

"Dunărea de Jos" University of Galați
Doctoral School of Engineering



PHD THESIS

SUMMARY

RESEARCH RELATED NUTRITION LABELLING EXTENSION WITH SUPPORT OF QR-CODE

PhD Student,

RADU (BALABAN) M.V. ADRIANA ELENA

Scientific coordinator,

Prof. PhD. Eng. Petru ALEXE

"Dunărea de Jos" University of Galați

Seria I Nr. 4 Industrial Engineering No. 59

GALAȚI

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KEY WORDS

- Food product
- Nutrition labelling
- consumer
- QR – code
- nutrient
- legislation
- authority
- control
- survey
- questionnaire
- market
- producer

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Introduction

In last years, was registered a high interest related to food labelling, from food industry part, authorithies and last but not least, from consumer part at national, European and International level. The European Union participates in achieving the high level of consumer protection through the measures transposed into the law. The free movement of heathy and safety food it is an important point of internal market and paprticipates signifiantly to the healthy, food safety, welfare, economic and social interest of consumers.

" The food label is perceived as a channel that facilitates the transmission of information from producer to final consumer." [1,2]

In order to ensure a high level of consumer's health protection and with the scope to give the right to information, it is a must to be ensured that exist a properly information of consumer related to food product that he will purchase. Consumer choice is influenced by different consideration as: health, economic, social – culture, ecological or ethical aspects. „Related to cosnumer choice, was registered a high interest among female consumer for purchase of organic products, an interest especially sustained by the Romanian citizen's culture, in which the woman is responsible for preparing the meals in the familly, for education of children, respectively by ensuring a healthy diet." [3]

" Nutrition labelling is defined as a space on the food label with information related to nutrient content" [4]

Tha main purpose of nutrition labelling is to help the consumer in selection of food products, in order to select the products which meets his needs and to increase his level of information "more informed and healthier food choices in the context of their daily diet". [5]

At the European level, in differents countries is used front of pack nutritional labelling which are agreed as national level with scope to provide nutritional information in a simple, visible and easily understandable way by the consumer. The questions from competent authority, food operators and consumer are how effective is this front of pack nutritional labelling model and what benefits brings.

Front of pack nutritional labelling systems are developed based on nutritional guideline agreed at national level with the local authorithies and food operators and have the scope to ensure a good information of consumer, which is more or less correct, based on consumer profile which is complex and influenced by different factors.

In United States, a scientific study has shown that, "consumers are increasingly exposed to labels that communicate specific elements of food manufacturing products, especially that specific food legislation requires to have this information mandatory for certain products.

"Good part", according with the statements of different organizations, is that this type of labels, which include information related to technological process of food products, can eliminate the „communications gaps" between producers and consumers, satisfying the consumer's demand for criteria such as: tighter and higher in terms of food quality, which brings value for both parts. "Unfriendly part" of these type of labels, is given by the fact, that, consumer may misinterpret these type of label, especially in the case of products manufactured with conventional technology, at industrial level, with food additives, even if there is no specific evidence to prove negative influence on consumers, or even in the case where these product have a different

composition. Based on this findings, three voluntary, recommended policies have been presented: mandatory labelling of technological process of food products, should be done only in situation has been scientifically proven that the product harms human health, with warning text;

Governments should not prohibit labels which have mention technological process, because this requirement contravenes consumer rights to know and control the products consumed and which may lead to a loss of consumer confidence; respectively encouraging the government to use voluntary labelling, which involve smart phone technology, similar to the smart labelling proposed by the government in 2016, related to the food products which contains modified organism. [6]

All this finding, highlight the need to develop an extension system of nutrition labelling with the scope to increase the level of knowledge and understanding of consumer related to the food products purchased. This need is underlined also in following paper work:” Perception of romanian consumer on organic food products”. [3]

” Perception of romanian consumer on nutrition labelling of food products”[7],
”Perception of romanian consumer on QR code as an extension of nutrition labelling.” [8]

Based on above reasons, the doctoral paper work is structured in 5 parts: part I (detailed in chapter I) include actual stage of study related to the nutritional models at national and European level, part II (detailed in chapter II) is focused on material and methodes, part III (reproduced in chapter III) – describes market research, part IV (described in Chapter IV) – Market research and analysis of perception of factors involved in food chain related to QR code content and part V (chapter V), General conclusion, original contributions and perspectives.

The **scope** of this doctoral thesis is to introduce a system of extension of nutrition labelling of food products using the QR code (quick response code), which will be introduced by issuing a legislative proposal.

By introducing this system of extension of nutritional labelling, the aim is to increase the knowledge of consumer information, by repeating the mandatory informtion mentioned in the legislation of food labelling and other information supplied by producers or retailer. It is necessary to repeat the mandatory information from labelling, due to the small space o the label, or small packages that do not always allow very good visibility for each category of consumers.

The legislative proposal will define the minimum information which will be added in QR code, as an extension of nutrition labelling based on requirements of consumers, specialists, regulatory and control authorithies.

The market study on the informations proposed to be introduced was done in Romania, in June – July 2018, based on a qualitative and quantitative research.

The qualitative research was based on a preliminary qualitative research carried out with the support of teachers, researchers, food industry engineers, authorities representative and a qualitative final research with final survey.

The final quantitative research was developed based on 6 detailed interviews with decision-makers from the retailers and food production area and a final qualitative research with support of 40 respondents' researchers.

The quantitative research was performed on a representative sample at national level (based on census from 2011) with a dimension defined by 624 respondents with an error margin of +/- 4% and a confidence interval of 95%.

The methodology used consisted in face to face interviews with the general public (woman and men, with age above 18 years, from urban and rural area). [8]

This paper work was supported by the Core Programm, project number PN 18 02 03 01.

Notation and abbreviation:

| | | |
|-----------------------|---|---|
| AIIBP | = | Association Internationale de L'industrie Des Bouillons Et Potages |
| ANPC | = | National Authority for Consumer Protection |
| ASAS | = | The Academy of Agricultural and Forest „Gheorghe Ionescu Sisești” Bucharest |
| ANSVSA | = | National Veterinary Health and Food Safety Authority |
| ASIAR | = | Association of Romanian Food Industry Specialists |
| ASIL | = | Association of Dairy Industry Specialists |
| ASMP – | = | Association of Bakery Specialists |
| CAOBISCO | = | Association des industries de la Chocolaterie, Biscuiterie et Confiserie de l'UE |
| CE | = | European Community |
| CEE | = | European Economic Community |
| CLITRAVI | = | Centre de liaison des industries transformatrices de viandes de l'U.E. Liaison centre for the meat processing industry in the E.U. |
| DSP | = | Health Public Direction |
| FAIBP | = | Federation des Associations de L'industrie Des Bouillons et Potages de la CEE |
| FSA | = | Food Standards Agency |
| HG | = | Government Decission |
| ICA | = | Institute of Food Chemistry |
| Imp. | = | important |
| INCD | = | National Institute of Development and Research |
| Loc. | = | inhabitants |
| Nr. | = | number |
| OSIM | = | Stae Office for Trademarks and Invention |
| Reg. | = | Regulation |
| QR . | = | quick response code = cod de răspuns rapid |
| UDJG | = | ”Dunărea de Jos” University of Galați |
| USV | = | ”Ștefan cel Mare” University of Suceava |
| USAMV Cluj- Napoca | = | University of Agronomic Sciences and Veterinary Medicine of Cluj-Napoca |
| UE | = | European Union |

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OBJECTIVES

- Satisfying of Romanian consumer needs to know nutritional and energy elements of food products;
- Repeating in QR cod of mandatory information provided by food legislation;
- Assesing the necessity of nutritional labelling using QR cod in the vision of education specilist - researcher;
- Assesing the necessity of nutritional labelling using QR cod in the vision of control authorities (ANPC, ANSVSA, DSP);
- Elaboration of coherent chestionnaire to underarm all previous marketing research;
- Assesing the necessity of nutritional labelling using QR cod in the vision of producers and retailers from food industry;
- Running the survey for validation of romanian consumers requirements for nutrition labelling extension;
- Legislative initiative for the application of nutritional labelling through QR code.

