

## ENVIRONMENTAL PROTECTION AND MOBILE TELECOMMUNICATIONS SERVICES MARKETING STRATEGIES

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*Accepted March 11, 2015*

*Purpose:* The purpose of this research paper is to identify the main effects of ICT development on the environment from the perspective of mobile telecommunications services providers, mobile telephones manufacturers and mobile telecommunications services customers.

*Approach/ methodology:* The analysis was made using statistical functions: descriptive statistics and factor analysis.

*Results:* According to the analysis made, we could underline the harmful effects on the environment that the mobile telephones have together with the actions that every actor takes in its corporate responsibility behavior.

*Originality:* The paper drew an objective analysis on the ICT devices linked to the environment protection.

*Key words:* Environment protection, mobile telecommunications service's providers, mobile telephones manufacturers, mobile telecommunications customers' behavior.

### INTRODUCTION

IT products “continue to revolutionize communication, entertainment, transportation, education and healthcare around the world”, with mobile telephone part of them (Nnorom, Osibanjo, 2009). That's why scientists are more and more concerned on the negative impact on the environment of the mobile devices, rather than on their positive effects in facilitating everyday life.

It is foreseen that the production of mobile devices will register a growth of 115 million tones of greenhouse gases till 2019 (Capital Journal, 2014) However, the report entitled “Green Mobile: the complete guide to vendor strategies & future prospects 2014–2019” emphasize that the design of mobile telephones has an important impact on the recycling processes, because of some design characteristics that make recycling unprofitable. The same report focuses on the fact that the biggest reduction of gas emissions can be made, while the production of components takes place. This

reduction of gas emissions can be foreseen to reach 18,8 megatons/year (Capital Journal, 2014).

Besides the plastic housing units of a mobile telephone, which represent around 15 to 55% of its total weight without battery, other materials are part of it: cadmium, chromium, mercury, bromine, tin, antimony etc. (Nnorom, Osibanjo, 2009) These are hazardous substances which can pollute the air when burned or the drinking water when leached into soil. For instance, plastics are “likely to remain inert in landfills for centuries”, causing pollution and danger to animals that accidentally ingest them (Ahmad, 2010; Barbalace, 2011).

Eventhough the life span of a mobile telephone is 10 years, most users change them once to 12–24 months. (Huang *et al.*, 2008) Mobile telecommunications companies stimulated this consumption habit of their customers by putting into practice marketing strategies based on affordable prices for these mobile devices and sometimes offered free of charge for a 12–24 months mobile telecommunications services subscription.

Another element of concern is “the energy consumption of mobile phones and their associated equipment” (Paiano *et al.*, 2013).

Moreover, besides the environmental damage that the mobile telephones produce, there are some proven side effects that affect the consumers’ health: headaches, hearing damage from use of earbuds, dry eyes, sore eyes, dizziness, blurry vision, tense neck muscles, tense shoulder muscles, sore hands and forearms from texting, tense facial muscles etc. (www.globalresearch.ca).

## MATERIALS AND METHODS

According to Ericsson Mobility Report for the period 2014–2020, 65–70% of the mobile devices sold, during the third trimester of the year 2014, were smartphones, compared to a percentage of 55% for the same trimester of the year 2013 (Mobile Communications Journal, 2014).

Samsung takes the first position regarding the number of mobile telephones sold during the third trimester of the year 2014, with 94 million unities sold, followed by Nokia (43.1 million unities sold) and Apple (38.2 million unities sold), (Figure 1).

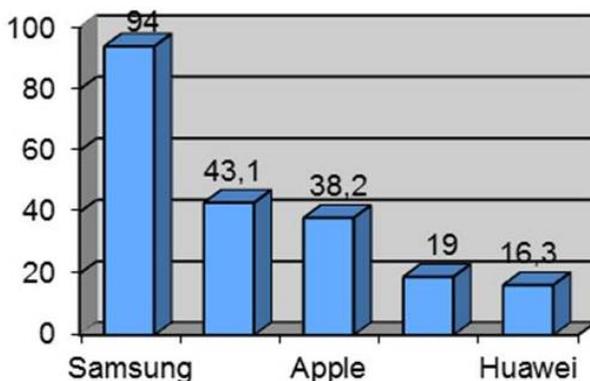


Fig. 1. Mobile telephones worldwide sales – millions (3<sup>rd</sup> quarter 2014).

