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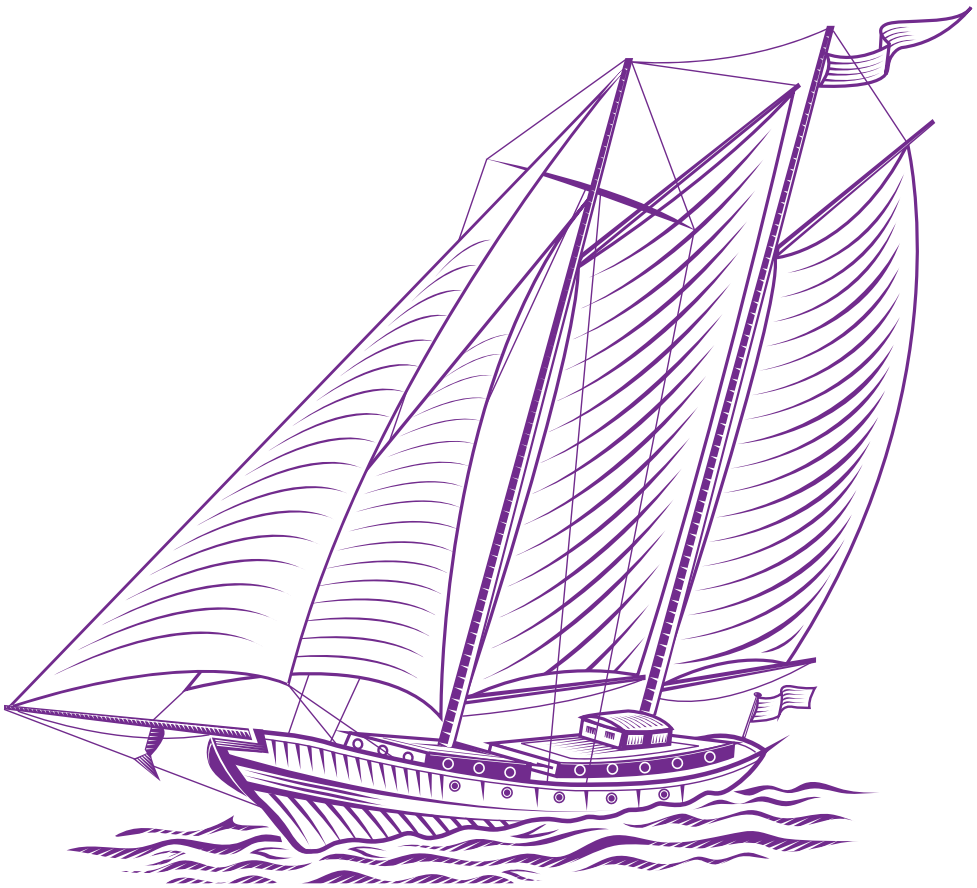

NEGOTIA

3/2015

STUDIA
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NEGOTIA

3/2015
September

EDITORIAL BOARD OF

STUDIA UNIVERSITATIS BABEŞ-BOLYAI NEGOTIA

YEAR **Volume 60(LX) 2015**
MONTH **SEPTEMBER**
ISSUE **3**

S T U D I A

UNIVERSITATIS BABEŞ–BOLYAI

NEGOTIA

3

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CUPRINS – CONTENT – SOMMAIRE – INHALT

STUDIA UBB NEGOTIA, LX, 3, 2015, pp. 5 - 22
(RECOMMENDED CITATION)

COSMETIC CONSUMPTION OF METROPOLITAN MALES IN A DEVELOPING COUNTRY

NEZIHE FIGEN ERSOY[1], MEDET YOLAL[2], BULENT BATMAZ[3]

ABSTRACT. In the last few decades, individuals have become more conscious about their image and appearance. Furthermore, due to the changing gender roles, men started using cosmetic products increasingly. As a result the beauty industry has flourished enormously. This study aims to examine attitudes of Turkish men towards cosmetic consumption and to identify the factors that are likely to influence men's cosmetic consumption behaviour utilizing data collected from Turkish males. Results indicate that self-esteem, lifestyle, societal beliefs, shopping and self-image are critical determinants of men's cosmetic consumption. Findings further suggest that cosmetic shopping behaviour of men is linked to self-image and lifestyle. Furthermore, significant relationship between self-esteem and self-image, and between societal beliefs and lifestyle come to the fore. The paper ends with implications for the marketers and theoretical contributions to the growing research on gender differences.

Keywords: Consumer behaviour, cosmetics, metropolitan males, shopping, Turkey.

JEL: M31

1. Introduction

There is abundant literature on gender differences in the context of consumption-related behaviour. Researchers have shown that shopping behaviour of men and women differ on many levels (Coley and Burgess, 2003). Due to an increase in the consumption of cosmetics and personal care products by men,

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several studies have also examined the factors that are likely to influence men's cosmetic consumption behaviour and the differences between male and female's cosmetic consumption behaviour (Bocock, 1993; Connelly, 2013; Davies and Bell, 1991; Dholakia, Pedersen and Hikmet, 1995; Featherstone, 1993; Firat, 1993; Fischer and Gainer, 1994; Mort, 1988; Nixon, 1992; Otnes, McGrath and Lowrey, 1995; Park, Iyer and Smith, 1989; Schouten 1991; Sturrock and Pioch, 1998; Sukato and Elsey, 2009; Thompson and Hirschman, 1995; Tuncay, 2005).

Naturally, men and women process information differently from each other with regard to their consumption of products (Coley and Burgess, 2003). At this point, postmodernity and its implications on consumer behaviour are very important because of new benchmarks. Firat (1993: 216) emphasizes that consumption reigns supreme for both women and men. Firat concludes that products are increasingly being marketed to men by conjuring up the notion that the use of such products will make them more presentable and attractive to potential sexual partners, mostly defined as women. In this vein, Souiden and Diagne (2009) explain that men have become key consumers for several cosmetic companies. Consequently, men's attitudes towards cosmetic products have altered and brought into being a newly defined important consumer of cosmetic products.

However, the research on men's cosmetic consumption is still thin on the ground, and further research is needed in order to better understand their behaviour. Moreover, to the authors' knowledge there has been no studies conducted on masculinity of males in an Islamic society. Further, previous studies are mostly on the developed western societies. As a result, it is important to identify what variables are affecting the consumption of men cosmetic products in a society like Turkey. Therefore, the aim of the study is to delineate attitudes of men in the framework of cosmetic consumption and to reveal the underlying factors and their correlation with each other when it comes to males focusing on the cosmetic consumption of this particular group in the Turkish market. The paper is structured as follows: first a review of the literature on the constructs of the proposed model, and a conceptual model on the basis of literature is presented. Next, the results of the testing the model using SEM analysis are reported. Finally, implications as well as limitations of the study and recommendations for future research are discussed.

2. Literature Review

Although beautification and fashion practices have a long history (Joy et al. 2010), in recent years, people have become more conscious about their image than ever before. Consequently, the beauty business has become a large sector of the economy and drives the sales of beauty aids, fashions, body care items and cosmetics among women and increasingly among men (Gross, 1995; Press, 2000;

McNeill and Firman, 2014). However, it is crucial to consider that the cosmetic world has two distinct parts (Blachin, Chareyron and Levert, 2007), namely the markets for both genders. Despite the fact that the cosmetic industry is traditionally associated with women, there is an increasing demand for cosmetics by men (Souiden and Diagne, 2009). According to Tuncay (2005) men are not only the influential decision makers for such traditional categories as electronics and hardware, but more recently, they are becoming enthusiastic consumers of personal care and beauty products.

The rising number of men beautifying themselves or customizing their bodies clearly shows men's increasing awareness of their look (Firat, 1993). Firat explains that this consumption trend is becoming an acceptable activity, even for males. Indeed they have been relatively freed from having to represent only the masculine side because of the cultural break that has begun to take place between the categories of gender and sex. Consequently, the changing roles of both sexes have resulted males' interest in consumption.

According to Bocock, men are a part of modern consumerism like women in a way that "their construction of a sense of who they are, of their identity as men, is now achieved as much through style of dress and body care, image, the right 'look', as women's" (Bocock, 1993 cf. Sturrock and Pioch, 1998: 337). Consequently, products are marketed to men through implications that consumption of such products will make them more presentable and attractive to women (Firat, 1993:218). Therefore sales in male cosmetic products are expected to increase by 18 percent globally (Sukato and Elsey, 2009).

Factors such as physical attractiveness, health and age can also be associated with metrosexuality. The word metrosexual is a combination of two words: "metropolitan" and "sexual" to designate men who are living in big cities and who give a particular importance to their physical aspect and well-being (Blanchin, 2007). Metrosexual people are neither androgynous nor homosexual, and this characteristic plays an important role in men's cosmetic consumption. Holt and Thomson (2004) wrote that American mass culture idealizes the man-of-action hero -an idealized model of manhood. The idea of idealized man is also valid for metrosexuality. This concept also denotes men's struggle to define their masculine social identities via their physical attractiveness. As such, a strong relation between metrosexuality and men's cosmetic consumption could be established.

A study by Sukato and Elsey (2009) in Thailand refer to the theory of reasoned action (Fishbein and Ajzen, 1975) to explain the men's purchasing behaviour toward cosmetic products. In their study on habits of men's cosmetic product usage, they found that there is a positive relationship between the self-image and normative influences. Further, male consumers are affected by beliefs

in product attributes toward applying skin care products positively. It was also found that self-image is associated with attitudes toward usage of cosmetic products by male consumers.

Studying on the Canadian and French men's consumption of cosmetics, Souiden and Diagne (2009: 97-109) clarified the impact of personal variables (i.e self-image, ageing, physical attractiveness, health), social-cultural variables like as beliefs and lifestyles and marketing variables (i.e. advertising, purchase situation). Their study revealed that advertising and attractiveness have a significant and positive effect on men purchasing behaviour toward cosmetic products. They also report that state of health and societal beliefs have no significant effect on attitude and purchasing behaviour of men toward the product. Interestingly, both consumer groups do not perceive that their cosmetic consumption is influenced by their cultural setting and beliefs. On the other hand it is found that self-image, ageing and lifestyle have strong impacts on Canadian male attitude toward the consumption and purchase of cosmetics. It is also shown that the main personal motives behind the purchase of men's cosmetics in Canada lie in the desire to increase their self-images, be physically attractive and convey a youthful appearance.

Similarly, Weber and Villebone (2002) investigate the differences in purchasing behaviour between the US and French cosmetic markets. They demonstrate that there are important competitive factors that affect consumer's choices like: price, quality, packaging, advertising, promotion, local recognition, opinion toward particular firms or products and the knowledgeable salesperson. Their results also indicate that there are notable differences in cosmetic purchase behaviour between the US and French market. A study by Ficheux, Wesolek, Chevillotte and Roudot (2015) assess the percentage of users, the frequency of use and the number of cosmetic products consumed by the French population. Their results suggest that an average French man uses eight hair, face and body products a day. Trying to explore men's increasing use of grooming products, Sturrock and Pioch (1998) have reported that men consume grooming products to alter their body and body image. They propose that through changing this image, men either aim to create or to alter self-identity. The authors conclude that image creation, concerns about enhancing one's attractiveness, reducing the ageing process and the maintenance of health are factors combined with kick of the use grooming products.

3. Theoretical Framework

According to previous researches on the subject, we recognized that the male behaviour toward cosmetic products is influenced by some important concepts especially so, previous researches underpin our studies on the construction

of the conceptual framework. According to Souiden and Diagne (2009:105), men's attitudes and purchase behaviour toward cosmetic products are influenced by different motivations and variables. Thus, in describing our hypothesis on this issue, we adapted some conclusions which run parallel to Turkish culture.

Self-esteem and Self image

Solomon (2006) defines self-esteem as the positivity of a person's self-concept. Blanchin and associates (2007) underline that "…the definition of self-esteem focuses on the idea of discrepancy, especially the one between the self that one wishes to be (the ideal one), and the self that one currently sees one self as being (the "real" or "perceived" self)". Components of the self-concept include physical, psychological, and social attributes, which can be influenced by the individual's attitudes, habits, beliefs and ideas. Consumers demonstrate consistency between their values and the products they purchase because their consumption behaviour is related to their self-concept. At that point, self-image congruence model (Solomon, 2006: 161) suggests that consumers choose some products when product attributes match some aspect of their self. This model assumes that there is a cognitive process of consumers matching between product attributes and consumer's self-image. As it is widely acknowledged, self-image refers to the perceptions individuals have of what they are like (Goldsmith, Moore and Beudoin, 1999). People with self-esteem expect to be successful, will take more risks, and are more willing to be the centre of attention.

On the other hand, people try to evaluate themselves by making a correlation to the people depicted in artificial images. Self-esteem is deeply embedded in social interaction (Askegaard, Gertsen and Langer 2002) and will inevitably help people to create a desired image. Lennon, Lillethun and Buckland (1999) note that high self-esteemed people have less social comparison and less dis-satisfaction with their own looks. Sturrock and Pioch (1998) stipulate that male consumption of grooming products contributes to the production of a desired identity and self-image. Men's increasing interest in their self-image is further stimulated by the increase in the number of men's magazines (Bakewell, Mitchel and Rothwell, 2006; Mintel, 2000 cf. Bakewell et al. 2006) that portray a distinct attractive image of the "new man". Based on the above discussion, it is proposed that:

H1: Self-esteem explains self-image in male consumption of cosmetic products.

Self-image and Shopping

Because many consumption activities are related to self-definition, it is not surprising to see that consumers demonstrate consistency between their values and their purchases. Self-image congruence models suggest that people choose products when their attributes match some aspect of the self (Solomon, 2006). Hu and Jasper (2006) reveal that an individual adopts a behaviour, which complies with others (normative influences), resulting from the belief that the adoption will enhance the individual's self-concept or self-image. People buy items for creating a desired image for themselves. Consumer goods can and do function as material symbols of who a person is and who they would like to be, and having certain qualities of material possessions is to maintain a certain kind of selfhood in relation to other people (Dittmar and Drury, 2000). Therefore, it is proposed that:

H2: Self-image explains shopping behaviours of males towards cosmetic products.

Societal beliefs and lifestyle

When consumers buy a product; they usually tend to fulfil some type of needs which are influenced by their own cultures and beliefs. Additionally, the cultural environment affects how and why people live and behave the way they do. Weber and Villebone (2002) argued that culture has a significant impact on consumer behaviour because the components of culture (e.g. beliefs) dictate individuals' behaviour.

However, as people get more influenced by an open-minded environment, make-up is seen more for the benefit of taking care of the skin rather than an effeminate practice. The social adaptation perspective assumes that the perceiver will weigh information more heavily if he feels it is instrumental in forming an attitude (Solomon, 2006). Askegaard et al. (2002) note that self-identity has become a reflexive project that each individual must undertake by him- or herself, but in interaction with other human beings and with the institutions of society. Further, lifestyle is defined as a pattern of consumption reflecting a person's choices of how he or she spends time and money (Solomon, 2006: 209). Psychologically as well as physically, people must present themselves to the world so that other people will be interested in remaining or engaging in mutually advantageous relationships with them (Askegaard et al., 2002). Based on the preceding discussion, it is proposed that:

H3: Societal beliefs explains lifestyle in male cosmetic consumption

Lifestyle and Shopping behaviour

With respect to lifestyle, several authors agree that it has a major impact on the purchase and consumption behaviour of consumers. For instance, Coley and Burgess (2003) argued that lifestyle determinants (such as social class, values and personality) have a huge impact on how individuals behave toward the consumption of products. As such, commodities are important for the creation and expression of cultural identity (Jansson, 2002).

On the other hand, career oriented men tend to be more concerned with their appearances because of their lifestyles. They are turning to cosmetics and beauty treatments to improve their looks (Liu, 2006). Additionally, those who live in urban areas and big cities are likely to use more cosmetics than those living in smaller cities (or rural areas) where there is less need to look good (Liu, 2006). Consequently, it is proposed that:

H4: Lifestyle explains shopping behaviour of males in cosmetic consumption

4. Methodology

This paper aims to delineate attitudes of Turkish men towards cosmetic consumption, and to reveal the underlying factors towards the consumption of cosmetics. A quantitative research method was employed for the purpose of the study. The questionnaire was originally written in English. A back translation approach was used to ensure that the meanings of items used were understood by the respondents. The questionnaire consisted of two parts. The first part had a scale of attitude of cosmetic consumption, and the second part consisted of demographic information. Self-image was measured by nine items adopted from Goldsmith et al. (1999), Soiden and Diagne (2009), and Sturrock and Pioch (1998). To examine the effect of confidence, four items were adopted from Coley and Burgess (2003). Lifestyle was assessed by five items adopted from Coulter, Feick and Price (2002). Regarding the effect of societal beliefs on the attitudes of men's cosmetics consumption thirteen items were adopted from Bakewell et al. (2006). Further five items were adopted from Bakewell et al. (2006) to assess the cosmetics shopping behaviour of men. These thirty-six items were reduced to twenty-nine items by the exploratory factor analysis. All the items were measured on a five-point Likert scale ranging from "strongly agree" to "strongly disagree".

The self-administered survey was conducted by the researchers and administered during January to March 2013. The subjects of the study were the male consumers older than 18 years of age. A convenience sampling method was

employed. Respondents were recruited from three department stores located in the metropolitan area of Eskisehir, Turkey. The males in the cosmetic department stores were approached and they were asked if they were willing to participate in the survey. A total of 440 respondents accepted to fill out questionnaires. Fifty-five of the returned questionnaires were eliminated due to missing information; resulting in 385 usable responses.

First, a multiple correspondence analysis (MCA) was conducted. Afterwards, an exploratory factor analysis was conducted. The proposed model was tested utilizing a variance based Structural Equation Modelling (SEM) approach with maximum likelihood (ML) method of estimation by using LISREL 8.80 package program. A two-stage process was used. First, a confirmatory measurement model that specifies the posited relations of the observed variables to the underlying constructs, with the construct allowed to intercorrelate freely, was tested. Afterwards, the structural model was tested. The structural portion of the SEM allows for testing of multiple equations with multiple dependent variables. The following indices were used to assess the model fit: chi square ($\chi 2$) and $\chi 2$/df ratio, Root Mean Square Error of Approximation (RMSEA), Normed Fit Index (NFI), and Comparative Fit Index (CFI).

5. Results

Table 1 presents the profile of the respondents. Almost half of the respondents were married (50.9 percent), and the rest were single. Slightly over 28 percent of the respondents were under 25 years of age. Most respondents were professionals working as employees (65.5 percent), and the remaining 34.5 percent represented the categories of college students (22.9 percent), employers and merchants (4.9 percent), managers (4.2 percent), and retired persons (2.6 percent). The majority of the participants had high school and college education. Slightly more than 39 percent reported a monthly income of US$700 to US$1400.

Table 1. Demographic profile of the participants (n=385)

Variable	Frequency	Percentage
Age		
Less than 25	109	28.3
26-30 years	68	17.7
31-35 years	74	19.2
36-40 years	48	12.5
41-45 years	40	10.4
46 years and older	46	11.9

Marital Status		
Single	189	49.1
Married	196	50.9
Education		
Primary school	29	7.5
High school	123	31.9
College	145	37.7
Post Graduate	51	13.2
Doctorate	37	9.6
Occupation		
Employee-Official	252	65.5
Student	88	22.9
Employer-Merchant	19	4.9
Managerial	16	4.2
Retired	10	2.6

Correspondence analysis was employed to delineate underlying relations among the socio-demographic characteristics of the respondents. Results of the correspondence analysis, as can be seen in the ScatterPlot graph, revealed that the male consumers who were between 26 to 40 years old, had an income of more than US$1400, and had a university or post-graduate degrees had a higher self-image, self-esteem, lifestyle and a higher shopping behaviour. These factors were closely interrelated. This group of male consumer was also composed of employees, officials and managerial works, and they are married. On the other hand, retired people, employers and merchants older than 41 years old had a low self-image, self-esteem, lifestyle and a lower shopping behaviour. These factors were also closely interrelated (Figure 1). However, high school graduates, singles and students younger than 25 years old were not related with all subscales.

