

The Perception of Young Adults on Intelligent Advertising. A Case Study on Romania

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Abstract: *This study investigates the way intelligent advertising, namely advertising through augmented reality, is perceived by young adults. Based on a population of young adults studying advertising and computer science, the research’s main hypothesis is that although the advanced technology is accepted as a natural flow, there is still a relatively high skepticism regarding the use of augmented reality techniques in advertising. The results should have implication for both the academic and the business environment. Academically, the paper might open a new research perspective regarding the impact of new technologies in communication science. In the business context, the data might influence the way technology is perceived by the advertising practitioners and the way companies adopt new technologies for marketing purpose.*

Keywords: *intelligent advertising, augmented reality, advertising, technology.*

Introduction

We live in a society characterized by a growing inflation of marketing messages. At the same time, the consumer becomes more and more sophisticated and increasingly aware of the manipulative role of advertising. However, the techno-

logical evolution has gained the capacity to change the way advertising is perceived, mainly by the young generations that use smart devices in their everyday life within interactive frameworks. In this context, this paper, being rather a descriptive attempt, aims to empirically investigate the role of intelligent advertising, namely advertising through augmented reality, on young adults' life.

The meaning of intelligent advertising is twofold. On one hand, intelligent advertising refers to personalized or customized marketing messages. Personalized advertising is defined as "*a form of customized promotional messages that are delivered to each individual consumer through paid media based on personal information (such as consumers' names, past buying history, demographics, psychographics, locations, and lifestyle interests)*" (Baek and Morimoto 2012, p. 59). For instance, the supermarket Tesco, one of the online sales leader in United Kingdom, already uses personalized messages by sending consumers specific offers based on correlations with past buying behavior patterns (Adams 2004, p. 72). On the other hand, intelligent advertising means marketing information transmitted through intelligent devices. Although the technology is believed to serve only as a carrier (Adams 2004, p. 73), in a context characterized by a growing volume of information, artificial intelligence might become indispensable and profoundly applicable (Adams 2004, p. 78).

Based on knowledge connectivity, reasoning and social connectivity (Davis 2008), the Future Internet paradigms (semantic web, augmented reality, affective computing, cloud computing etc.) influence the way advertising messages are developed. Merging the entire range of computer networks into one single IT platform (Vermesan *et al.* 2009, p. 10), the Internet of Things, as the major component of Future Internet, allows people and object to be connected anytime, anyplace, with anything and anyone, using any network and any service (Vermesan *et al.* 2009, p. 12). In a framework that increasingly implies interactions between the real (physical) and the digital (virtual) world through intelligent devices, things become context aware and capable of data exchange (Vermesan *et al.* 2009, p. 13).

The sample used in the research is formed of students from advertising (Babes-Bolyai University, Cluj-Napoca, Romania) and students from computer science (Technical University of Cluj-Napoca, Romania). There are two reasons for choosing this sample. First, students are the most appropriate group of people as they are young and very much informed on new technologies. Second, the two specializations, advertising and computer science, are exactly the domains of interest for this research. The research method is the opinion survey. We hypothesize that although the advanced technology is widely accepted as a natural flow of the society, there is a relatively high skepticism regarding the use of augmented reality techniques in advertising. We expect to find deep differences between the prospective advertising specialists and the prospective computer science specialists.

Theoretical Framework

The theoretical part of the paper emphasizes two main concepts: augmented reality and intelligent advertising. As augmented reality implies technologies that can be used in a variety of domains, intelligent advertising integrates augmented reality within the marketing domain.

Carmigniani and Furht (2011, p. 3) define augmented reality as a view of the real environment that is enhanced with virtual, computer generated information. Azuma considers that augmented reality implies a 3D and real time integration of computer generated images and real environment (Azuma in Balog *et al.* 2008, p. 163). By providing a new paradigm for human-computer interaction (Shen *et al.* 2011, p. 523) augmented reality is a comfortable mechanism that can simplify the lives of the users by providing extra information to the real world in real time (Carmigniani and Furht 2011, p. 3) using technology. Augmented reality differs from Virtual reality. While in virtual reality individuals are completely immersed in the virtual environment, in augmented reality virtual objects and the reality co-exist in the same space (Girbacia 2010, p. 791). While the line between reality and computer-generated content becomes increasingly blurred with modern technology (IJsselsteijn *et al.* 2005 in Regenbrecht *et al.* 2011, p. 559), augmented reality can serve for reconstructing the missing parts of the reality, for instance a human hand (Regenbrecht *et al.* 2011, p. 559).

Augmented reality aims “to enable a person to carry out sensory-motor and cognitive activities in a new space by associating the real environment and a virtual environment” (Hugues, Fuchs and Nannipieri 2011, p. 49). It can be a helpful and optimizing tool within the decision-making process (Hugues, Fuchs and Nannipieri 2011, p. 50). In the same respect, Kalkofen *et al.* (2011, p. 65) consider that augmented reality applications supplement the real environment with synthetic information. Moreover, this information must be generated in real time and the virtual objects must be registered with real world structures (Azuma *et al.* in Kalkofen *et al.* 2011, p. 65).

Mobile phone is one of the most convenient platforms for using augmented reality, by being equipped with cameras, accelerometers, magnetometers and GPS systems (Carmigniani and Furht 2011, pp. 20-21). There is a large number of augmented reality applications for iPhones as WikitudeDrive (a GPS application that allows individuals to keep the eyes on the road while understanding the GPS guidelines) or Le Bar Guide (an application that guides the individuals to the nearest place where they can drink Stella Artois beer) (Carmigniani and Furht 2011, p. 36). Ullah khan *et al.* (2011, p. 92) refer to Layar and Wikitude as two examples of mobile augmented reality applications that are now available for both Android and iPhone platforms. Showing real and virtual objects in the same space, augmented reality is increasingly applied to product marketing, map navi-

gation, teaching, and commerce (Botella *et al.*, 2011 in Chang *et al.* 2011, p. 581), to entertainment and education domains (Carmigniani and Furht 2011, pp. 29-30; Lee 2012, p. 14), to medical field (Carmigniani and Furht 2011, pp. 33-35), and to designing products' physical parts or prototypes (Lee 2012, p. 14).

