Factors that influence the behaviour of consumers of smartphone services in multinational companies

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This article reports a study relating to the behaviour of users of smartphone services conducted in three multinational companies and provides an overview of the specialized literature on the socio-psychological behaviour of consumers, as well as on adopting new technologies. The purpose of the article is to identify and analyse factors that influence the users of smartphone services to further increase the usage of such services. The approach adopted was first to review the literature related to the technology acceptance models and then to test the hypotheses using SPSS regression analysis.

Keywords: Consumer behaviour, multinational companies, smartphone services, technology acceptance models.

SHAPING and influencing people's behaviour to help them maximize usage of smartphone services in multinational companies as well as to identity the factors that influence this behaviour are the main goals of the present article.

The benchmark population is represented by users of smartphone telecommunication services from multinational companies due to the following reasons:

(i)   the investments of these companies in information technology and telecommunication system occupy a significant part of the total investments;
(ii) the national and international extension of these companies creates the need for inter- and intra-company communication of the performance and business in real time;
(iii) the employees benefit from smartphone telecommunication equipment or other similar devices;
(iv) getting to know this environment by following a researcher's professional experience and training in field.

Through ages, people have been communicating not only within the groups and communities they belong, but also with their geographically distant peers in order to transmit and share the information and knowledge they possess. This distant communication – telecommunication – began thousands of years before, ranging from smoke signals used by the Indians, to the lighthouses in ports used by sailors to guide their ships to the invention of the telephone by Alexander Graham Bell in 1887, which marked the first step towards the use of technology and the beginning of the telecommunication age[1]. Fatoki[2] observed that 'the world is rapidly becoming a global village and an important tool in this transformation is communication, and telecommunication represents a key factor. The pace of development in the telecommunication industry is extremely fast all around the world, and it is considered that an innovation replaces a previous one in a couple of weeks.'

A study by Omekwu[3] regarding how people have accepted new technologies indicates that the use of the radio as the technology for about 38 years by 50 million people since its invention, has been replaced by television, with an equal viewership in only 13 years and later by the internet, in only four years.

The telecommunication services, on the one hand, are much more complex and difficult to access than many other services offered to consumers, and on the other, they are necessary to fulfil some basic needs of communication. The complexity of these services is an immediate result of the inseparability of the three elements that make telecommunication possible:

(i)   the network infrastructure and communication technologies frequently used;
(ii) the equipment – the device through which the users are connected; and
(iii) the applications which the devices are equipped with to ensure connectivity and the interaction between users.

The complexity of telecommunication services, as an added consequence of the complexity of the equipment, technologies, notions and associated language, leads to the idea that accessing and using them is no longer the

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result of chance, intuition, repeated attempts, flair or luck[4]. According to Shuhuai *et al.*[5], the transition from simple information to knowledge is a necessity aimed at creating a cooperative environment in which knowledge is shared. They concluded that in communities with innovative fields, the interchangeability of explicit and implicit knowledge ensures a better understanding of activities and phenomena[5].

Kotler *et al.*[6] argue that the new technology wave allows connectivity and interactivity between individuals and groups as a result of the impact of three major forces: cheap phones and computers, accessible internet services and availability of the sources, which contribute to the development of individual expression and cooperation between people. Thus, even the mobile phone is now confronted with an 'identity crisis': if in 1990s a mobile phone was a simple device – you dialled a number, and talked to someone, nowadays it is no longer easy to know if the device is a phone, a radio, a camera or a video camera, or an electronic play station, besides being efficient for a variety of other reasons: energy consumption, size, accessibility, etc.

The present study was carried out in the developing field of telecommunication, in which mobile telecommunication services play an important role. The smartphone services represent the newest and most appealing part of these services for any researcher due to the diversity of facilities and opportunities they offer, which require also a smart promotion towards potential users.

The smartphone concept appeared in the year 2000, and since then there has been significant increase in sales each year. The definition of a smartphone varies in the scientific community in accordance with the scientific progress in the field[7].

Considering the rapid technological progress, and from personal and professional experience in the field, a smartphone could be defined more analytically as a mobile phone equipped with an operating system on which various applications can be run, and whose characteristics and facilities are similar to those of a computer. This definition will be used throughout the present article. The smartphone services can be defined as the telecommunication activities and services which can be performed in real time as a result of combining the characteristics and facilities of the smartphone with the ability of the provider to validate them anytime and anywhere.