CHAPTER II. MATERIALS AND METHODS

This paper work, including market research, was done with support of Core Programm, project number PN 18 02 03 01.

II.1. Methodology used in qualitative research.

In order to achieve qualitative research, was used as a methodology the detailed interviews, based on using of questionnaire.

Two qualitative research were carried out:

- preliminary qualitative research
- final qualitative research

The preliminary qualitative market research was carried out during the Ecotrophelia 2017 competition and within the Euroaliment Galați 2017 event, a research carried out among teachers, researchers, food engineer and respondents of control authorities who enjoyed at these events. In preliminary research was used as methodology, questionnaire sending metioned in Annex I, which contain the elements proposed to be added in QR code.

The final qualitative market research was carried out after was define final questionnaire, in following stage:

- qualitative market research in producer and retailers of food products area
- qualitative market research in researcher of food industry area

The final qualitative market research in producer and retailers of food products area used as a methodology, in-depth interviews. The interviews were done by a specialized market research company with 6 stakeholders from food industry:

- 3 interviews with decision persons from Commercial area (Bucharest and Ilfov)
- 3 interviews with decision persons from Production area (Bucharest and Ilfov) [8]

The qualitative market research in researcher of food industry area, used as a methodology the questionnaire for industry, retail and resercher area presented in Annex II, which contain final elements proposed to be added in QR cod. The questionnaire for research were send on e-mail for collect their feedback.

CHAPTER III. MARKETING RESEARCH

III.3.2. Using the QR code on food labels.

„QR cod was developed in 1994 by the Japanese company Denso Wave, Inc. And it is an English abbreviation of the text *quick response*, which means to receive an answer in short time, and is the trademark of this company. The main objective which supported the development of this QR cod was development of an easy-to-use coding and reading system for the consumer.” [94]

In comparassion with traditional barcodes, QR codes consist of a square which contain black and white blocks alternative (fig. 10).

This codes are most commonly used by marketrs in promotions and advertising, because this code can be scanned with smartphone or tablet and may contain an internet adress or text message with additional information.



Figure 10
Quick response, QR

The QR code gives the consumer quick access to certain information from different links (locations).

At the place of purchase of food products it is necessary to have the QR code reading device.

By scanning the QR code attached to the food labels, on display for redaing information will be presented information related to the food product, in a clear and visibil way, with characters with corresponding size, allowing them to be read at least from 50 cm.

Food business operators are responsible for correct information dispalyed by the scanning the code.

Currently the QR code is used by a small percentage of food business operators from Romania, being used in particular for providing marketing elements, campaignes to promote the foods.

QR code mentioned in this project is seen as an extension of the nutritional labelling, in which will be mentioned minimum the requirements provided by food labelling legislation, as well as new elements that will render the interpretation of nutrition declaration from nutrients quantity

point of view in a way that is easy for the consumer to understand. It has been proposed to be added in QR code and other food product information.

In order to implement this QR code in Romania on the food label, the need was made to know the opinion and requirements of all the categories of factors that carry out their activity in the food industry, opinions that will be analyzed and promoted. In order to collect this data and to know the opinions of as many consumers as possible, it was necessary to carry out a market research that had as an objective the establishment of the content of the information related to food products, contained in the QR code.

CHAPTER IV

MARKET RESEARCH AND ANALYSIS OF PERCEPTION OF FACTORS INVOLVED IN FOOD CHAIN RELATED TO QR CODE CONTENT

This chapter presents the market research that has been carried out based on the questionnaire developed for food industry, retail, researcher and consumers: collecting data from respondents, respectively interpreting the results and drawing the final conclusions.

All data were been collected with help of survey which was run with "Gizmo survey soft" and analysed with IBM SPSS Statistical program.

This activity was completed in 2 stage:

- final qualitative research
- quantitative research

IV.1 Qualitative research

In order to carry out qualitative research, detailed interviews were used as a methodology, respectively the use of questionnaires.

IV.1.2 Food producer's perception related to information proposed to be added in QR code

The study shows us that the respondents are willing to use QR code on the label if it spreads on a small area, already overcrowded by legislation requirements. Some respondents from producers area are of the opinion that in some case label is written with very small characters and that the information is difficult to be read, and the consumer looks at the shelf life and at few ingredients from list of ingredients subsequently giving up reading completely it.

The benefits of using QR code, identified from producers point of view are :

- consumer could access different links with information related to promotional campaigns
- involves small area on the label and could eliminated label overload
- consumer has information in real time

The disadvantages of using the QR-code:

- it apparently addresses to young consumers and more experienced in accessing the online environment and various IT applications
- involve different applications which must be installed on smart mobiles (*"it occupies a space for which there is no confirmation whether the consumer is willing to use it for QR code"*)
- the presence of QR code reading devices is required at the place of purchase of food products. [8]

IV.1.3 Retailers's perception related to information proposed to be added in QR code

Retailer's respondents are agree with introduction of additional information in QR code, based on their desire and purpose to increase sales volume and on the other hand that supplementing product information in an important step in education of consumer, based to detailed information. [8]

During the interviews conducted with these respondents, it was found that they analyze very carefully the consumer behavior in stores and organize their activity according to the findings made on the shelf, based on reaction of the buyer.

Regarding the introduction of the QR code on the food label, retailers are not affected, given that there is the expectation that communication and education of consumers related to information provided by the QR code, should be done by producer. They see some opportunity by scanning these codes on the shelf using smartphones, but they think that it is unlikely to be achievable in Romania.

As mentioned above, the respondents want the information that will be found in the QR to be helpful for consumers, so that they can select the products that they will buy knowingly, in particular information related to:

- the local producer or supplier of ingredients, given that there is a tendency in the market to support the production of small local entrepreneurs;
- the technological manufacturing process, especially if there is a suspicion from the consumer's point of view that the products would contain more or less desired ingredients by the consumers, such as: preservatives, flavours enhancers, foaming agents etc.;
- instruction of preparation or consuming, if is applicable or if is relevant;
- the country of provenance of food product, most of the time, this information is an important criteria in selection of food products for purchase;
- details which are not mentioned on the label, which can increase the degree of information, education of consumer related to food product, taking into account the retailer's statement " One most informed consumer is a winning customer".[8]

IV.1.4 Researcher's perception related information proposed to be added in QR code

The size of the sample of research respondents who answered to the questionnaire is 40 respondents and was represented by: university professors, scientific researchers, engineers and research technicians, with agre between 19 and 65 years. The questionnaire was sent electronically, by e-mail.