The exploratory factor analysis of 29 items of cosmetics consumption resulted in five factors-*self-esteem*, *lifestyle*, *societal beliefs*, *shopping* and *self-image*- and explained almost 56.4 percent of the variance. Each dimension had an Eigenvalue of at least one or higher and explained more than 8 percent of the variance. The total Cronbach's alpha value indicated that the model was internally reliable (α=.915). The appropriateness of factor analysis for cosmetics consumption was determined by Barlett's test of sphericity = 4789.326 $p<0.000$ and the test KMO = .922, $p = 0.000$. None of the individual loading was less than .49, and the reliability coefficients of the delineated factors ranged from .746 for self-image to .889 for self-esteem (Table 2). Unlike the previous study by Souiden and Diagne (2009) the factors of *health* and *ageing* were not found to be significant for the Turkish male consumers. However, these findings still showed consistencies and similarities with the previous studies.

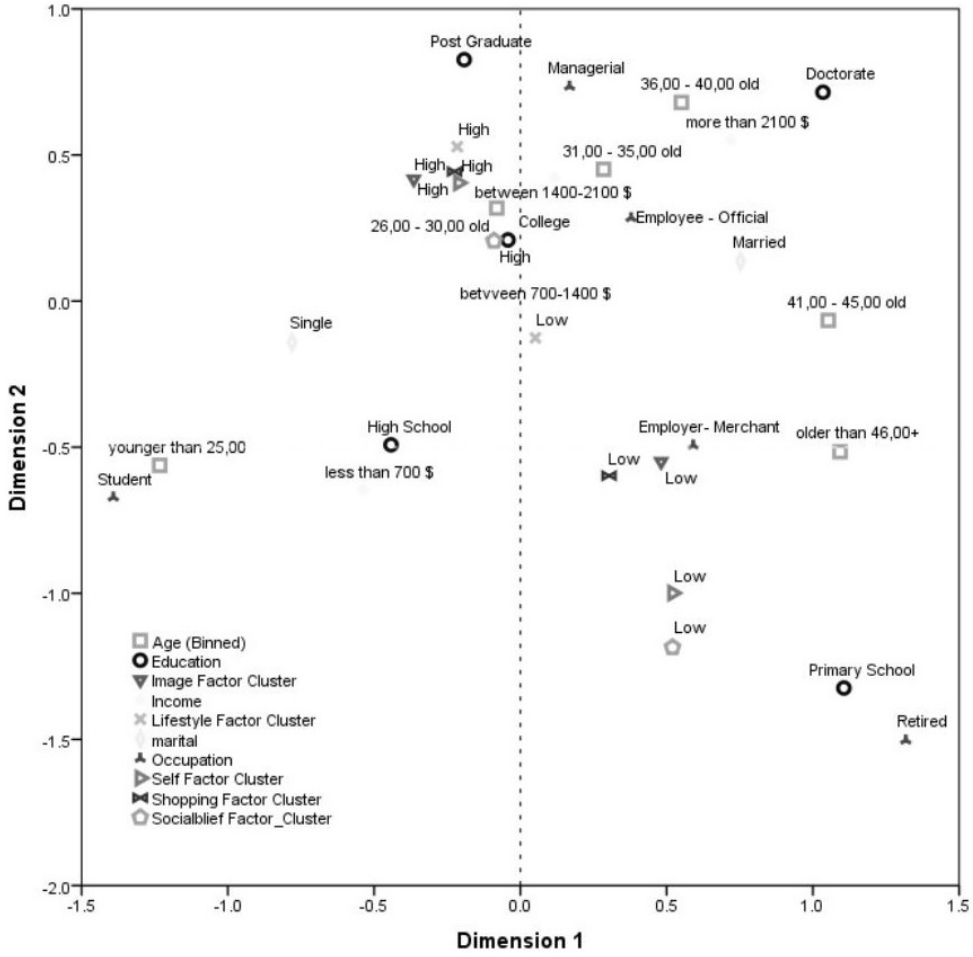

Figure 1. Scatter plot for multiple correspondence analysis

Table 2. Factor analysis of consumer behaviour

Items	Factor loading	Eigenvalue	Variance explained	Reliability coefficient
Self-esteem		9.195	15.18	.889
Applying cosmetic products give me confidence	.804			
I believe that consuming cosmetic products enhance my confidence	.786			
I believe that consuming cosmetic products enhance my well-being	.734			

Cosmetic products plays a role in creating self	.711			
I buy cosmetics in order to make myself feel better	.639			
It is important to keep up with the latest trends in cosmetics	.506			
I love using/wearing cosmetic products	.499			
Lifestyle		2.637	12.27	.821
I am usually the first to buy the latest cosmetics	.777			
Other people ask me what is fashionable/trendy	.735			
I am interested in cosmetics literature	.616			
I look in the mirror throughout the day	.583			
It takes a long time to decide about the cosmetics I wear	.563			
I feel excited when buying cosmetics	.541			
My family, friends and neighbours often ask my advice about cosmetics	.529			
Societal beliefs		1.723	10.53	.801
In general I am confident that I make good choices when I buy cosmetics	.732			
I think carefully about the cosmetics I wear	.697			
I am confident that I buy good cosmetics for the money I pay	.685			
I am conscious of the cosmetics I wear	.664			
Shopping		1.532	10.12	.798
I am not very bold when it comes to cosmetics	.631			
I do not shop frequently for cosmetics	.627			
I do not discuss it as a topic with other people	.612			
I usually buy the lower price products	.599			
I use a limited variety of cosmetics	.578			
I rarely buy cosmetics	.573			
I normally shop quickly, buying the first product or brand that seems good enough	.516			
Self-image		1.267	8.30	.746
Men consider creating or strengthening a desired image by the use of cosmetics	.820			
Men consider using cosmetics for creating a stronger impression outside	.699			
I use cosmetics for creating a self-image	.613			
I have an image that I want to have and I pick the product to go with it	.558			
Total variance explained			**56.39**	

The squared standardized weighs (R^2) are presented in Table 3 for the measured model. The chi-square value was found to be 1649.84 and statistically significant ($p<0.001$). The x^2/df ratio (4.43) was relatively high. However, the criterion for acceptance varied across researchers, ranging from less than 2 (Ullman, 2001) to less than 5 (Schumacker and Lomax, 2004). RMSEA (0.095) was at the acceptable level; NFI (0.92) was very close to criterion (NFI $\geq$ 0.95). These values indicated a good fit between the model and the observed data.

Table 3. Results of path analysis

ITEM	SUBSCALE										*t*	R^2
	SELF ESTEEM		SELF IMAGE		LIFESTYLE		SOCIETAL BELIEFS		SHOPPING BEHAVIOUR			
	λ	*SE*	*λ*	*SE*	*λ*	*SE*	*λ*	*SE*	*λ*	*SE*		
SELF_1	1	0.33									11.42*	0.72
SELF_2	0.8	0.45									17.12*	0.55
SELF_3	0.82	0.38									18.35*	0.6
SELF_4	0.87	0.22									21.74*	0.74
SELF_5	0.81	0.22									21.16*	0.72
SELF_6	0.7	0.34									17.19*	0.55
SELF_7	0.74	0.58									14.84*	0.45
IMAGE_1			1	0.24							8.85*	0.74
IMAGE_2			1	0.51							16.84*	0.57
IMAGE_3			1.03	0.4							18.29*	0.64
IMAGE_4			0.72	0.45							14.14*	0.44
LIFE_1					1	0.56					12.87*	0.34
LIFE_2					1.42	0.52					10.78*	0.53
LIFE_3					0.54	0.33					7.5*	0.2
LIFE_4					0.84	0.49					8.77*	0.3
LIFE_5					1.16	0.41					10.5*	0.49
LIFE_6					1.42	0.24					11.73*	0.71
LIFE_7					1.35	0.51					10.64*	0.51
SOCIE_1							1	0.82			9.71*	0.67
SOCIE_2							0.92	0.99			15.81*	0.59
SOCIE_3							0.6	0.53			14.85*	0.53
SOCIE_4							0.63	0.73			13.85*	0.47
SHOP_1									1	0.39	12.08*	0.37
SHOP_2									0.93	0.85	7.17*	0.19
SHOP_3									1.19	0.18	11.06*	0.65
SHOP_4									1.21	0.37	10.18*	0.47
SHOP_5									0.78	0.26	9.12*	0.34
SHOP_6									1.03	1.75	5.88*	0.12
SHOP_7									0.98	1.06	6.82*	0.17

* p<0.05

Chi-Square = 1649.84

Degrees of Freedom = 372

$\chi 2/df$ 4.43

Root Mean Square Error of Approximation (RMSEA) = 0.095

Normed Fit index (NFI) 0.92

The path diagram in the theoretical framework was given in Figure 2. The items in the subscales and the t-values that showed the fitness of the model can be traced from the figure. According to the diagram the relations between all the subscales were significant ($p<0.05$).

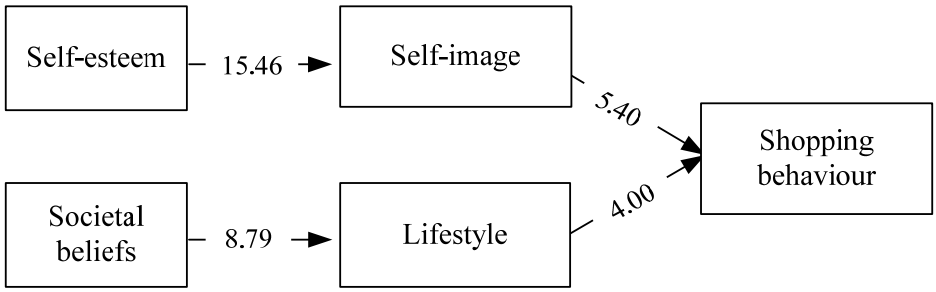

Figure 2. Structural model test and hypothesis test results

Hypotheses 1 that proposed a positive significant relationship between self-esteem and self- image was supported ($\gamma_1 = 0.70$, *t-value* = 15.46, $p < 0.05$). Further Hypotheses 2 that proposed a positive significant relationship between societal beliefs and lifestyle was also supported ($\gamma_1 = 0.26$, *t-value* = 8.79, $p < 0.05$). Similarly, Hypotheses 3 that proposed a positive significant relationship between self-image and shopping behaviour was supported ($\gamma_1 = 0.20$, *t-value* = 5.40, $p < 0.05$). Finally Hypotheses 4 that proposed a positive significant relationship between lifestyle and shopping behaviour was also supported ($\gamma_1 = 0.23$, *t-value* = 4.00, $p < 0.05$).

Table 4. Summary of hypothesis testing results

	PATH	***λ***	***SE***	***t***	***R²***	***Result***
H1	SELF-ESTEEM → SELF-IMAGE	0.7	0.26	15.46*	0.62	Supported
H2	SOCIETAL BELIEFS → LIFESTYLE	0.26	0.18	8.79*	0.39	Supported
H3	SELF-IMAGE → SHOPPING BEHAVIOUR	0.2	0.17	5.4*	0.26	Supported
H4	LIFESTYLE → SHOPPING BEHAVIOUR	0.23	0.17	4*	0.26	Supported

*p<0,05

6. Conclusion

Cosmetic consumption has long been accepted as behaviour specific to women. However, changing values and lifestyles have resulted in new norms for the male consumers. While cosmetic use was previously accepted to be feminine, the process starting with aftershave and shampoos has yielded with personal care and cosmetic products specifically developed for male consumers. This could be attributed to social development and change. The impact of this change is particularly prominent in the postmodern societies (Firat, 1993). However, the changes in the expectations of the consumers under the effects of postmodernism have also changed the cosmetic consumption of the men. Contrary to rigid attitudes towards cosmetic consumption, cosmetic products have become important for men in order to define their self-concept, increase their self-esteem and create new lifestyles.

The purpose of this study was to examine attitudes of men in the framework of cosmetic consumption and to reveal the underlying factors and their correlation with each other. Overall, the results are coherent with the previous studies conducted by Efes Pilsen (2007) and Balkıs (2013). The results show that self-esteem, lifestyle, societal beliefs, self-image were important dimensions underlying the cosmetic shopping behaviour of male consumers. The results suggest that self-image was found to be associated with attitudes towards cosmetic products and this is coherent with the results of Sukato and Elsey (2009). It seems that through changing this image, male consumers aimed at either create or alter their self-identity (Sturrock and Pioch, 1998). The results also indicate that self-esteem explains self-image in male consumption of cosmetic products. Further, the results suggest that both self-image and lifestyle have a strong influence on the males' cosmetic consumption, and this is coherent with the previous studies. Finally, the results suggest that societal beliefs explain lifestyle when it comes to male cosmetic consumption. In comparison to previous studies of Sukato and Elsey (2009) in Thailand and Souiden and Diagne (2009) in Canada and France, it is understood that similar factors are influential in men's cosmetic consumption. Thus, it is suggested that male consumers use cosmetic products not simply for the tangible benefits they provide but also the meanings that are conveyed by consuming them.

Unlike the current study, Sukato and Elsey (2009) have also found that beliefs in product attributes such as salesperson, promotion and packaging positively affect male consumers' attitudes towards shopping cosmetics. Similarly, in both the studies of Sturrock and Pioch (1998) and Souiden and Diagne (2009), the impact of the factors such as health, age, physical attractiveness were also analysed in terms of men's cosmetic consumption. Although these attributes were also included in the current survey, they were removed from further

analysis due to their low factor loadings. Consequently, it can be argued that health and physical attractiveness are ineffective in men's cosmetic consumption in the study area.

From a managerial and marketing perspective, this study can provide useful implications for marketers to undertake research findings to plan and implement their marketing strategies regarding cosmetic products so as to better satisfy male consumers. The current study proposes a theoretical framework that explains cosmetic consumption of male consumers and the underlying constructs. The results of the study indicate that self-image and lifestyle are two important factors explaining the cosmetıc consumption behaviour of males. Thus, it is important for the marketers to further analyse these constructs, since people buy items for creating a desired image for themselves. Further, a special emphasis should be given to the promotion of cosmetic products for men. Advertising campaigns and promotional messages focusing on the self-image and self-esteem are highly recommended in order to attract male consumers. Moreover, societal beliefs, formed by the society in which the individuals reside, seems to be a significant factor in explaining lifestyles. Therefore, in tailoring the marketing tools, it is important to take social influence groups into consideration in order to approach this group effectively. As a consequence, it is recommended that marketing managers concentrate on values that are important into the eyes of their consumers when advertising or selling men's cosmetics.

This study is limited to a metropolitan environment, in Turkey, and reports the results regarding the metropolitan men's cosmetic consumption. As a result, generalizing the results in this study to other countries should be done carefully. However, the cosmetic consumption patterns of men in rural areas should also be investigated, and this issue seems to be an important constraint of our study. As such, further studies are needed dealing with both metropolitan and rural consumers in the same society and their cosmetic consumption. Future studies investigating the impacts of other variables in explaining males' cosmetic consumption would also enhance the scope of the present study.

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STUDIA UBB NEGOTIA, LX, 3, 2015, pp. 23 - 50
(RECOMMENDED CITATION)

TOURIST INNS ON ROMANIA'S MODERN TOURISM MARKET

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ABSTRACT. The present paper investigates a less debated topic of the accommodation sector: the presence of tourist inns on the Romanian market. More than 20 years ago, authorities decided to exclude tourist inns from the official classification system. Relying on both official data, collected and processed based on the List of Accommodation Facilities (Lodgings and Food-service units) elaborated by the National Authority for Tourism, and on the information available on specialized websites (e.g. Booking.com) a thorough analysis has been performed in order to identify all structures that function on the local market pretending to be inns. The identified structures have been categorized and discussed according to various criteria: name of the hospitality unit, name of the enterprise that owns/runs the inn, type of unit, level of classification, lodging capacity; localization. The undertaken research and analyses led to the identification of 288 accommodation and/or food-service structures matching one or more criteria that link them to inns. One of the main findings establishes that in Romania's modern tourism industry there is a fully justified need to grant a special attention to inns. Further investigations have already been initiated in this field, continuing the current study.

Keywords: tourist inns, accommodation facilities, food-services, secondary data analysis, Romania

JEL Classification: L83

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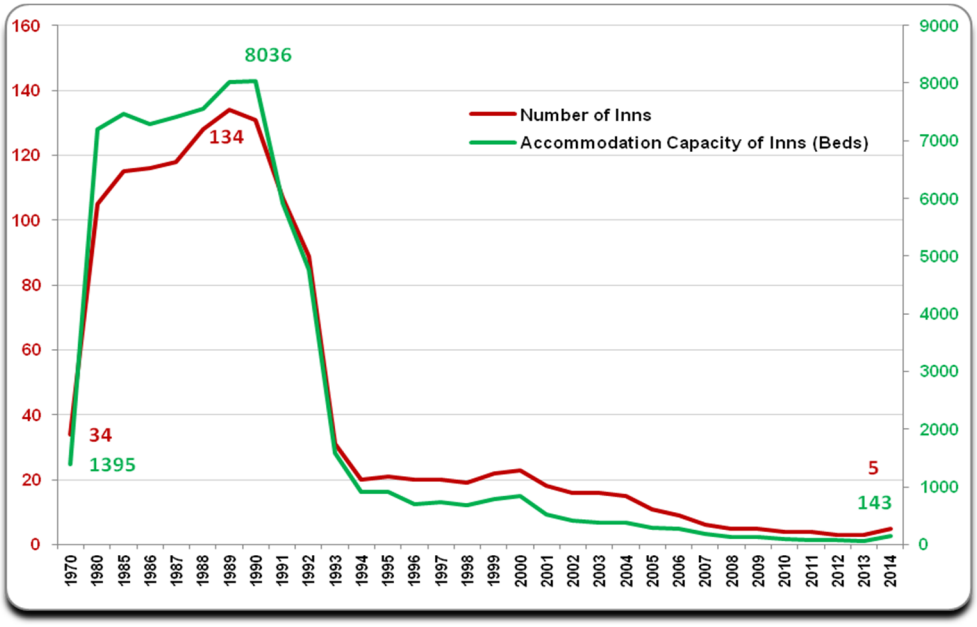
1. Introduction

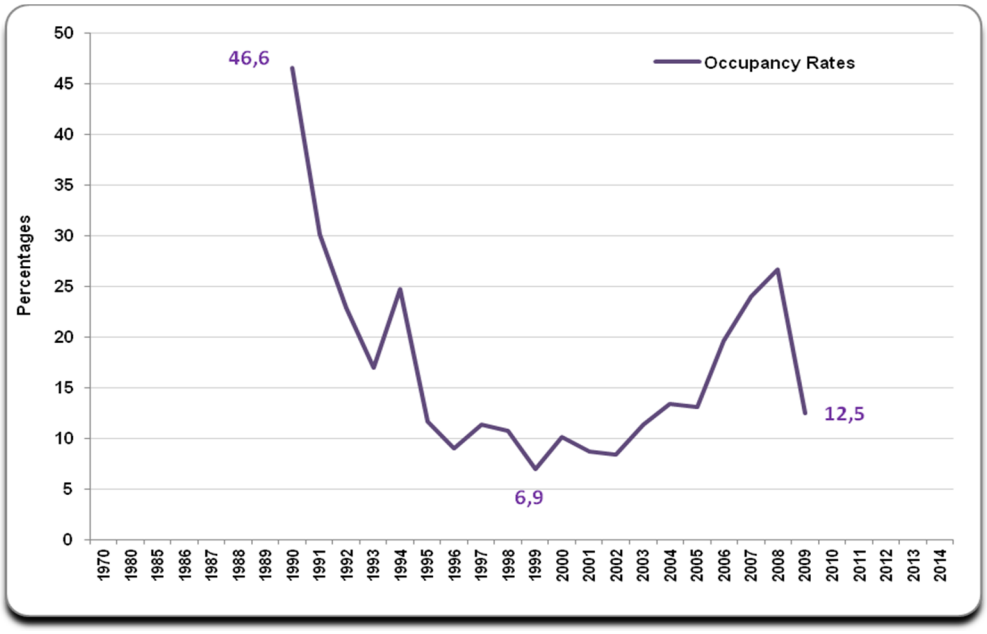
The fall of communism determined changes in many fields, including tourism. Romanian tourism industry was subject to numerous questionable and contrarian decisions during the past two decades. An example of such debatable decisions is that of excluding tourist inns from the officially defined and classified lodging facilities in 1993. Due to their distinctive features, tourist inns have an important potential in terms of attracting both Romanian and foreign tourists. This paper aims at creating a framework for further investigations concerning the presence of tourist inns on the Romanian market and how they relate to respectively differentiate from other accommodation facilities.