If we consider that the evolution of advertising overlaps the technological evolution, we might claim that augmented reality is one of the most efficient future technologies for promotional messages. Most techniques already used within the marketing domain require the individuals to use the webcam either on special software or on company's websites. One example very present within the literature is the Mini Cooper car company example: navigating on the website of the company, the individual must show the ad in front of the webcam and a 3-D Mini appeared on the screen (Carmigniani and Furht 2011, p. 24). Another very popular example is the Magic Mirror, a system that allows the individuals to try the shoes virtually prior to buying them. The user is thus able to see the reflection of the shoes in the Magic Mirror, which is an LCD screen, without having to test them per se. One of the advantages is that of having the possibility of personalizing the shoes based on the color or details preference. Technically speaking, the individuals must use special socks with sensors and infrared reflective painted-on markers, used as a tracking system (Carmigniani and Furht 2011, p. 26). Similar systems can be used for trying on clothes (Carmigniani and Furht 2011, p. 28). At the same time, marketing augmented reality is efficient due to the possibility of building virtual prototypes of products, which are less expensive (Carmigniani and Furht 2011, p. 25).

Since the market place becomes an increasingly complex space with large and competing number of digital media, the nature of advertising must be reexamined (Adams 2004, p. 68). Being addressed to the "always-on" generations, the advertising message must be more individualized and contextualized (Adams 2004, p. 70). Moreover, the consumer behavior is changing by becoming more conversational, more human, and more interactive (Adams 2004, p. 69). Thus, digital media allows advertisers to talk directly to the customers in a more natural, open, direct, customized, and personalized language (Cluetrain 2000 in Adams 2004, p. 69). Considering that a traditional advertising campaign is no longer satisfactory and efficient, "*the right message has to be delivered to the right person at the right time in the correct context*" (Adams 2004, p. 70).

Becoming an important element within the advertising mix, the Internet offers the two main unique features: addressability – a direct and targeted communication with the consumer, and responsiveness – an interactive communication in which the receiver's respond is very important (Deighton 1997 in Pergelova *et al.* 2010, p. 41). In the same respect, interactivity is considered one of the main reasons that make the Internet an efficient advertising tool (Roberts and Ko 2001 in Per-

gelova *et al.* 2010, p. 41). It brings a mutual benefit for advertisers and consumers: while advertisers have the possibility to specifically target the consumers and to differentiate them based on preferences and post-purchase behavior (Roberts and Ko 2001 in Pergelova *et al.* 2010, p. 41), consumers have the possibility to select the preferred advertisements and the way they want to interact (Pavlou and Stewart 2000, Pergelova *et al.* 2010, p. 41).

The literature claims that the growth of interactive advertising is partly due to the sophistication of the consumer and thus the increased sophistication of the advertising content and production (Adams 2004, p. 71). It is believed that the most effective form of digital advertising is the one that encourages the consumer to pass on the received message, thus creating viral messages (Adams 2004, p. 70).

Although augmented reality is perceived either as a topic that raises controversies regarding long-term benefits or only as a promotional tool, it is defined as a form of experiential marketing by contributing to the development of a positive relationship between customer and brand (Bulearca and Tamarjan 2010, 238). Moreover, it focuses not only on the product but emphasizes the experience lived by the consumer (Yuan and Wu 2008 in Bulearca and Tamarjan 2010, 238) and the emotions one feels within the interaction. While augmented reality is a tool of experiential marketing, it is likely to deliver both emotional and functional value, and positive satisfaction (Schmitt 1999 in Bulearca and Tamarjan 2010, 240) and to induce the need of promoting the product to other people or of purchasing the product (Yuan and Wu 2008 in Bulearca and Tamarjan 2010, 240).

Based on the above literature review, the paper further analyzes the way young adults perceive augmented reality from the point of view of the way it can be used in advertising and from the point of view of the feelings it is associated with.

Methodological Framework

Methodological design

The paper aims to analyze the main perceptions of advertising and computer science students on advanced technology and on using augmented reality in advertising. The hypotheses of the paper are the following:

H1: The concept of augmented reality is not entirely understood either by advertising students or by computer science ones.

Although there are individuals that have heard of the concept of augmented reality, mainly due to the development of Google Glasses, they are not yet able to give an exact definition of the concept or to connect the concept of augmented reality with certain types of technologies. In addition, we expect small differences between the way advertising and computer science students understand the term of augmented reality.

H2: Although the advanced technology is widely accepted as a natural flow of the society, there is a relatively high skepticism regarding the use of augmented reality techniques in advertising.

We expect that while students on computer science do not consider augmented reality as an efficient tool for advertising, students from advertising consider augmented reality applications as too intrusive in personal life.

H3: The feeling associated with the use of augmented reality in advertising is mainly of surprise.

Although we expect a strong association between technology and positive feeling and between advertising and negative feelings, we sustain that using augmented reality in advertising might generate a rather positive perception. However, we expect that rather computer science students, in comparison with advertising students, to associate augmented reality in advertising with negative emotions, like sadness, frustration, or anger.

An opinion survey has been conducted with students from the Department of Communication Public Relations and Advertising (Babes-Bolyai University, Cluj-Napoca) and the Department of Computer Science (Technical University of Cluj-Napoca), in Cluj-Napoca, Romania. The sample is composed of students in their third, respectively fourth year of study, namely 20-21 years old. This selection is due to the fact they have a more in-depth knowledge on the analyzed issues. The number of the interviewed students is 93. Although the initial aim of the study has been that of including all the students from the two specializations within the sample, due to absenteeism, only students that have come to school have filled in the questionnaire. The responses' rate is around 60%.

The questionnaires have been self-applied and has been filled in offline. The number of advertising respondents (44, meaning 46,8%) is almost equal to the number of computer science respondents (49, meaning 52,1%). However, the gender distribution is reversed regarding the two specializations. Thus, while there are more males (65,3%) within the computer science specialization, there are more females within the advertising specialization (72,7%). These numbers highly coincide with the distribution within the entire population.

The main parts of the questionnaire refer to the perception of technology in general, the perception of advertising in general, and the perception of certain platforms and applications that include both advertising and technology. The first part of the questionnaire aims to emphasize the role of technology in peoples' lives. Thus, the main items refer to the importance of technology nowadays, the understandings, use and perceived efficiency of the advanced technology, and the emotions induced by technology. On the second part of the questionnaire, the references to advertising are operationalized into the following aspects: the variables

that counts within the buying behavior process, the meaning of the future advertising, the consumption of advertising, the efficiency and credibility of advertising, the most important elements of a commercial, and the emotions attached to advertising. The last and most comprehensive part of the questionnaire aims to correlate the concepts of advertising and technology and to emphasize the perception of intelligent advertising. In this respect, the main variables used are: the importance and efficiency of using new technologies in advertising, the meaning of intelligent advertising, the knowledge of augmented reality and of affective computing applications, the degree to which new technology produces fear, and the perceived profile of the persons that is more probable to use intelligent advertising. Moreover, within this part, the individuals have been asked to read several examples of augmented reality and of affective computing, to express their perception on the feasibility and efficiency of these examples and to associate them with certain emotions, from happiness to fear and frustration.