The structure of the researcher respondents's sample consist of:

- | | |
|------------------------------|-----------------------------|
| - 10% university professors | - 15% researcher engineers |
| - 52% scientific researchers | - 23% researcher technician |

The information proposed to be added in QR code, were been the information which received from respondents the qualification "important" (4 points) and "very important" (5 points) (fig. 11) and the followings findings were made:

- very high percentages in the evaluation with "important" and "very important" were also recorded for the information: ingredients which causes allergies or intolerances, the date of minimum durability and storage conditions that received a percentage of 97.5%.
- the mention regarding nutrition declaration and nutrients quantity registered a percentage of 95%, the vote of confidence in this information that support consumer to understand the quality and value of the respective product; the score were: 65% "very important" and 30% "important".
- 87% were registered for the information related to the expression of energy value and nutrient content per portion and /or per unit of consuming, proof of the importance given to this information by the group's respondents.
- an important percentitional statement proposed, Energy value and the nutrient quantities expressed as a percentage of the Reference Intake values.
- at the opposite pole was the information proposed to be included in QR code was the information related to reference standard used in the manufacture of the food product, evaluated 62,5%. From here, we can see, that more than half of the respondents appreciated with 4 and 5 point this additional statement, but still less than other elements metioned in the questionnaire.

Regarding nutrition labelling systems used on front of pack based on colour code presented to be added in QR code, this researcher's respondents, in a percentage of 80% (figure 13), voted as important/ very important the nutrition labelling system on the front of the pack UK Traffic light from Great Britain, compared with Nutri Score used in France.

In Figure 12 we have following information related to score registered (from left to right) in column number:

1st – name of food product;/ 2nd – country of origin or place of provenance of food product/ 3rd – country of origin or place of provenance of primary ingredient/ 4th – name of commercial name of food operators; 5th – importer name in EU; 6th – list of ingredients; 7th: ingredients which contain allergen or causes intolerance; 8th – net weight of food products; 9th – quantity of ingredients emphasized on the label; 10th – shelf life or use; 11th – storage conditions; 12th – instruction of preparations; 13th – nutrition declaration per 100g/100ml; 14th - nutrition declaration per portion size/ unit of consuming; 15th – information related to standard certification; 16th – reference standard of production; 17th – information related energy value and nutrients reported vs Reference Intake values.

Colour of code for Figure 12:

green (very important – 5), yellow (important - 4), grey (neither important or important - 3), orange (less important – 2) and blue (no important – 0).

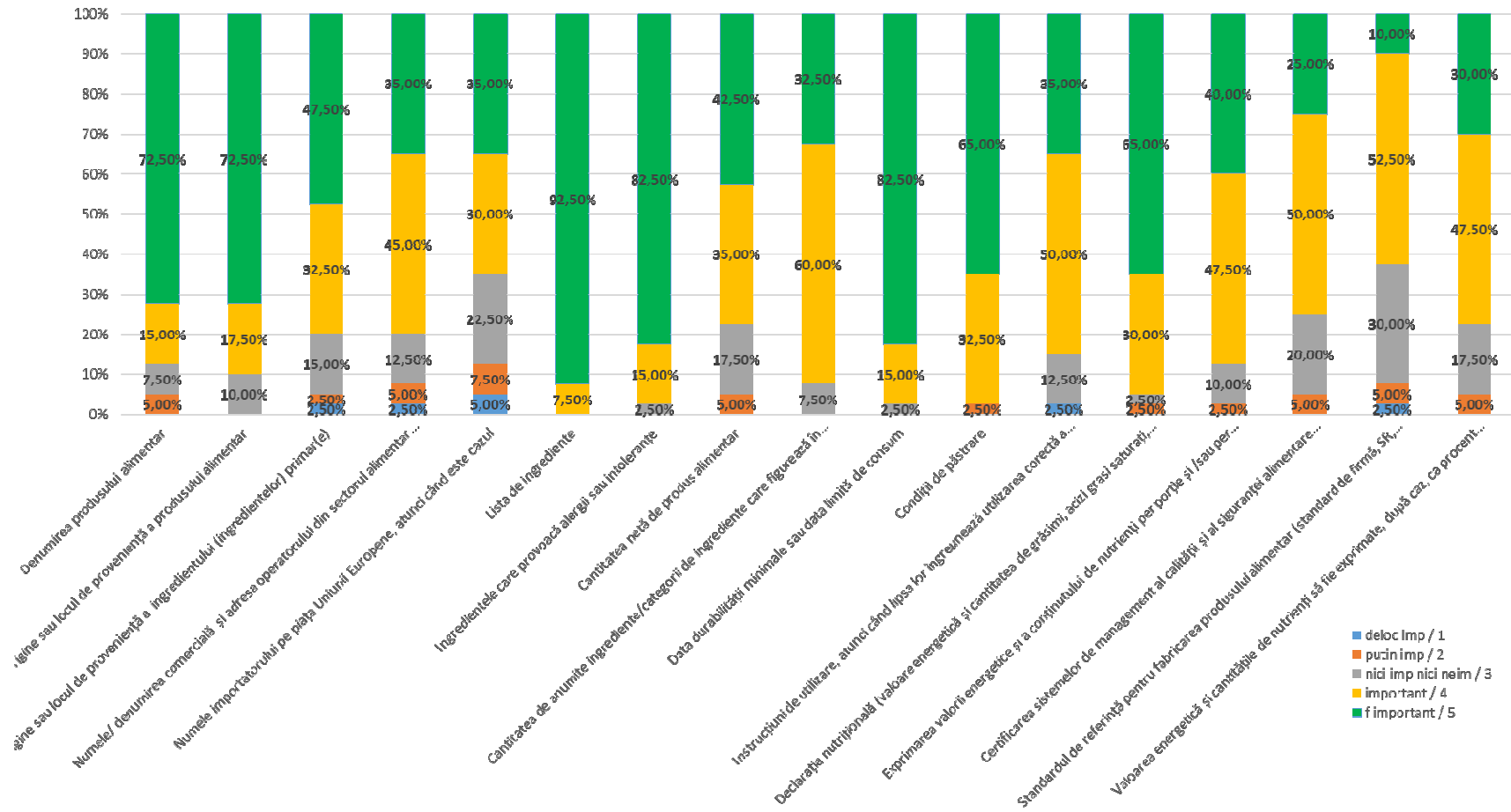


Figure 12 Importance of information proposed to be added on QR cod from reserchers resondents point of view