Literature review

The rapid technological progress in the last few years has led to the emergence of a multitude of mobile phones and other electronic gadgets like laptops, e-books, etc. All these gadgets use the internet for various applications. In comparison with the rapid technological progress, the rate at which the knowledge required to operate this equipment is acquired by the users is slow. Therefore, this discrepancy should be taken into consideration by mobile telecommunication operators in order to invest in research related to such gadgets.

The present study focuses mainly on two important aspects regarding consumer behaviour.

Socio-psychological behaviour of consumers

People's behaviour is an important factor to be considered by marketing specialists who want to promote their products and services. They have to identify the needs of consumers in order to develop new products and facilitate their distribution and sale[8]. Several theories related to the socio-psychological behaviour of people have been developed namely the social cognitive theory, the rational action theory, the planned behaviour theory and the ARCS motivation model.

Consumer behaviour related to new technologies

The progress made in the field of technology has brought about major changes for producers, consumers and markets. The new wave of digital technology enables people to connect anywhere across the globe. How do we make the most of these technological benefits? Many researchers have analysed the reasons why consumers accept and adopt new technologies and have developed several theories and models indicating the key elements regarding the extent of their usage.

Three such theories have been considered in this article – the technology acceptance model, the diffusion of innovation theory, and the unified theory of acceptance and use of technology.

The technology acceptance model is one of the most popular theories which explains why users accept new technologies, and constitutes the foundation of the proposed research model in this article[9]. Conceptually, it is suggested that using a technological or information system is a response which can be explained depending on the degree of motivation of the user, who, in turn, is directly influenced by external stimuli represented by the characteristics, parameters and technical data of the respective system[10].

Figure 1 shows the proposed model, derived from this double approach, i.e. deductive and inductive.

The aim, objectives and methodology

Taking into consideration the easy availability of telecommunication equipment, especially mobile phones, which have become a permanent accessory in our daily lives, combined with the contradiction between the elementary and stringent needs of these services and the
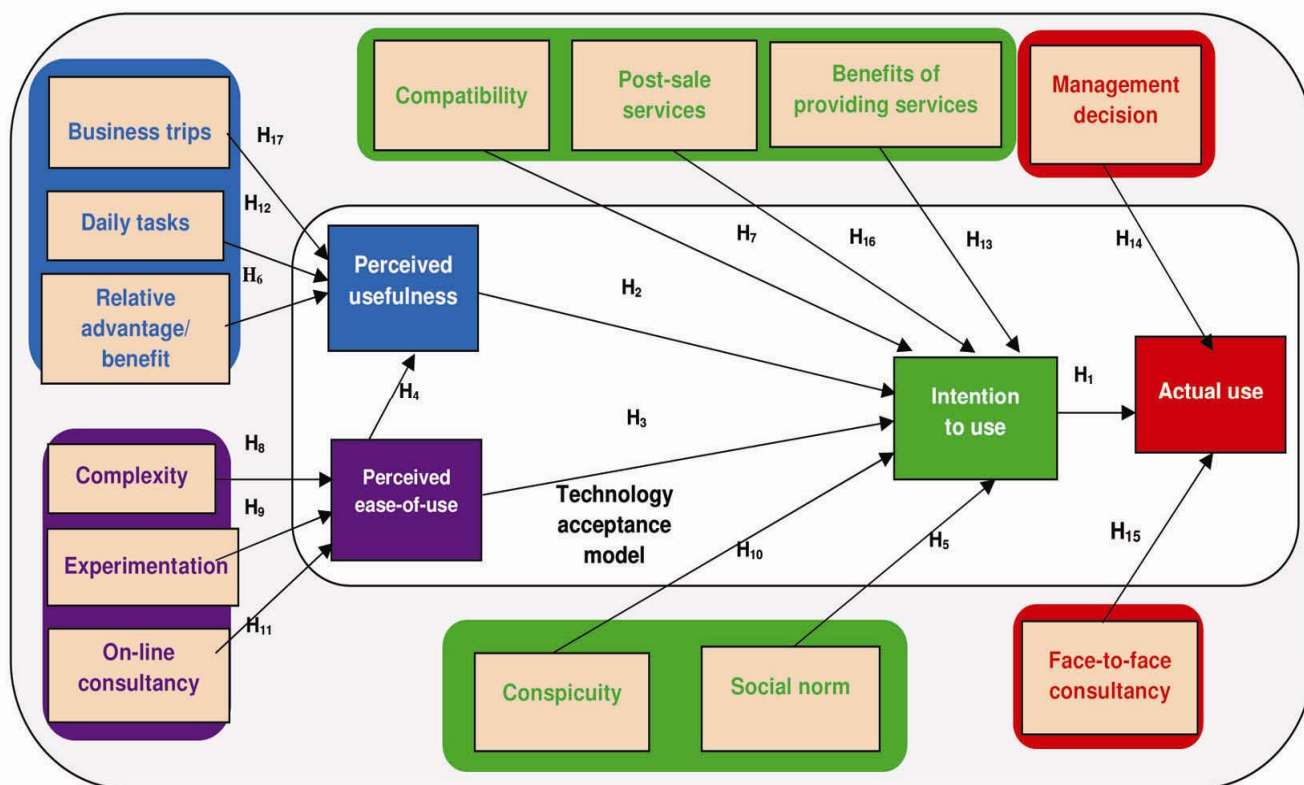
Figure 1. The proposed research model.