Results and discussions

While the questionnaire is composed of three main parts (perception on technology, perception on advertising, and perception of using advanced technology in advertising), the results are presented in respect with the same structure.

The perceptions on technology

As expected, the advanced technology is usually perceived by young generations as a natural flow and it is widely accepted. Thus, all the respondents consider, to a large degree, that technology represents an important component of life. As presented in the Figure no.1, when asked to define technology, the highest percentages of individuals consider that technology means smart TV and smart phone. Somehow surprisingly, a smaller part of the individuals claim that computer is part of the advanced technology. A possible explanation for this situation is that the computer has become a very used tool and it is already defined as a traditional or integrated component of life.

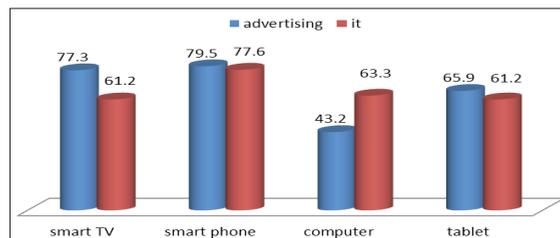


Figure 1. The meaning of advanced technology (%)

There are rather small differences between the students on advertising and students on computer science. While smart phones and tablets are considered as part of the advanced technology by the both categories almost in the same proportion, some differences appear when it comes to smart TV and computer. Thus, smart TV is perceived as an advanced technology by 77,3% of the computer science students, in comparison with 61,2% of the advertising students. A reversed situation is valid for computer. While 63,3% of the computer science students consider it part of the advanced technologies, only 43,2% of the advertising students claim the same thing. As stated above, this may be explained by the fact that especially computer scientists, who work with computers every day, perceive computers as a natural extension of their being and not as a new and revolutionary tool for communication.

In order to complete the above background, some of the respondents have given other meanings for advanced technology. Some of the main examples are the following: medical equipment, autonomous automobile, intelligent watch, intelligent fridge, intelligent washing machine, robotics, optical computers, cloning techniques, artificial intelligence, Google glasses, virtual reality, Nano technology, or technology that is not yet available on the market and about which we do not have enough knowledge.

Being a part of their lives, technology, beyond the fact that is important for all the respondents, they all like using it (Figure 2). The main reasons that make technology efficient are considered to be the possibility to find information quicker, to communicate faster and to have access to a large amount of information. In the same respect, other similar responses are related to the improvement of life quality and to the work facilitation. There was no answer claiming that advanced technology is not efficient. As presented in the following table, the difference between advertising and computer science students is minor. While for advertising students faster communication seems to be more important, for computer science students finding information more quickly and communicating easier are more important than for the other category (Figure 3).

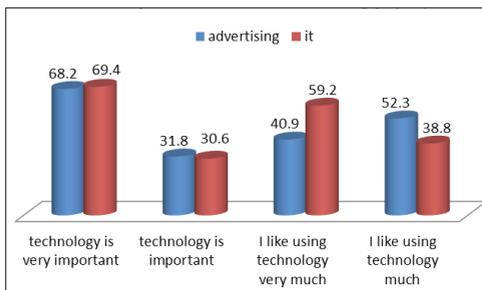


Figure 2. Perceptions on technology (%)

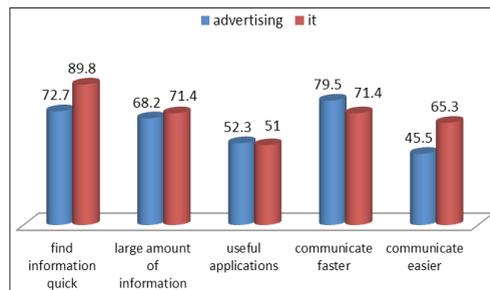


Figure 3. Reasons for considering advanced technology efficient (%)

Living in a context in which technological evolution overlap young generations' time, almost all the respondents declare that they own a computer and a smart phone. The differences between advertising and computer science students are insignificant, yet interesting given the fact that only 88.6% of the advertising individuals declare that they own a computer (Figure 4). In the situation they have a smartphone or would own one, the majority of the respondents claims that the main use of the device is or would be for emails (Figure 5). In the same respect, they use the device for maps, news, or games. The difference between advertising and IT students lies in the fact that while the first use the smart phone more for emails and games, in comparison with the computer science specialists, the latter use the device more for maps and news. Having the possibility to give additional answers, the individuals consistently name the navigation on social networks.

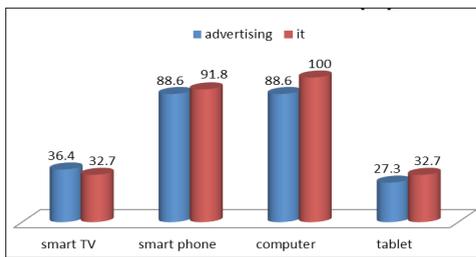


Figure 4. What device one owns (%)

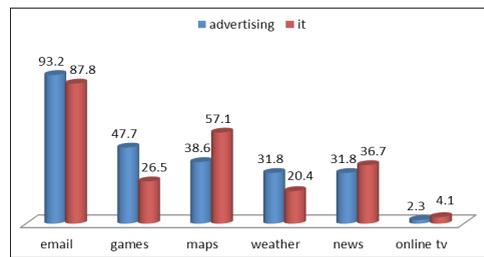


Figure 5. What applications one uses on the smart phone (%)

Owning technology to such a large scale, one of the key questions within the questionnaire refers to the feelings one develops regarding technology. Although there are feelings intentionally used not fitting technology (as disgust, fear or anger), the results are interesting (Figure 6).