Source: Mobile Communications Journal, 2014.

Mobile telecommunications sector generates high revenues for the providers. At the level of the European Union countries, the revenues of telecommunications sector, for the year 2012, were: 58,020 million Euro for Germany, 53,628 million euro for United Kingdom, 50,336 million euro for France. Romania takes the 17<sup>th</sup> position regarding the revenues of telecommunications sector with 3,646 million Euro for the year 2012,

compared to 3.662 million Euro for the year 2011 (Figure 2).

If we take a closer analysis at the data for the year 2009 and we compare it with the data for the year 2012, we can see that the revenues of telecommunications sector decreased for most of the European Union countries, except for: Netherlands, Sweden, Finland, Slovenia, Estonia, Luxembourg, Cyprus and Malta.

However, the loss registered by the other European Union member states for telecommunications sector was not so important and we can say that, with all the new technology development, this market has a huge potential to rise.

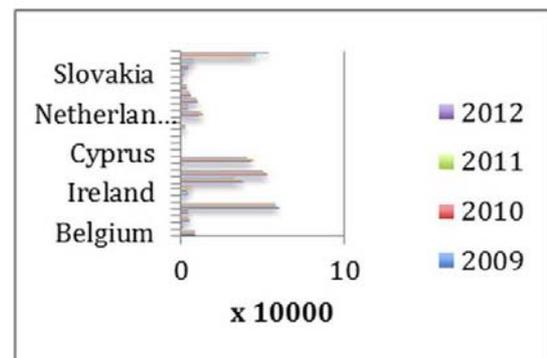


Fig. 2. Revenues of telecommunications sector (million Euro) 2009–2012.

Source: [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc\\_tc\\_mcrev&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_tc_mcrev&lang=en), accessed 01.04.2015.

Romania has a big potential regarding the number of subscriptions, occupying the 7<sup>th</sup> position with 22.6 million mobile subscriptions. The first positions are owned by: Germany (104.1 million mobile subscriptions), Italy (99.1 million mobile subscriptions), United Kingdom (82.9 million mobile subscriptions), France (72.5 million mobile subscriptions), Spain (55.9 million mobile subscriptions) and Poland (51.9 million mobile subscriptions), (Figure 3).

According to Ericsson Mobility Report for the period 2014–2020, the number of smartphones associated to mobile telecommunications services subscriptions represents 37%. However, it is foreseen that the number of worldwide mobile telecommunications services subscriptions associated to smartphones will register a raise from 2.7 billion to 6.1 billion in 2020 (Mobile Communications Journal, 2014).

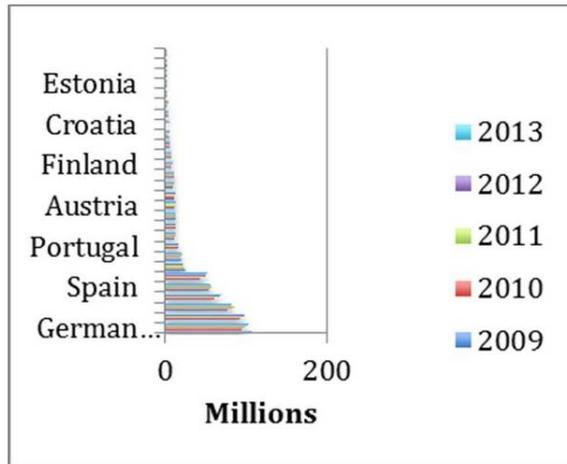


Fig. 3. Number of mobile communications – subscriptions and penetration

Source: [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc\\_tc\\_mcsupe&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_tc_mcsupe&lang=en), accessed 01.04.2015.