While the changes in accommodation classification forced inns to disappear from official rankings, the current research reveals that they continue to exist given the local entrepreneurs' sense and intuition regarding the inns' tourist potential. Therefore, there exist both willingness and interest in developing and running accommodation and food-service facilities under the name of inns. However, the reasons for choosing to build and operate such facilities need further and more detailed investigations.

Any discussion regarding this issue must consider a brief analysis of the development of the Romanian tourist inns throughout the past 45 years. By analyzing Graphs 1a and 1b below, the following remarks may be made. First, inns have registered a quick development, both in terms of number of units and lodging capacity, between 1970 and 1980, continuing the ascending trend until 1989-1990. Second, the changes in the legal framework, dating since 1992-1993 are reflected in the steep decrease of inns both in number and in accommodation capacity. Starting with 1994, some of the former inns were transformed and reauthorized, continuing to function as other types of facilities: motels, boarding houses, hotels, etc. Other units either closed-down and were abandoned or continued to function as unclassified structures. None of these last two options generated any positive economic impacts on the local tourist market. Moreover, the assimilation of inns (with their typical architecture) to other types of lodgings only contributed to the development of the visual and architectural chaos that tends to characterize the supply side of tourism and hospitality services in Romania. The disappearance of inns coincided with the first developments of tourist boarding houses (pensions) and of small hotels. These last two types of lodgings have developed under the conditions of an unclear and unstable legal framework. This vagueness has led to numerous compromises in terms of architecture, style, and overall accommodation services quality.

Graphs 1a and 1b: The development of tourist inns in Romania (1970-2014).





Source: Authors' calculations based on NIS data (Yearbooks 1975-2012, TempoOnline 2015).

Although officially inns have significantly decreased all over Romania (Graphs 1a and 1b, and Tables 1 and 2), as one may further note, the market-reality is not similar to the official statistics: 5 inns in 2014 as opposed to 288 identified units. For example, Arges, Brasov, Cluj, Harghita, and Suceava counties do not have any officially registered inns as of 2014, though, according to the findings of the present research these five counties account together for 90 (31.25%) of the 288 identified inns. The breakdown by each of these counties is the following: Harghita (22), Brasov (21), Arges (19), Cluj (15), and Suceava (13).

Table 1. The development of tourist inns in Romania by county (2001-2014)

County	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Romania	**18**	**16**	**16**	**15**	**11**	**9**	**6**	**5**	**5**	**4**	**4**	**3**	**3**	**5**
Arges	:	1	1	1	1	1	:	:	:	:	:	:	:	:
Bacau	1	1	1	:	:	:	:	:	:	:	:	:	:	:
Bihor	:	1	1	1	1	1	1	1	1	:	:	:	:	:
Brasov	1	1	:	:	:	:	:	:	:	:	:	:	:	:
Braila	1	1	1	1	:	:	:	:	:	:	:	:	:	:
Caras-Severin	1	:	1	1	1	1	1	1	1	1	1	:	:	:
Cluj	1	1	1	1	1	1	1	:	:	:	:	:	:	:
Constanta	:	:	:	:	:	:	:	:	:	:	:	:	:	1
Covasna	1	:	:	:	:	:	:	:	:	:	:	:	:	:
Dambovita	:	:	:	:	:	:	:	:	:	:	:	:	:	1
Hunedoara	4	3	3	3	2	2	:	:	:	:	:	:	:	:
Prahova	1	1	1	1	:	:	:	:	:	:	:	:	:	:
Suceava	1	:	:	:	:	:	:	:	:	:	:	:	:	:
Teleorman	3	3	3	3	3	1	1	1	1	1	1	1	1	1
Timis	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tulcea	2	2	2	2	1	1	1	1	1	1	1	1	1	1

Source: Authors' calculations based on NIS data (TempoOnline 2015).

Table 2. Romanian tourist inns' accommodation capacity development, by county (2001-2014)

County	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Romania	**526**	**422**	**378**	**385**	**292**	**278**	**186**	**136**	**136**	**97**	**77**	**81**	**61**	**143**
Arges	:	12	30	30	12	12	:	:	:	:	:	:	:	:
Bacau	30	10	10	:	:	:	:	:	:	:	:	:	:	:
Bihor	:	40	40	40	40	40	40	40	40	:	:	:	:	:
Brasov	45	45	:	:	:	:	:	:	:	:	:	:	:	:
Braila	15	15	15	10	:	:	:	:	:	:	:	:	:	:
Caras-Severin	16	:	18	18	18	18	16	16	16	16	16	:	:	:
Cluj	26	26	26	26	26	50	50	:	:	:	:	:	:	:
Constanta	:	:	:	:	:	:	:	:	:	:	:	:	:	60
Covasna	44	:	:	:	:	:	:	:	:	:	:	:	:	:
Dambovita	:	:	:	:	:	:	:	:	:	:	:	:	:	22
Hunedoara	164	104	104	104	98	98	:	:	:	:	:	:	:	:
Prahova	26	26	26	46	:	:	:	:	:	:	:	:	:	:
Suceava	18	:	:	:	:	:	:	:	:	:	:	:	:	:
Teleorman	84	66	36	38	38	20	20	20	20	20	20	20	20	20
Timis	20	40	40	40	40	20	40	40	40	40	20	40	20	20
Tulcea	38	38	33	33	20	20	20	20	20	21	21	21	21	21

Source: Authors' calculations based on NIS data (TempoOnline 2015).

The demand perspective is also relevant for the present analysis. Table 3 synthesizes the development of some useful indicators related to demand side.

Table 3. Demand development for Romanian tourist inns (2001-2013)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total arrivals	**3,670**	**4,049**	**3,952**	**4,113**	**4,084**	**5,502**	**5,456**	**1,877**	**914**	**638**	**611**	**823**	**643**
Romanians	3,402	3,815	3,806	3,989	3,984	4,826	5,020	1,703	797	591	606	818	643
Foreigners	268	234	146	124	100	676	436	174	117	47	5	5	:
Total overnights	**6,142**	**4,668**	**5,162**	**6,048**	**6,585**	**8,061**	**8,751**	**5,133**	**2,132**	**3,304**	**1,586**	**1,099**	**790**
Romanians	5,478	4,378	4,566	5,181	6,034	7,365	8,256	4,302	1,831	2,937	1,571	1,089	790
Foreigners	664	290	596	867	551	696	495	831	301	367	15	10	:

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Average length of stay	**1.67**	**1.15**	**1.31**	**1.47**	**1.61**	**1.47**	**1.60**	**2.73**	**2.33**	**5.18**	**2.60**	**1.34**	**1.23**
Romanians	1.61	1.15	1.20	1.30	1.51	1.53	1.64	2.53	2.30	4.97	2.59	1.33	1.23
Foreigners	2.48	1.24	4.08	6.99	5.51	1.03	1.14	4.78	2.57	7.81	3.00	2.00	:
Occupancy rate	**8.7**	**8.4**	**11.3**	**13.4**	**13.1**	**19.6**	**24**	**26.7**	**12.5**	**25.1**	**10.8**	**10.6**	**10.8**

Source: Authors' calculations based on NIS data (TempoOnline 2015).

Obviously, due to the fact that inns ceased to be officially defined and ranked, tourist demand for their services followed the same descending trend registered in the number of enterprises and in the dimension of their supply, in terms of available beds.

The present paper is one of the series of studies investigating Romanian inns and will focus on presenting the units identified as inns by types of provided services, by localization, by classification, by used names, and by types of operating entities. The study provides the framework for further researches regarding both the supply and the demand for tourist inns on the Romanian market.

2. Literature Review

Some of the most popular definitions of inns are presented below. Medlik (1996, pp.141) states: "Unlike in earlier times when the term [*inn*] was used, sometimes with legal sanction, to differentiate **establishments** providing overnight **accommodation** from taverns and ale-houses, no specific meaning attaches to it at present. It is used more or less indiscriminately for **hotels** and also eating outlets without overnight accommodation. Although probably more commonly applicable to smaller establishments, it is not confined to them, as shown by such **companies** as Holiday Inns". This point of view is highly consistent with the international urbanization trend; in fact, most Western societies face a continuous decrease of their rural spaces and, consequently, of their rural tourism.

Inn, Inns (in Romanian *han*, *hanuri*) – Establishment with food-service (***ospătărie***), located at the side of country roads or in the suburbs of towns; their function was to accommodate travelers overnight, horses and wagons included (Macrea, 1958, pp.354).

Inn (*han*) – (in the past in the Romanian principalities), building usually situated at a cross-road, serving for the accommodation of travelers and of their means of transportation. The **inn** played the role of hotel, restaurant and stable; it sometimes also possessed a small technical service unit for the repairing of the vehicles. Some inns used to be fortified, the rooms being often displayed around an inner courtyard (e.g. Hanul lui Manuc from Bucharest). The term *han* is of Turkish origin (Joja et al., 1964, pp.651).

From a historic perspective (Potra, 1985, pp.27-30), inns have developed alongside with trade and commerce, at cross-roads, along the roads, in suburbs, near town-gates/barriers, in the middle of markets and fairs. These structures have known many forms according to the area where they developed but basically they all provided more or less the same services: of accommodating tired travelers, of hosting political meetings and assemblies, of serving food and drinks. They provided the main source of income to their owners (nobility, merchants or monasteries).

Some of the most common classifications of inns in the Romanian principalities (Potra, 1985, pp.25) include from the perspective of their owners five categories: inns belonging to the governors/princes; monastery and church inns; inns of the nobility; merchant inns; and small suburban inns. Their roles involved: the provision of accommodation and food-services to travelers, and the granting of their safety; trade and logistics for merchant exchanges (shops and warehouses; real-estate investments; international relations (political and economic relations generated by international trade); political role (hosting of assemblies, meetings, reunions, etc.), social role (provided space for the local people's private events), etc.

As after 1990 inns ceased to be discussed, this paper belongs to a first series of studies dedicated to Romania's tourist inns. The definition considered the most relevant for the present study and for the further analysis of the identified inns is the one that follows. Hospitality services similar to those of hotels are provided within **tourist inns,** defined among the units providing accommodation services, with the single difference that these ones [*the inns*] provide tourist services in units with classic/historic architecture, furbished in a modern and functional style and comfort. Food-services are dominated by regional menus. They can be exploited permanently or seasonally (Donoaica, 1989, pp.48). Moreover, due to their particularities, inns are highly valuable and can contribute to the development of Romania's rural tourism. Given their features, inns have the capacity to better adapt and to tune with Romania's rural traditions.

3. Material and Method

A database of all inns active on the Romanian market was created relying on both official and commercial data. In this respect, a total of eight different versions of the official ranking lists[4] of accommodation facilities, respectively of food-services were processed in order to identify all the lodgings, food-service units, and operating entities that use the name inn on the Romanian market. The oldest database available is the one containing accommodation facilities authorized and ranked at the end of 2005. The most recent lists of ranked lodging facilities and food-service units were downloaded in February 2015. The database contains both inns that are currently listed/registered as guest houses, hotels, motels, and other types of lodgings, or as food-service providers like classic restaurants, day bars etc., and also inns that were at some point ranked under such categories. The existence/functioning of the inns that are not currently ranked was further verified by cross-checking the available information on various websites (*e.g.* Booking.com and all of the other 86 ones included in the final section of References). Moreover, a thorough analysis has been run in order to identify all (as many as possible) entities pretending to be inns. In this respect, aiming to complete the list, a large variety of Internet sources were checked using (inn-related) key-words such as: *han*, *hangiță*, *hangiu* and *hanul nostru*; *jupâniță* and *jupân*; *cârciumă*, *cârciumăreasă*, *birt*, and *birtuț*; *făgădău* and *fogadó*; *inn*; *Gasthof*; *răscruce* and *la răscruce*. All of the identified inns were cross-checked in all available databases with the purpose of establishing under what type of unit they are currently operated or used to be registered, respectively under which classification type they are/used to be ranked. Given the fact that one of the well-known particularities of the Romanian tourism market is that a considerable number of hospitality facilities function and operate in the shadow economy, without any official ranking certificates[5], all of the identified units are considered in this study. The identified inns have been categorized and discussed according to various criteria. Bearing in mind the historic and cultural dimensions of inns in Romania's historic provinces, the analyses are realized by grouping the identified inns both within the historic provinces and within the country's modern regions of development.

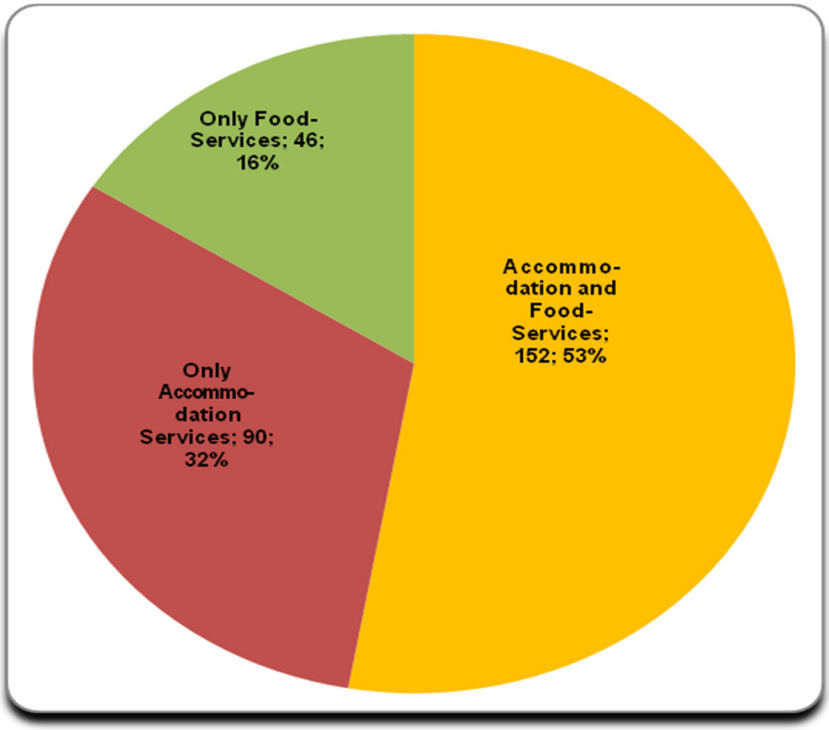
[4] Unfortunately, the National Authority for Tourism/Ministry of Tourism updates the lists of officially ranked accommodation, respectively food-service providers, without a clear periodicity and by overwriting the existing list (without keeping/publishing any previous versions), therefore, such an attempt (as the one of realizing a database of inns) becomes quite a challenge.

[5] For example, of the nearly 8,000 boarding houses, villas and chalets identified in 2014 by the National Foundation of Young Managers, over 3,000 units were functioning without official classification certificates [Cojocea; Coroș, 2013: 23-31].

4. Results and Discussions

The total number of inns identified in Romania is of **288** entities, of which 152 units provide accommodation and food-services, 90 units offer exclusively accommodation services, and 46 units provide only food-services. They account for approximately[6] 3,310 rooms and 7,714 beds, respectively for about 30,992 table seats. Graph 2 and Table 4 below provide more data regarding the mentioned aspects. The majority of the identified inns (52 %) provide both accommodation and food-services. This distribution is consistent with the typical services historically provided by inns (as explained in the literature review section). These are followed by units focusing exclusively on accommodation services (32 %). Only less than a fifth of the inns (16 %) provide only food-services. These quotas seem to remain constant at the level of all analyzed regions.

Graph 2: Services provided by the identified Romanian inns



Source: Authors' calculations based on the collected data.

[6] It was impossible to find exact figures for all of the identified inns.

Table 4. Services provided in Romanian inns, by regions

		Accommodation and Food-services	Only Accommodation Services	Only Food-Services	Total
ROMANIA		**152**	**90**	**46**	**288**
Historic provinces	**Transylvania**	78	44	19	**141**
	Dobrogea	9	9	2	**20**
	Wallachia[7]-Oltenia	27	31	19	**77**
	Bukovina-Moldova	38	6	6	**50**
Modern regions of development	**North-East**	27	5	3	**35**
	South-East	20	10	5	**35**
	South-Muntenia	16	16	6	**38**
	South-West-Oltenia	8	10	5	**23**
	West	12	6	5	**23**
	North-West	20	9	9	**38**
	Center	46	29	5	**80**
	Bucharest-Ilfov	3	5	8	**16**

Source: Authors' calculations based on the collected data.

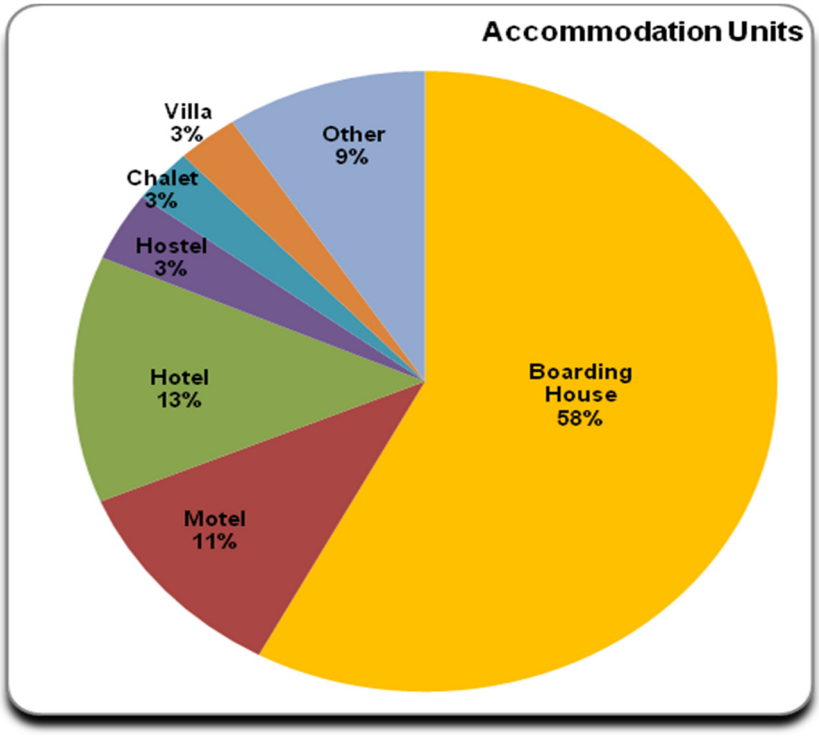
An analysis by types of units reveals (Graphs 3a and 3b below) that: for accommodation services, boarding houses are by far the most popular forms for running today's inns in Romania, while in the case of food-services, classic restaurants are the most frequent. A closer look shows that among the lodgings, which include in their name *inn*-related terms, boarding houses/pensions/guest houses represent approximately 58 % in the total number of accommodation providers; they are followed by hotels (around 13 %), motels (about 11 %), hostels, chalets, and villas (each accounting for about 3 %). The category "Other" includes: tourist complexes (units that are not officially defined by the Romanian tourist authorities but which are claimed by the entrepreneurs), camping sites and camping huts, bungalows and apartments/rooms to let and apart-hotels.