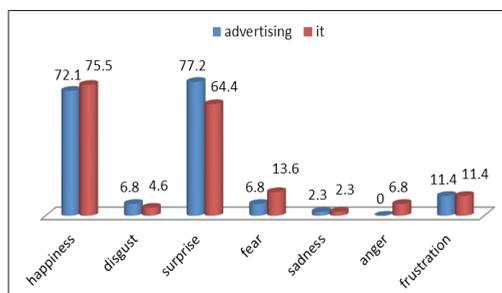


Figure 6. The feeling associated with technology (%)

As presented in the above figure, the positive emotions are preponderantly associated with technology in comparison with the negative ones. Although the computer science students are not that surprised, both specializations feel happiness and surprise to a very high and high degree regarding the advanced tech-

nology. Interestingly, there are few individuals that feel mainly fear, anger and frustration. While in the case of frustration there is no difference between the percentages of advertising and computer science students (11,4%), more IT specialists develop fear and anger than the other category. It might be explained by the context in which they learn and work, a context characterized by a high level of technological development and thus, by control over the human being.

Based on the above presented data, it is evident that the advanced technology is already adopted by young generations represented in the sample, either by owning it by now, or by having a large amount of information about its usefulness. As expected, the emotional attachment is rather a positive one.

The perceptions on advertising

While the attachment for the advanced technology has been proved to be a positive one, when it comes to advertising, the data are expected to be more intriguing.

While around 70% of the respondents declare that they never or rarely go shopping, a higher number of advertising students consume advertising very often and often, in comparison with computer science students. Although it is an implicit result considering the specialization domain, it is interesting to emphasize their preferences for different advertising channels. The largest part of the respondents, both advertising and computer science students, claims that they consume mainly online advertising. While Internet navigation has become a way of life for young generations and while online shopping is increasingly developing, it is logically that they consume or are witness to online advertising.

Besides Internet advertising, outdoor and print advertising seems to be the main advertising types consumed by the respondents, yet in a much lower proportions by the IT students (Figure 7). Women from advertising specialization tend to consume more often Internet ads (96,9%) in comparison with men (81,8%). This is not the case for IT students, both genders consuming almost equally often online advertising (65%). The least consumed types of advertising are TV, radio and guerrilla advertising. While for the radio, both types of students consume radio advertising in a similar frequency, the students in advertising declare that they consume TV and guerrilla advertising more often (Figure 8). To a large extend, this conclusion is explicable and expected, due to the profile of the advertising specialization's curriculum. However, given the omnipresent advertising, the differences between the two specializations is rather high.

In spite of declaring that they often consume Internet advertising, only a small part of the respondents claim that Internet advertising is credible (40,9% of the advertising students and 24,5% of the IT students). In addition, while few advertising students consider TV, magazine and outdoor ads credible, there is a large part

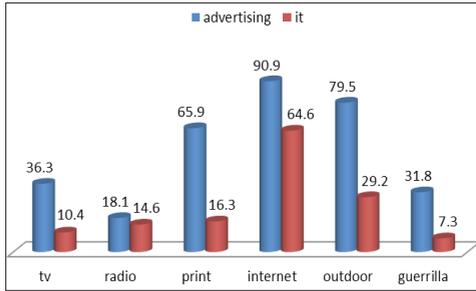


Figure 7. Advertising consumption very often and often (%)

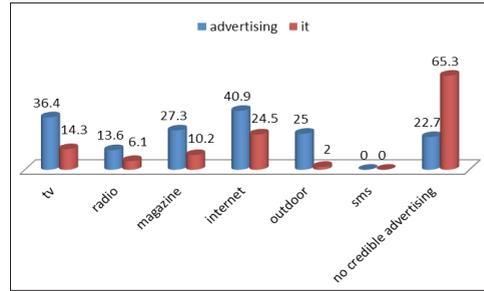


Figure 8. The credibility of advertising channels (%)

of the IT individuals (65,3%) that stress that credible advertising does not exist. In the same category are 22,7% of the advertising students.

When asked what aspects they use to take into consideration in buying products, the respondents' main choices are quality, price and design. Surprisingly, in this context, advertising seems to be an important purchasing component for only around 20% of the respondents.

Although advertising is not a domain of interest for all of the respondents, a large part of them declare that advertising is important or very important in buying behavior (Figure 9). While there are more than 85% of advertising students that consider advertising as being important, there are almost 60% of IT students considering the same thing.

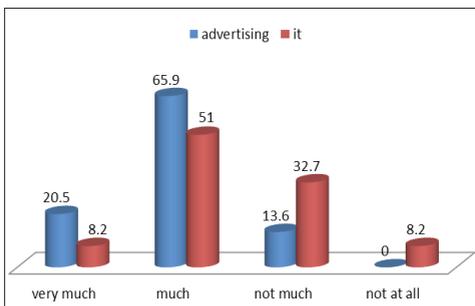


Figure 9. The importance of advertising in buying behavior (%)

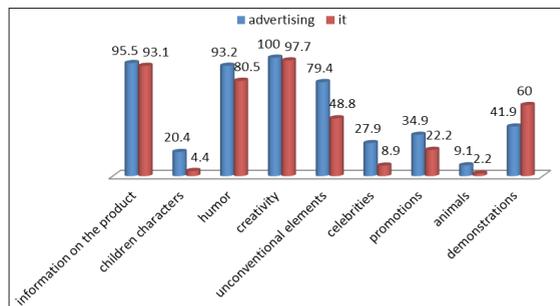


Figure 10. The elements that make a commercial efficient (%)

More specifically, while almost 75% of the respondents declare that they do not have a preferred commercial, the most important elements that make a commercial efficient seem to be creativity, the information on the products, humor, and unconventional elements (Figure 10). Although not very significant, there are several differences between the two specializations. First, while advertising students appreciate more all the above mentioned elements, demonstration with the product is a very important element for the IT students. Second, unconventional

elements and humor are less appreciated by the computer science students, in comparison with advertising ones. All these differences might exist due to the fact that advertising domain and some specific concepts are much better understood by advertising students who theoretically and empirically study them. Completing the above information, the elements the respondents would use in promoting a product are online advertising, emotions, shocking and unique elements, guerilla elements, humor, celebrities or superheroes, quality, and sensory elements.

When asked if they have a preferred brand, the positive and negative answers have been similar in number. The most often named brands are Apple, Asus, HTC, Google, Samsung, Sony, Milka, Zara, or Lenovo. As it can be remarked, regardless of the specialization of the respondents, the main brands belong to the technology domain.

