
trendiness	I like to be trendy	each variable is measured using a Cantril scale	
group	It makes me feel part of a group		
<i>security</i>			
work	It is necessary for my work		
privacy	I can safeguard my privacy		
expenses	I can control/contain my telephone expenses		
personal security	It makes me feel safe		
<i>information and entertainment</i>			
additional functions	I find the additional functions useful (calendar, calculator, alarm, etc.)		
advanced services	I'm interested in the advanced services (videophoning, Internet, etc.)		
photo camera	I can use it as a photo camera		
palmtop	I use it as a palmtop (agenda, data management, etc.)		

Table 3. Description of *motivation* variables (Mazzoni et al., 2007)

Questionnaire was administered with CATI technique to 1067 Italian citizens, aged between 14 and 65 selected through a random sampling procedure⁶.

According to the goals of LAM Model, data analysis consisted in a segmentation procedure based on the sequential application of two multivariate techniques, factor analysis and cluster analysis. The sequential combination of these two techniques is a common practice in methodological literature as it provides an extreme synthesis of data (Di Franco, 2001).

Factor analysis was performed to identify latent factors beneath each set of variables; cluster analysis allowed to group respondents according to those factors.

Factor analysis showed that a three-factor solution best represented each dimension (Table 5).

⁶ Random sampling procedure was proportionally stratified: strata were built considering the distribution of Italian population by region, gender and age. Sample size was calculated with a 3% standard error.

variable	operational definition and description	measurement	
	<i>each variable required a different operational definition</i>		
<i>socio-graphic</i>			
sex	Gender	dichotomy	
age	Years	open ended questions	
qualification	higher qualification obtained by interviewees		
marital status	current marital status of interviewees	classification	
occupation	current occupation of interviewees		
residence	province in which interviewee lives		
<i>values and interests</i>	<i>interviewees had to specify the importance attached to each item</i>		
bodycare	importance attached to care of the body		
culture	importance attached to culture		
environment	importance attached to environmental respect		
family	importance attached to family		
friendship	importance attached to friendship		
love of country	importance attached to love of country	each variable is measured using a Cantril scale	
personal success	importance attached to personal success		
politics	importance attached to politics		
religion	importance attached to religion		
social commitment	importance attached to social commitment/voluntary work		
solidarity	importance attached to social equality/ solidarity		
sport	importance attached to sport		
work	importance attached to work		
<i>media usage</i>	<i>interviewees were asked to specify how often they perform the following activities:</i>		
cinema	going to the cinema		each variable is measured using a 4 point Likert scale
theatre	going to the theatre		
radio	listening to the radio		
video games	playing with video games		
book	reading a book		
dailies	reading dailies		
magazines	reading magazines (weekly, monthly)		
sports dailies	reading sports dailies		
Internet	surfing the Internet		
mobile phone	using a mobile phone		
computer	using the computer		
television	watching television		

Table 4. Description of *lifestyles* variables (Mazzoni et al., 2007).

Motivation dimension is represented by the following three factors:

- *integrated use*: the choice of mobile devices is driven by the need for a tool allowing efficient communication and time management;
- *info-entertainment*: this factor highlighted the alternative use of mobile phone (this use was emergent at the time research was performed, and it is widespread nowadays) as a device for gaming, music and photo;
- *relationships*: it is the conventional and basic use of mobile phones as simple tools to communicate, in other words, mobile devices are seen as an extension of the traditional phone.

The three factors representing attributes dimension were:

- *practical aspects*: this factor regards those basic attributes, allowing an easy and efficient use of the mobile phone (ease of use, battery life, screen visibility, and durability);
- *state-of-the-art*: it underlines the preference attached to the attributes of technologically advanced mobile phones (availability of technologically advanced services, quantity of available accessories, availability of other functions);
- *service convenience and quality*: this is characterized by economic and quality attributes connected, on the one hand, with the pricing policy of handset manufacturers and network operators, and on the other hand, with the good functioning of the phone in its basic function, i.e., signal reception.

<i>dimension</i>	<i>factor's name</i>	<i>explanation</i>
motivation	integrated use	sophisticated needs for efficient communication and time management
	info-entertainment	need for amusement, information availability, and the desire to keep up with the times
	relationships	simple need for usual communication and for more traditional mobile services
attributes	practical aspects	basic attributes of mobile phones allowing simple and immediate use
	state-of-the-art	more advanced characteristics of mobile phones
	service convenience and quality	economic and quality attributes
lifestyles	Connected	multiple uses of modern media and a great interest in sport
	Committed	demanding cultural consumptions, principles of culture and social participation, and scant interest in the care of the body and sport
	Traditionalist	basic information consumption and traditional values

Table 5. Factor Analysis Results

Finally, lifestyles factor analysis gave these three factors:

- *connected*: characterized by a variety of cultural consumptions (Internet, video games, cinema, radio, etc.), this first factor is positively correlated with the sport value and negatively correlated with social commitment/voluntary work value;
- *committed*: positively correlated with cultural consumptions (such as reading books, going to the theatre, reading newspapers), and with social and cultural values; on the contrary, it is negatively correlated with care of the body and sport values;

traditionalist: this factor is positively correlated with traditional values, such as family, friendship and work, and negatively correlated with that of social commitment/voluntary work and social equality/solidarity. The nine factors above shown were subsequently used as criteria variables in a non-hierarchical cluster analysis, performed using K-means algorithms and Euclidean distance.

Cluster analysis results led to the identification of three clusters that could be considered as demand segments for mobile market.

According to the different combination of factors and to the socio-demographic information characterizing each clusters solutions, demand segments were named *techno-fun*, *value-driven* and *basic users*.

Figure 3 shows their position in multidimensional space.