modest and rather difficult use of the multitude of facilities which they offer[11], the present study aims to identify the factors that influence the behaviour of users of telecommunication services offered by smartphones in order to improve their usage and developing a model applicable to this behaviour.

The companies that provide such services analyse and study the needs of the consumers as well as the evolution of the telecommunication market in order to meet these needs. The needs of the consumers are influenced both by the facilities offered at anytime by the telecommunication services and the internal and external interactions which occur as a result of the free circulation which enables them to observe and borrow new smartphone use habits and behaviour. The evolution of the telecommunication market is mainly determined by the technological progress which ensures the emergence of new technologies that facilitate easy access and rapid transfer of information.

This article defines two fundamental objectives. The first objective is linked with identifying the influence of the technological, social, organizational and relational factors (the relationship between providers and users) on the effective behaviour of the smartphone users. The second objective is linked with constructing and validating the model corresponding to the behaviour of the smartphone services users.

The hypotheses were derived from the specialized literature and the professional experience in a double approach, theoretical and deductive. This approach was adopted with the intention of identifying the factors that would influence the behaviour of the consumers of smartphone services.

Table 1 provides a consolidation of the hypotheses with their sources[12–22].

Field study

The collection of data on the field ensured the connection between theoretical framework of the study and practical framework in a well-defined temporal space.

In order to ensure that the final data would be relevant and practical, it is important to define the framework of the study and the research sampling frame and the way in which the study was conducted on the field.

The framework of the field research

The field research was carried out between 11 and 24 February 2013, in three multinational companies in Romania with branches all over the country: a company active in the field of sales and distribution of soft drinks

Table 1. Construction of hypotheses

Means	Source	Hypotheses
Theoretical documentation	Refs 12–14	H_1: The intention to use smartphone telecommunication services determines their effective usage.
		H_2: The perceived usefulness of the smartphone services influences the intention to use them.
		H_3: The perceived ease of using smartphone services influences the intention to use them.
	Refs 15 and 16	H_4: The perceived ease of using smartphone services influences their perceived usefulness.
	Refs 17 and 18	H_5: The social norm influences the intention to use smartphone services.
	Refs 19–22	H_6: The relative advantage of smartphone services influences the perceived usefulness.
		H_7: The compatibility with the smartphone services influences the intention to use them.
		H_8: The complexity of smartphone services influences the perceived ease-of-use.
		H_9: Experimenting with smartphone services influences the perceived ease-of-use.
		H_{10}: The conspicuity or observability of smartphone services influences the intention to use them.
Studies and professional training of the researchers	Professional training and managerial experience of the researchers	H_{11}: The on-line consultancy provided to users influences the perceived ease-of-use of smartphone services.
		H_{12}: The users' daily tasks influence the perceived usefulness of smartphone services.
		H_{13}: Providing smartphone services in the perks package influences the intention to use them.
		H_{14}: The decision of the company management to promote smartphone services influences their effective use.
Analysis of the business context (regional organization, branches, etc.)	Territorial pattern of distribution (flagship stores, distributors, partners, etc.)	H_{15}: Face-to-face consultancy influences the effective use of smartphone services.
		H_{16}: Post-sale smartphone services influence the intention to use them.
		H_{17}: Business trips influence the perceived usefulness of smartphone services.