One of the most interesting questions is the one that asks the respondents to attach a single word to the phrase “future advertising”. Although the answers are diverse, the following description is an attempt to classify them in specific groups. The words that have been chosen by the most of the respondents are the following: *online or Internet, innovation, interactivity, creativity, annoyance, personalization, technology, and adaptability*. Besides these concepts, the answers can be categorized into positive and negative ideas. While positive notions used are *truth, efficiency, evolution, unlimited, rapidity, revolution, speed, facilitation*, words with negative connotations are *unsafely, unethical, mind control, irritating, inefficient, false, exaggeration, and control*. As expected, computer science students tend to give more negative connotations to the concept of “future advertising”.

In the same perspective, the emotions associated with advertising are interesting and different based on specialization (Figure 11).

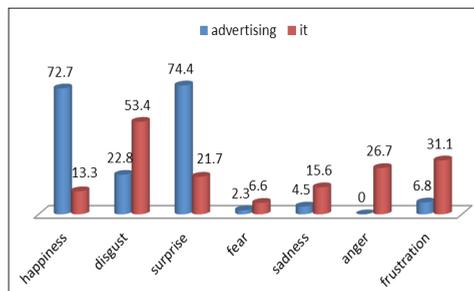


Figure 11. Feelings on advertising (%)

As the above figure shows, advertising students associate advertising with feelings as happiness and surprise. However, computer science students correlate with advertising rather negative emotions like disgust, frustration and anger. A possible explanation for this last results is that, in general, especially TV advertising is considered to be annoying.

Concluding, in comparison with technology that is a widely accepted and liked, advertising is perceived rather as a negative phenomenon. Moreover, the label of “non-credible” given to advertising and the negative emotions associated with it might mean that a change in the advertising domain is desirable.

The perception of using technology in advertising

When the concepts of technology and advertising are put together, the results become even more interesting. Almost all the individuals consider that technology is an important component in advertising, mainly due to the fact that it captures attention (Figure 12). In the same respect, while 51,2% of the advertising students consider that technology in advertising can help in producing personalized messages, 34,7% of the IT students consider that the efficiency of using technology in advertising resides in being something new. Other reasons named by the respondents are easy and rapid access, a more exact targeting, and a large coverage of technology use (Figure 13).

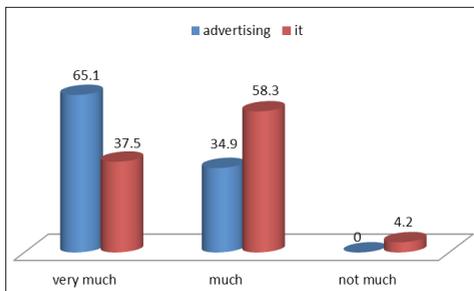


Figure 12. The degree to which technology is important in advertising (%)

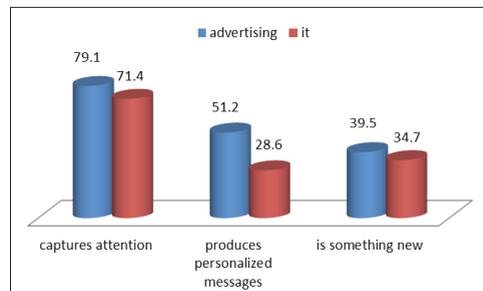


Figure 13. The reasons for which technology can be efficient in advertising (%)

As expected, less than a half of the respondents declare that they know the meaning of “intelligent advertising” (Figure 14). In contrast with the initial expectations, significantly more advertising students (65%) declare they know the meaning of the used concept. Only 21,7% of the IT students have heard about it. In addition, the most chosen meanings of the concept are the following: *personalized advertising, advertising that uses new technologies, advertising that is efficient, innovative and creative*. Interestingly, 42,9% of computer science students, in comparison with 70,7% of the advertising students claim that intelligent advertising implies the use of new technologies (Figure 15). This result can be correlated with the computer science students’ knowledge on the concept and with their prudence in associating the idea of technology with something they do not really know.

In the same respect, while around 20% of the respondents consider that there is no need for technology and around 60% claim that TV is a proper device for intelligent advertising, more than 80% of the individuals have chosen computer,

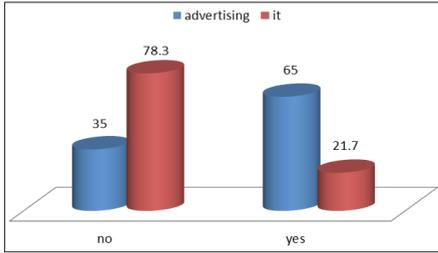


Figure 14. The knowledge of "intelligent advertising" concept

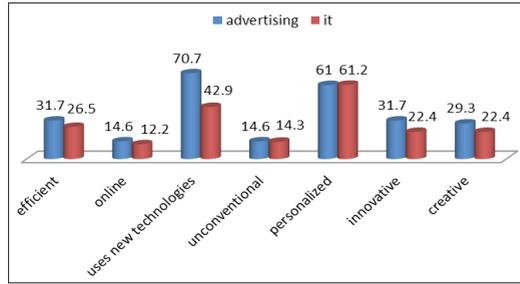


Figure 15. The perception of "intelligent advertising" meaning (%)

telephone and table as being suitable platforms for intelligent advertising. The advertising students, more than the IT ones, slightly tend to associate intelligent advertising with the three above mentioned devices (Figure 16).

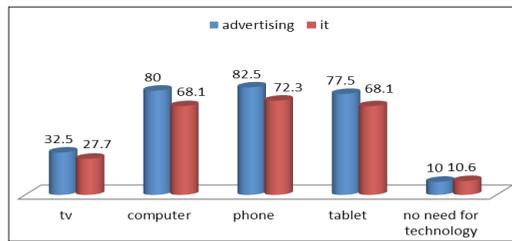


Figure 16. The perception of the devices used for intelligent advertising (%)

More specifically, when it comes to augmented reality, almost 30% of students from each specialization have heard of the concept. Although we have expected that computer science students to be more aware of the concept of augmented reality, the difference between advertising students and IT students is minor. Men declare in a much higher degree that they have heard of augmented reality. Thus, there are 63,6% of the advertising male students and 34,4% of the IT male students that know the above concept, in comparison with 19,4% of female advertising female students and 14,3% of IT female students.