Another proof that mobile telecommunications companies make profit consists in the analysis of the average revenue per user (ARPU). Thus, the first five European Union member states regarding the average revenue per user, at the level of the year 2012, were: Luxembourg (279.67 Euro), Ireland (270.65 Euro), France (259.75 Euro), Denmark (247.61 Euro), Cyprus (242.17 Euro), (Figure 4).

At the other end, the countries that generated the lowest average revenue per user, at the level of the year 2012, were: Latvia (42.39 Euro), Romania (53.19 Euro), Lithuania (53.19 Euro), Bulgaria (63.62 Euro) and Poland (95.22 Euro), (Figure 4).

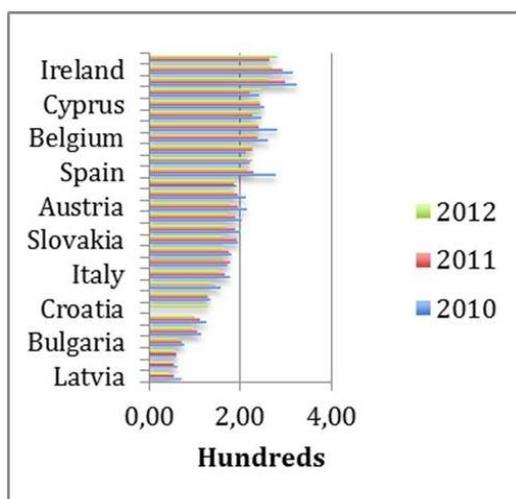


Fig. 4. Average mobile telecommunication revenue per user (Euro).

Source: [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc\\_tc\\_mcrev&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_tc_mcrev&lang=en), accessed 01.04.2015.

## RESULTS AND DISCUSSION

### Mobile telecommunications services providers.

On the Romanian mobile telecommunications market, there are for operators: Orange Company, Vodafone Company, Telekom Company and RCS-RDS Company. Orange mobile telecommunications company is the leader on the Romanian mobile telecommunications services market, with 42.8% market share (2013), (Figure 5).

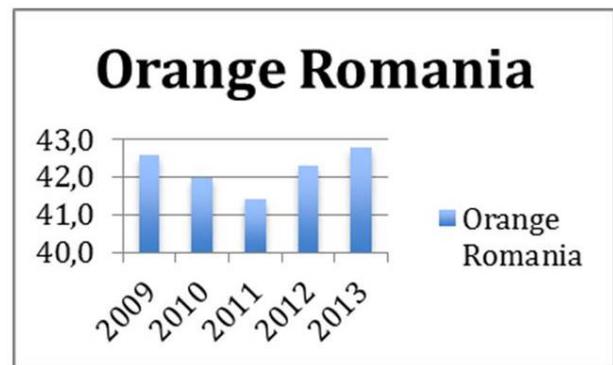


Fig. 5. Market share of leading operator in percentage of active SIM cards.

Source: [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc\\_tc\\_mcmash&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_tc_mcmash&lang=en), accessed 01.04.2015.

Mobile telecommunications companies from Romania, in their attempt to create an environmental friendly image, put into practice campaigns of buy-back.

For instance, Orange mobile telecommunications provider give customers a voucher of minimum 10 Euro for their broken ancient mobile telephone with the condition of acquiring a new one at a special price with a subscription for at least 24 months ([www.orange.ro](http://www.orange.ro)).

Vodafone Company created the same system of old mobile telephones recycling possibility through the service of buy-back. This time, the customers can benefit from price discounts either for acquiring a new mobile telephone, laptop or ipad with a subscription or for extending an existing subscription, buying a new pre-paid SIM card or a mobile telecommunications services package with telephone included ([www.vodafone.ro](http://www.vodafone.ro)).

As we can observe, some of the mobile telecommunications companies present on the Romanian market focus on the development of the IT sector, creating offers that push their clients towards new technology.