(Coca Cola Hellenic Romania), another in the field of mobile telecommunication (Vodafone Romania), and the third in the field of mobile telecommunication equipment repairs and distant communication systems (Cordon Electronics Romania).

The target group consisted of employees of the aforementioned companies who share common characteristics when it comes to using smartphone services: the provision of smartphones as a communication tool between the employees, the existence of branches all over the country and the necessity to communicate between them, the circulation between the various branches for managing their activity, etc. The survey sample frame was made of employees from the three aforementioned multinational companies using probability sampling.

Operationalization of the field research

Six hundred and seventeen employees were sent questionnaires via e-mail, informing them about the aim of the study. Incomplete questionnaires were discarded and 307 complete questionnaires were used for further analyses in SPSS.

Analysis of internal consistency and instrument validity

The analysis of internal consistency of the multi-item scale was carried out by determining the Cronbach alpha coefficient, which for most items was equal to or above the accepted value of 0.70, except the scale for complexity which improved compared with the pre-testing stage of the questionnaire, but never reached the appropriate level. The validity of the multi-item scale was tested through factorial analysis which expects the values of the factorial saturation of the items to reach the acceptable level of 0.5 (ref. 23). In order to achieve these, the principal component method was used in two iterations: using the Promax with Kaiser normalization rotation method, the former was related to the number of factors and the latter utilized a number of factors with eigen value greater than 1.
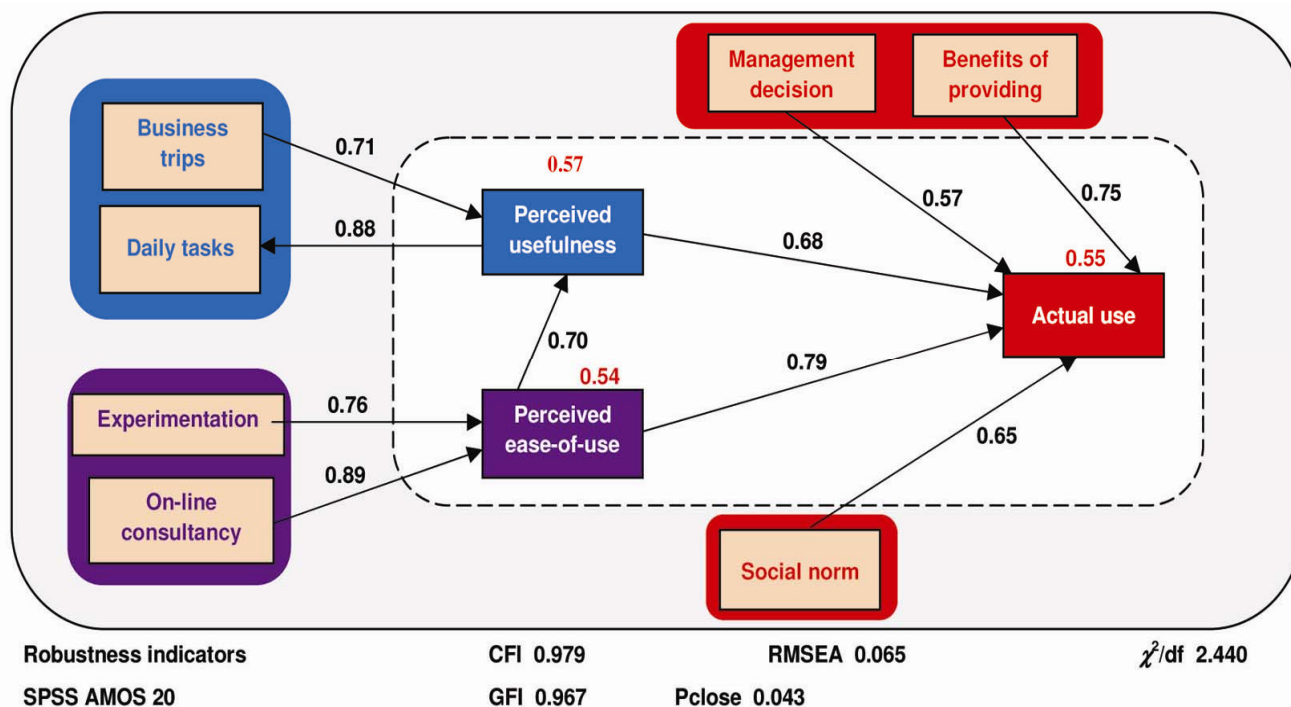
Figure 2. Final research model.