In spite of the fact that almost 60% of the respondents claim that they know the concept (Figure 17), only a small part of them has tried to give a definition. From the most valid definitions, several example are the following: *"adding virtual information to real in real time"*, *"3D applications that offer extra information by using the video camera of a smart phone"*, *"a copy of reality to which sensorial data are added"*, *"holograms"*, *"the combination between physical reality and virtual reality"*, *"the improvement of the reality by using real or virtual technological devices"*, or *"a mixture between real and virtual elements that overlap or are complementary"*. Some of the respondents have tried to explain the concept by making connections with marketing domain.

Several examples are: *“within a visual reality, there is a promotional element of a product or brand; by using advanced technology, the element is accessed and the message is transmitted to the consumer”*, *“personalized reality, based on each consumer’s characteristics”*, *“QR code scanning possibilities that directs you to a website where a commercial is presented”*.

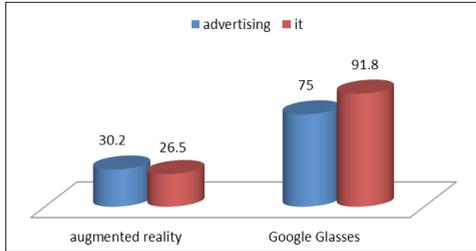


Figure 17. The knowledge on “augmented reality” and Google Glasses (%)

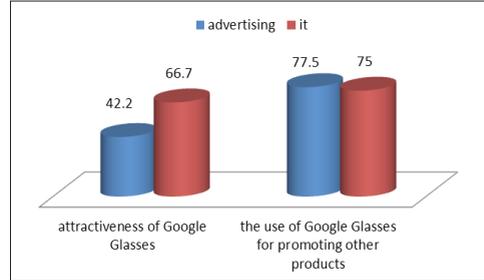


Figure 18. The perception on Google Glasses (%)

Asked whether they have heard of Google glasses, 75% of the advertising students and 91,8% of the IT students have given a positive answer (Figure 18). Interestingly, there are significantly more respondents that know about Google glasses than about augmented reality, although the first is an application of the latter. While almost half of the respondents consider Google glasses as being attractive, more than 70% of the students from each specialization claim that Google glasses are suitable for promoting other projects or services, due to its applications.

In a context in which the concept of augmented reality is rather poorly known, the questionnaire translates this concept into several examples. The respondents are asked to decide the feasibility, the efficiency and the feelings for each situation. All the following situations can be properly used in marketing in order to attract attention over a specific product through technology.

The first situation describes the context of a museum; only by pointing the smart phone to one of the paintings, a large amount of information on that painting becomes available for the visitor. While all the advertising students claim that this situation is feasible and efficient to a high and very high degree, more than 90% of the computer science students claim the same thing (Figure 19). As expected, only the positive feelings, as happiness and surprise are highlighted within this situation (Figure 20). However, there are 16,3% of the advertising students and 11,3% of the IT students that evoke sadness as an emotion associated with the situation. A possible explanation might be the fact that having such a technology, museum guides might become useless and machines might replace the humans.

The second situation reveals a similar context with the above one. By pointing the smart device to an office building, information on the companies that have the headquarter within the building is available. This situation appears feasible and

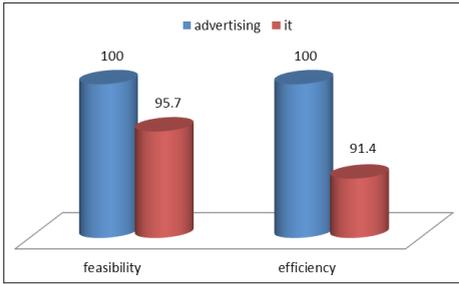


Figure 19. The feasibility and efficiency of the situation 1 (%)

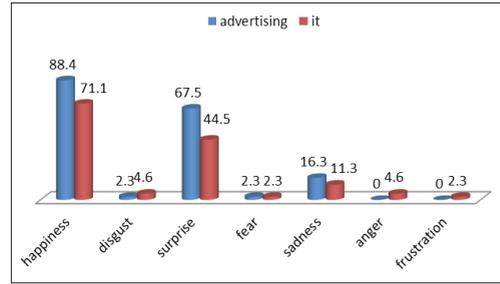


Figure 20. The feeling regarding the situation 1 (%)

efficient for an average of 85% of the respondents (Figure 21). There are small but significant differences between the respondents from the two specializations mainly when it comes to the feasibility of the situation. Thus, as expected, computer science students are more skeptical than the advertising students when it comes to technology. As in the above mentioned situation, the feelings of happiness and surprise are preponderant. However, there are several cases in which this situation is associated with frustration (Figure 22).

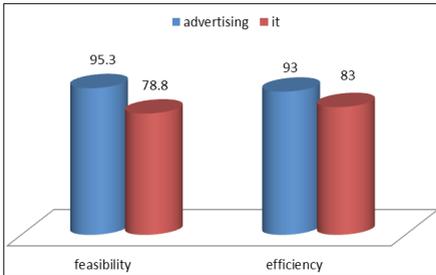


Figure 21. The feasibility and efficiency of the situation 2 (%)

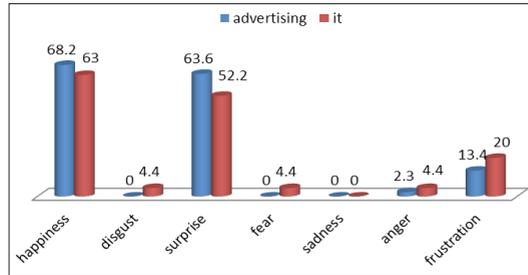


Figure 22. The feeling regarding the situation 2 (%)

The third example refers to the shopping behavior: wanting to buy a shirt, one does not have to physically try on the product. Having a virtual dressing room, the image of the person, dressed with the shirt, is available in the mirror. The resulted pattern is respected within this situation as well, computer science students claiming less than the advertising students that the presented case is feasible and efficient (Figure 23). Although the negative feelings, as fear, sadness, or anger have not been widely chosen, they have been chosen in this particular context more than in other cases. There are two possible explanations: while this situation is a more personal experience and the outcome is something that directly affects the individual, there might be a larger degree of pleasure while physically trying on clothes. Moreover, the fact that more than 30% of the IT students associate the virtual fitting room with fear, might signify that the technological evolution or the way the technology is used are exceeding a certain accepted limit (Figure 24).