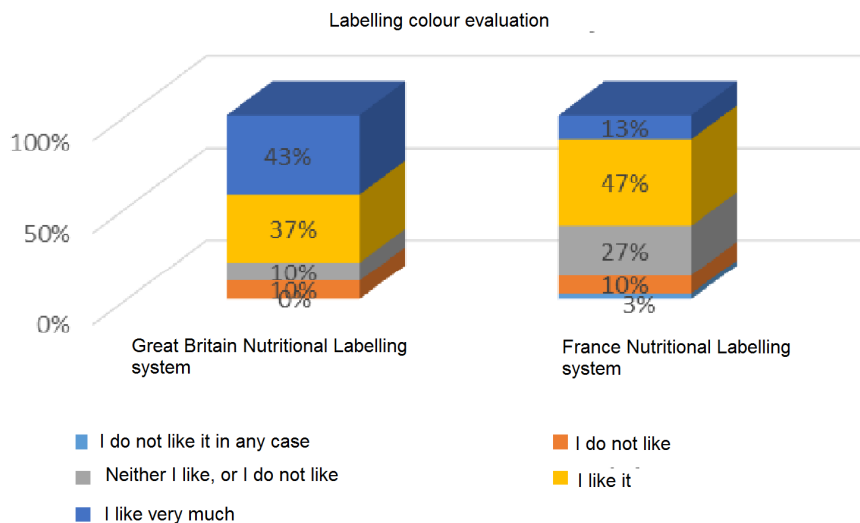
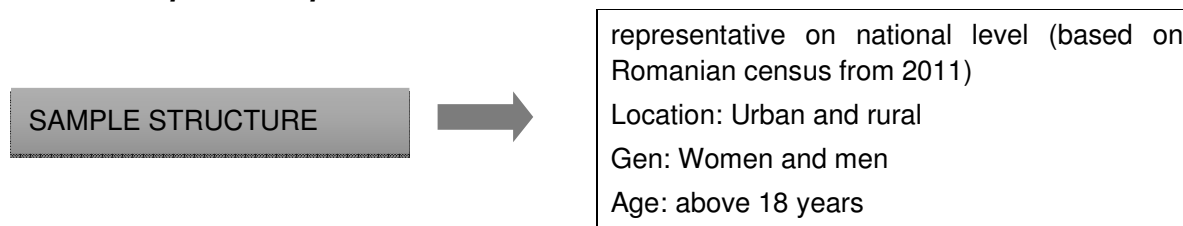


Figure 13

Evaluation of nutritional labelling systems with colours from reserchers respondents point of view

IV.2 Quantitative research

IV.2.2. Sample description



| Regions | Small urban (< 20 k pop.) | Medium urban (20 k -100 k pop.) | High urban (> 100 k pop.) | Rural |
|-----------------------------|---------------------------|---------------------------------|---------------------------|-------|
| South (Muntenia + Oltenia) | 3% | 5% | 5% | 19% |
| East (Moldova + Dobrogea) | 2% | 4% | 5% | 14% |
| West (Transilvania + Banat) | 4% | 5% | 9% | 16% |
| Bucharest | | | 9% | |

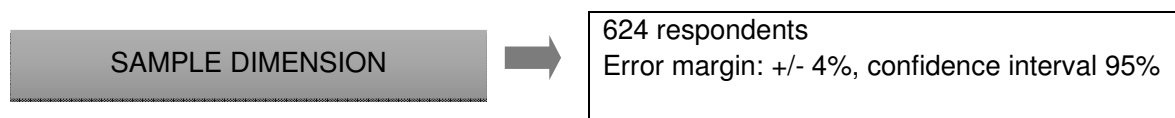


Figure 14

Structure and dimension of sample in quantity research

The structure of sample consists on a of 624 consumers above 18 years of age, from rural and urban areas. This market research had an error matgin of +/- 4% and a confidence interval of 95%. (Figura 14).

Posibility of accessing the information proposed to be added in QR – code.

For scanning or accessing information from the QR code, it is necessary a reading tool to read it, for example an smartphone. 94% from consumers respondents have a mobil phone, and 75% from them have a smart phone, therefore, these consumers can access food information by scanning the QR code (Figura 16). [8]

In conclusion, 70% of Romnaia population could currently access the information mentioned in QR code.

„Information related to e-commerce, video, food and non-food products, applications, are the most accessed informations using QR.”[99]

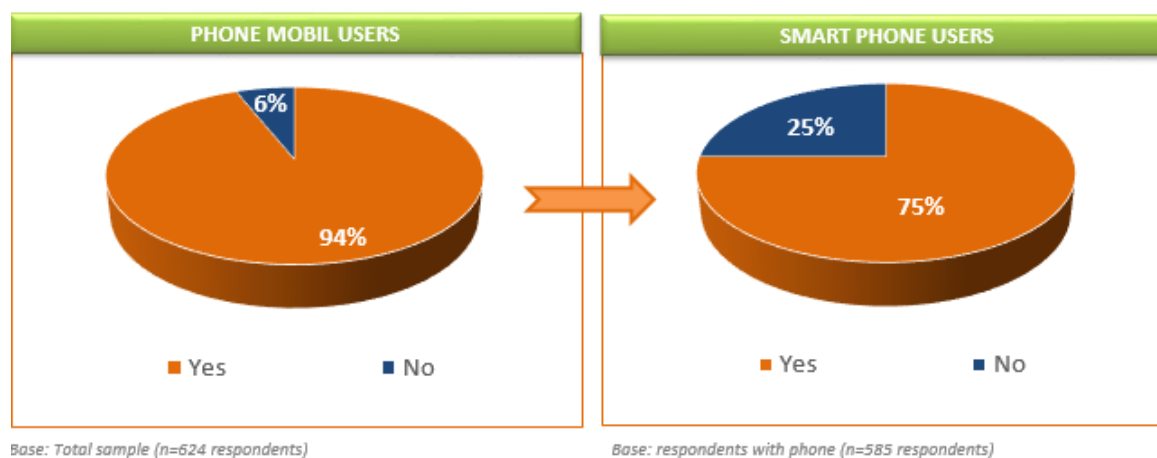


Figure 16
Possibility of information access via QR – code

IV.2.3 Rezults of quantitative research

Face to face interviews were conducted with support of questions from the questionnaire developed for an average consumer and is described in Annex III. [8]

From importance point of view, the information proposed to be added on QR code was evaluated by average consumer, on a scale from 1 to 5 points, having the following meaning:

- 1 point – no important
- 2 points – less important
- 3 puncte – neither important or important
- 4 points - important
- 5 points – very important