As a result of the two factorial analysis iterations we obtained the necessary and sufficient conditions for validating the instrument, leaving 41 items associated with 12 factors for further analysis, with the complexity factor being eliminated entirely.

Testing the hypotheses and proposed research model

Two categories of analyses in SPSS and AMOS were developed during the study, which were in agreement with the two categories of established objectives:
(a) Testing the hypotheses, formulated in order to achieve the objectives related to the influence of the factors believed to determine the effective behaviour of users of smartphone services; (b) estimating the validity and robustness of the research model in order to achieve the objectives related to the construction and testing of the model related to smartphone services.

Thus, out of the 17 formulated and tested hypotheses, 11 were confirmed using regression analyses: (H_1, H_2, H_3, H_4, H_6, H_7, H_9, H_{11}, H_{12}, H_{14} and H_{17}, Table 1) while six were rejected: (H_5, H_8, H_{10}, H_{13}, H_{15}, H_{16}, Table 1).

Final consolidation and validation of the model

In order to validate a research model that includes independent variables associated with several dependent variables, regression analyses on the groups of dependent variables and the connection with the independent variables are necessary, but not sufficient to test and demonstrate the robustness of the model in its entirety[24]. The most popular method of testing for a research model estimated in its entirety is the structural equation model, which allows the simultaneous analysis of several dependent variables.

Modelling based on structural equations fundamentally requires two stages in order to work:

Stage 1: a preliminary analysis of the factors involved in the estimated model using the results from the hypothesis testing stage in SPSS 20.

Stage 2: the modelling itself in AMOS 20 with the purpose of improving the robustness in its entirety.

After following the two necessary stages, a robust model was developed which includes the most relevant and statistically significant factors (Figure 2). As can be seen in the final model in Figure 2, three groups of factors were retained as significant in influencing the effective use of smartphone services. (i) Factors which influence directly, represented graphically on a red background (MD, BPS and SN), in a blue square (PU) and a purple square (PE); (ii) Factors which influence indirectly through perceived usefulness represented on a blue background (business trip and daily tasks); (iii) Factors which influence incorrectly through perceived ease-of-use, represented on a purple background (experimentation and online consultancy).

Table 2. Indicators of robustness from the initial to the final model in AMOS 20

Values/coefficients	$\chi^2/\mathrm{d}f$	GFI	RMSEA	CFI	Pclose	Source/eliminated variables
Recommended	Optimal difference	>0.9	<0.08	>0.9	<0.05, $\sigma_i \neq 0$	Bentler, P. M. (1990); McDonald, R. P. and Marsh, H. W. (1990); Rigdon, E. E. (1994)
Initially obtained	7.696	0.825	0.140	0.830	0.0	CPX
Finally obtained	2.440	0.967	0.065	0.979	0.043	CPX (complexity), IU (usage intention), SPV (post-sale services), CMP (compatibility), OBS (conspicuity), AR (relative advantage), CFF (face-to-face consultancy)

GFI, Goodness of fit index; RMSEA, Root mean square error of approximation; CFI, Comparative fit index; Pclose, Measure of the proximity of the most robust model; CPX, Complexity.

It can also be noticed that out of the nine significant factors involved in the model, four were built based on our professional experience, while the other four were based on the specialized literature. It has been demonstrated that the model of technology acceptance needs a simplification by eliminating the usage intention for users of smartphone services, thus becoming more robust compared to retaining this indicator. The iterations where the factors associated with usage intention were retained showed an indicator of model adequacy (GFI), below the acceptable level of 0.9 and an error approximation indicator (RMSEA) higher than 0.10 in iteration 4, indicating average robustness, while all the other iterations from 1 to 3 indicated weak robustness and had values higher than 0.12.

Table 2 presents the comparative results of the robustness coefficients of the model from the stage of the initial model to those pertaining to the final model which implied the elimination of seven factors.

Building a model with several dependent and implicitly independent variables implies the ensemble analysis of the model robustness where the values obtained are supposed to reach the level recommended by the specialized literature, testing the needed degree of stability, taking into account that the field of smartphone mobile telecommunication services is dynamic and subject to a fierce competition.