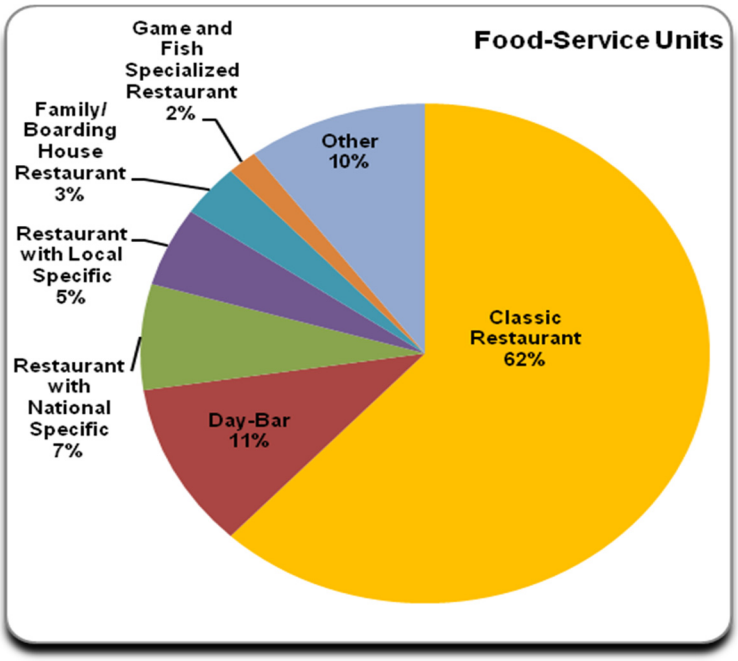
The analysis clearly reveals that of the 144 identified guest houses that declare themselves inns almost 73 % are located in rural areas, capitalizing on the potential of authentic experiences; the remainder of around 27 % are urban lodgings, some of them having the chance to valorize some heritage buildings. This aspect is also subject to further investigation.

[7] Wallachia is the historical name of the modern Muntenia region.

Besides classic restaurants, accounting for about 62% of the food-service outlets, the following other types were identified: day-bars (around 11 %), restaurants with national specific (less than 7 %), restaurants with local and regional cuisine (slightly above 5 %), family/boarding house restaurants (around 3 %), restaurants specialized in game and fish dishes, mainly serving fresh water fish (nearly 2 %). In this case, too, the category "Other" is quite ample (of around 10 %), including: bistros, buffet-bars and snack-bars, coffee-bars and confectionaries, self-serving restaurants, fast-food units, summer gardens and terraces, wine-cellars and beer-pubs, respectively pizzerias.

Graphs 3a and 3b: The distribution of accommodation and food-service units by types





Source: Authors' calculations based on the collected data.

Based on Table 5 below other observations concerning the identified inns need to be made. Some inns do not provide any accommodation services at all (92 units). Further, a number of 242 inns provide accommodation services as it follows: 235 inns have only one accommodation unit while 7 inns provide accommodation services in 2 lodgings each, located at the same address[8]. Similarly, 128 inns do not provide any food-services, while most inns (169) only operate one food-serving unit. Still, of the total of 198 inns operating at least one food-serving unit: 23 inns run at the same location 2 types of food-serving units[9]; other 5 inns operate 3 different food outlets[10], and 1 inn has 4 types of food services[11].

[8] Some of these inns run guest houses together with camping sites, motels with camping sites, motels with villas, camping sites/huts with bungalows, etc.

[9] The most common associations are of classic restaurants and day-bars; there also are examples of inns having local or national restaurants and wine-cellars, etc.

[10] In this case, the most frequent cases are of inns having classic restaurant, associated with day-bars and a snack-bar/buffet-bar or a coffee-shop or a fast-food unit, etc.

[11] Finally, the unit providing most food-services is Mariko Inn Hotel 3*, which operates 4 food-serving units, all ranking 3*: a classic restaurant, a traditional restaurant, a wine-cellar and a bistro.

Table 5. Services provided in Romanian inns

	Inns providing:	
Number of provided services	**Accommodation services (242 units)**	**Food-services (198 units)**
0	92	128
1	235	169
2	7	23
3	0	5
4	0	1
Total number of provided services	**249**	**234**

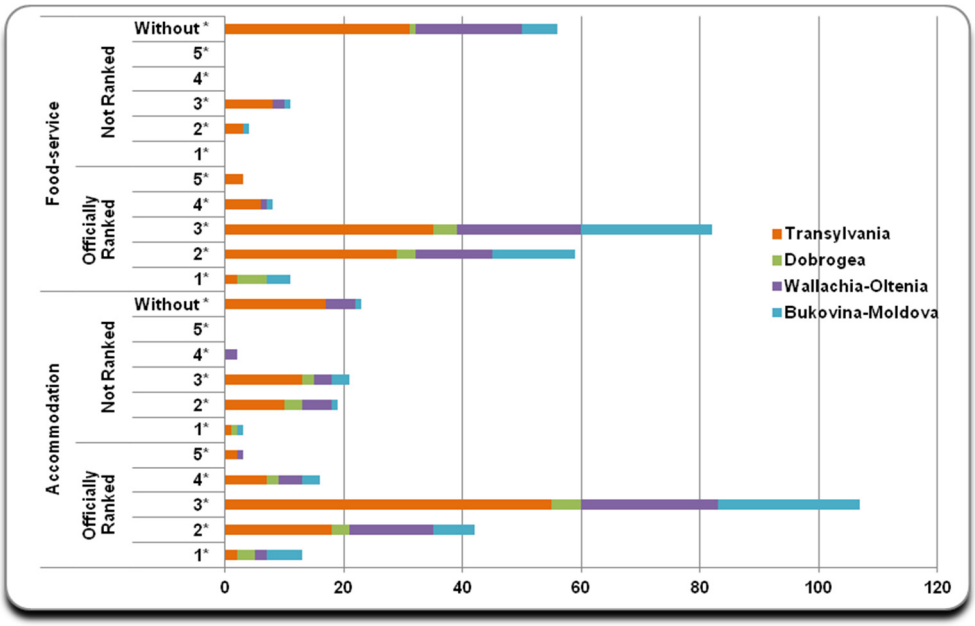
Source: Authors' calculations based on the collected data.

Concerning the level of classification of the identified inns (Graph 4), the following remarks need to be made. First, one must note that from the 249 inns providing accommodation services (with or without food-services), only 72.7 % are officially classified by the National Authority for Tourism, the remainder of 68 inns (27.3 %) function without official authorization; moreover, a large majority of these last ones (66 %) pretend to be ranked in their promotional activities. Thus, given the fact that the official database does not register the accommodation units which applied for the renewal of their classification permit, it is not clear how many of these 68 inns are waiting for a new authorization and how many chose to function without a proper permit, risking high fines and closure.

From among the 234 identified inns that provide food-services (with or without accommodation services), only 69.7 % are officially ranked, while the remaining 30.3 % function without authorization; in their case the percentage of food-service providers that pretend to be officially ranked drops to 21 %. The fact that such a large number of inns function without official classification certificates has major implications upon the performance in terms of competitiveness and profitability of the providers who respect the legal provisions, and obviously influences upon the perceived quality of the Romanian tourism and hospitality services providers.

Both lodging facilities and food-service units are dominated by structures ranked at 3* (stars/flowers – depending on the type of unit), followed by 2* structures. All other levels of classification are poorly represented.

Graph 4: The distribution of inns by level of classification

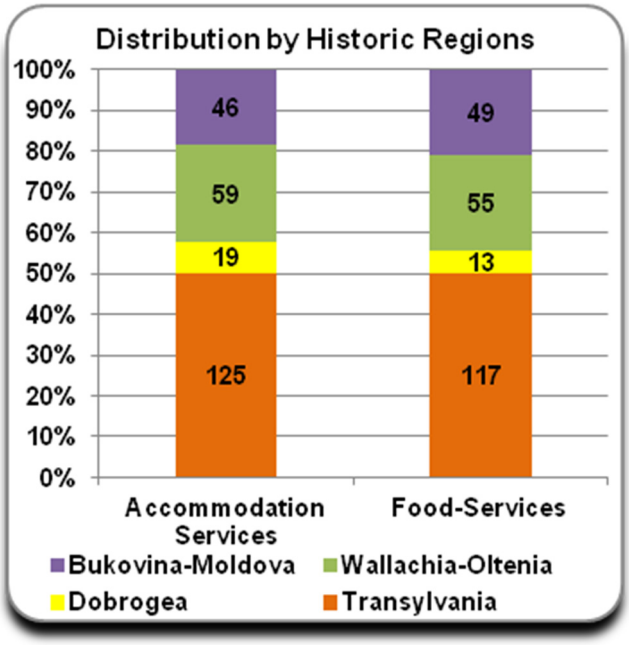


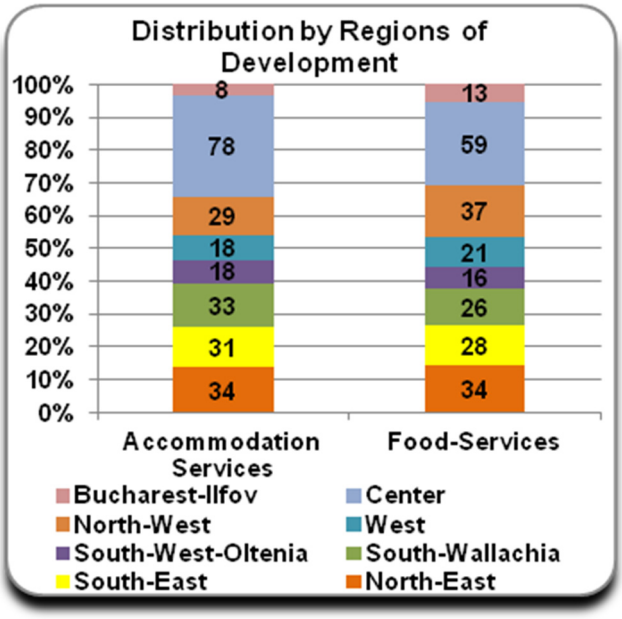
Source: Authors' calculations based on the collected data.

In terms of regional distribution, two aspects have been considered as presented in Graphs 5a and 5b below, and Table 4 above. Except for four counties (Botosani, Calarasi, Ialomita and Vaslui[12]) all other counties have at least one inn. Because of the historic roots of inns, it has been considered that the distribution by historic regions is just as relevant as the one by today's modern regions of development. As expected the areas situated on the former historic borders/ crossing points of Romania's historic provinces, respectively the counties crossed by today's major European roads (E 60, E 68, E 81, E 85 or E 87) and those located on some of the former commercial routes are the ones with the highest number of identified inns. In fact, 14 counties have between 10 and 22 inns: Harghita (22), Brasov (21), Arges (20), Cluj (15), Suceava (13), Constanta (12), Bucuresti, Buzau, Neamt, Prahova, and Sibiu (11 each), Alba, Dolj, and Mures (10 each).

[12] A peculiar situation occurs in the case of Vaslui county: an inn registered as hostel (Hanul Florilor) was identified in Ciortesti commune, Iasi county, nearby the border of Vaslui county. According to the National Authority of Tourism the hostel is located in Iasi county, while its classic restaurant appears in Vaslui county. Given the fact that the operating company (SC Gabriel SRL) is also located in Iasi county, it has been decided to include the inn on the list of the county of Iasi.

Graphs 5a and 5b: Inns' distribution by historic regions and by regions of development



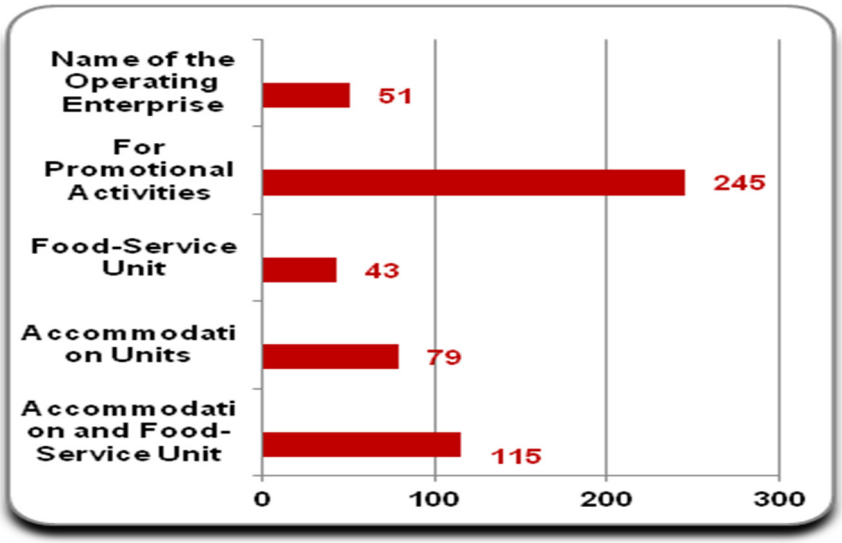


Source: Authors' calculations based on the collected data.

Some of the counties with the lowest numbers of inns are also destinations with a rather poor tourist activity, in general: Bistrita-Nasaud, Braila, Giurgiu, Mehedinti, Olt, Satu Mare or Tulcea.

Another investigated aspect consists in the determination of the context and/or purpose of the use of inn-related terms. In this respect, five situations have been identified. Hospitality units use inn-related terms: in the hospitality units' names, in the names of the accommodation and/or of the food-service providers, respectively in the case of online promotion or in the name of the operating enterprise. The findings are presented in Graph 6 and Table 6 below:

Graph 6: The use of inn-related terms



Source: Authors' calculations based on the collected data.

Table 6: The use of inn-related terms, by regions

		Accommodation and Food-Service Unit	Accommodation Units	Food-Service Unit	Promotional Activities	Name of the Operating Enterprise
ROMANIA		**115**	**79**	**43**	**245**	**51**
Historic provinces	**Transylvania**	58	39	18	120	18
	Dobrogea	7	8	2	17	1
	Wallachia-Oltenia	20	25	16	65	22
	Bukovina-Moldova	30	7	7	45	10

		Accommodation and Food-Service Unit	Accommodation Units	Food-Service Unit	Promotional Activities	Name of the Operating Enterprise
ROMANIA		**115**	**79**	**43**	**245**	**51**
Modern regions of development	**North-East**	21	5	3	33	7
	South-East	16	10	6	29	4
	South-Muntenia	13	13	2	32	13
	South-West-Oltenia	5	7	4	16	5
	West	8	5	5	19	2
	North-West	16	9	8	30	6
	Center	34	25	5	71	10
	Bucharest-Ilfov	2	5	10	15	4

Source: Authors' calculations based on the collected data.

One may easily note that most of the analyzed inns opt for using inn-related terms especially in their promotional activities. These are followed by the decision of the entrepreneurs to designate their hospitality units in a suggestive way, using inn-related terms when naming their facilities. Only 51 of the identified operating enterprises use inn-related term in the names of the firms. The operating enterprises/entities have not yet been identified for 42 of the analyzed units.

Table 7. The use of inn-related terms, by types of services provided

Inn-related Terms	Han/Hanu'/ Hanul/ Hangița	Birt/Cârciumă/ Jupâniță/ Ospătărie	Făgădău/ Fogadó	Inn	Gasthof	TOTAL
Accommodation Services	162	3	9	27	4	**205 (of 249)**
Food-Services	139	2	4	16	1	**162 (of 234)**

Source: Authors' calculations based on the collected data.

The results of the analysis of the terms considered relevant for the present research are synthesized in Table 7 above. Thus, 205 of the 249 identified accommodation units have opted for the use of inn-related terms when naming their lodging facilities, according to the official databases and to the inns' promotional activities. Similarly, 162 of the 234 inns providing food-services use inn-related terms in their units' names. By far, the terms derived from *han*, the Romanian correspondent of *inn* like: *Hanul*, followed by *Han*, *Hanu'* and *Hangița* are the favorite choices. Words used more frequently in the past also occur: *Birt*,

Cârciumă, *Făgădău*, *Jupâniță*, and *Ospătărie*, respectively *Gasthof*, the German version of *inn* and *Fogadó*, the Hungarian term. Derived from the Hungarian *Fogadó*, *Făgădău* is used mainly in Transylvania.

When it comes to the English term, *inn*, the present analysis reveals two situations. The first one occurs when the word is used properly, in order to name an accommodation and/or food-service unit similar to the concept. The second one is, in fact, a quite frequent situation of misunderstanding. The term *inn* is inappropriately used, being misapplied and mistaken for the concept of *all inclusive services*. Moreover, the confusion goes even beyond this level, entrepreneurs using the term *inn* when naming their apart-hotels and/ or apartments/rooms to let. Another peculiar situation is registered in the case of Sunset Tour Inn which is the operating company of a 5* resort nearby Cluj-Napoca and of a 4* complex from the town of Turda, both located in Cluj county. Obviously, the two locations have none whatsoever to do either with the traditional concept of inn, or with any modern such establishments.

Regarding the use of inn-related terms in the promotion activities of their hospitality units, deeper analyses have revealed that of the 288 identified facilities:

- 129 units (44.79 %) have their own websites; moreover, as already pointed out, 245 units (85.07 %) use inn-related terms in the promotional activities they carry out; thus, it results that almost 53 % of these enterprises promote their offers both directly and by the means of intermediaries/platforms, while the remainder opt for national but also international booking platforms;
- 127 units (44.1 %) use personalized e-mail addresses, associated to their official websites or to public providers such as Yahoo or Gmail;
- 51 enterprises use in their names inn-related words; some of these companies (8 enterprises) operate more than one unit, while some inns have accommodation facilities operated by an enterprise and the food-service units by another one (6 situations), therefore calculating percentages is not relevant.

When it comes to the inns' impact upon local communities, one cannot but notice that one of Romania's most famous inns, Hanu Ancuței, has led to the adoption of that name for the village where it is located. Other five inns that have given their own names to villages, streets or other locations were identified as follow: Hanu Conachi (village Hanu Conachi, Fundeni commune, Galati county), Hanul Cotul Donului (Timisul de Sus resort, belonging to Predeal town, Brasov county), Hanul Reci (Reci village, Covasna county), Imobil Hanul dintre Sălcii

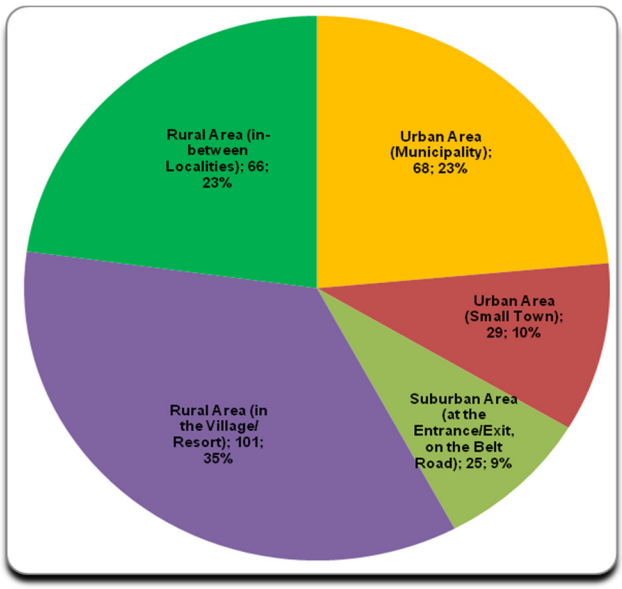
(Oarda village, belonging to Alba Iulia municipality, in Alba county), and Popas Hanul Morilor (Horia village, on National Road Nº 1 Constanta-Harsova, at km 64, Constanta county).