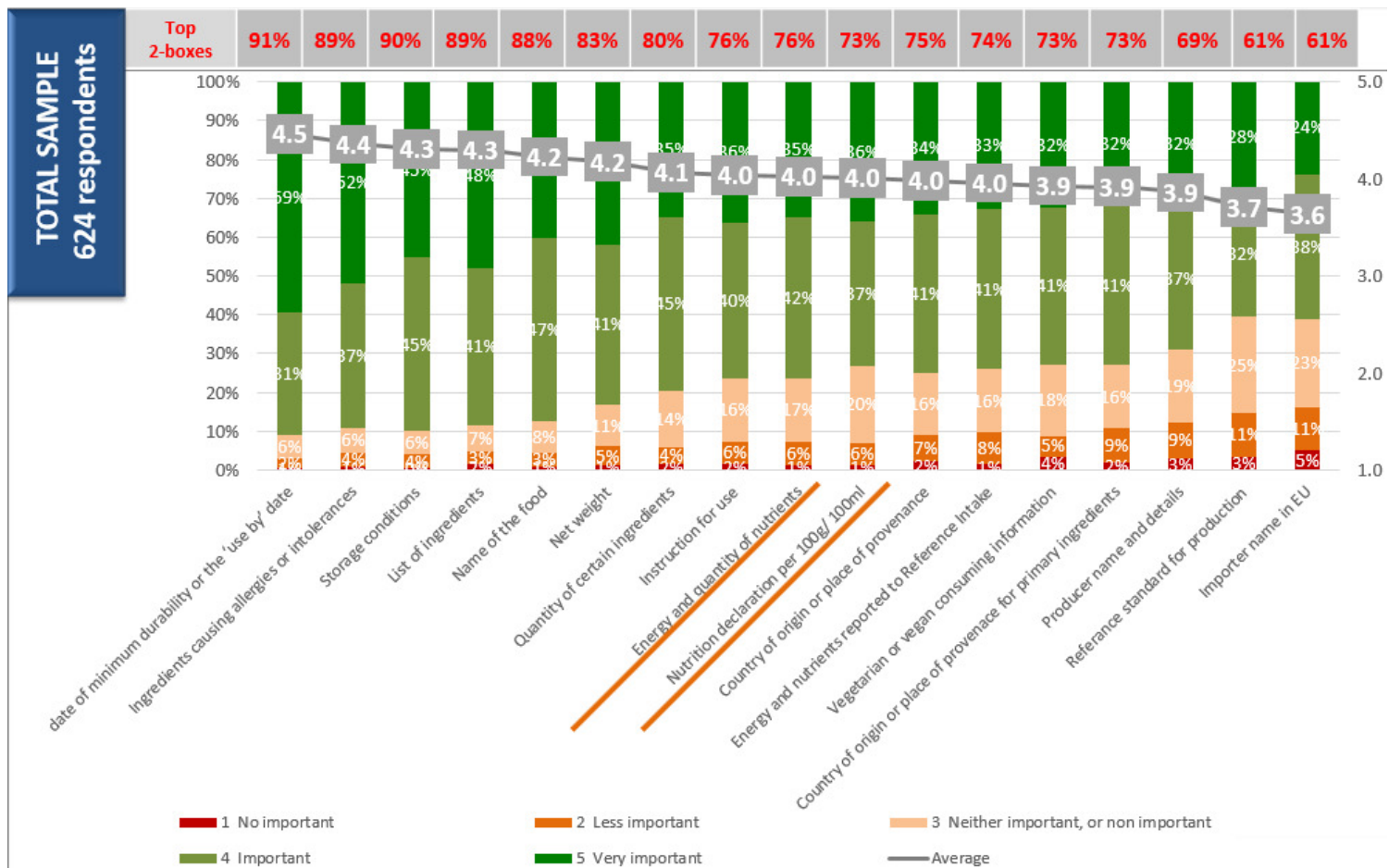


Figure 17

Evaluation of information importance proposed to be added on QR code by respondents of consumers

As can be seen from Figure 17, a number of 12 mentions proposed by the consumer questionnaire, were been evaluated by them with more than 4 points as an average (between 4 and 4.5 points), which means this information were considered important and very important for them. The other 5 mentions were also appreciated, obtaining as an average scores between 3,9 (3 mentions – as important) and 3,6 – score that fits this information with the degree of importance between: „medium important” and „important”, which show us that the informations proposed to be included in this code are essential for the consumer.

The data collected showed that the indications regarding the date of minimum durability or the end date of consumption and the ingredients which causes allergies or intolerance are considered most important information for consumer, obtaining an average score around 4.5 from 5 maximum points.

Based on above information we can draw the following conclusions in general, namely, that the Romanian consumer respondents are looking at the data of durability of the products, which is a positiv thing, respectively they are given a big importance to the content of ingredients and especially to the presence of ingredients and/or substance which causes allerggies and intolerances, information checked by different respondents on the food label.[8]

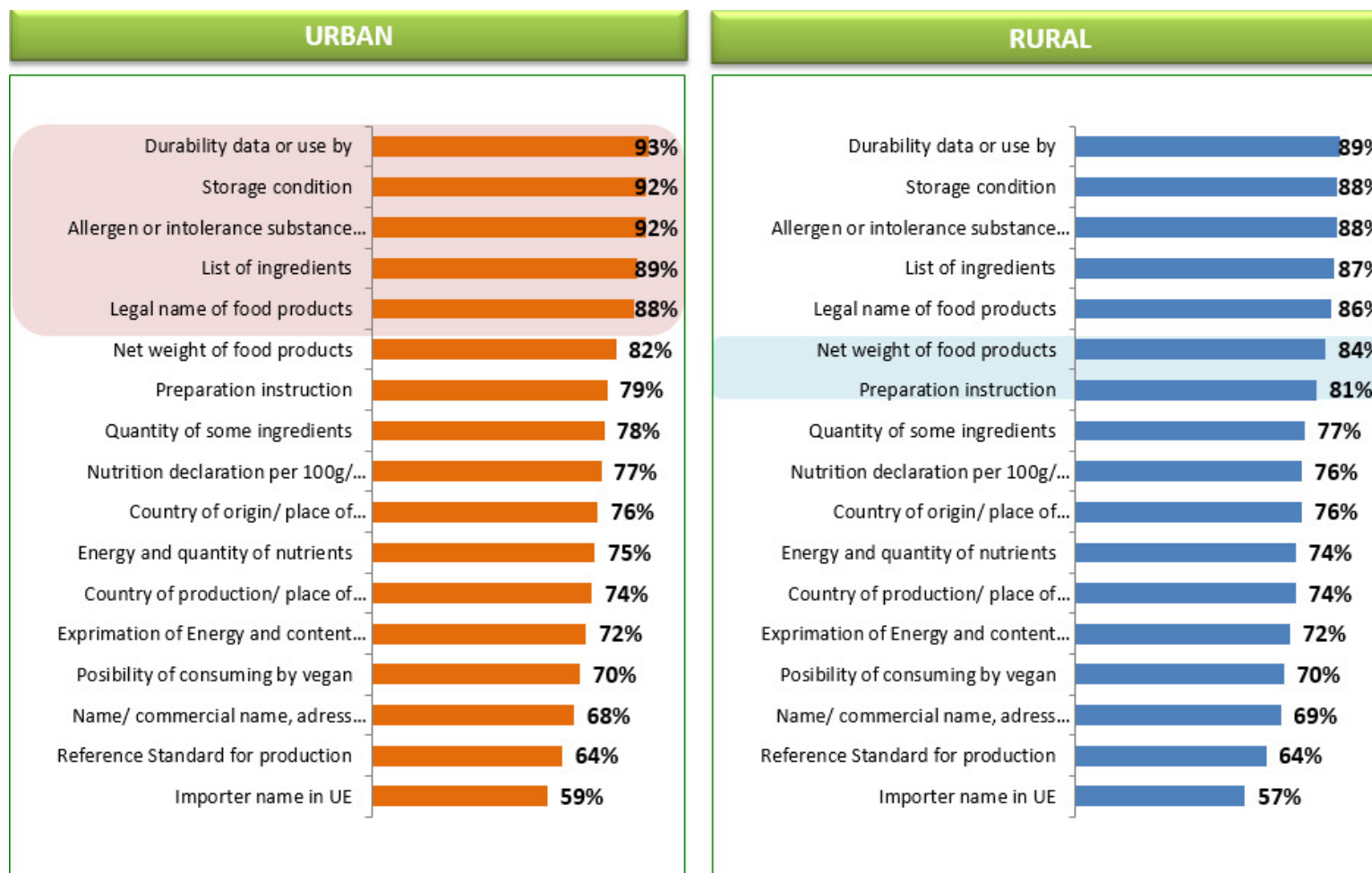


Figure 22

Comparison in evaluation of information voted as very important and important, urban versus rural