The presentation of the model by grouping the factors based on categories (Figure 2) shows that all categories influence the effective use of smartphone services in the following manner:

– The organizational factors directly influence the effective use through MD (management decision, **H14**) and AA (award advantage) and indirectly through the perceived utility, by means of DT (daily tasks) and BT (business trips).
– Among the innovation factors, only EXP (experimentation) significantly and indirectly influences the effective use through the perceived ease-of-use.

– Among the socio-cultural factors, only SN (social norm) directly and significantly influences the effective use through the perceived ease-of-use.
– Among the factors concerning the support services, only OLC (on-line consultancy) significantly and indirectly influences the effective use through the ease-of-use.

Following this distribution by factor categories, the results indicate that, in the case of use of smartphone services, the organizational factors play an important role, represented, on the one hand, by certain factors with decisional power, namely **H14** to promote and support the use of smartphone services and the advantage of awarding in the benefits package smartphone services, and on the other hand, with operational meaning, such as daily tasks that need to be done and the business trips which are inherent in the context of the study. The factors from the other categories should also be considered when analysing the level of use of smartphone services. Furthermore, they should be viewed in a larger sense, that is, by identifying other additions and obtaining through this model the confirmation of the influence of the respective categories.

Conclusion and managerial implications

As in the case of all studies, research in telecommunications started with a problem for which solutions are yet to be found, but one which has been part of a dominant context. The context developed as telecommunication evolved, until it came to be known simply as the globalization of businesses on a global, regional and national level. The general question which constituted the starting point in understanding the research problem was: which factors influence businessmen to maximize the use of telecommunication services? In order to find an exhaustive answer, an analysis of the business context was carried out. It was noticed that many years ago, closing a deal meant communication in a physical form in order to

transmit the necessary messages and information and the business environment was dominated by the physical approach. Businesses were completed locally within close geographical boundaries. Nowadays, the business environment is dominated by the virtual approach, where people share information in real time and businesses are done on a global scale.

Consequently, once the context was known, the problem needed to be identified specifically, and it can be summarized by asking a specific question: what are the smartphone facilities that business people use? This question only covers a small part of the topic, as a correct analysis would imply a correlation with all smartphone facilities and their full potential.

In order to achieve the objectives of the study the following steps were followed:

(a) The study of specialized literature from various fields collateral to the theme of the research.

– Literature related to the socio-psychological behaviour, which led to the conclusion that people are influenced in their decisions to buy products or services by both volitional and non-volitional factors.
– Literature related to the acceptance of technologies by people, which led to the conclusion that the more useful and easy to use the high technologies are perceived, greater is the probability that they are more easily accepted.

(b) Retrospective analysis in the field of communications in the company where one of the authors gained professional experience. Many findings were confirmed by the theoretical framework, while others were indirectly connected to the evolution of the business environment.

Once the theoretical and practical foundations were laid, the field research was carried out in three multinational companies which led to the following conclusions:

– The research sample was made up of 344 respondents, out of which 94% were smartphone services users.
– The response rate was of 56% during two weeks of research.
– Eleven out of the 17 formulated hypotheses were confirmed.
– The hypotheses related to the technology acceptance model were confirmed during the course of this study.
– Four out of the six hypotheses formulated by us were confirmed.

Reaching the fundamental objective O1 – identifying the factors which influence the behaviour of smartphone services consumers – started from testing the hypotheses of the research which derived from a double approach, deductive and inductive.

Reaching the fundamental objective O2 – constructing and validating a research model applicable to the behaviour of smartphone services users – was achieved by projecting a model of analysis and perfecting it, using the model of structural equations in the following way:

– The initially proposed model, made up of 4 dependent variables and 13 independent variables was not robust and was therefore modelled in AMOS 20 during the course of 7 iterations to reach a most robust variant.
– Even if the hypotheses of the model of technology acceptance were confirmed, once integrated in the model ensemble, they were not robust, which led to additional modelling and elimination of usage intention.
– The resulting final model with good robustness was made up of three dependent and seven independent variables, containing as central elements the utility and perceived ease-of-use which directly influence the effective use of smartphone services.