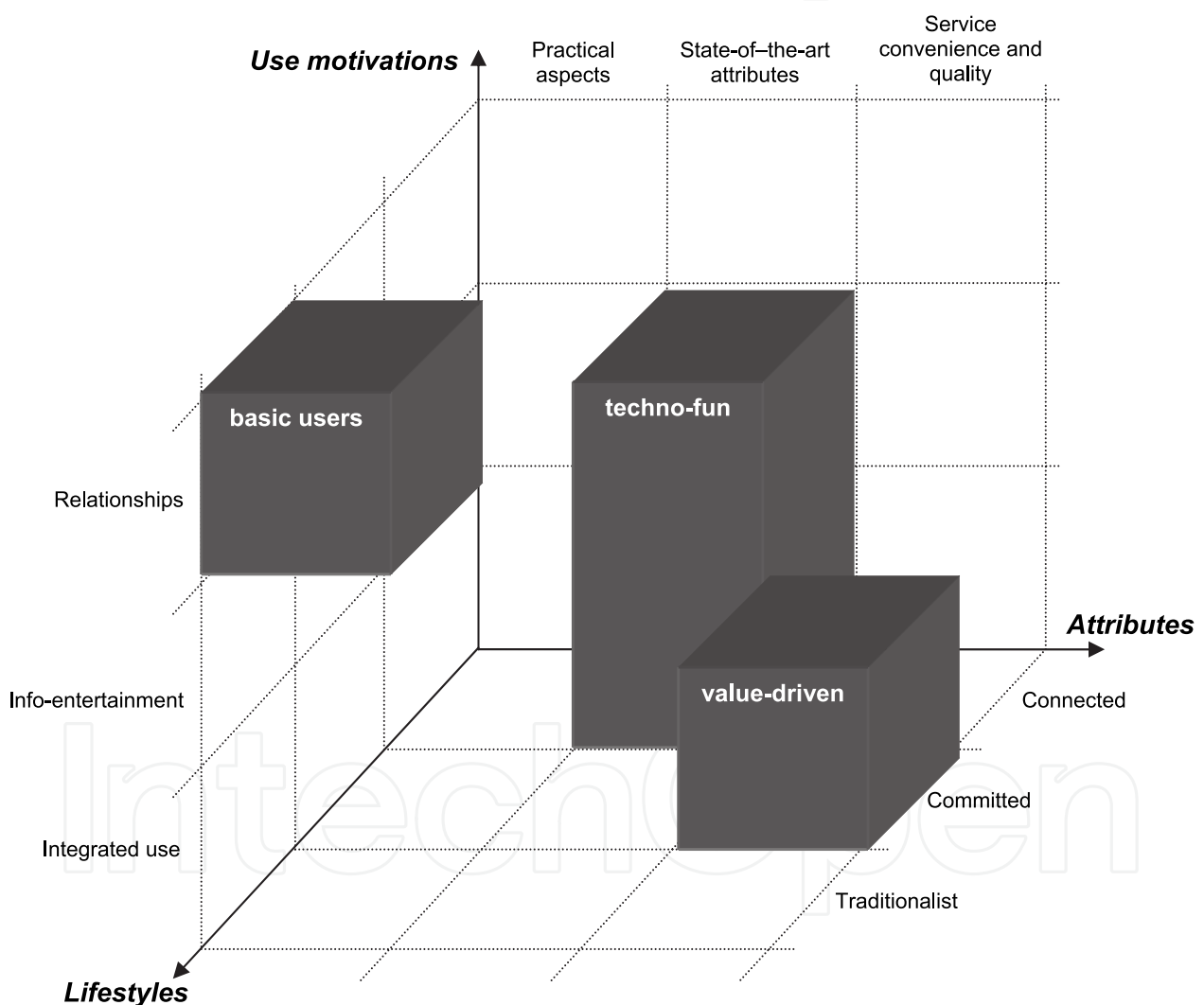


Fig. 3. Three-dimensional representation of the three demand segments

Here's a brief description of the three segments:

- the *techno-fun* segment: consumers belonging to this cluster (24.3% of respondents) are sensitive to media integration and technology, mainly with an entertaining attitude. Techno-fun people are mostly males (66.4 %), with an average age of 26 (in fact they are mainly students, unmarried and have completed secondary education). They have a

connected lifestyle (multiple consumers of new media) and they buy a mobile phone (often more than one) motivated by integrated use (take advantage of additional functions and advanced services) and info-entertainment (self-entertainment and the desire to keep up with the times). Techno-fun consumers pay particular attention to the state-of-the-art attributes: presence of technologically advanced services, availability of other functions (photos, music, videophone) and accessories, while they show a limited interest in price, handiness and aesthetic characteristics. Considering the recent development of mobile market, this cluster is the most interesting because it embodies the direction of the change. These consumers, mostly young, conceived and used mobile phone as a multimedia devices and they were enthusiastically willing to explore all the possibilities offered by the integration between mobile communication and other media. People belonging to this cluster now have grown older and they have probably bought a smartphone or a tablet (or maybe both of them). In other words, they were a driving force that has led the market evolution to the current paradigm shift in mobile communication: the always connected style. Probably this segment has grown up to become the biggest one among mobile market consumers;

- the *value-driven* segment: it includes consumers (38.3% of respondents) driven by rationality and functionality criteria. In their daily life, so in purchasing and using mobile phone too, they try to maximize the value of their choices. The segment is composed mainly of married and single women (58.4 %), aged 35 (average) with a high educational level; they are mostly clerks and show principally a committed lifestyle. When purchasing a mobile phone, they are driven by an integrated use motivation and they search for service convenience and quality attributes (costs, promotional offers and signal reception), showing low interest in mobile phone design and aesthetics. Put specifically, consumers belonging to this cluster show a rational evaluation of mobile phone: it is conceived as an useful and technologically advanced tool, necessary not only to communicate, but also to manage time and organize daily life. So, the mobile phone purchasing choice is based on an accurate evaluation of cost/quality ratio. Value-driven segment plays a key role in our analysis: it is an “adult” cluster in the sense that these consumers have an aware and focused consumption of mobile phone. They are permeable to technological innovation, but they tend to subordinate it according to their personal needs. In a certain sense, a value-driven individual is what a techno-fun may become in the future;
- the *basic users* segment: consumers belonging to this segment (37.4% of respondents) share an essential use of mobile phone. They have a traditionalist lifestyle, based on primary values (family, friendship and work) and basic consumptions. They are women (59.8 %) with a low qualification and an average age higher than the other clusters (48 years), usually married. They are self-employed workers, retired people or housewives. Mobile phone for this consumers has to perform exclusively its primary function: communicate (motivations are connected to their social relationships). So they search for those attributes linked to practical aspects, that is, to all the features allowing a simple and efficient use of mobile phone: ease of use, battery life, screen visibility and durability. It is not unlikely to forecast that this segment is destined to shrink as the diffusion of integrate mobile communication is wide spreading among new generation of consumers.