The result in the quantitative market research stage, allowed to make the comparisons that would lead to the real and the most correct conclusions related to the content of the information proposed to be introduced in QR code. In this line, was compared the percentages obtained from the information mentioned in questionnaire which received the highest score (important - 4 points and very important – 5 points/ comparison 2 top boxes), were compared, in rural and urban areas (Figure 22).

The respondents from the urban area registered a higher interest on the following information::

- the date of minimum durability or the „use by date” - 93% of them considered this information important (4 points) and very important (5 points)
- storage conditions - 92%
- ingredients causing allergies or intolerances - 92%
- the list of ingredients - 89%
- the name of the food - 88%

The respondents from rural area registered a slightly high attention for:

- the net quantity of the food – 84%
- instruction for use – 81%

Different studies show consumers' increased interest in the list of the ingredients and statements from the packaging. [76, 89,7].

Based on information mentioned above, we can conclude that this interest in the information on food packaging contributes to the education of the consumers and its influence in the choice of product purchased.

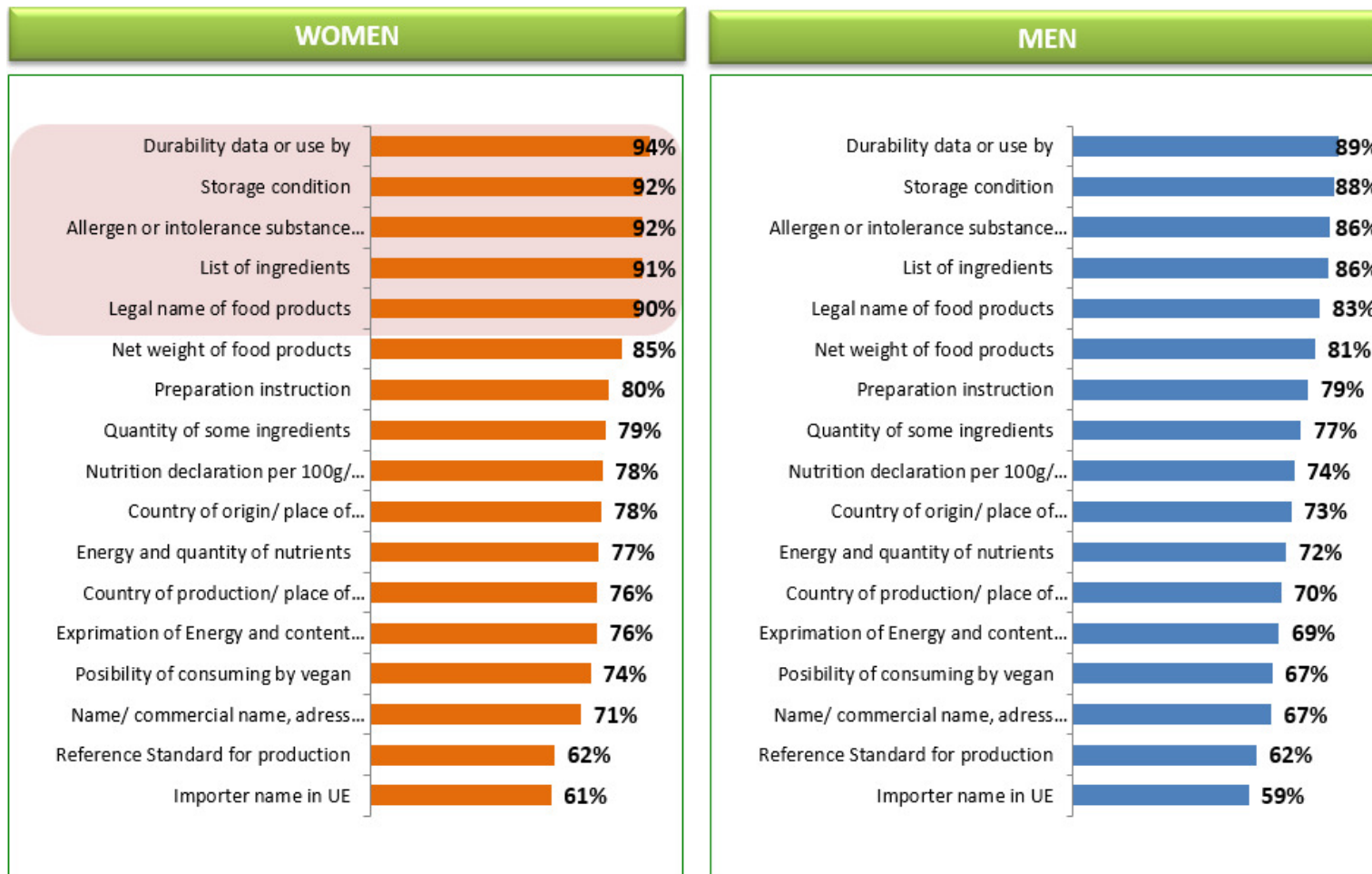


Figure 25

Comparison in evaluation of information proposed to be added on QR code, women respondents versus men respondents

As can be seen from Figure 25, women respondents have a greater interest than men respondents related to all food products information, provided through the questionnaire.