In Romania, the IT sector had only 1.2% contribution to GDP at the level of the year 2010. As we can see from the Figure 6, the percentage varied between 1.1%–1.2%, since the year 2006. However, information technology expenditure at the level of European Union countries was 2.5% of GDP in 2010, more than two times higher than for Romania. We should take into consideration the potential of IT sector from Romania, because more and more companies prefer to move their plants to Eastern Europe countries, for the weak regulation regarding workplace conditions and low salaries of the employees.

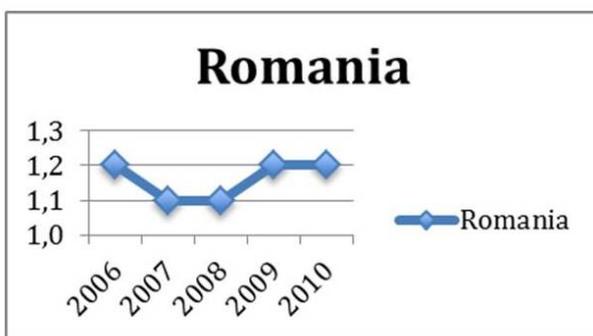


Fig. 6. Information technology expenditure as a percentage of GDP.

Source: <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>, accessed 01.04.2015.

Telekom Company underlines its interest in environment protection and human health by putting into place special collecting containers for telephones batteries and accumulators at the selling point ([www.telekom.ro](http://www.telekom.ro)).

However, this is not the only activity for environment protection that this company undertakes. Other environment friendly activities were created over the years: the implication of its employees to implement an integrated management in the field of quality, health, protection of work and environment (2014); the plantation of 9000 trees by Romtelecom and Cosmote volunteers (2013); the implication of employees to protect the environment, beginning with their workspace (2013); the plantation of a tree for every telephone sent to be recycled, with the possibility to win a smartphone (2012); the implication of the company in taking care of an already planted forest near Ploiesti – Romania

(2011); the plantation of the second forest near Ploiesti – Romania (2010) etc. ([www.telekom.ro](http://www.telekom.ro)).

#### Mobile phones manufacturers

On the other hand, the mobile telephones manufacturers advice consumers to use their products, taking into consideration the environment. Apple Company gives advice to iphone owners how to use and extend the life span of the lithium-ion batteries. ([www.apple.com](http://www.apple.com)) The company also specifies some advices to maintain the battery autonomy for iphones, such as ([www.apple.com](http://www.apple.com)):

- Adjusting the brightness of the display;
- Using Wi-Fi for Internet connection;
- Turning off the function of application to refresh in the background;
- Deactivating the localization services;
- Deactivating the push notifications on the main screen;
- Activating Airplane Mode in situations with poor network signal.

Another important mobile devices manufacturer, Microsoft Company, also takes into consideration the environment protection, emphasizing on corporate responsibility towards its suppliers. The company states that its global supply chain begins with “raw material extraction and processing, and ends with manufacturing of components and final product assembly and distribution” ([www.microsoft.com](http://www.microsoft.com)), stating that over 90% of its phone hardware and mechanics suppliers’ sites are ISO 14001 certified.

The company has implemented the Supplier Code of Conduct for its mobile phone component suppliers, which establishes environmental policies “to ensure monitoring, controlling and proper treatment of energy consumption, air emissions, waste, wastewater, hazardous substances and chemicals generated from operations” ([www.microsoft.com](http://www.microsoft.com)).

#### Mobile telecommunications services’ consumers

From the consumers’ perspective, they demand high technological mobile telephones. This fact was verified by a marketing study made on a sample of 100 smartphones’ owners, during the following period of time: 1<sup>st</sup> of March 2015– 1<sup>st</sup> of April 2015. The data collection method was the face-to-face interview, based on a questionnaire.