Research findings proved significant differences among mobile phone consumers according to the three dimension of the LAM model proposed by Mazzoni. Each cluster had very

peculiar characteristics related to lifestyles, motivations and attributes. The three market segments got in touch with mobile devices in different times and ways, and therefore have a different approach to mobile communication.

Even if results seem to be good and reliable, epistemological cautions and methodological limitations should never be forgotten: segmentation is a representation of a reality, constructed under the conceptual and methodological choices of the research group. So, when interpreting cluster analysis results, one must be careful, avoiding to fall into the fallacy of reification, as Wedel and Kamakura clearly state: "in applying models to segmentation, one should recognize that every model is at best a workable approximation of reality. One cannot claim that segments really exist or that the distributional form of unobserved heterogeneity is known. Segmentation is a marketing concept that is used to approximate the condition of market heterogeneity by positing diverse homogeneous groups of customers. It has proven to be a very useful concept to managers, and we conjecture that it will continue to be so far some time" (2003, p. 329).

However, a broad representation of consumers could be very useful for those interested in the evolution of mobile market: academic scholars, companies and firms. Moreover, conceiving segmentation results (i.e., the consumers clusters) as something not fixed, but open to be discussed and eventually changed, made LAM multidimensional segmentation model a flexible analytic tool that could be refined according to the development of the market.

4. The evolution of mobile market towards a user-centred structure

When we conducted our research the mobile telecommunication market appeared rather different from today.

At that time, mobile telecommunication business was MNOs-centred. Indeed, also because of their direct and strong relationship with consumers, mobile network operators (MNOs) were leading firms, ruling, connecting and coordinating the other value-creating network operators in order to generate a high end value. Thus MNOs directly delineated the structure and managed the network, defining operators' connection modalities and communication codes. MNOs also stimulated innovation, determining its speed and direction. More than mere data carriers they were mobile media companies, exercising not only control over provided content and services but also influence on handset manufacturers as to obtain the diffusion of cell phones enabling the easy fruition of advanced, innovative services (Sorrentino, 2006, pp. 53-60).

In summary, as shown in Figure 4, MNOs were central in the mobile telecommunication value network (Kothandaraman & Wilson, 2001; Li & Whalley, 2002; Maitland et al., 2002; Stabell & Fjeldstad, 1998; Tilson & Lyytinen, 2006), managing the relationships with all network agents and conveying to end-users other operators' valuable products and services. Moreover, at that time, mobile handset business was a stable oligopoly mainly dominated by operators that made successful entry decisions at the beginning of the mobile era: Nokia, Motorola, Samsung, Sony Ericsson and LG Electronics (ENTER & IDATE, 2007, p. 21; West & Mace, 2007, p. 2).

The year 2007 marked the beginning of a new era for mobile telephony, following the introduction of feature-rich and easy to use cell phones, first of all Apple's iPhone⁷ (went on sale on June 29, 2007).

⁷ Over 500,000 units were sold on the first weekend immediately after its launch (Laugesen & Yuan, 2010, p. 91).

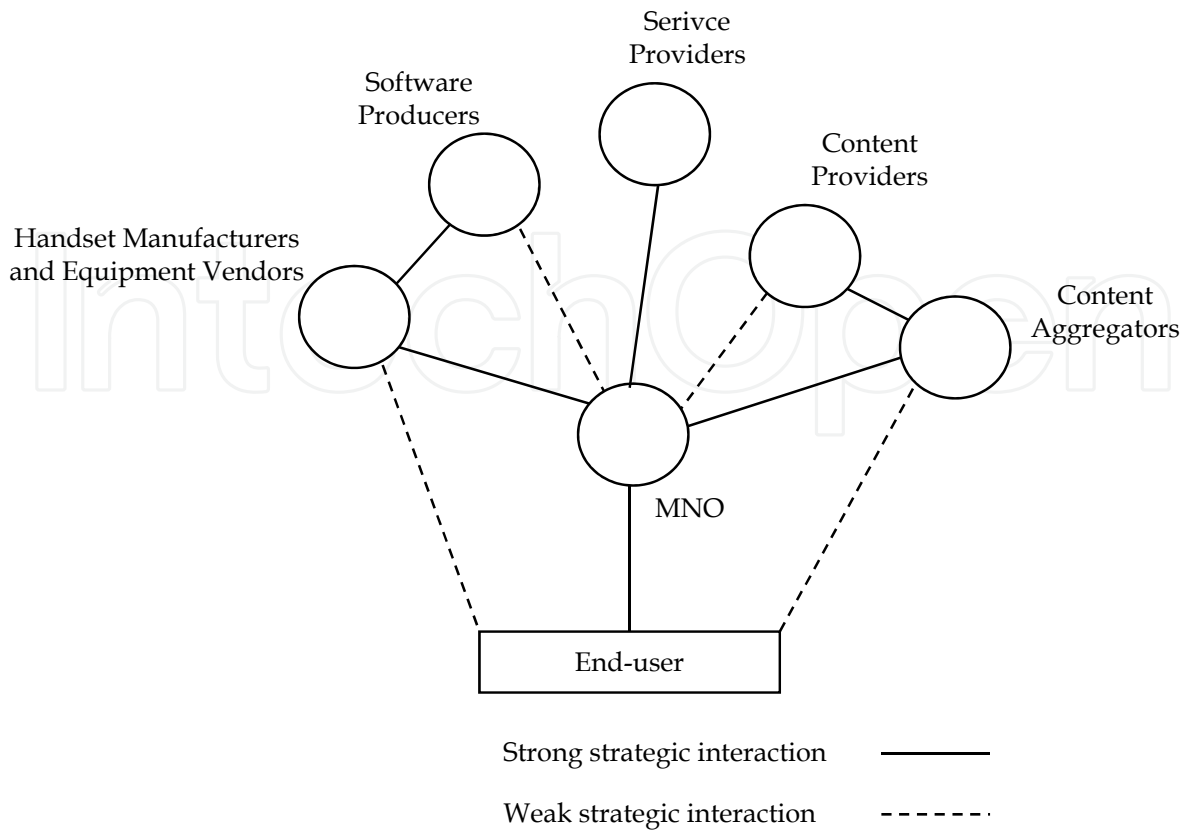


Fig. 4. Mobile telecommunication value network (Sorrentino, 2006)

Since that time many iPhones have been sold, making of Apple – a new comer – the fourth largest brand in the worldwide mobile phone market, with 16.9 million mobile devices sold to end-users in the first quarter of 2011 (Table 6).