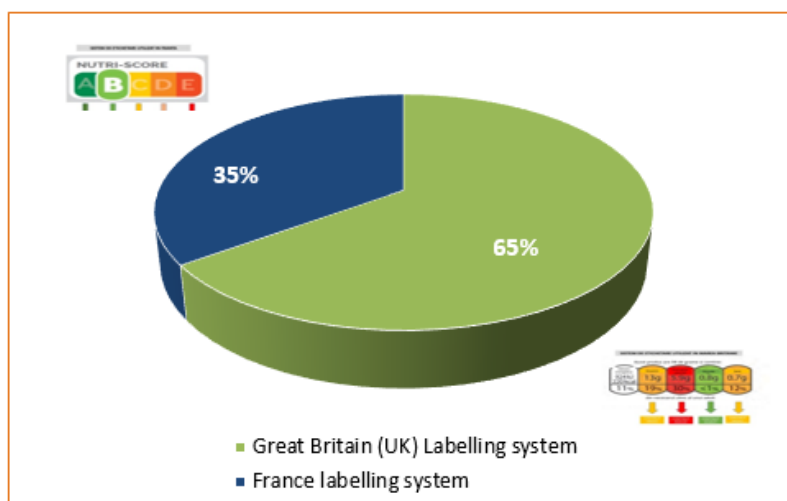
In the case of the first 5 information proposed, the differences between the two groups (women – men) are large, as follow:

- the date of minimum durability or the „use by date” – at women respondents the percent is 94%, therefore 94% from respondents considered this information is important and very important, while for men respondents the percentage is 89%.
- storage conditions – 92% was registered for women respondents, compared with 88% for men respondents.
- ingredients causing allergies or intolerances – 92% voted for women and 86% for men respondents, so women respondents are more interested in food intolerance and they want to know whether or not the food contains or not such type of ingredients.
- The list of ingredients – 91% was registered by women respondents, compared with 86% by men respondents.
- The name of the food – 88% registered for women respondents, while for men respondents was registered 83%.

Evaluation of additional front of pack nutrition labelling colour system

During the presenting questionnaire, was mentioned and illustrated the two proposal related to front of pack nutrition labelling colour system, initiated and used already in the Great Britain and France, but alos implemented in other countries, voluntarily.

65% from consumer respondents chose Great Britain front of pack nutrition labelling colour system. (Figure 37).



Base: Total sample (n=624 respondents)

Figure 37

Preference of consumer respondents on nutrition labelling system based on colours

CHAPTER V

GENERAL CONCLUSION, ORIGINAL CONTRIBUTIONS AND PERSPECTIVES

Quick response code (QR code) is an intelligent solution for extending the additional nutritional labelling of food products, which offers quick access to certain information, satisfying in this way *Romanian consumer needs to know nutritional and energy elements of food products, respectively increasing the degree of consumer information.*

Repeating in QR cod of mandatory information provided by food legislation is supported by the small characters on the food labelling packaging, which do not allow for each category of consumers a good visibility or a good understanding of information, as found in the study conducted in Romania [7].

The market research was carried out in two stages: a preliminary research among the researchers based on the preliminary questionnaire that was carried out during the events Ecotrophelia 2017 and Euroaliment 2017, which showed us that *the extension of nutrition labelling in the vision of education specialist – researcher*, by analyzing the information proposed to be added on QR code, these being accepted, respectively with the purpose of increasing the degree of consumer information, through the most accurate and complete information of consumer, as well as their preference to have on the label the nutritional labelling system "Traffic light".

The extension of nutrition labelling in the vision of control authorities (ANPC, ANSVSA, DSP), is seen as a programm to increase the degree of consumer, but also as a program to increase the degree of consumer confidence related to the control authorities in terms of dual quality of food.

Based on the data collected in the preliminary quality market research and consultation with the control representative authorities, was formulated *an coherent questionnaire which underarm all previous marketing research.* This questionnaire was personalized in a questionnaire for industry, retail and research (Annex II) and in a questionnaire for food consumers (Annex III).

The final quantitative and qualitative market research was carried out on a representative sample of respondents at national level, involving the main categories of factors in the area of food products, sample that allowed the collection, analysis and interpretation of market data regarding to teh content of QR code.

The study found that *food producers* generally agree, in generally, implementation of QR code in our country, as an extension of nutritional labelling, but considers it appropriate to introduce images, short movies and other presentation, consumer-friendly information and which by the way of presentation they can be easily understood by them. In the same time they believe that a new way of labelling would lead to high costs and this is not a welcome fact for the companies.

Retailer's respondents embrace the extension of nutritional labelling of food stuffs through the QR code, the introduction of new food product information, other than mandatory information in the content of this code, they are interested in the selling products, and supplementing the

number of product information and communication channel would lead to increase the volume of sales. They stated that they want to introduce the nutritional labelling system "Traffic light", respectively, informations related to: the manufacturing process of the product, local manufacture or ingredients supplier, given that all major retailers have developed category and trade mark of Romanian products, supporting and encouraging the production of small entrepreneurs.

The respondents from researcher area agree with introduction of QR code on the labelling, considering that all the informations from questionnaire are important and very important. The majority voted for the color nutritional labelling system implemented in Great Britain. The agreement to introduce the information proposed to be added in QR code, as well as the preference of this respondents related to the nutritional labelling front of pack system implemented in Great Britain was registered on the both market research, in preliminary research and in final research, findings which support the implementation of nutritional labelling by QR code as a fast reading tool, which contain information proposed.

The respondents of average consumers in 94% at national level have a mobile phone, and 75% from them have smart phone. They considered that all information mentioned in the questionnaire are important and very important in a percentage of over 60%. The most important information chosen by them was data of minimum durability (91%), followed by information related to ingredients causing allergies or intolerance and storage condition (90%).

The respondents who participated to this study among food industry researcher, average consumers, producers and retailers, expressed a preference for implementation of Traffic light nutritional labelling system, from Great Britain, as essential for increase the information level of consumer.

The perspective of this paper work is to increase the degree of consumer and to participate as a technical support regarding the quality difference that characterize some products in the single market, to increase the transparency between the producer and consumer.

The QR code implemented on the food labelling participates in increasing transparency and in the online marketing environment, as it can also help the traceability of the food product.

In the end of 2018 year and the beginning of 2019, during the open discussion with representative of National Consumer Protection Authority and Agriculture Ministry, the proposals regarding the introduction of QR code on the food labelling and the unique register of control of commercialized food products on EU were presented as a part of dual quality of food standard.

The data from this paper work have contributed scientifically in the process of elaboration of Report completed by European Parliament related to the dual quality of food based on element presented and is recognized by the European Commission [95], of the proposal legislative related to introduction of QR code on food labelling [105], respectively by law no. 133/2019 for the establishment of the Agency for Quality and Marketing of Agriculture Food Products [98], *achieving in this way the objective regarding the legislative initiative for the application of nutritional labelling through QR code*. The objective of the Agency for Quality and Marketing of Agriculture Food Products is to promote the consumption of food products that are voluntarily certified, based on certification system elaborated by the national or European legislation.