Unfortunately, this first analysis has revealed that in most cases, managers/entrepreneurs-managers do not acknowledge the importance of being coherent in any attempt of managing, branding and promoting a hospitality unit, an moreover in those cases related to valorizing and enhancing the potential of tourist inns. There are many examples of identified inns that are not coherent at all when it comes to the use of inn-related terms in their branding and promotion strategies; some of the most notorious examples are:

- Hanul Rotbav (rural boarding house, ranked 2 flowers) which incorporates KM 22 (classic restaurant, ranking 2 stars), both located on National Road 13 at km 22, in Feldioara village, Rotbav commune, and both operated by the same enterprise from Brasov, Mido-Lux SRL;
- Hanul Dâmbu Morii (4* officially ranked boarding house), Dâmbu Morii (3* officially ranked hotel) and Dâmbu Morii (3* officially ranked classic restaurant), all located in Sacele town Braşov county and all promoted by the same website but operated by two firms: the boarding house by Flodem Mobil SRL, respectively the hotel and the restaurant by Dâmbu Morii SRL;
- Gobe (3* officially ranked boarding house and 2* officially ranked boarding house restaurant) located in Oradea city, Bihor county and operated by Han Tengri SRL; both the pension and the restaurant are promoted as Hanul Gobe;
- Poienița 2006 (3* officially ranked Motel and Classic Restaurant) located in Ramnicu Sarat municipality, Buzau county, is operated by Poienița Societate Cooperativă; the unit is promoted as a tourist inn, using the name Hanul Poienița both for the lodging and for the restaurant, respectively promoting the unit's activity by the means of its own website: *http://www.hanulpoienita.ro* and of a personalized e-mail address: *hanpoienita@yahoo.com*.

A brief analysis of the addresses of the identified inns leads to the possibility of splitting them into five large categories (Graph Chart 7 and Table 8). Thus, these facilities are located in: municipalities, small towns, suburban areas (at the entrance/exit, respectively on the belt roads), villages and resorts, and in-between localities).

Graph 7: The location of the investigated inns



Source: Authors' calculations based on the collected data.

Table 8. The location of inns, by regions

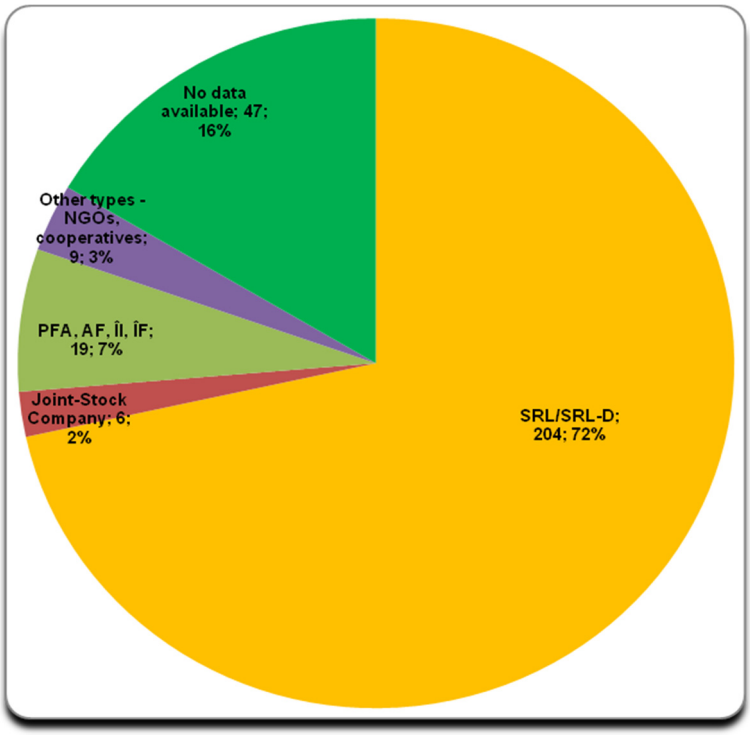
		Urban Area (Municipality)	Urban Area (Small Town)	Urban Area (at the Entrance/ Exit, on the Belt Road)	Rural Area (in the Village/ Resort)	Rural Area (in-between Localities)
ROMANIA		**68**	**29**	**24**	**102**	**65**
Historic provinces	**Transylvania**	34	13	12	53	29
	Dobrogea	3	5	2	5	5
	Wallachia-Oltenia	23	6	6	25	17
	Bukovina-Moldova	8	5	4	19	14
Modern regions of development	**North-East**	7	5	2	15	6
	South-East	4	5	4	9	13
	South-Muntenia	6	5	5	13	9
	South-West-Oltenia	6	1	1	8	7
	West	6	2	4	4	7
	North-West	13	3	2	11	9
	Center	15	8	6	38	13
	Bucharest-Ilfov	11	0	0	4	1

Source: Authors' calculations based on the collected data.

One may easily observe that the majority of Romania's inns are located in rural or suburban areas (cumulated, 66 %; more exactly: 35 % in villages or in rural/spa/sea/mountain resorts, 23 % rural areas in-between localities and 8 % nearby urban areas). As expected, there is a significant number of inns in large towns and municipalities (accounting for nearly 25 %), while small towns have a lower contribution, being somewhat poorly represented (10 %). This distribution is respected within all regions.

The last aspect considered for investigation throughout this paper refers to the identification of the type of business for which entrepreneurs have opted in order to run their inns.

Graph 8: Preferred types of business for operating the Romanian inns



Source: Authors' calculations based on the collected data.

Table 9: Types of businesses for operating Romanian inns

		Limited Liability Company (including SRL-D)	Joint-Stock Company	Authorized Individual/ Family Businesses	Other types - NGOs, cooperatives	No data available
ROMANIA		**204**	**6**	**19**	**9**	**47**
Historic provinces	**Transylvania**	101	2	12	1	26
	Dobrogea	15	0	3	2	1
	Wallachia-Oltenia	53	1	3	2	14
	Bukovina-Moldova	35	3	1	4	6
Modern regions of development	**North-East**	25	3	1	3	2
	South-East	25	0	3	3	5
	South-Muntenia	26	0	2	1	6
	South-West-Oltenia	19	0	1	1	2
	West	14	1	1	1	6
	North-West	27	0	2	0	8
	Center	60	1	9	0	12
	Bucharest-Ilfov	8	1	0	0	6

Source: Authors' calculations based on the collected data.

As Graph 8 and Table 9 reveal, a large majority, of nearly three quarters (72 %) of the investigated inns are owned and run by limited liability companies (SRL); this type of enterprise is very popular in Romania for most fields of activity due to the easiness to establish it. Family businesses[13], run by individuals or family associations, have a lower but not negligible contribution (7 %) to the development of inns in Romania. Cooperatives still occur in certain cases, while joint-stock enterprises are the least chosen type. It is expected that the 16 % attributed to "No data available", once identified, shall respect the current distribution.

As previously mentioned, a small number of enterprises control two or more inns, therefore they have been taken only once into consideration (*e.g.* ÎI Stanciu Cristina controls the entire Dracula Domain from Danes village, Mures

[13] The following types of businesses were included in this category: authorized person/independent person (*persoană fizică autorizată* or PFA), individual enterprise (*întreprindere individuală* or ÎI), family association (*asociație familială* or AF) and family enterprise (*întreprindere familială* or ÎF).

county – one hostel, two boarding houses, some camping-type huts and a classic restaurant; SC Hanul lui Matei SRL operates two boarding houses, several camping-type huts, and two buffet-bars from Sanduleni village and commune, Bacau county, etc), while other cases have led to the inclusion of two businesses into calculations – one operating the accommodation services and the other one the food-services (*e.g.* Hangița 3* ranked boarding house, operated by ÎI Bucur Elena, with 2* restaurant and 2* pizzeria, both operated by SC Hangița SRL; in the case of Classic Inn Hotel, with day-bar and classic restaurants, Petrol Grup SRL controls the hotel and the day-bar, while the classic restaurant is run by ArcoRCI SRL; when it comes to Hanul Dâmbu Morii, the boarding house and the hotel are operated by SC Flodem Mobil SRL, while SC Dâmbu Morii SRL operates the classic restaurant, etc.). Sunset Tour Inn is a limited liability company that, as previously mentioned, does not have anything in common with inns and operates two hotels, four classic restaurants and two day-bars.

In order to complete the picture and to properly assess this situation, one ought to determine the attractiveness of the identified inns among both Romanian and foreign tourists, respectively, to identify the triggering factors of the entrepreneurs who opt for the identification and differentiation of their hospitality businesses based on inn-related aspects. At the same time, the demand side is also going to be investigated, as understanding the perspective of the consumer is crucial for the future success of these lodging facilities.

5. Conclusions

The interest for a revival of Romanian inns was induced by their long existence in Romania until the beginning of the 1990s. Their continuity has been interrupted by force due to the changes in tourism regulation of the 1993. Inns were demoted in a trial to cut the ties with the (communist) past and in a quest for updating the classification of Romanian accommodation facilities, the tradition and authenticity were overlooked.

Romanian inns have continued to exist throughout all historic periods and to evolve independently or to be assimilated to the newly created, modern lodging facilities that respond to the more and more diversified contemporary needs. One ought not to forget that the image of inns specific to some historic regions is fully and highly detailed described and immortalized in the literary works of various Romanian authors, the best known being Slavici[14] and

[14] Due to the difficulty to adequately translate the literary fragment, this is resumed in English and quoted afterwards as it was originally written. As halting and resting place, gaining notoriety because of the humans' needs to socialize and to keep traditions alive, *Cârciuma de*

Sadoveanu. Likewise, the inn *Hanul Ancuței* is the idyllic place where life takes its course softly and enveloped in the mysteries, in the lights and shades of stories in which history, people and tales become one and the same, melting into each other.[15]

Despite inns' historic roots, their authentic feature that could generate a source of differentiation for Romania's (rural) tourism, the reforms undertaken in post-communist Romania until now have only led to the decrease in the number of inns and in their lodging capacity. By eliminating inns from the official classification system, Romanian authorities hindered the development of a specific/niche tourist potential. It is not clear how many historic inns were lost by closure and deterioration of their building or how many have lost their authentic features by being included into inappropriate lodging and food-service categories.

The collected and analyzed data reveal that, at least in name, inns did not disappear and that they deserve to be taken into consideration as a distinct class of lodging or food-service units. The undertaken researches and analyses have led to the identification of 288 accommodation and/or food-service structures matching one or more criteria that link them to inns. This proves an obvious interest of entrepreneurs towards such lodgings. Without the support of a proper legal framework, most of the identified entrepreneurs express and assume their facilities' classification using terms from the lexical family or related to inn (especially, *han*) in most of their own promotional activities, in the communication and promotion process intermediated by reservation sites and platforms, or in the personalization of the tools provided by Yahoo or Google.

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la Moara cu Noroc (*The Tavern/Pub from the Mill with Luck*) is the symbol of a place capable of changing the destiny of people: all travelers stop at the mill... Little by little, the mill turned into a tavern and a shelter place for tired travelers, and especially for those who were caught by night on the road. Eventually the tavern was moved/rebuilt in a more adequate spot. "... aici se opresc toți drumeții, …, și oarecum pe nesimțite moara a încetat a mai măcina și s-a prefăcut în cârciumă și loc de adăpost pentru tot drumețul obosit și mai ales pentru acela pe care noaptea-l apucă pe drum. În cele din urmă, arândașul a zidit cârciuma la un loc mai potrivit…" (Slavici, 1967, pp. 34)

[15] For the same purposes as above, the quotation from Mihail Sadoveanu is rephrased in the following lines; the original fragment is included afterwards. Sadoveanu insists that *Hanul Ancuței* was not an inn, it was a fortress. It had thick walls and locked gates as one had never seen before. It enabled the shielding of people, cattle and wagons, who were protected of any thieves, whom they had no thought about. Its gates would stay open, just like at the Seat and, during the calm autumn days one could see the valley of Moldova. Sometimes, the fiddlers' lines would stop; it was then, that the stories would begin… and such stories could only be heard at such an inn… "Trebuie să știți dumneavoastră că hanul acela al Ancuței nu era han, era cetate. Avea niște ziduri groase de ici până colo, și niște porți ferecate cum n-am văzut de zilele mele. Pe lângă adăpost, hanul oferea și prilej de petrecere. În cuprinsul lui se puteau oplosi oameni, vite și căruțe și nici habar n-aveau dinspre partea hoților... Porțile stăteau deschise ca la Domnie. Și prin ele, în zile line de toamnă, puteai vedea valea Moldovei. /…/ Contenea câte un răstimp viersul lăutarilor, și porneau poveștile... /…/ asemenea povești numai la un asemenea han se pot auzi…" (Sadoveanu, 1928, Chapter I. Iapa lui Vodă]

More than half of the identified inns offer combined accommodation and food-services. They are followed by the providers (around a third) who only focus on accommodation services. Another observation worth to be made is that some entrepreneurs have understood the need of developing their businesses by the means of diversification. Consequently, some of them have completed their offer with leisure services (fishing, riding, spa, swimming pools or traditional activities).

Most of the inns offering accommodation and food-services are registered as guesthouses. Nearly three quarters are located in rural areas and in-between villages. Worth to point out is also the fact that regarding the inns located nearby towns (in neighboring villages or in the towns' suburbs), two different types can be distinguished. A first category includes those that match the rural profile and try to exploit it on behalf of urban tourists. The second type consists of some rather kitschy inns, that are neither rural, nor urban, mainly focusing on organizing events and that aim at attracting local people, claiming to provide authentic services.

Other categories of lodgings that offer an umbrella for inns are hotels and motels. They cover a lower percentage of the identified inns, about 10% each. Their distribution reflects both the specific features of transit lodgings, in the case of those located on the sides of the roads, and also the potential to capitalize on historic and specific architectural heritage, in the case of both urban and rural units (e.g. Hanul lui Manuc from Bucharest). The location of inns mainly within the old historic provinces, with a high concentration in Transylvania, shows that this potential is sensed by their operators.

On the other hand, the supply of food-services is represented at a great extent (more than half) by classic restaurants, followed at a significant distance by other types of food-service providers. The research revealed that restaurants with national, regional and local specific, respectively specialized restaurants are not representative from a quantitative perspective; therefore, one may conclude that this segment offers a generous potential in terms of encouraging the development of such restaurants as inns; they can become highly valuable in Romania's attempt of differentiating on the international tourism market.

The identified inns are operated mainly (about 71%) by limited liabilities companies which are largely associated with small and microenterprises. This situation reflects that the developing potential of these entities is low, given their limited access to financing resources. Nevertheless, the availability of European funds can contribute to the creation and maintenance of niche and authentic tourist services and products offered by the units labeled as inns.

The findings of this study show that inns, as distinct structures for lodging and/or food-services, did not disappear and that, consequently, their niche potential should not be ignored. Currently, Romanian regulations do not include any specifications for inn classification. It will be maybe too much to ask for the re-introduction of this category among the (too many) existing ones. Thus, it will not be unreasonable to recognize inns as a subcategory for any of the appropriate

structures. Therefore, a set of criteria could be established in order to preserve inns' specific features (mainly when historic buildings are concerned) and to give operators the possibility to use in the name of their unit the term inn standing alone and not to create confusion and hilarious situations with compulsory names like Motel Inn XX or Guesthouse Inn YY, as the present regulations require.

While abroad, inns may have been assimilated to other types of accommodation facilities, on the Romanian market they might provide an important opportunity for the further development of (rural and heritage) tourism, by integrating them into authentic experiences.

Further investigations regarding the supply side (starting from the reasons to develop an inn to the in-depth analyses of the provided services) and the demand side are necessary in order to create a solid base for supporting the development of inns on Romania's tourist market.

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3) http://cazare.info/
4) http://cazare.infocons.ro/
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STUDIA UBB NEGOTIA, LX, 3, 2015, pp. 51 - 78
(RECOMMENDED CITATION)

PORTFOLIO OPTIMIZATION ALGORITHMS

IONUT TRAIAN LUCA[1]

ABSTRACT. A milestone in *Portfolio Theory* is represented by the Mean-Variance Model introduced in 1952 by Harry Markowitz. During the years, mathematicians have developed several different models extending, improving and diversifying the Mean-Variance Model. This paper will briefly present some of these extensions and the resulted models. The aim is to search and identify some connections between portfolio theory and energy production. Analyzing the Mean-Variance Model and its extensions we can conclude that from practical point of view the minimax model is the easiest to be implemented, because the analytical solution is computed with low effort. This model, like all others from Portfolio Theory, has a high sensitivity for mean. We consider that this model fits to our goal (energy optimization) and we intend to implement it in our future research project.

Key words: portfolio, optimization, algorithms

JEL classification: G11

1. Introduction

The optimal allocation of financial resources is of outmost importance. Capital allocation can determine the development or the stagnation of an economic sector, depending on investors' perception and risk aversion.

A milestone in *Portfolio Theory* is represented by the Mean-Variance Model introduced in 1952 by Harry Markowitz (see [21]). The main idea of Markowitz's theory is that portfolio diversification will reduce risk, measured using variance, as a spread of returns around the expected return. The model is formulated in such way that risk (variance) is minimized while expected return does not fall below a predefined level, or maximizes the expected return while risk (variance) does not exceed a predefined level.

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During the years, mathematicians have developed several different models extending, improving and diversifying the Mean-Variance Model. This paper will briefly present some of these extensions and the resulted models. The aim is to search and identify some connections between portfolio theory and energy production. We will insist on models which we consider appropriate to provide some starting points for our goal.

2. Markowitz Model

Portfolio investment problem was first studied by the mathematician Harry Markowitz, which published in March 1952 in *The Journal of Finance* his paper "*Portfolio selection"* (see [21]) considered the mille stone of this field.

In constructing the entire theory of portfolio optimization, Markowitz presumes that an investor will always chose a portfolio which offers a higher profitability for the same risk or a portfolio which offers the same profitability against a lower risk.

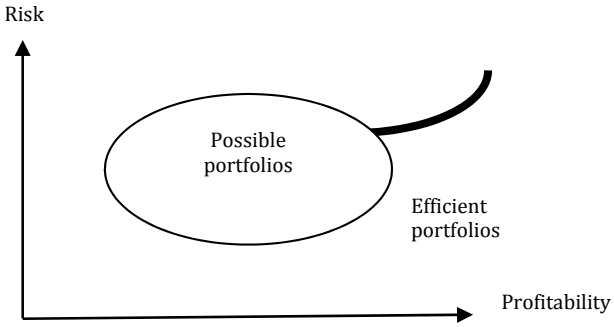


Figure 1: Risk and profitability
Source: Markovitz [21]

Markowitz proved, in a simple way, using tools of analytic geometry, that an efficient method to reduce risk is to diversify the portfolio instead of placing the entire amount in a single asset.