The characteristics of the sample are presented below (Table 1):

Table 1

Research sample characteristics

		Age			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20 years old	18	18.0	18.0	18.0
	21 years old	43	43.0	43.0	61.0
	22 years old	29	29.0	29.0	90.0
	23 years old	6	6.0	6.0	96.0
	24 years old	2	2.0	2.0	98.0
	25 years old	1	1.0	1.0	99.0
	26 years old	1	1.0	1.0	100.0
	Total	100	100.0	100.0	
		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	81	81.0	81.0	81.0
	Male	19	19.0	19.0	100.0
	Total	100	100.0	100.0	

Source: Data analysis with SPSS 20.0 software for windows

Table 2

Number of smartphones owned

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	One smartphone	87	87.0	87.0	87.0
	Two smartphones	11	11.0	11.0	98.0
	Three smartphones	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

Source: Data analysis with SPSS 20.0 software for windows

The sample is aged between 20–26 years old, with 81% women and 19% men (Table 1).

According to the results, 87% of the respondents own only one smartphone, 11% of them own two smartphones and only 2% of them have three smartphones (Table 2).

Youngsters are interested in novelties and the fact that 11% of them own the second mobile device, can lead to concerns.

In this way, the mobile telecommunications companies can put into practice strategies for developing “a sustainable consumer behavior”, because “conscientious consumers” consider “environmental ramifications of the entire lifecycle

of the devices they use” on one hand, and on the other hand, they send their “obsolete mobile telephones to be recycled” (Cramer, 2011).

In order to analyze the most important factors in the choice of a smartphone by consumers, we will use the factor analysis. The factors taken into consideration are: the brand, the camera performance, the hardware performance, the technology, the battery life, the price, the operating system and the connectivity.

KMO and Bartlett’s test have the value 0.733, which means that the results of this factor analysis can be accepted (Table 3).

Table 3

KMO and Bartlett’s Test

<b>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</b>		.733
<b>Bartlett's Test of Sphericity</b>	<b>Approx. Chi-Square</b>	92,520
	<b>df</b>	6
	<b>Sig.</b>	.000

Source: Data analysis with SPSS 20.0 software for windows

Table 4  
Total variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.277	56.930	56.930	2.277	56.930	56.930
2	.803	20.071	77.001			
3	.495	12.363	89.364			
4	.425	10.636	100.000			

Extraction Method: Principal Component Analysis.

Source: Data analysis with SPSS 20.0 software for windows

Table 5  
Component Matrix

	Component
	<b>1</b>
Camera performance is an important feature for my smartphone choice	.599
Hardware performance is an important feature for my smartphone choice	.787
Operating system is an important feature for my smartphone choice	.839
Technology is an important feature for my smartphone choice	.772

Extraction Method: Principal Component Analysis.  
a. 1 components extracted.

Source: Data analysis with SPSS 20.0 software for windows

Table 6  
Reliability Statistics

Cronbach's Alpha	N of Items
.746	4

Source: Data analysis with SPSS 20.0 software for windows

According to the data from the Table 4 the variation can be explained in a percentage of 56.93%.

As we can observe from the Table 5, consumers take into consideration the following elements linked to their smartphones: camera performance, hardware performance, operating system and technology.

The value of Cronbach's Alpha of 0.746 represents a viability of acceptable internal coherence (Table 6).

As the results show, customers look for the technological performance of their mobile devices. On the other hand, these consumers "are never involved in the manufacture of their devices, they are never involved in the extraction of raw materials or the disposal of new devices, and they are unlikely to live near the locations where these activities take place" (Cramer, 2011).

## CONCLUSION

From the results obtained, this article emphasizes the importance of green information communication technologies (ICTs) for the environment protection.

All the actors implied in mobile telecommunications services should be aware of the effects on the environment of their actions.

Even though the mobile telecommunications services providers and the mobile telephones manufacturers take several actions of corporate responsibility, it is not enough. More strategies are needed, some of them oriented also towards the environmental education of their customers, who demand performance and want to change their mobile telephone once to 12–24 months, even though its life span is of 10 years.

## ACKNOWLEDGEMENTS

“This paper is supported by the Sectorial Operational Programme Human Resources Development (SOP HRD), financed from the European Social Fund and by the Romanian Government under the contract number SOP HRD/159/1.5/S/136077”.

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