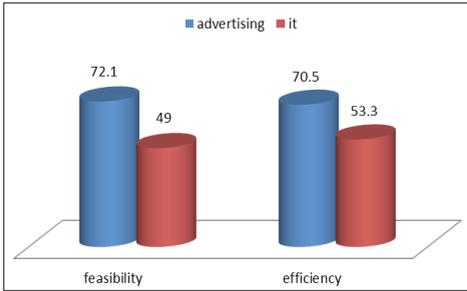


Figure 23. The feasibility and efficiency of the situation 3 (%)

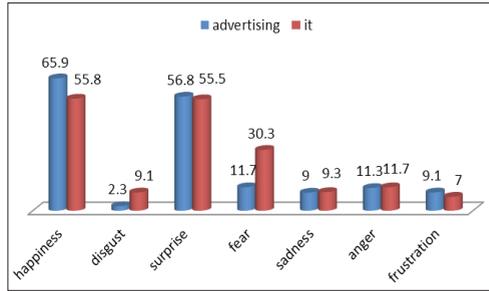


Figure 24. The feeling regarding the situation 3 (%)

The fourth situation describes the possibility to feel the texture of a blouse on the touchscreen of a smart phone. It is a situation that can be contextualized especially in the case of Internet purchasing. While the majority of the advertising students consider this situation feasible and efficient, the computer science specialists are much more skeptical. Only 17,4% of them claim that it is a feasible situation and 55,8% that it is an efficient one (Figure 25). When it comes to the emotions associated with the situation, as in the other cases, the positive ones are much better represented. However, it can be emphasized that computer science students are less happy and less surprised than the advertising students. In addition, this particular situation raises feelings as anger and sadness for an average of 10% of the respondents from each specialization (Figure 26).

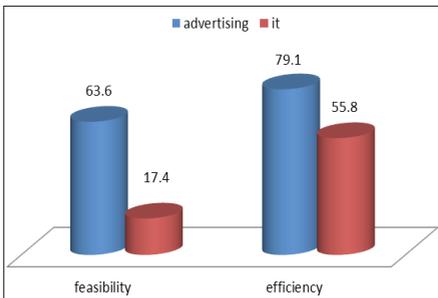


Figure 25. The feasibility and efficiency of the situation 4 (%)

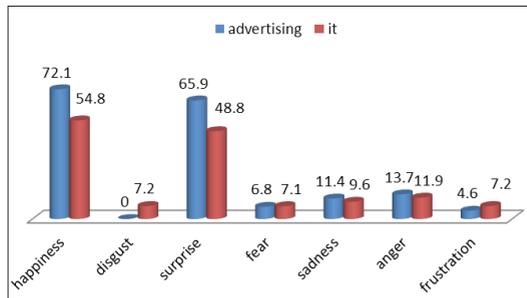


Figure 26. The feeling regarding the situation 4 (%)

Asked what is the general opinion on the abovementioned situations, the thoughts are dichotomous. A part of the individuals perceive these examples as rather intrusive and non-pragmatic. Some of the respondents' arguments are that these applications "induce wrong habits", create dependency on technology and the possibility to be controlled. Another part of the individuals claim that these examples are a natural evolution and the respective technologies and applications can be useful.

Complementary, asked if they would use the described applications, the results are intriguing. The most accepted situation is the first one, referring to the application for the museum (Figure 27). There are fewer individuals that would use the two situations referring to clothes. While computer science students clearly prefer the museum and the office building situations, the advertising students claim, more than the IT students, that they prefer the last two situations. Related to gender, the data state that both men and women, from both specializations better prefer the first two situations (Figure 28). However, there are a few interesting differences. Thus, while all the women from IT specialization would use the application for the museum, a much significant percentage of the advertising women would use the applications for the virtual fitting room and for fabric and texture recognition of a blouse.

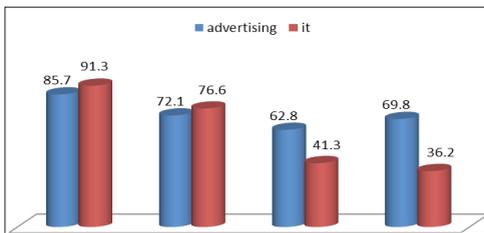


Figure 27. The hypothetical use of the four situations (%)

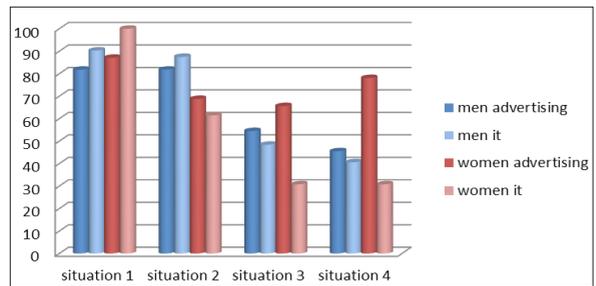


Figure 28. The hypothetical use of the four situations based on gender (%)

The above described situations can be used in marketing as unconventional instruments in order to attract individuals that are searching for new marketing types of communication, that are curious and comfortable. Thus, for instance, a company can invest in the necessary technology in order to help a customer find information about it or about its products (to create marketing messages) by only using an application on a smart device. In the same respect, a company that sells online can invest in offering the customers the possibility to online “touch” the products.

Although, technology has been expected not to scare the respondent, around 30% of the advertising students and around 25% IT students claim that they are much or very much scared by it. This conclusion might consciously appear only after the four situations have been presented.

Concluding, technology is largely accepted as a natural evolution on human kind. Moreover, it is perceived as being efficient to be used in advertising in order to create a novelty element, especially for young generations. The concept of intelligent advertising is pretty strongly associated with personalized messages transmitted through advanced technology. Although the majority of the respondents

have not heard about the concept of augmented reality, the Google glasses application is widely known. Moreover, the four presented situations that use augmented reality applications in order to communicate a message are significantly considered feasible and efficient and are associated rather with positive emotions than negative ones.

Conclusions

This paper has aimed to empirically investigate whether advertising through advanced technology, mainly through augmented reality, might be a feasible possibility in order to create more desirable advertising. Moreover, the research analyzes the differences between advertising and computer science students in respect to their perceptions over the use of the advanced technology in advertising.

In general, due to the technological context, the perception over the advanced technology is a positive one. While technology is linked with positive emotions by the advertising students, as happiness and surprise, a part of the computer science students tend to relate it with feelings as fear and anger. In the same respect, some of the respondents emphasize that advanced technology tends to scare them. When it comes to advertising, the majority of the students consume mainly online advertising. However, only a small part of them considers this type of advertising as being credible. As expected, IT students are more skeptical regarding advertising in general and online advertising in particular. More than half of them underline that there is no credible advertising. Although advertising seems to be an important purchasing tool for a small number of individuals, the most important elements an ad must have in order to be efficient are creativity, information on the product, humor, and unconventional elements. The emotions associated with advertising are positive for advertising students (happiness and surprise) and rather negative for computer science students (disgust, frustration, anger).