The more competitive environment, determined to a large extent by the globalization of business and geo-political changes from different regions of the world, has contributed to the development of multinational companies by directing them to form communities for the research and development of products and services. The role of these communities is mainly to create new products and services and their development must take into account the specificity of the markets to launch their products. Together with the marketing communities they need to develop promotion strategies for each market depending on the behaviour of consumers.

The expression 'products and services' is being used more and more in the business environment as a whole, due to the fact that work experience and collaboration with the consumers showed that a new and interesting product can be used to its full potential if it is supported by additional services which highlight its advantages.

If the globalization and the consolidation of businesses into a single decision centre have produced their effects initially as a result of the standardization of products, operational processes, workflows, personnel structures, etc. advantage of the scale economy applied to that particular business, today it has been concluded that the standardization of products is no longer a solution for the consumers. The solution, with a greater effect on profitability, has proven to be efficient only in the short term and only in certain sectors. Today each individual wishes to be perceived as unique in a world that seeks to standardize more and more. The solution which in the beginning seemed efficient, proved to be only a short-term one and in some sectors only because the results of the companies showed negative effects related to the stock level,

both for clients and the company, transport losses for merchandise returns, to the products repackaging for other destinations, to the cash-flow management, etc.

As a consequence, the management of these companies invests time and money in order to understand in the best way possible how consumers react to different products and services launched, the causes that determine such reactions, that means they could determine the change of their options, getting help from other companies specialized in market surveys that could provide them this information. In this respect, the present article could contribute to companies interested in developing products and services, offering not the results of an ordered survey for a certain segment, but a well-documented, customized alternative. The positive aspects would be that the market study includes a field research performed in a structured, analytical way using valid analysis and research tools based on which the interpretation errors could be minimized. This could further contribute to the future directions of action with a high degree of accuracy.

The improvement in the usage of smartphone services in companies that invest in this area becomes one of the operational priorities of the managers, since they need to communicate in real time with their employees from the field. The main factors that contribute to the accomplishment of this goal are: the utility of services and their ease-of-use. Managers should be aware of the factors that contribute to the influence of utility and ease-of-use, which in the present case were identified as business trips, daily tasks of employees and the optimal functioning of equipment which is supported by on-line consultancy. On the other hand, certain factors such as management decision and the advantage of awarding such equipment and services as benefits manifest a direct influence on the use of smartphone services, while additional analyses that are time-consuming may not be necessary. Last but not least, the demand for such equipment and services determined by the existing social context, expressed in the model by means of the social norm, also has a direct influence on the use of smartphone services. This aspect can determine a certain kind of decision or approach of the employees.

Identification of the factors that contribute to maximization of the use of telecommunication services would more efficiently support the development plans of new products, since knowledge of the behaviour of the consumers of these services may direct the investments in infrastructure on a long term and influence the level of the turnover on a medium and long term together with other actions of operational marketing that increase the clients' satisfaction and stimulate consumption.

Therefore, the research is useful both for the managers of the companies of mobile telecommunication equipment and smartphone service operators as well as for companies where the employees use smartphones as a means of communication and achievement of work tasks.

Being aware of the factors that influence the use of smartphone services as well as their category may significantly contribute to better identification of the needs of consumers of smartphone services, as well as those of non-consumers of such services who could become potential consumers in the future and to the definition of product and price strategies on a long term as well as other marketing actions.

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	2	27,000	45,000	39,000	63,000	54,000	72,000
	4	52,000	87,000	77,000	1,22,000	1,04,000	1,37,000
	6	75,000	1,25,000	1,10,000	1,75,000	1,50,000	2,00,000
	8	93,000	1,56,000	1,40,000	2,21,000	1,92,000	2,51,000
	10	1,12,000	1,87,000	1,65,000	2,62,000	2,22,000	2,97,000
	12	1,25,000	2,06,000	1,83,000	2,90,000	2,52,000	3,31,000
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	4	29,000	52,000				
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	8	51,000	93,000				
	10	60,000	1,12,000				
	12	66,000	1,25,000				

Other Countries	Tariff (US $)*					
	No. of insertions	Inside pages		Inside cover pages		Back cover pages	
Size		B&W	Colour	B&W	Colour	B&W	Colour
Full page (H = 23 cm; W = 17.5 cm)	1	300	650	450	750	600	1000
	6	1500	3000	2250	3500	3000	5000
Half page (H = 11 cm; W = 17.5 cm)	1	200	325				
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