Let's consider a portfolio of n assets denoted by $S_j, j = \overline{1,n}$. An investor, owning the initial amount V_0, focuses the problem to determine which amount to invest in each asset such that the profitability will be maximized and the risk minimized.

Obviously, each considered asset S_j, has a certain rate of return, denoted R_j, which is a random variable. The expected rate of return for asset S_j is $r_j = E[R_j], j = \overline{1,n}$.

Markowitz used variance (L_2 risk function) to measure the risk. The evaluation of risk for the entire portfolio requires that correlation between assets should be considered. If correlation exists, a change in an asset will generate changes for correlated assets. As measure for correlation, the covariance $\sigma_{ij} = E\big[(R_i - r_i)\big(R_j - r_j\big)\big], i, j = \overline{1,n}$ is calculated. It's well known that the covariance between a variable and itself results in variance.

Denoting by x_j the amount invested in asset S_j, $j = \overline{1,n}$, the risk function becomes:

$$\sum_{i=1}^{n}\sum_{j=1}^{n}\sigma_{ij}x_i x_j$$

Let V_0 be the initial wealth of investor and ρ the minimum return expected from the investment. To limit the risk for asset S_j, investor is imposing a maximum amount u_j to be invested.

The mathematical model created by Markowitz (***MV-Mean Variance Model***) (see [21]) is:

$$\begin{cases} min\sum_{i=1}^{n}\sum_{j=1}^{n}\sigma_{ij}x_i x_j \\ \sum_{j=1}^{n} r_j x_j \geq \rho V_0 \\ \sum_{j=1}^{n} x_j = V_0 \\ 0 \leq x_j \leq u_j, \qquad j = \overline{1,n} \end{cases}$$

To validate the model, the following conditions have to be fulfilled:

- Random variables R_j, $j = \overline{1,n}$ are normally distributed;
- Investor has a desire to reduce risk.

Although this model created by Markowitz in 1952 is considered to be the foundation of portfolio theory, practitioners are rarely using it. The main drawbacks considered as being the following:

1. Solving the problem is not easy due to quadratic objective function and due to the complexity of covariance matrix, especially when the number of considered assets is large.
2. Investors are considering variance as a non-appropriate measure for risk. Their arguments are that an investor is not satisfied with a small profit or loss; thus he/she is highly satisfied with a high profit, therefore he/she behaves in a different manner toward the risk and reward.

3. The model is very sensitive to errors generated by random variables and their expected value.
4. The model considers a single period portfolio, while almost all portfolios are held over multiple periods or multi-period.

Analyzing the vast literature we have identified five directions that extend, improve and diversify the mean-variance model:

- Extending the model from the single period to multi-period.
- Including the transaction cost in the mathematical model.
- Analyzing the sensitivity for input data.
- Approximation schemes
- Introduction of new risk measures.

In 1972, Merton (see [23]) computed the efficient frontier for Mean-Variance model, using Lagrange multipliers, in a special case when short selling is allowed (no sign restriction on $x_j, j = \overline{1,n}$).

3. Multi-period time horizon approach for Mean-Variance model

By extending the portfolio optimization model to multi-period time horizon, investor has the opportunity to reoptimize the portfolio at some precise time moments. Unfortunately the literature does not offer any indications how the investor should act in the case of reoptimization.

The existing algorithms provide tools for the initial optimization of portfolio; thus the investor could not interfere until the end of the period. In 1967, Smith (see [33]) extended the methodology used for initial configuration of multi-period time horizon portfolios to include intermediate time moments, allowing investor to reoptimize the portfolio during its lifespan.

In 1968, Mossin (see [25]) proves that at each moment of time t, $t = \overline{1,T}$ the amount invested in each selected asset depends on the wealth at stage t, $t = \overline{1,T}$. Also, he proved that: (i) investment decision for stage t, $t = \overline{1,T-1}$ can't be computed before the result of stage $t-1$ is known and (ii) decision for stage t, $t = \overline{1,T-1}$ considers not only the information regarding returns for stage t, but also information regarding returns for stages $t+1, \ldots T$. In the same paper Mossin studied the impact on decision of number of stages until end of the period.

Due to non separability of variance, it is not easy to extend the classical Mean-Variance model for multi-period time horizon. Mathematicians like Merton (see [22]), Samuelson (see [29]) and Fama (see [11]) have developed models which used expected utility as objective function. The expected utility is considered

to include besides the wealth at each time stage *t,* the amount used by investor to cover his current costs. They study the relation between investment decisions, consumption decisions and total wealth. We remark that in Portfolio Theory appears the idea of bicriteria problems.

The utility function had overcome some of the difficulties of extending the model to multi-period time horizon, but the use of total or average return still remains a part of the difficulties. In order to overcome this problem, in 1971 Hakkanson (see [14]) developed a model which is using the average compound return.

In 1974, Elton and Gruber (see [9]) realized a very precise inventory of models developed until that moment, specifying for each model the conditions imposed on the objective function, and the probability distribution for rate of return (normal, symmetric stable, log normal, Stable Paretian, none). Using dynamic programming, they developed a multi-period time model which maximizes the utility of an investor which uses at each time stage *t,* $t = \overline{1,T}$ part of the wealth to cover current costs and the rest to continue the investments. They remark that multi-period time model behaves similar to the single period model. In a different paper (see [10]), also from 1974, Elton and Gruber analyze how geometric mean and expected utility of multi-period returns behave as selection criteria for portfolio. Also, they analyze which is the impact on portfolio performance of the number of reoptimizations made by the investor.

Only in 2000 the analytical solution for multi-period time model was computed. The result is due to Li and Ng (see [20]). They returned to the classical formulation of Markowitz model which maximizes the expected final wealth while variation of total wealth does not exceed a predefined level, or minimizes variation of total wealth, while expected final wealth does not fall below a predefined level.

The mathematical model for the problem is

$$(1)\quad \begin{cases} \max E(V_T) \\ var(V_T) \le \sigma \\ V_{t+1} = \sum_{j=2}^{n} x_{t,j} r_{t,j} + \left(V_t - \sum_{j=1}^{n} x_{t,j} \right) r_{t,1}, \quad t = \overline{1, T-1} \end{cases}$$

or

$$(2)\quad \begin{cases} \min var(V_T) \\ E(V_T) \geq \varepsilon \\ V_{t+1} = \sum_{j=2}^{n} x_{t,j} r_{t,j} + \left(V_t - \sum_{j=1}^{n} x_{t,j} \right) r_{t,1}, \quad t = \overline{1, T-1} \end{cases}$$

The significance for all notations involved is presented in Section 5.3.

To solve the problem, Li and Ng [20] have used a principle somehow similar to Lagrange multipliers to develop the following problem:

$$(3)\quad \begin{cases} \max\left(E(V_T) - \omega var(V_T)\right) \\ V_{t+1} = \sum_{j=2}^{n} x_{t,j} r_{t,j} + \left(V_t - \sum_{j=1}^{n} x_{t,j} \right) r_{t,1}, \quad t = \overline{1, T-1} \end{cases}$$

where $\omega \in [0, \infty)$.

An equivalent problem for (3) is solved and thus the solution for (3) is computed. Considering the relation between problems (1), (2) and (3), the efficient frontier for multi-period Markowitz model is computed.

4. Transaction cost, sensitivity to input data and approximation schemes

As part of extending the Markowitz model to multi-period time horizon, mathematicians have considered to include transaction costs in the model. Through transaction costs we understand the brokerage fee, the cost incurred by analysis, and any other cost generated in the process of deciding upon placing or not an order, including the price difference generated by the delay in executing an order. Financiers and mathematicians argued that the optimal solution computed with zero transaction costs may be different from the solution when transaction costs occur. In the literature this idea was developed by Constantinides (see [7]), Perold (1988, see [27]), Amihud and Mendelson (1988, see [1]), Dumas and Luciano (see [8]).

Perold [27], respectively Amihud and Mendelson [1] have a more financial oriented approach by analyzing the impact of execution and opportunity cost, respectively of liquidity and marketability of the assets on portfolio construction. Constantinides [7], respectively Dumas and Luciano [8] favored

a mathematical approach. They developed multi-period models with infinite horizon and studied the influence of transaction costs on optimal solution. While in Constantinides [7] model the investor is calculating the transaction costs at each time stage as a fixed percentage from the total wealth, in Dumas and Luciano [8] model the transaction costs are consumed only at end moment of time.

The sensitivity of solution to input data was studied by Best and Grauer (see [3] and [4]), Chopra, Hensel and Turner (see [6]). They have studied the sensitivity of solution to changes of mean and/or coefficients in problems restriction. The general conclusion is that an optimal solution is extremely sensitive to mean and some adjustments of input data may improve the solution.

Approximation schemes were developed to overcome difficulties (computing the covariance matrix for example) created by specific form of portfolio optimization problem. Contributions to this direction are due to mathematicians like Sharpe (see [30], see [31], see [32]), Stone (1973, see [34]), van Hohenbalken (1975, see [35]).

Sharpe (see [30]) created an index model. He introduced and computed an index for all assets evaluated for investment and instead of calculating the correlations for all pairs of assets, the correlation between each asset and the index is calculated, reducing the time allocated for the operation. More recent, the index models have been further developed by Lee, Finnerty and Wort (see [19]), Huang and Qiao (see [15])

In 1971, Sharpe (1971, see [17]) remarked that "*if the essence of the portfolio analysis problem could be adequately captured in a form suitable for linear programming methods, the prospect for practical application would be greatly enhanced."* This remark opened the way of linear approximation of Mean-Variance Model on which also Stone (1973, see []) has contributed.

Van Hohenbalken (see [35]) created a model which makes successive approximations of the constraint set.

5. Introduction of new risk measures

Using variance to evaluate the risk creates serious difficulties both in computing the covariance matrix and extending the single period Mean-Variance model to multi-period time horizon. It is well known that variance is a square function. Analyzing the graph of x^2 and $|x|$ functions reveals a similarity, which led mathematicians to develop new measures for risk.

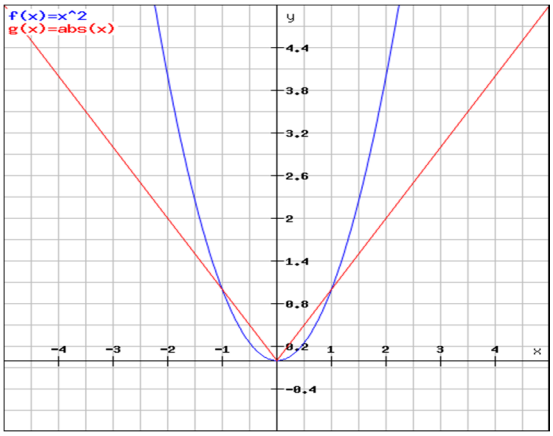


Figure 2: x^2 and $|x|$ functions
Source: author's own work

5.1. Mean absolute deviation model (MAD)

In 1988, Hiroshi Konno (see [17]) proposed to use absolute deviation as a measure for risk (L_1 risk function). The risk for a portfolio of n assets is:

$$\omega = E\left[\left|\sum_{j=1}^{n} R_j x_j - \sum_{j=1}^{n} r_j x_j\right|\right]$$

If R_j is normally distributed, then the two measures for risk (measure of Markowitz and measure of Konno) are equivalent.

The model created by Konno and Yamazaki (see [18]) in order to optimize the investment is:

$$\begin{cases} minE\left[\left|\sum_{j=1}^{n} R_j x_j - \sum_{j=1}^{n} r_j x_j\right|\right] \\ \sum_{j=1}^{n} r_j x_j \geq \rho V_0 \\ \sum_{j=1}^{n} x_j = V_0 \\ 0 \leq x_j \leq u_j\,, \qquad j = \overline{1,n} \end{cases}$$

Being a linear programming problem, this model eliminates the difficulty of solving the problem which appeared to the Markowitz model.

5.2. Minimax model for single period portfolio selection

Generally, the risk is perceived as a variation between total profitability and total expected profitability. Markowitz used variance to evaluate this variation, which means that

$$\omega = E\left[\left\|\sum_{j=1}^{n} R_j x_j - \sum_{j=1}^{n} r_j x_j\right\|\right]^2.$$

Instead of calculating the expected value for this deviation, it might be considered the probability that the deviation is greater than a predefined value. This means

$$P\left(\left|\sum_{j=1}^{n} R_j x_j - \sum_{j=1}^{n} r_j x_j\right| \geq \varepsilon\right).$$

To keep the variance as low as possible, it's enough to keep the above probability as low as possible.

Using the Markov inequality $P(X \geq a) \leq \frac{1}{a}E(X)$ we obtain:

$$P\left(\left|\sum_{j=1}^{n} R_j x_j - \sum_{j=1}^{n} r_j x_j\right| \geq \varepsilon\right) \leq \frac{1}{\varepsilon}E\left(\left|\sum_{j=1}^{n} R_j x_j - \sum_{j=1}^{n} r_j x_j\right|\right) \leq$$

$$\frac{1}{\varepsilon}E\left(\left|\sum_{j=1}^{n} R_j - \sum_{j=1}^{n} r_j\right| x_j\right) \leq \frac{1}{\varepsilon}\sum_{j=1}^{n} E(|R_j x_j - r_j x_j|) \leq$$

$$\frac{n \max\limits_{1\leq j\leq n} E(|R_j x_j - r_j x_j|)}{\varepsilon}$$

Using this argument, Cai (see [5]) introduced a new measure for risk:

$$\omega_\infty = \max_{1\leq j\leq n} E(|R_j x_j - r_j x_j|)$$

Which is the meaning for this risk proposed by Cai? For each individual asset, the absolute deviation between profitability and expected profitability is calculated and the maximum of all these values is the portfolio risk.

Which is the link between risk defined by Markowitz (ω) and risk defined by Cai (ω_∞)? If ω_∞ is small then also the variance (ω) is small. If the variance (ω) is small, there is not a guarantee that ω_∞ is small.

Using this risk measure, Cai introduced a new portfolio optimization model, known as ***Minimax model*** (see [5]) and formulated as:

$$(PO\ 1)\qquad \begin{cases} min\left(\max\limits_{1\le j\le n} E\left(\left|R_j x_j - r_j x_j\right|\right); -\sum\limits_{j=1}^{n} r_j x_j\right) \\ \sum\limits_{j=1}^{n} x_j = V_0 \\ x_j \ge 0, \qquad\qquad j=\overline{1,n} \end{cases}$$

It's obviously that $(PO\ 1)$ is a bicriteria optimization problem.

Denoting by $q_j = E\left(\left|R_j - r_j\right|\right), j=\overline{1,n}$ the expected absolute deviation for R_j, risk becomes:

$$\omega_\infty = \max_{1\le j\le n} q_j x_j$$

Solving this problem means to determine the amount to be invested in each asset, as such that the total wealth is maximized and the investment risk is minimized. From mathematical point of view, the solution is an efficient point, defined as:

An admissible solution x is efficient if there does not exist an admissible solution y such that:

$$\max_{1\le j\le n} q_j y_j \le \max_{1\le j\le n} q_j x_j$$
$$\sum_{j=1}^{n} r_j x_j \le \sum_{j=1}^{n} r_j y_j$$

Formulated in natural language, it is not possible to have another allocation with a smaller risk and a higher profitability.

To simplify the bicriteria problem, it can be rewritten it as:

$$(POB\ 1)\qquad \begin{cases} min\left(y; -\sum\limits_{j=1}^{n} r_j x_j\right) \\ q_j x_j \le y, \qquad j=\overline{1,n} \\ \sum\limits_{j=1}^{n} x_j = V_0 \\ x_j \ge 0, \qquad j=\overline{1,n} \end{cases}$$

Referring to a result of Yu, from 1974, which links bicriteria and parametric problems, $(POB\ 1)$ is rewritten as:

$$(PO(\lambda)\ 1) \qquad \begin{cases} min\left[\lambda y - (1-\lambda)\sum_{j=1}^{n} r_j x_j\right] & \\ q_j x_j \le y, & j = \overline{1,n} \\ \sum_{j=1}^{n} x_j = V_0 & \\ x_j \ge 0, & j = \overline{1,n} \end{cases}$$

Proposition 1 (Yu, 1974) (see [41] and [5])

(x,y) is an efficient solution for $(POB\ 1)$ *if and only if there exist* $\lambda \in (0,1)$ *such that* (x,y) *is optimal solution for* $(PO(\lambda)\ 1)$*.*

λ is the investor's acceptance for risk. The investor will accept a higher risk when λ is closer to 1.

Considering the equivalence between $(PO\ 1)$ and $(POB\ 1)$, the result of Yu is extended between $(PO\ 1)$ and $(PO(\lambda)\ 1)$. For a fixed λ, the optimal solution of $(PO(\lambda)\ 1)$ is the efficient solution for $(PO\ 1)$. An efficient frontier will be obtained by solving the problem $(PO(\lambda)\ 1)$ for any $\lambda \in (0,1)$ which means that, for any risk tolerance, the investor will determine the amount to be invested in each asset.

The ***Minimax Model*** created by Cai has the advantage of providing an analytical solution, which makes the model easy to be utilized by practitioners. Moreover, the model allows the investor to avoid the calculation of covariance, which requires an important effort for large portfolios. Unfortunately, Minimax Model does not allow short-selling, which facilitates solution in Mean Variance Model. The short-selling impact on the solution is not known. Also the impact of bounding the amount invested in each asset on the solution is not known.

Solving the $(PO(\lambda)\ 1)$ problem is a 2 step process.

First, all assets are ranked by the expected rate of return and then the selected assets for the investment are chosen.

Second, the amount invested in each asset is computed. To compute this amount, the risk for each asset is evaluated and the invested amount is computed such that the exposure is similar for all assets. Through exposure we understand $q_j x_j, j = \overline{1,n}$.

For a fixed λ the solution for problem $(PO(\lambda)\ 1)$ is computed. The following theorem provides the solution.

Theorem 2 (solution for parametric problem) (see [5])
For $\forall\lambda \in (0,1)$ *the solution for parametric problem* $(PO(\lambda)\ 1)$ *is:*

(1)
$$x_j^* = \begin{cases} \dfrac{V_0}{q_j}\left(\displaystyle\sum_{l\in\mathcal{F}} \frac{1}{q_l}\right)^{-1}, & j \in \mathcal{F} \\ 0, & j \notin \mathcal{F} \end{cases}$$

(2)
$$y^* = V_0\left(\sum_{l\in\mathcal{F}} \frac{1}{q_l}\right)^{-1}$$

where $\mathcal{F}$ *is the set of assets to be invested and is computed as following:*

If $\exists k = \overline{0, n-2}$ *such that:*

(3)
$$\frac{r_n - r_{n-1}}{q_n} < \frac{\lambda}{1-\lambda}$$

(4)
$$\frac{r_n - r_{n-2}}{q_n} + \frac{r_{n-1} - r_{n-2}}{q_{n-1}} < \frac{\lambda}{1-\lambda}$$

……

(5)
$$\frac{r_n - r_{n-k}}{q_n} + \frac{r_{n-1} - r_{n-k}}{q_{n-1}} + \cdots + \frac{r_{n-k+1} - r_{n-k}}{q_{n-k+1}} < \frac{\lambda}{1-\lambda}$$

(6)
$$\frac{r_n - r_{n-k-1}}{q_n} + \frac{r_{n-1} - r_{n-k-1}}{q_{n-1}} + \cdots + \frac{r_{n-k} - r_{n-k-1}}{q_{n-k}} \geq \frac{\lambda}{1-\lambda}$$

then $\mathcal{F} = \{n, n-1, \dots, n-k\}$;
else $\mathcal{F} = \{n, n-1, \dots, 1\}$.