Company	2007		Company	1Q11	
	Units	Market Share (%)		Units	Market Share (%)
Nokia	435,453.1	37.8	Nokia	107,556.1	25.1
Motorola	164,307.0	14.3	Samsung	68,782.0	16.1
Samsung	154,540.7	13.4	LG	23,997.2	5.6
Sony Ericsson	101,358.4	8.8	Apple	16,883.2	3.9
LG	78,576.3	6.8	RIM	13,004.0	3.0

Table 6. Top 5 worldwide mobile terminal sales to end-users 2007-1Q 2011 (thousands of units) (Gartner Press Release, 2008; 2011)

The technological innovation of Apple's iPhone has changed consumers' needs, has moved competition to a new level, has ruled out of market operators unable to adapt to change and has originated a *gateway to entry*⁸, favouring the access of new firms often operating in other industries and accelerating the media convergence phenomenon.

⁸ On *gateways to entry* see Yip, 1982.

Despite the lack of experience with mobile telecommunication, Apple could draw upon its core competencies (Prahalad & Hamel, 1990) in product design, innovation and marketing, personal computer hardware and software, online distribution systems and network management⁹. It could therefore deliver a converged handset able to provide traditional voice, data, entertainment and mobile Internet services (West & Mace, 2007, p. 2).

The iPhone success is strongly due to the high quality of browsing experience (Eaton, 2009; Laugesen & Yuan, 2010, p. 94).

While in the past it was largely believed that there was a need for a new version of the Internet in order to make it appropriate for use on cell phones (because of limited mobile data speed, small screens and no keyboards on handsets), Apple - sustained by infrastructural innovations such as the development of 3rd generation standards and the wireless Internet connection - created a mobile capable of delivering (in a user-friendly way) the wired Internet, thus leveraging its already-mature ecosystems. The iPhone improved mobile browsing experience having a large touchscreen, the Safari standard browser based on that developed for its personal computers (rather than a rewritten one), a graphical user interface with intuitive scrolling, panning and zooming designed specifically for touchscreens, and no physical keyboard (Eaton, 2009; Laugesen & Yuan, 2010, p. 94; West & Mace, 2010, pp. 275-276). This way it proved that the killer application for the mobile Internet was the same as for the wired Internet, i.e., a web browser: as the browsing experience became similar to that on PCs, mobile Internet usage increased dramatically (AdMob, 2010; West & Mace, 2010, p. 279).

Moreover, basing on its iTunes competencies, Apple developed the App Store, an online marketplace to deliver its own as well as third-party applications. It was launched in July 2008 and in the first month users downloaded more than 60 million apps (Wingfield, 2008) to arrive to 10 billion downloads out of the 350,000 apps available as of January 2011 (Apple Press Release, 2011).

As it controls many of the assets related to the value proposition and has a direct and strong relationship with customers, the business model adopted by Apple through the iPhone represents what has been named a *system integrator platform* (Gonçalves et al., 2010).

As illustrated in Figure 5, while customers pay MNOs for network access, they buy handsets and mobile content and services through the system integrator platform (i.e., Apple). Indeed the latter produces and delivers third-party products/services¹⁰.

Several competitors - already operating in the mobile market as well as new comers (e.g., Google) - have followed (imitated and emulated) Apple's strategy. Indeed mobile phone manufacturers have acknowledged the rising importance of content and services for end-users (Cusumano, 2010, p. 22) and therefore recognized the value of delivering devices enabling the fruition of personalized services¹¹.

⁹ Software developers were crucial for Machintosh adoption and diffusion as well as content providers and third-party add-on suppliers for iPod success.

¹⁰ System integrator platforms' success rests upon the ability to simultaneously attract application developers and end-users. Therefore they allow and encourage third-party developers to use their platform in order to increase its value as well as end-user service offering (Gonçalves et al., 2010, pp. 67, 69-70).

¹¹ This is moving competition from physical attributes (e.g., handiness, battery life, signal reception, etc.) to soft components of handsets, such as operating systems, graphical user interfaces, online marketplaces.