List of scientific paper work published and presented

- [1] Radu (Balaban), A. E., Alexe, P., (2018), Perception of romanian consumer on organic food products. Series E. Land Reclamation, Earth Observation & Surveying, Environmental Engineering. Vol. VII, 2018 Print ISSN 2285-6064, CD-ROM ISSN 2285-6072, Online ISSN 2393-5138, ISSN-L 2285-6064, <http://landreclamationjournal.usamv.ro/pdf/2018/Art4.pdf>
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- [20] https://www.referenceintakes.eu/files/downloads/5_clitravi_view_on_portion_sizes.pdf
- [21] https://www.referenceintakes.eu/files/downloads/2_caobisco_rationale.pdf
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- [23] https://www.referenceintakes.eu/files/downloads/8_imace_margarine_portion.pdf
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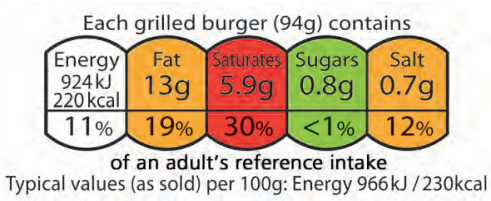
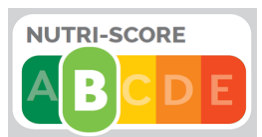
QUESTIONNAIRE for industry, retail and researcher

Related to the information which are mentioned or you are think that should be mentioned in QR code (quick response code) from the food labelling

How important do you consider that the information mentioned bellow related to the food products, to be mentioned in QR code (quick response code) on the food label?

| | |
|----------------|-------|
| Activity area: | |
| Industry | _____ |
| Retail | _____ |
| Researcher | _____ |

| No. | Food information to be mentioned in QR Code | No imp. 1 | Less Imp. 2 | Imp. Medium 3 | Imp. 4 | Very imp. 5 |
|-----|--|--------------|----------------|------------------|-----------|----------------|
| 1. | The name of food product | | | | | |
| 2. | The country of origin or place of provenance of food product | | | | | |
| 3. | The country of origin or place of provenance of primary ingredient (s) | | | | | |
| 4. | The name or business name and address of the food business operator (producer) | | | | | |
| 5. | Impoter name on UE market, when is the case | | | | | |
| 6 | List of ingredients | | | | | |
| 7 | Ingredients which causing allergies or intolerance | | | | | |
| 8 | The net quantity of the food | | | | | |
| 9 | The quantity of ingredients/ ingredients category emphasized in legal name | | | | | |
| 10 | the date of minimum durability or the 'use by' date | | | | | |
| 10 | Storage conditions | | | | | |

| | | | | | | | | | | | | | | | | |
|----------------------------|---|----------------------------|----------------|-------------------|----------------|--------------|-----|-----|-----|-----|-----|--|--|--|--|--|
| 12 | instructions for use where it would be difficult to make appropriate use of the food in the absence of such instructions | | | | | | | | | | | | | | | |
| 13 | Nutrition declaration (energy value and quantity of fat, sat fat, carbohydrates, sugars, proteins and salt) /100g/ 100ml | | | | | | | | | | | | | | | |
| 14 | energy value and quantity of fat, sat fat, carbohydrates, sugars, proteins and salt) /per portion / per unit of consuming | | | | | | | | | | | | | | | |
| 15 | energy value and quantity of nutrients reported to Reference Intake value / 100 g/ 100 ml. | | | | | | | | | | | | | | | |
| 16 | Reference standard for manufacturing of food products (standard of company, SR, SR ISO etc) | | | | | | | | | | | | | | | |
| 17. | Certification of Quality and Food Safety Management system implemented by producer | | | | | | | | | | | | | | | |
| 18. | <p>Expression, by colour, of the nutrient content: fat, sat fat, carbohydrates, sugars and salt (UK Traffic light system), as: high content – red colour, average content – yellow colour, low content – green colour</p>  <p>Each grilled burger (94g) contains</p> <table border="1"> <tr> <td>Energy 924kJ 220kcal</td> <td>Fat 13g</td> <td>Saturates 5.9g</td> <td>Sugars 0.8g</td> <td>Salt 0.7g</td> </tr> <tr> <td>11%</td> <td>19%</td> <td>30%</td> <td><1%</td> <td>12%</td> </tr> </table> <p>of an adult's reference intake Typical values (as sold) per 100g: Energy 966kJ / 230kcal</p> | Energy 924kJ 220kcal | Fat 13g | Saturates 5.9g | Sugars 0.8g | Salt 0.7g | 11% | 19% | 30% | <1% | 12% | | | | | |
| Energy 924kJ 220kcal | Fat 13g | Saturates 5.9g | Sugars 0.8g | Salt 0.7g | | | | | | | | | | | | |
| 11% | 19% | 30% | <1% | 12% | | | | | | | | | | | | |
| 19. | <p>The colour expression of the nutritional quality of the food product France Nutri Score system: (dark green (A) = nutritional favorable product; up to dark orange (E) = less nutritionally favorable product)</p>  | | | | | | | | | | | | | | | |

QUESTIONNAIRE for consumer

Respondent data:

1. Age

18-30 31-50 51-65 peste 65

2. Gen

Female Ma

3. Educational level

Secondary school High school University

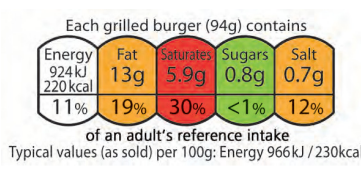
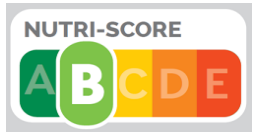
4. Area

Rural Urban

Related to the information which are mentioned or you are think that should be mentioned in QR code (quick response code) from the food labelling

How important do you consider that the information mentioned bellow realted to the food products, to be mentioned in QR code (quick response code) on the food label?

| No. | Food information to be mentioned in QR Code | No imp. 1 | Less imp. 2 | Imp. Medium 3 | Imp. 4 | Very imp. 5 |
|-----|--|--------------|----------------|------------------|-----------|----------------|
| 1. | The name of food product | | | | | |
| 2. | The country of origin or place of provenance of food product | | | | | |
| 3. | The country of origin or place of provenance of primary | | | | | |

| | | | | | | |
|-----|---|--|--|--|--|--|
| | ingredient (s) | | | | | |
| 4. | The name or business name and address of the food business operator (producer)sectorul alimentar (producătorului) | | | | | |
| 5. | Impoter name on UE market, when is the case | | | | | |
| 6 | List of ingredients | | | | | |
| 7 | Ingredients which causing allergies or intolerance | | | | | |
| 8 | The net quantity of the food | | | | | |
| 9 | The quantity of ingredients/ ingredients category emphasized in legal name | | | | | |
| 10. | the date of minimum durability or the ‘use by’ date | | | | | |
| 11. | Storage conditions | | | | | |
| 12. | instructions for use where it would be difficult to make appropriate use of the food in the absence of such instructions | | | | | |
| 13, | Nutrition declaration (energy value and quantity of fat, sat fat, carbohydrates, sugars, proteins and salt) /100g/ 100ml | | | | | |
| 14, | energy value and quantity of fat, sat fat, carbohydrates, sugars, proteins and salt) /per portion / per unit of consuming | | | | | |
| 15. | energy value and quantity of nutrients reported to Reference Intake value / 100 g/ 100 ml. | | | | | |
| 16. | Possibility of eating the food by vegetarians/vegan | | | | | |
| 17. | Reference standard for manufacturing of food products (standard of company, SR, SR ISO etc) | | | | | |
| 18. | <p>Expression, by colour, of the nutrient content: fat, sat fat, carbohydrates, sugars and salt (UK Traffic light system), as: high content – red colour, average content – yellow colour, low content – green colour</p>  | | | | | |
| 19. | <p>The colour expression of the nutritional quality of the food product France Nutri Score system: (dark green (A) = nutritional favorable product; up to dark orange (E) = less nutritionally favorable product)</p>  | | | | | |