This is the meaning for the relation

$$\frac{r_n - r_{n-1}}{q_n} < \frac{\lambda}{1-\lambda}$$

Rewriting the above inequality as $(1-\lambda)(r_n - r_{n-1}) < \lambda q_n$ we deduce that, if the inequality holds then the return rate for asset S_n is big enough to make the asset attractive.

Theorem 2 gives the optimal solution when all assets are risky. Risk free assets can not be neglected (for example government securities) but they small rates of return. Without loss of generality, risk free asset will be on position 1 in the ranking process. To determine whether the risk free asset is selected or not for investment, the following inequality has to be checked

$$\frac{r_n - r_1}{q_n} + \frac{r_{n-1} - r_1}{q_{n-1}} + \cdots + \frac{r_2 - r_1}{q_2} < \frac{\lambda}{1-\lambda}$$

If the inequality holds, the entire amount will be invested in the risk free asset.

Having the optimal solution for parametric problem $(PO(\lambda)\ 1)$, efficient solution for portfolio optimization problem $(PO\ 1)$ has to be computed.

Denoting by

$$\beta_k = \frac{r_n - r_{n-k}}{q_n} + \frac{r_{n-1} - r_{n-k}}{q_{n-1}} + \cdots + \frac{r_{n-k+1} - r_{n-k}}{q_{n-k+1}},\ \ k = \overline{1, n-1}$$

$$\beta_0 = 0$$

inequalities *(3), (4), (5)* and *(6)* will be

$$\beta_1 < \frac{\lambda}{1-\lambda}, \qquad \beta_2 < \frac{\lambda}{1-\lambda}, \qquad \ldots\ldots\ldots \quad \beta_k < \frac{\lambda}{1-\lambda}, \qquad \beta_{k+1} \geq \frac{\lambda}{1-\lambda}$$

Obviously $\beta_0 \leq \beta_1 \leq \cdots \leq \beta_{n-2} \leq \beta_{n-1}$

To compute the set $\mathcal{F}$ of assets to be invested, *k* has to be determined such that:

$$\beta_k < \frac{\lambda}{1-\lambda}, \qquad \beta_{k+1} \geq \frac{\lambda}{1-\lambda}$$

Solving the above inequalities we have $\frac{\beta_k}{1+\beta_k} < \lambda \leq \frac{\beta_{k+1}}{1+\beta_{k+1}}$ and denoting by $\underline{\lambda}_k = \frac{\beta_k}{1+\beta_k}$, $\overline{\lambda}_k = \frac{\beta_{k+1}}{1+\beta_{k+1}}$, we get $\lambda \epsilon \left(\underline{\lambda}_k, \overline{\lambda}_k\right]$.

According to *Theorem 2* the set of assets to be invested is $\mathcal{F} = \{n, n-1, \ldots, n-k\}$ where $k = \overline{0, n-2}$ and the invested amount and risk will be computed using *(1)* and *(2).* This means that for each λ in $\left(\underline{\lambda}_0, \overline{\lambda}_0\right]$, $\left(\underline{\lambda}_1, \overline{\lambda}_1\right]$, ... $\left(\underline{\lambda}_{n-2}, \overline{\lambda}_{n-2}\right]$ solution for parametric problem $(PO(\lambda)\ 1)$ is computed. For interval $\left(\underline{\lambda}_{n-1}, \overline{\lambda}_{n-1}\right]$ solution coresponds to case $\mathcal{F} = \{n, n-1, \ldots, 1\}$ from *Theorem 2.*

Has the parametric problem $(PO(\lambda)\ 1)$ a unique solution? Cai proved that solution is unique on intervals$\left(\underline{\lambda}_k, \overline{\lambda}_k\right)$, while for $\lambda = \overline{\lambda}_k$ problem has multiple

solution, which is obtained by considering for investment the first asset which was eliminated in the ranking process. The amount invested in this asset will come from reducing the amount invested in the other considered assets. Diversifying the portfolio will determine a risk decrease and also a total wealth decrease. Risk decrease will be Δ_y, where

$$0 \leq \Delta_y \leq \frac{y^*}{1 + \sum_{l \in \mathcal{F}} \frac{q_{n-k-1}}{q_l}}$$

The value chosen by investor for Δ_y will have a huge impact on final solution.

Following theorem gives the efficient frontier for portfolio optimization problem $(PO\ 1)$.

Theorem 3 (solution for portfolio optimization problem)(see [5])

Efficient frontier for portfolio optimization problem $(PO\ 1)$ *is computed by considering* n *intervals* $\left(\underline{\lambda}_k, \overline{\lambda}_k\right)$, $k = \overline{0, n-1}$ *with* $\overline{\lambda}_k = \underline{\lambda}_{k+1}$, $k = \overline{0, n-2}$, *for which the following holds:*

1. *For each* $k = \overline{0, n-1}$, *problem* $(PO\ 1)$ *has a unique solution on interval* $\left(\underline{\lambda}_k, \overline{\lambda}_k\right)$.

   The amount invested in each asset is:

$$x_j^* = \begin{cases} \frac{V_0}{q_j}\left(\sum_{l \in \mathcal{F}} \frac{1}{q_l}\right)^{-1}, & j \in \mathcal{F} \\ 0, & j \notin \mathcal{F} \end{cases}$$

where $\mathcal{F} = \{n, n-1, \dots, n-k\}$.

Total portfolio risk is:

$$y^* = V_0 \left(\sum_{l \in \mathcal{F}} \frac{1}{q_l}\right)^{-1}$$

Total wealth is:

$$z^* = V_0 \sum_{j \in \mathcal{F}} \frac{r_j}{q_j} \left(\sum_{l \in \mathcal{F}} \frac{1}{q_l}\right)^{-1}$$

2. *For each* $k = \overline{0, n-2}$ *and for* $\lambda = \overline{\lambda}_k = \underline{\lambda}_{k+1}$ *problem* $(PO\ 1)$ *has multiple solutions.*

   The amount invested in each asset is:

$$x_j^0 = \begin{cases} x_j^* - \Delta_j, & j \epsilon \mathcal{F} \\ \Delta_l, & l = n-k-1 \\ 0, & else \end{cases}$$

   where $\mathcal{F} = \{n, n-1, \dots, n-k\}$.

   Total portfolio risk is:

$$y^0 = y^* - \Delta_y$$

   Total wealth is:

$$z^0 = z^* - \Delta_y \frac{\bar{\lambda}_k}{1 - \bar{\lambda}_k}$$

   Where:

$$0 \leq \Delta_y \leq \frac{y^*}{1 + \sum_{j \in \mathcal{F}} \frac{q_{n-k-1}}{q_j}}$$

$$\Delta_j = \frac{\Delta_y}{q_j}, j \epsilon \mathcal{F}$$

$$\Delta_l = \sum_{j \in \mathcal{F}} \Delta_j$$

If the portfolio contains also a risk free asset, then the solution is presented by the following theorem.

Theorem 4 (solution for portfolio optimization problem in case of risk free asset) (see [5])

The efficient frontier for portfolio optimization problem $(PO\ 1)$ *is computed by considering n-*i_0*+1 interval* $(\underline{\lambda}_k, \overline{\lambda}_k)$, $k = \overline{0, n - \iota_0 - 1}$ *with* $\overline{\lambda}_k = \underline{\lambda}_{k+1}$, $k = \overline{0, n - \iota_0 - 1}$ *for which the following are true:*

1. *For* $k = \overline{0, n - \iota_0 - 1}$, *problem* $(PO\ 1)$ *has unique solution on intervals* $(\underline{\lambda}_k, \overline{\lambda}_k)$.

The amount invested in each asset is

$$x_j^* = \begin{cases} \dfrac{V_0}{q_j}\left(\displaystyle\sum_{l\in\mathcal{F}}\frac{1}{q_l}\right)^{-1}, & j \in \mathcal{F} \\ 0, & j \notin \mathcal{F} \end{cases}$$

with $\mathcal{F} = \{n, n-1, \dots, n-k\}$.

Total risk of portfolio is

$$y^* = V_0\left(\sum_{l\in\mathcal{F}}\frac{1}{q_l}\right)^{-1}$$

and total wealth is

$$z^* = V_0\sum_{j\in\mathcal{F}}\frac{r_j}{q_j}\left(\sum_{l\in\mathcal{F}}\frac{1}{q_l}\right)^{-1}$$

2. *For each* $k = \overline{0, n-\iota_0-1}$ *and for* $\lambda = \bar{\lambda}_k = \underline{\lambda}_{k+1}$ *problem* $(PO\ 1)$ *has multiple solutions.*

The amount invested in each asset is

$$x_j^0 = \begin{cases} x_j^* - \Delta_j, & j\epsilon\mathcal{F} \\ \Delta_l, & l = n-k-1 \\ 0, & else \end{cases}$$

with $\mathcal{F} = \{n, n-1, \dots, n-k\}$.

Total risk of portfolio is

$$y^0 = y^* - \Delta_y$$

and total wealth is

$$z^0 = z^* - \Delta_y\frac{\bar{\lambda}_k}{1-\bar{\lambda}_k}$$

where

$$0 \le \Delta_y \le \frac{y^*}{1+\sum_{j\in\mathcal{F}}\frac{q_{n-k-1}}{q_j}}$$

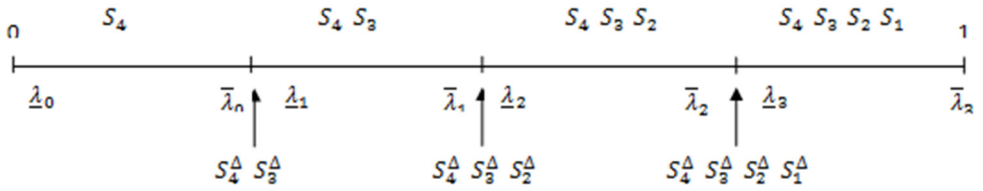
$$\Delta_j = \frac{\Delta_y}{q_j}, j\epsilon\mathcal{F}$$

$$\Delta_l = \sum_{j\in\mathcal{F}}\Delta_j$$

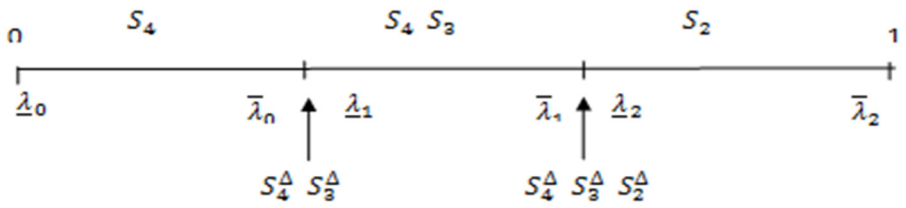
3. *For interval* $\left(\underline{\lambda}_{n-i_0}, 1\right)$ *problem* $(PO\ 1)$ *has unique solution.*
   The entire amount is invested in riskless asset, so $x_{i_0} = V_0$.
   Total portfolio risk is y=0.
   Total wealth is $z = r_{i_0} V_0$.

The following diagram presents an optimization process for a portfolio of 4 assets.

Portfolio of 4 risky assets



Portfolio of 4 assets, with 2nd asset being risk free



5.3. Minimax models for multi-period portfolio selection

Yu model

The first analytical solution for a multi-period portfolio problem was obtained by Li and Ng (see [20]). The problem, which actually is an extension of Markowitz Model from single period to multi-period, was briefly presented in Section 3.

A second analytical solution was obtained by Yu, Wang, Lai and Chao in 2005 (see [40]).

The main difference between those two models is given by the way the mathematical model is developed.

In Li and Ng model, the investor seeks either to maximize the total wealth while risk is less than or equal to a defined level or to minimize the risk while the total wealth does not decrease under a defined level.

In the model of Yu, investor seeks to minimize the risk and to maximize the total wealth.

The two groups of researchers are defining risk in different ways. Li and Ng are defining risk as variance of total wealth, while Yu is defining risk as a sum over all periods for maximum of absolute deviation calculated for each individual asset.

Analyzing the two different approaches it comes out that Yu's model is more conservative, due to the fact that it does not allow short-selling.

An investor which owns an initial wealth V_0 will invest it in a portfolio of assets $S_1, S_2 \dots S_n$ for a time horizon *1,2,...., T.* Knowing that investor may step in and reallocate the amount between assets only at the moments *1, 2, … t, … T-1*, he has to compute the amount $x_{tj}, t = \overline{1,T}, j = \overline{1,n}$ allocated to each asset $Sj, j = \overline{1,n}$ such that at time period *T* the total wealth will be maximized and total risk will be minimized.

Each asset S_j, $j = \overline{1,n}$ has at time moment *t,* $t = \overline{1,T}$ a certain rate of return, denoted by R_{tj}. Expected value for the random variable R_{tj}, is r_{tj}. At each moment of time investor will not introduce and will not extract money from the system, so the following holds:

$$V_{t-1} = \sum_{j=1}^{n} x_{tj}, \qquad t = \overline{1,T}$$

By $R_t = (R_{t1}, R_{t2}, \dots, R_{tn})$ is denoted the vector of rates of return at time moment *t,* and $x_t = (x, x_{t2}, \dots, x_{tn})$ is the vector of the amount invested in each asset.

At the end of each time period, the investor is computing the total wealth according to

$$V_t = V_{t-1} + R_t x_t, t = \overline{1,T}\,.$$

The investment risk at each time moment *t,* $t = \overline{1,T}$ is computed according to

$$\omega_t(x_t) = \max_{1 \le j \le n} E\left(\left|R_{tj}x_{tj} - r_{tj}x_{tj}\right|\right)$$

and the total risk for the investment is

$$\omega_t = \omega_{t-1} + \max_{1 \le j \le n} E\left(\left|R_{tj}x_{tj} - r_{tj}x_{tj}\right|\right)$$

Using the above notations, the mathematical model will be:

$$\text{(PO 2)} \quad \begin{cases} min\left(\omega_T, -E(V_T)\right) & \\ V_t = V_{t-1} + R_t x_t, & t = \overline{1,T} \\ \omega_t = \omega_{t-1} + \max\limits_{1\le j\le n} E\left(\left|R_{tj}x_{tj} - r_{tj}x_{tj}\right|\right), & t = \overline{1,T} \\ V_{t-1} = \sum\limits_{j=1}^{n} x_{tj}\,, & t = \overline{1,T} \\ x_{tj} \ge 0, & t = \overline{1,T}, j = \overline{1,n} \end{cases}$$

Analyzing the objective function, is clear that we have a bicriteria optimization problem. In order to simplify (PO 2) we introduce the following constraint

$$E\left(\left|R_{tj}x_{tj} - r_{tj}x_{tj}\right|\right) \le z_t, j = \overline{1,n} \text{ and } t = \overline{1,T}$$

this conducts to the following equivalent problem

$$\text{(POB 2)} \quad \begin{cases} min\left(\omega_T, -E(V_T)\right) & \\ V_t = V_{t-1} + R_t x_t, & t = \overline{1,T} \\ \omega_t = \omega_{t-1} + z_t, & t = \overline{1,T} \\ E\left(\left|R_{tj}x_{tj} - r_{tj}x_{tj}\right|\right) \le z_t, & j = \overline{1,n}, t = \overline{1,T} \\ V_{t-1} = \sum\limits_{j=1}^{n} x_{tj}\,, & t = \overline{1,T} \\ x_{tj} \ge 0, & t = \overline{1,T}, j = \overline{1,n} \end{cases}$$

The equivalence between (PO 2) and (POB 2) is sustained by following proposition.

Proposition 5 (see [40]).

If (x,z) is an efficient solution for (POB 2)*, then x is the efficient solution for* (PO 2)*.*

If x is the efficient solution for (PO 2)*, then (x,z) with* $z = (z_1, z_2, \dots, z_T)$ *and* $z_t = \max\limits_{1\le j\le n} E\left(\left|R_{tj}x_{tj} - r_{tj}x_{tj}\right|\right)$, $t = \overline{1,T}$ *is the efficient solution for* (POB 2)*.*

To solve the bicriteria problem (POB 2) the result of Yu (*Proposition 1)* is employed and (POB 2) is converted in a parametric optimization problem.

For any $\lambda \in (0,1)$ the following problem is obtained:

$$(PO(\lambda)\ 2) \qquad \begin{cases} min\big(\lambda\omega_T - (1-\lambda)E(V_T)\big) \\ V_t = V_{t-1} + R_t x_t, & t = \overline{1,T} \\ \omega_t = \omega_{t-1} + z_t, & t = \overline{1,T} \\ E\big(\left|R_{tj}x_{tj} - r_{tj}x_{tj}\right|\big) \le z_t, & j = \overline{1,n}, t = \overline{1,T} \\ V_{t-1} = \sum_{j=1}^{n} x_{tj}, & t = \overline{1,T} \\ x_{tj} \ge 0, & t = \overline{1,T}, j = \overline{1,n} \end{cases}$$

The solution for $(PO(\lambda)\ 2)$ is computed using retrospective analysis of dynamic programming method. The corresponding Bellman functional equation is:

$$f_t(\omega_t, V_t) = \lambda\omega_t - (1-\lambda)V_t \quad , \quad t = \overline{1,T}$$
$$f_{t-1}(\omega_{t-1}, V_{t-1}) = \min_{(x_t, z_t)} E\big(f_t(\omega_t, V_t)\big) \quad , \quad t = \overline{1,T}$$

To simplify the notation used to evaluate the individual risk of each asset at any moment of time, the following will be used:

$$q_{tj} = E\big(\left|R_{tj} - r_{tj}\right|\big), t = \overline{1,T}, j = \overline{1,n}$$

The problem which has to be solved for time stage T is

$$\begin{cases} min\big(\lambda\omega_T - (1-\lambda)E(V_T)\big) \\ V_T = V_{T-1} + R_T x_T \\ \omega_T = \omega_{T-1} + z_T \\ E\big(\left|R_{Tj}x_{Tj} - r_{Tj}x_{Tj}\right|\big) \le z_T, & j = \overline{1,n} \\ V_{T-1} = \sum_{j=1}^{n} x_{Tj} \\ x_{Tj} \ge 0, & j = \overline{1,n} \end{cases}$$

Assuming ω_{T-1} and V_{T-1} known and using Bellman functional equation, the following problem is obtained

$$\begin{cases} \min E\big(f_T(\omega_T, V_T)\big) = \min[\lambda(\omega_{T-1} + z_T) - (1-\lambda)(V_{T-1} + r_T X_T)] \\ q_T x_T \le z_T \\ V_{T-1} = \sum_{j=1}^{n} x_{Tj} \\ x_{Tj} \ge 0, \qquad j = \overline{1,n} \end{cases}$$

this is similar to the problem of Cai.