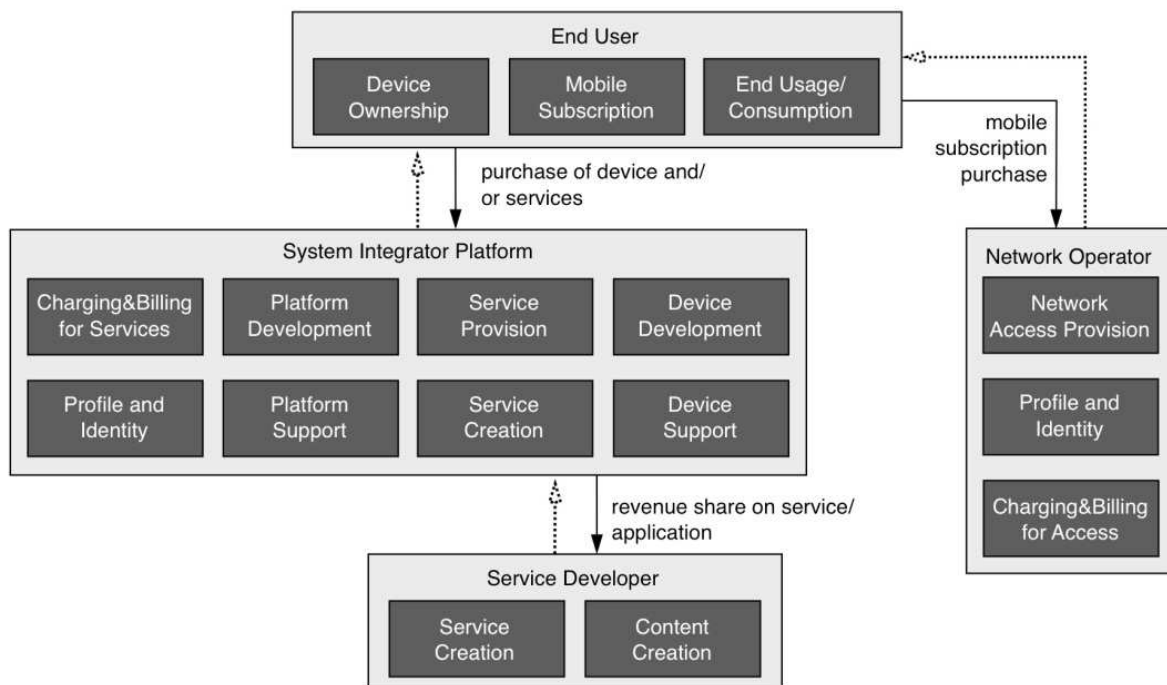


Fig. 5. System integrator platform (Ballon, 2009, as cited in Gonçalves et al., 2010)

As a consequence, today's handsets are not simply phones in their traditional definition but better mobile computing platforms for voice communication and content and services fruition, i.e., what has been named a *mobile ecosystem* (Mitchener, 2009).

The huge amount of available software applications and accessories (often third-party and subject to approval procedures) allows vast personalization of handsets through hardware and multimedia content (news, games, music, utilities, VoIP software, social networks, etc.), determining devices' functional capabilities.

The emergence of Apple in the mobile telecommunication market has therefore changed the original characteristics of the mobile phone business, broken down its traditional boundaries and moved power from MNOs to handset manufacturers, hardware and software developers and consumers, thus leading to the reconfiguration of the value network (Laugesen & Yuan, 2010; Vogelstein, 2008). In particular, end-users have assumed a central role as they can directly define, thus personalize, the characteristics of their devices. This is also due to the fact that, because of the ease of access to the wired Internet through new mobile phones, all of its existing applications, content and services are immediately available for consumers, through a Wi-Fi connection or MNO service (where MNO operates as mere bit-pipe)¹².

This is making obsolete many of the services previously offered to consumers by MNOs and paradoxically is likely to set back these operators' role to that prevailing of voice and data carriers, complemented by the most recent of bit-pipe for the Internet connection.

Today's mobile telecommunication business thus appears Internet-based and user-centred, as consumers can easily surf the Web and create their own personalized mobile telecommunication product/service

¹² "Now, in the pursuit of an Apple-like contract, every manufacturer is racing to create a phone that consumers will love, instead of one that the carriers approve of" (Vogelstein, 2008).

In the new value network, as shown in Figure 6, handset manufacturers are directly connected with end-users, to whom they convey content and services. Therefore, more than being influenced by MNOs, nowadays handset manufacturers exercise an influence on them as they represent the gateway to new consumers¹³.

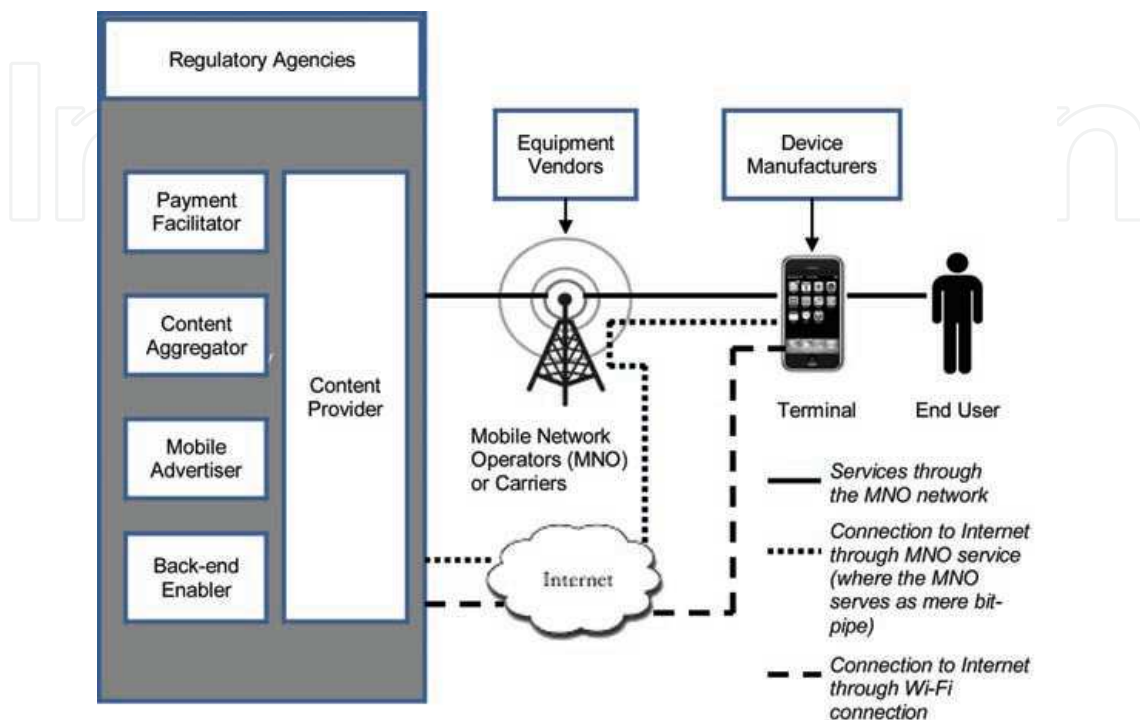


Fig. 6. Mobile value network (Seal, 2010)

Mobile telecommunication business therefore is user-centred nowadays, as consumers can directly shape the characteristics of the product/service on their exact needs.

As a consequence, content, services and innovative processes are not MNOs-directed anymore but better a direct consequence of end-users' characteristics and needs.

5. The advent of service economy

As already said in section 4, during the years and particularly since 2007 mobile market has undergone evolutions. Among the several changes that have occurred, in what follow we focus our attention on *servitization*. Through a literature review, the attempt is to define the servitization phenomenon (section 5.1) and describe its implication on company business and activities (section 5.2). Finally (section 5.3), how servitization takes shape in mobile market is described.