Almost all the respondent, regardless of the specialization, consider technology as an important component in advertising and claim that by using it there can be generated personalized messages and a new way of communication. Only around 30% of the students from each specialization have heard of the concept of augmented reality and much less of them have tried to give a definition. Based on these results, the first hypothesis is to a large degree validated. Although there are many respondents that know the concept of Google glasses, they do not associate it with augmented reality and they do not give suitable definitions of the latter concept.

The questionnaire underlines four situations in which augmented reality is used. All the presented applications may be used as a marketing tool in order to attract consumers' attention for different products or services: an application used in museums in order to give extra information of a work by using a smart

phone, an application used for smart devices that can transmit information about the companies within an office building, a virtual fitting room, and an application used for smart phones based on which one can feel the texture of a blouse on a touch screen. Practically, any brand that uses such a technology might be positively perceived by young generation for which technology is a way of life.

Based on these situations, the opinions can be grouped in two parts. For one group, the development of technology and its use for marketing purpose are perceived as a natural evolution and can be integrated into daily life as useful tools. However, for another group, technology and the presented situations are perceived to induce wrong habits and are rejected due to their capacity to control the human behavior. In general, it can be said that computer science students, in comparison with advertising ones, are much more skeptical and against using such developed technologies by masses. Considering these aspects, the second hypothesis is validated.

Regarding the last hypothesis, the data show that the use of augmented reality in advertising is preponderantly associated with positive feelings, as happiness and surprise. However, there are several cases in which the respondents feel negative emotions, as disgust, fear, sadness and frustration when it comes to situations in which technology assume a large part of the human's task or responsibilities.

Concluding, the advertising and computer science students are different regarding their perceptions over technology, advertising and the use of augmented reality in marketing. However, the differences between them are not that significant as expected. In general, they all have already adopted the advanced technology and a large part of them condemn advertising. In addition, although they consider the use of technology in advertising a proper tool in making advertising more efficient, the use of augmented reality in marketing seems to be too intrusive and controlling in patches.

References

1. Adams, Richard. (2004). Intelligent advertising. *AI & Society*, 18: 68–81. DOI: 10.1007/s00146-003-0259-9.
2. Baek, Tae Hyun and Mariko Morimoto. (Spring 2012). Stay Away From Me. Examining the Determinants of Consumer Avoidance of Personalized Advertising. *Journal of Advertising*, Vol. 41, No. 1: 59-76. DOI: 10.2307/23208321.
3. Balog, Alexandru, Costin Pribeanu, and Dragos Iordache. (2008). Augmented Reality in Schools: Preliminary Evaluation Results from a Summer School. *International Journal of Social Sciences*, Vol. 2 No. 3: 163-166.
4. Bulearca, Marius, Daniel Tamarjan. Augmented Reality: A Sustainable Marketing Tool?. *Global Business and Management Research: An International Journal*, Vol. 2, No. 2 & 3, 2010: 237-252.

5. Carmigniani, Julie and Borko Furht. (2011). Augmented Reality: An Overview. In Borko Furht (Ed.), *Handbook of Augmented Reality* (p. 3-46), Springer.
6. Chang, Yong-Fu, Sheng-Wen Hsieh, Ching-Chang Lee and Ming-Chia Hsieh. (2011). An Empirical Study on Augmented Reality System Development And Satisfaction For Supporting Hair Style Design. *Pakistan Journal of Statistics*, Vol. 27, No. 5: 581-590. DOI: 10.1002/0471667196.ess0332.pub2.
7. Davis, Mills. (October 2008). Project10X's Semantic Wave 2008 Report: Industry Roadmap to Web 3.0 & Multibillion Dollar Market Opportunities. Executive Summary.
8. Girbacia, Florin. (2010). An Approach to an Augmented Reality Interface For Computer Aided Design. *Annals of DAAAM for 2010 & Proceedings of the 21st International DAAAM Symposium*, Vol. 21, No. 1, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria, EU.
9. Hugues, Olivier, Philippe Fuchs, and Olivier Nannipieri. (2011). New Augmented Reality Taxonomy: Technologies and Features of Augmented Environment. In Borko Furht (Ed.), *Handbook of Augmented Reality* (pp. 47-63), Springer.
10. Kalkofen, Denis, Christian Sandor, Sean White, and Dieter Schmalstieg. (2011). Visualization Techniques for Augmented Reality. In Borko Furht (Ed.), *Handbook of Augmented Reality* (pp. 65-98), Springer.
11. Lee, Kangdon. (March/April 2012). Augmented Reality in Education and Training. *TechTrends*, Vol. 56, No 2: 13-21.
12. Pergelova, Alben, Diego Prior, and Josep Rialp. (Fall 2010). Assessing Advertising Efficiency. Does the Internet Play a Role?. *Journal of Advertising*, Vol. 39, No. 3: 39-54.
13. Regenbrecht, Holger T., Elizabeth A. Franz, Graham McGregor, Brian G. Dixon, Simon Hoermann. (December 2011). Beyond the Looking Glass: Fooling the Brain with the Augmented Mirror Box. *Presence*, Vol. 20, No. 6: 559-576. DOI: 10.1162/PRES_a_00082.
14. Shen, Y., S.K. Ong, and A.Y.C. Nee. (2011). Vision-Based Hand Interaction in Augmented Reality Environment. *International Journal of Human-Computer Interaction*, Vol. 27, No. 6: 523-544. DOI: 10.1080/10447318.2011.555297.
15. Ullah khan, Rehman, Muhammad Khaliq, Edmund Ng Gaip Weng, Shahren Ahmad Zaidi Adruce. (December 2011). The Road to the blend of Augmented Reality and Intellectual Capital: a Case of Data Management for Outdoor Mobile Augmented Reality. *Interdisciplinary Journal of Contemporary Research in Business*, Vol. 3, No. 8: 89-97.
16. Vermesan, O., M. Harrison, H. Vogt, K. Kalaboukas, M. Tomasella *et al.* (Eds.). (2009). The Internet of Things – Strategic Research Roadmap. Cluster of European Research Projects on the Internet of Things, CERP-IoT.