5.1 Servitization

The expression *service economy* refers to the increasing economical importance that service sector - compared to other sectors as agriculture and industry - has been taking in the industrial economy. Strict meaning, service economy (Fuchs, 1968; Gustafsson & Johnson,

¹³ For the period July 2008-June 2009, 40% of newly activated iPhones brought AT&T new subscribers, accounting for 48% of the operator's new subscriptions during the same year (West & Mace, 2010, p. 279).

2003) is also used as synonymous of servitization (Baines et al., 2007). The servitization is the evolution of the offering from a material product to one which is inseparable from services. Since products and services become one offering, manufacturers shift and extend their business from goods selling to services delivering.

Boundaries among what was conceived as the material part (product) and the intangible part (service) of supply are vanishing; indeed, as a product offering is enriching with services, inverting this perspective, *productization* is leading the inclusion of material component in service offering. Thus many authors argue that there is no more reason to distinguish among tangible and intangible components, as offerings in service economy are composed by a variable mix of products and services often named *product-service-system* (PSS) (Manzini et al., 2001; Baines et al., 2007; Mont, 2002).

A PSS offering consists of three parts (Goedkoop et al., 1999):

1. *product*: a tangible commodity manufactured to be sold;
2. *service*: an activity (work) done for others with an economic value;
3. *system*: a set of elements including their relations.

As the mix and the combination of product and services and their relations can vary, there are different types of identified PSS. In a study on the state of art of PSS research (Baines et al., 2007) emerges that literature converges on the existence of three PSSs types:

1. product-oriented offering: selling the product to customers while adding after sales service (i.e., assistance, maintenance and repair);
2. use-oriented offering: selling the availability of a product without giving to customer its ownership (i.e., leasing a product without selling it);
3. result oriented offering: it is sold the product result instead of a product (i.e., selling photocopies instead of photocopier, or washed laundry instead of a washing machine).

Tukker (2004) reports eight types of PSSs representing subcategories clustered by their economical and sustainability potential and characteristics (see Figure 7).

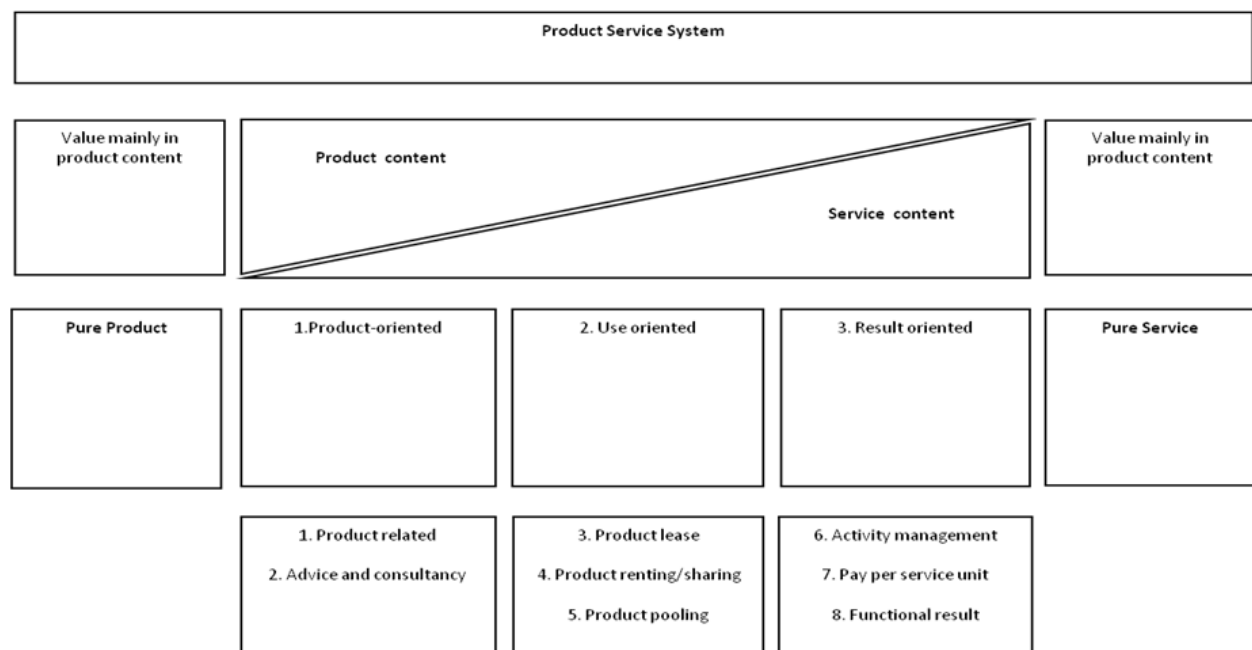


Fig. 7. Main and sub-categories of PSS (Tukker, 2004)

Beyond many ways to cluster, a product service system can be put on a continuum where on one side of the spectrum there is the traditional manufacturer who adds service to its product and, on the opposite side of the continuum, there is a product that is just a vehicle for services and value delivery (Wong, 2004, as cited by Baines et al., 2007).

5.2 Moving towards services: business implications

Servitization may affect several aspects of firm's business model: operations, organizational structure, costs and investments structure, marketing management and on a broader scale, the overall strategy and its focus.

From an operational point of view, companies need to move up the value chain in order to couple manufacturing activities with service providing. This shift implies a reorganization of firm's structure and activities, while efforts in the acquisition of new managerial and technical skills are necessary.

Business servitization also compels companies to make changes in the behavioural process and in the organizational culture; indeed, despite the high revenue expectation stemming from extending a business to services, firms have low propensity towards the servitization of their own business. As a previous study shows (Gebauer & Fleish, 2007), companies seeing service as 'evil', hinder supplementary services providing because their managers lack of motivations.

Enriching a product offering with services might also require to change the centre of the value proposition and, consequently, the business strategy. Indeed, through the adoption of the most radical servitization model towards the end of the spectrum, business focus will necessarily shift from the product to those services strictly linked with it. While in a product oriented approach manufacturers projects and sell just products adding few services, in a more servitized approach, the strategy is plotted out on many services for which product is a complementary good, while services become the basis on which competitive strategy is drawn.

Companies also gain competitiveness by costs reduction and energy saving; in fact, it is not by chance that in the literature, the ecological implications leaded by servitization of manufacturing are one of the most frequently investigated aspects (Baines et al., 2007; Gebauer & Fleish, 2007; Tukker, 2004). It is clear that while moving along the product-service continuum from the product-oriented type up to the result-oriented type, these positive effects become stronger and stronger. Surely, servitization is a growth strategy that offers opportunities to reach a competitive edge by increasing revenues.

Nevertheless, the major motivation pushing managers to servitize firms' business seems to be the willingness to match customers' needs (Baines et al., 2010). Servitizing a business adds value to product and supports firm competitiveness since it allows to deliver a high customized offering that is tailored on customer' needs and enables to create a strong consumer relationship (Tukker, 2003). A mass-market product like the mobile phone becomes extremely customizable by the complementary services that can be integrated into it: software updating allows customers to entail the mobile phone functionality on their unique needs. Therefore, it should be clear that extending business to service also involves changes in the marketing strategy that might switch from a transactional approach to a relational one, as services can be sold and delivered over a period of time (Baines & Lightfoot, 2011). Authors argue that servitization fosters the rise of a new *service dominant logic*, where marketing becomes a process of doing things in interaction with customer who is a co-creator and a co-producer of service (Vargo & Lush, 2004).

5.3 Combining service and product in mobile market industry: ecosystem

During 1990s, featured by a product stagnant demand in many manufacturing industries, moving downstream of value chain towards providing services was a winning strategy for many firms. Companies became aware that most of opportunities lay in services that have been promising high margins and sales despite few assets are required for their delivery (Wise & Baumgartner, 1999). Therefore, servitization is not a new phenomenon, but nowadays the integration of intangible components and service into manufacturing good is involving also mobile market.

Service and product in mobile market has been always strictly linked, since some services provided by the MNOs (e.g. Multimedia Message Service, Internet connection, etc.) are accessible only if mobile manufacturers enable these functionalities on their mobile device and vice versa. Even though this relation is also intuitive, empirical researches support these statements. For example, Ono and Tang's research (2010) shows that handset and network mobile service are chained up in their evolution since the diffusion of a network mobile service is wider if handset entailed on this service will be broadly spread in the market. Although convergence in mobile industry does not concern the integration of handset with network service, it cannot be denied that the offering in mobile market is also enriching of intangible components named contents, applications, software and generally speaking services. "The increased offering of fuller market packages or 'bundles' of customer focused combinations of goods, services and knowledge" (Vandermerwe & Rada, 1988, as cited by Baines and Lightfoot, 2011) is totally involving mobile industry as well. The cornerstone of this evolution towards servitization is often placed in June 2007 when the iPhone was launched on the market.

Apple's strength mainly lay in its ability to set the standard for mobile web surfing and change consumers' browsing experience. While other industry players as MNOs and content suppliers were trying to improve networks or to adapt web contents to the handset use, Apple just made surfing more similar to the wired Internet experience by introducing a wide touch screen, scrolling and zooming functionalities (West & Mace, 2010). With the enhanced opportunity to have an easy access to Internet, the "walled garden" (*ibidem*, p. 283) of contents managed and provided by service companies was already moving in manufacturer hands. Thus, when Apple made its entrance on the mobile market, this company was not just a device manufacturer, but also a service provider through the iPhone applications development. In June 2008, with the launch of App Store, although Apple gives to third parties the application development, the company still keep the control of services and contents by its portal (Laugesen & Yuan, 2010). Services and application enrich iPhone users' experience and add value to it, becoming source of its competitive edge. This innovation strategy has been so successful that has been emulating also by other competitors like, for example, Samsung with its web market.

At confirming that servitization of business is taking off in mobile industry as well, there is the more and more importance of the *ecosystem*. An ecosystem is composed of products and services complementing a device, this concept is rooted in the idea that the value generation is not solely in a product, but it is also generated by its surrounding environments. Mitchener (2009) reports three different ways to use this term. Firstly and broadly, an ecosystem is a set of environments with which a device interact (e.g., car's radio and speakers). Secondly, the ecosystem is made of software, content and services complementing the device (i.e., applications for iPhone and iPod). Finally, ecosystem is also

referred to the accessories and gadgets built by third parties with schemes for approval and accreditation. Anyway, all these material and immaterial related offerings have the power to add value to the original manufacturer's device and to extend the user's experience. So more compulsory is becoming manufacturer's need to consider a product not as a standalone business but with all real and potential complementary innovations: the value and its several forms take shape not just in a product but in an broader ecosystem.

In a consumer perspective, applications and services add value to customers' handset and are becoming the main source of value creation. Thus also mobile manufacturer companies are changing their strategy focus: switching from the product, for which applications and services are designed, on applications which are becoming an increasing and valid source of new value creation. Mobile companies are also aware that value is moving downstream toward customers, thus in order to add further value, they try to place on the market as much as high-personalized offerings. They reach this goal engaging customers in developing their own applications and by delivering them development tool and allowing them to distribute their software through firm's web store.

Definitely in mobile industry, competition field seems to be moved from mobile handset to its service, both in suppliers and consumers' perspective.

6. The impact of servitization on market demand

Considering that the mobile telecommunication market and its value network are changing quickly under the spur of many technological innovations, new challenges or opportunities stem from the exploitation of innovations in mobile devices (section 4). The service economy, that implies the shift of manufacturers from good selling to service delivering, is one of them. Mainly since 2007, with the iPhone introduction, *servitization* has been an extending trend among mobile phone suppliers, as they try to mix in their offering both good and service components, integrating phone devices with increasing software and applications (section 5).

In a supplier perspective, this shift has an important impact on economical aspects, stemming from selling a variety of complementary services for products. Nevertheless, servitization also brings implications in the operation management and in the innovation strategy and compels providers to revise their business models (section 5.2).

But what is happening in the consumer perspective? A mass-market product like the mobile phone has become extremely customizable through the complementary services that can be integrated into it: software downloading allows customers to entail mobile phone functionality on their unique needs.

Servitization has meant a shift of market demand from the hardware component of cell phones to the possibility to buy devices as "terminals" enabling the fruition of personalized services.

It has therefore impacted on the LAM model's three dimensions (section 2), i.e., on the needs that induce purchase (use motivations), on the characteristics of the offering influencing consumers' choice among the various models and brands in the market (attributes), and on the characteristics of individuals (lifestyles).

As to the *attributes* dimension (Table. 2), servitization has mainly affected the following variables:

1. *handiness and screen visibility*, as the size of cell phones and the characteristics of their displays directly affect Web browsing experience and the ability to access content: as opposed to previous miniaturization, handsets are becoming increasingly bigger and with ample touchscreens enabling panning, zooming and scrolling;
2. *personalization*, as the possibility of personalising mobile phones is progressively moving from their accessories and tangible features (e.g., covers) to services and software applications;
3. *brand reputation*, as brand image nowadays depends on cell phones' operating system (OS) more than on the reputation of handset manufacturers since the former determines end-users' access to services and external ecosystems¹⁴;
4. *advanced services*, as nowadays many more technologically advanced services are available to consumers (e.g., online marketplaces, Wi-Fi connection, m-banking, etc.).

Moving to the *use motivations* dimension, the main impact of servitization has regarded the *information and entertainment* variable (Table 3). Indeed nowadays – given the integration of mobile communication and the wired Web and the high and continuously increasing number of available services – this variable should be better explored to consider the increasing relevance assumed by content and software applications among purchasing motivations for mobile phones.

Finally, as to the *lifestyles* dimension (Table 4), given media convergence and the rising importance of services for end-users, it should be better explored the *media usage* variable to consider the relevance assumed by the Internet and social networks.

By the end, as servitization is leading to the increasing importance of offering's intangible component and therefore also to low storage and distribution costs, the LAM model could allow to point out micronized segments, thus representing the base for increasingly personalised marketing policies to reach niche markets.

We will consider and study in depth the above-mentioned impact of servitization on the model's dimensions for the design and implementation of further empirical research.

7. Conclusion

Empirical researches discussed in this chapter proved that LAM model could be fruitful applied in market segmentation; in particular LAM model seems to be very suitable in analyzing mobile market communication. However, as pointed out by many epistemologists (Popper, 1963; Kripke, 1972; Marradi, 1990), when analyzing a classification one must be careful and not fall under the essentialist fallacy: to think that classifications are almost immutable because they reach the essence of things. A segmentation technique, is essentially a form of classification, so its results could not be considered fixed (Wedel & Kamakura, 2003), especially when segmentation techniques are applied to a fast changing phenomenon like the mobile market communication one.

Therefore, we think that could be interesting to update the multidimensional segmentation model according to the latest evolution of mobile market, above all integrating servitization perspective into the main LAM conceptual dimensions. In other words, our research will try to conceptualize, and operationally define the progressive shift from the product (smartphones) to the service (web applications). Moreover, attributes and motivations will

¹⁴ This could explain why in the first quarter of 2011 Android (followed by Apple's iOS) dominates the smartphone operating system business (Gartner Press Release, 2011).

be significantly redefined to take into account the new tendencies of the consumption of mobile communication. For example, technological attributes will receive a higher consideration than in the previous research (Mazzoni et. al. 2007), while the integration between mobile communications and other media, above Web services, will be deeper analyzed in the motivation dimension.

Our research will maintain its mixed method approach, because, as showed in paragraph 3, the integration of different methodological perspectives enhance the quality of research design and findings. So, data collection will be performed integrating a qualitative technique (focus group) with a quantitative one (questionnaire). Probably, we will also use online market research technique for quantitative data collection, such as a web questionnaire, because they have many advantages: low costs, fast data collection, a potentially global reach, ease to compile (Murthy, 2008; Migliaccio et al., 2010).

Data analysis will be performed following two steps; firstly, we will adopt the same multidimensional segmentation procedure used in previous researches: factor analysis and cluster analysis applied in sequence. This will guarantee a certain degree of comparability between the results of the new research and those of the previous ones. Obviously, we will not compare the results from a substantial and theoretical point of view, as the LAM model will be composed by different variables, but we will evaluate the descriptive power of LAM model. In other words, we will test if LAM model is still able to perform a good synthesis of the actual state of play of mobile communication market.

Secondly, we will test different market segmentation procedures, giving a predictive orientation to LAM model. Put specifically, we will apply finite mixture regression models, because these statistical techniques seems to be very helpful in overcoming limitations and constraints of the usual descriptive market segmentation techniques (Wedel & Desarbo, 2002; Sarstedt, 2008).

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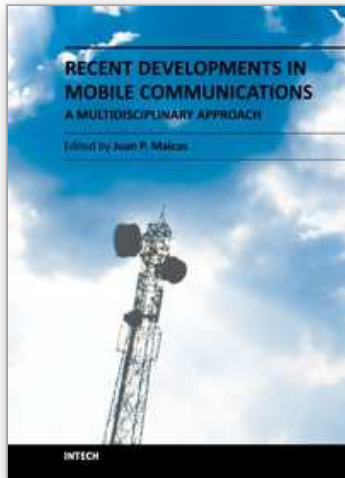
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Recent Developments in Mobile Communications - A Multidisciplinary Approach offers a multidisciplinary perspective on the mobile telecommunications industry. The aim of the chapters is to offer both comprehensive and up-to-date surveys of recent developments and the state-of-the-art of various economical and technical aspects of mobile telecommunications markets. The economy-oriented section offers a variety of chapters dealing with different topics within the field. An overview is given on the effects of privatization on mobile service providers' performance; application of the LAM model to market segmentation; the details of WAC; the current state of the telecommunication market; a potential framework for the analysis of the composition of both ecosystems and value networks using tussles and control points; the return of quality investments applied to the mobile telecommunications industry; the current state in the networks effects literature. The other section of the book approaches the field from the technical side. Some of the topics dealt with are antenna parameters for mobile communication systems; emerging wireless technologies that can be employed in RVC communication; ad hoc networks in mobile communications; DoA-based Switching (DoAS); Coordinated MultiPoint transmission and reception (CoMP); conventional and unconventional CACs; and water quality dynamic monitoring systems based on web-server-embedded technology.

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