To solve it, first all assets will be ranked according to their expected rate of return and the set of assets to be invested, denoted $\mathcal{F}$, is computed. Next, the amount to be invested in each asset is computed. By (x_T^*, z_T^*) is denoted the optimal solution of the problem. Replacing this solution into Bellman functional equation we obtain:

$$\begin{aligned} f_{T-1}(\omega_{T-1}, V_{T-1}) &= \min_{(x_T, z_T)} E\left(f_T(\omega_T, V_T)\right) \\ &= \lambda(\omega_{T-1} + z_T^*) - (1-\lambda)\left(V_{T-1} + \sum_{j=1}^{n} r_{Tj} x_{Tj}^*\right) \\ &= \lambda\left(\omega_{T-1} + V_{T-1}\left(\sum_{l\in\mathcal{F}} \frac{1}{q_{Tl}}\right)^{-1}\right) \\ &- (1-\lambda)\left(V_{T-1} + \sum_{j=1}^{n} r_{Tj} \frac{V_{T-1}}{q_{Tj}}\left(\sum_{l\in\mathcal{F}} \frac{1}{q_{Tl}}\right)^{-1}\right) \\ &= \lambda(\omega_{T-1} + V_{T-1} a_T) - (1-\lambda)(V_{T-1} + V_{T-1} a_T b_T) \\ &= \lambda\omega_{T-1} + \lambda V_{T-1} a_T - (1-\lambda)V_{T-1} - (1-\lambda)V_{T-1} a_T b_T \\ &= \lambda\omega_{T-1} - V_{T-1}[(1-\lambda) + (1-\lambda)a_T b_T - \lambda a_T] \\ &= \lambda\omega_{T-1} - V_{T-1}[(1-\lambda)(1 + a_T b_T) - \lambda a_T] = \lambda\omega_{T-1} - V_{T-1} c_T \end{aligned}$$

where

$$\begin{aligned} a_T &= \left(\sum_{l\in\mathcal{F}} \frac{1}{q_{Tl}}\right)^{-1} \\ b_T &= \sum_{l\in\mathcal{F}} \frac{r_{Tl}}{q_{Tl}} \\ c_T &= [(1-\lambda)(1 + a_T b_T) - \lambda a_T] = c_{T+1}(1 + a_T b_T) - \lambda a_T \end{aligned}$$

Proceeding to the next stage *(T-1),* the problem to be solved is

$$\begin{cases} min\big(\lambda\omega_{T-1} - (1-\lambda)E(V_{T-1})\big) \\ V_{T-1} = V_{T-2} + R_{T-1}x_{T-1} \\ \omega_{T-1} = \omega_{T-2} + z_{T-1} \\ E\big(\left|R_{T-1,j}x_{T-1,j} - r_{T-1,j}x_{T-1,j}\right|\big) \le z_{T-1}, \quad j = \overline{1,n} \\ V_{T-2} = \sum_{j=1}^{n} x_{T-1,j} \\ x_{T-1,j} \ge 0, \qquad j = \overline{1,n} \end{cases}$$

Assuming ω_{T-2} and V_{T-2} known and using Bellman functional equation, together with some constraints from problem at time stage *T-1,* the objective function becomes

$$\begin{aligned} min\big(\lambda\omega_{T-1} - (1-\lambda)E(V_{T-1})\big) &= min\Big(E\big(f_{T-1}(\omega_{T-1}, V_{T-1})\big)\Big) \\ &= min(\lambda\omega_{T-1} - E(V_{T-1})c_T) \\ &= min\big(\lambda(\omega_{T-2} + z_{T-1}) + c_T(V_{T-2} + r_{T-1}x_{T-1})\big) \end{aligned}$$

and the parametric optimization problem to be solved is:

$$(PO(\lambda)\ 2, T-1) \quad \begin{cases} \min[\lambda(\omega_{T-2} + z_{T-1}) + c_T(V_{T-2} + r_{T-1}x_{T-1})] \\ q_{T-1}x_{T-1} \le z_{T-1} \\ V_{T-2} = \sum_{j=1}^{n} x_{T-1,j} \\ x_{T-1,j} \ge 0, \qquad j = \overline{1,n} \end{cases}$$

The structure of this problem is somehow similar to that of Cai. The difference is given by c_T value, which in the model of Cai is replaced by $(1-\lambda)$.

The principle of solving this problem is similar to that of Cai, meaning that first, the set of assets to be invested is computed, and after that the amount to be invested in each asset is determined. The solution is presented in the following theorem.

Theorem 6 (solution for parametric optimization problem at time stage T-1) (see [40])

The optimal solution for parametric optimization problem $(PO(\lambda)\ 2\ , T-1)$ *is*

$$x^*_{T-1,j} = \begin{cases} \dfrac{V_{T-2}}{q_{T-1,j}} \left(\displaystyle\sum_{j \in \mathcal{F}} \frac{1}{q_{T-1,j}} \right)^{-1}, & j \in \mathcal{F} \\ 0, & j \notin \mathcal{F} \end{cases}$$

$$z^*_{T-1} = V_{T-2} \left(\sum_{j \in \mathcal{F}} \frac{1}{q_{T-1,j}} \right)^{-1}$$

where $\mathcal{F}$ *is the set of assets to be invested and is computed as follows:*

1. *If* $c_T > 0$ *(case similar to Cai), then:*
   if $\exists k = \overline{0, n-2}$ *such that:*

$$\frac{r_{T-1,n} - r_{T-1,n-1}}{q_{T-1,n}} < \frac{\lambda}{c_T}$$
$$\frac{r_{T-1,n} - r_{T-1,n-2}}{q_{T-1,n}} + \frac{r_{T-1,n-1} - r_{T-1,n-2}}{q_{T-1,n-1}} < \frac{\lambda}{c_T}$$
$$\cdots\cdots\cdots\cdots\cdots$$
$$\frac{r_{T-1,n} - r_{T-1,n-k}}{q_{T-1,n}} + \frac{r_{T-1,n-1} - r_{T-1,n-k}}{q_{T-1,n-1}} + \cdots + \frac{r_{T-1,n-k+1} - r_{T-1,n-k}}{q_{T-1,n-k+1}} < \frac{\lambda}{c_T}$$
$$\frac{r_{T-1,n} - r_{T-1,n-k-1}}{q_{T-1,n}} + \frac{r_{T-1,n-1} - r_{T-1,n-k-1}}{q_{T-1,n-1}} + \cdots + \frac{r_{T-1,n-k} - r_{T-1,n-k-1}}{q_{T-1,n-k}} \geq \frac{\lambda}{c_T}$$

then $\mathcal{F} = \{n, n-1, \ldots, n-k\}$,
else $\mathcal{F} = \{n, n-1, \ldots, 1\}$.

2. *If* $c_T = 0$, *then* $\mathcal{F} = \{n, n-1, \ldots, 1\}$.

3. *If* $c_T < 0$, *then:*
   If $\exists k = \overline{0, n-2}$ *such that:*

$$\frac{r_{T-1,1}-r_{T-1,2}}{q_{T-1,1}}>\frac{\lambda}{c_T}$$
$$\frac{r_{T-1,1}-r_{T-1,3}}{q_{T-1,1}}+\frac{r_{T-1,2}-r_{T-1,3}}{q_{T-1,2}}>\frac{\lambda}{c_T}$$
$$\cdots\cdots\cdots\cdots\cdots$$
$$\frac{r_{T-1,1}-r_{T-1,n-k-1}}{q_{T-1,1}}+\frac{r_{T-1,2}-r_{T-1,n-k-1}}{q_{T-1,2}}+\cdots+\frac{r_{T-1,n-k-2}-r_{T-1,n-k-1}}{q_{T-1,n-k-2}}>\frac{\lambda}{c_T}$$
$$\frac{r_{T-1,1}-r_{T-1,n-k}}{q_{T-1,1}}+\frac{r_{T-1,2}-r_{T-1,n-k}}{q_{T-1,2}}+\cdots+\frac{r_{T-1,n-k-1}-r_{T-1,n-k}}{q_{T-1,n-k-1}}\leq\frac{\lambda}{c_T}$$

then $\mathcal{F}=\{1,2,\dots,n-k-1\}$,
else $\mathcal{F}=\{1,2,\dots,n\}$.

Continuing the above algorithm for all time stages, the optimal solution is computed.

Total wealth at the end of time stage T is

$$\begin{aligned}E(V_T)&=V_{T-1}+r_Tx_T^*=V_0+r_1x_1^*+r_2x_2^*+\cdots+r_{T-1}x_{T-1}^*+r_Tx_T^*\\&=(V_0+V_0a_1b_1)+r_2x_2^*+\cdots+r_{T-1}x_{T-1}^*+r_Tx_T^*\\&=V_1+V_1a_2b_2+\cdots+r_{T-1}x_{T-1}^*+r_Tx_T^*\\&=V_0(1+a_1b_1)(1+a_2b_2)\dots(1+a_Tb_T)\end{aligned}$$

and total risk for the investor is

$$\begin{aligned}\omega_T&=\omega_{T-1}+z_T=\omega_0+z_1+z_2+\cdots+z_T=V_0a_1+z_2+\cdots+z_T\\&=V_0a_1+V_1a_2+\cdots+z_T\\&=V_0a_1+V_0(1+a_1b_1)a_2+V_0(1+a_1b_1)(1+a_2b_2)a_3+\cdots\\&+V_0(1+a_1b_1)\dots(1+a_{T-1}b_{T-1})a_T=\\&=V_0a_1+\sum_{i=1}^{T-1}\left[a_{i+1}V_0\prod_{j=1}^{i}(1+a_jb_j)\right]\end{aligned}$$

The following diagram presents step by step the algorithm employed to compute the optimal solution:

1	t	T-1	T
$\begin{cases} min(\lambda\omega_1 - (1-\lambda)E(V_1)) \\ V_1 = V_0 + R_1x_1 \\ \omega_1 = \omega_0 + z_1 \\ E(\lvert R_{1j}x_{1j} - r_{1j}x_{1j}\rvert) \le z_1, \quad j = \overline{1,n} \\ V_0 = \sum_{j=1}^{n} x_{1j} \\ x_{1j} \ge 0, \quad j = \overline{1,n} \end{cases}$	$\begin{cases} min(\lambda\omega_t - (1-\lambda)E(V_t)) \\ V_t = V_{t-1} + R_tx_t \\ \omega_t = \omega_{t-1} + z_t \\ E(\lvert R_{tj}x_{tj} - r_{tj}x_{tj}\rvert) \le z_t, \quad j = \overline{1,n} \\ V_{t-1} = \sum_{j=1}^{n} x_{tj} \\ x_{tj} \ge 0 \qquad j = \overline{1,n} \end{cases}$	$\begin{cases} min(\lambda\omega_{T-1} - (1-\lambda)E(V_{T-1})) \\ V_{T-1} = V_{T-2} + R_{T-1}x_{T-1} \\ \omega_{T-1} = \omega_{T-2} + z_{T-1} \\ E(\lvert R_{T-1,j}x_{T-1,j} - r_{T-1,j}x_{T-1,j}\rvert) \le z_{T-1} \quad j = \overline{1,n} \\ V_{T-2} = \sum_{j=1}^{n} x_{T-1,j} \\ x_{T-1,j} \ge 0 \qquad j = \overline{1,n} \end{cases}$	$\begin{cases} min(\lambda\omega_T - (1-\lambda)E(V_T)) \\ V_T = V_{T-1} + R_Tx_T \\ \omega_T = \omega_{T-1} + z_T \\ E(\lvert R_{Tj}x_{Tj} - r_{Tj}x_{Tj}\rvert) \le z_T \quad j = \overline{1,n} \\ V_{T-1} = \sum_{j=1}^{n} x_{Tj} \\ x_{Tj} \ge 0 \qquad j = \overline{1,n} \end{cases}$
$\begin{cases} min\left(E(f_1(\omega_1, V_1))\right) = \\ = min(\lambda(\omega_0 + z_1) - c_2(V_0 + r_1x_1)) \\ q_1x_1 \le z_1 \\ V_0 = \sum_{j=1}^{n} x_{1j} \\ x_{1j} \ge 0, \quad j = \overline{1,n} \end{cases}$	$\begin{cases} min\left(E(f_t(\omega_t, V_t))\right) = \\ = min(\lambda(\omega_{t-1} + z_t) - c_{t+1}(V_{t-1} + r_tx_t)) \\ q_tx_t \le z_t \\ V_{t-1} = \sum_{j=1}^{n} x_{tj} \\ x_{tj} \ge 0, \quad j = \overline{1,n} \end{cases}$	$\begin{cases} min\left(E(f_{T-1}(\omega_{T-1}, V_{T-1}))\right) = \\ = min(\lambda(\omega_{T-2} + z_{T-1}) - c_T(V_{T-2} + r_{T-1}x_{T-1})) \\ q_{T-1}x_{T-1} \le z_{T-1} \\ V_{T-2} = \sum_{j=1}^{n} x_{T-1,j} \\ x_{T-1,j} \ge 0, \quad j = \overline{1,n} \end{cases}$	$\begin{cases} min\left(E(f_T(\omega_T, V_T))\right) = \\ = min(\lambda(\omega_{T-1} + z_T) - (1-\lambda)(V_{T-1} + r_Tx_T)) \\ q_Tx_T \le z_T \\ V_{T-1} = \sum_{j=1}^{n} x_{Tj} \\ x_{Tj} \ge 0, \quad j = \overline{1,n} \end{cases}$
$\mathcal{F} = \begin{cases} \dots & c_2 < 0 \\ \dots & c_2 = 0 \\ \dots & c_2 > 0 \end{cases}$ | $x_1^*; z_1^*$	$\mathcal{F} = \begin{cases} \dots & c_{t+1} < 0 \\ \dots & c_{t+1} = 0 \\ \dots & c_{t+1} > 0 \end{cases}$ | $x_t^*; z_t^*$	$\mathcal{F} = \begin{cases} \dots & c_T < 0 \\ \dots & c_T = 0 \\ \dots & c_T > 0 \end{cases}$ | $x_{T-1}^*; z_{T-1}^*$	$\mathcal{F} =<$ | $x_T^*; z_T^*$
	$f_{t-1}(\omega_{t-1}, V_{t-1}) = \min_{(x_t, z_t)} E\left(f_t(\omega_t, V_t)\right) = \lambda\omega_{t-1} - V_{t-1}c_t$	$f_{T-2}(\omega_{T-2}, V_{T-2}) = \min_{(x_{T-1}, z_{T-1})} E\left(f_{T-1}(\omega_{T-1}, V_{T-1})\right) = \lambda\omega_{T-2} - V_{T-2}c_{T-1}$	$f_{T-1}(\omega_{T-1}, V_{T-1}) = \min_{(x_T, z_T)} E\left(f_T(\omega_T, V_T)\right) = \lambda\omega_{T-1} - V_{T-1}c_T$
	$a_t; b_t; c_t = fct(a_t; b_t; c_{t+1})$	$a_{T-1}; b_{T-1}; c_{T-1} = fct(a_{T-1}; b_{T-1}; c_T)$	$a_T; b_T; c_T = fct(a_T; b_T; (1-\lambda))$

Young model

The minimax model created by Robert Young (see [37]) maximizes the minimum over all time stages of expected return, subject to restrictions that average return of portfolio exceeds a predefined level and the total amount invested at each time stage does not exceed the available amount. The mathematical model of the problem is presented below

$$\max_{j=\overline{1,n}} \left\{ \min_{t=\overline{1,T}} \sum_{j=1}^{n} x_{tj} r_{tj} \right\}$$

$$\sum_{j=1}^{n} x_j \overline{r_j} \geq G$$

$$\sum_{j=1}^{n} x_{tj} \leq V_{t-1}$$

$$x_{tj} \geq 0 \qquad\qquad t = \overline{1,T}, j = \overline{1,n}$$

where

$$\overline{r_j} = \frac{1}{T} \sum_{t=1}^{T} r_{tj}$$

G is the predefined level for average return of portfolio.

6. Conclusions

Analyzing the Mean-Variance Model and its extensions we can conclude that from practical point of view the minimax model is the easiest to be implemented, because the analytical solution is computed with low effort. This model, like all others from Portfolio Theory, has a high sensitivity for mean. We consider that this model fits to our goal (energy optimization) and we intend to implement it in our future research project.

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STUDIA UBB NEGOTIA, LX, 3, 2015, pp. 79 - 92
(RECOMMENDED CITATION)

INTEGRATED COMMUNICATION - A MODERN MANAGERIAL INSTRUMENT USEFUL IN IMPROVING ORGANIZATIONAL SUCCESS

MARIA-MAGDALENA LUPU[1]

ABSTRACT. Integrated communication is a concept that first appeared in marketing where it proved its usefulness through successful results. From this to its extended use in organizational communication activity was just a step that opened integrated communication as a modern managerial instrument for effective communication inside and outside the organization. The beginning of the third millennium is characterized by a spectacular evolution of informational and communication technology liked by a great number of users who increase in number every day. These realities force us live according to modern times and apply our new discoveries order to achieve the organizational aims. This article publishes the results of a study that aimed to identify the information level, the interest and the implementation of the integrated communication concept in the district councils in the south of Romania starting from the premise that communicative abilities are essential qualities for the experts working in the administrative domain, qualities that can make the organizational activity develop without any problem.

Key words: managerial communication, integrated communication, Public Administration, organizational effectiveness.

J.E.L. CODES: H830

1. Introduction and Review of Literature

It takes a few characteristics so the communication act becomes efficient and these are: the clarity, coherence and concision. Controlling all these and helped by the modern technology that offers the possibility to cancel distances and to make an important time economy, we can say that we brought the communication very close to ideal and the problems regarding the communication become very easy to manage.

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The integrated communication concept appeared just for the necessity of having a more efficient communication and its use with professionalism can represent for any organization a very useful instrument in reaching the wanted objectives. The identification of all the ways and channels that we can use in communication for making it better already does not represent a big problem because of the fact that these are well known. The integrated communication inside the organization does not refer just to the channels through which it is done, but especially to those general strategies, because planning is crucial in the integrated communication. For an organization to express with one voice it is necessary for a coordinated effort and it is, also, necessary that each member of that organization to understand the importance of this process that requires responsibility (Stuart et al., 2007:7). Because we live in the digital era, we must account for the new evolutions of the digital space that redefined the mass-media and which became one of the strongest communication channels (Young, 2010:2) reminding us that the future belongs to the communication, to the data base and to the new electronic transportation vectors (Schultz, 1996:139).

The integrated communication concept appeared, as we know, as a marketing instrument that sends one message to the consumers, using all the ways and channels that it has. Later, thanks to the impressive obtained results, the integrated communication extended fast and to others domains (Finne, Grönroos, 2009:179). And because it is necessary to understand the evolution of this concept we must start from its beginnings, from the marketing integrated communication. Initially, the marketing integrated communication idea has been launched at the end of the last century, in the United States, where it was made the first study in this domain (Schultz, Kitchen, 1997:7). There are authors that consider that forerunners ideas of the marketing integrated communication appeared in the 50's (Van Riel, Fombrun, 2007:28) when the *integration* represented the coordination between the marketing functions and other disciplines, the same way that there are authors that place the apparition of this concept at the beginning of the 70's, or the 80's (Cornelissen, Lock, 2000:8). Initially, the concept related to the integration of the same message in all the elements of the marketing mix and through evolution it got to the strategic integrated communication plan, which purpose is to integrate in a marketing communication company different communication disciplines to obtain the wanted results (Kitchen, Burgmann, 2010:5).

In the same time with the digital revolution appeared one of the biggest challenges in the development of the marketing integrated communication thanks to the fact that the digital communication has development and expansion different rates according to the development grade of a country (Schultz, Patti, 2009:77). Described, in time, in a different way that the one that studied this

concept did, the marketing integrated communication is a domain that still develops, progresses and which from the first theoretical development stage will get for sure to a common theoretical type, singular and formal (Cornelissen et al., 2006:7). The marketing integrated communication is still a young discipline that needs solid theoretical fundamentals, that proves its efficiency in practice (Dewhirst, Davis, 2005:81). The faster spreading of this concept is explained through the fact that it offers a couple of advantages by efficiently applying the information's technology in issues regarding to the promotion and the efficient management of the relations with the clients (Dissanayake, 2012:28). Conceptual, the marketing integrated communication uses all the marketing communication instruments to obtain the predetermined products and to reach the marketing integrated communication objectives (Pickton, Broderick, 2005:26). This use of multiple communication instruments through the coordination of more actions regarding the achievement of a common result, with economy of ways, is what it is called the marketing integrated communication synergy (Prasad, Sethi, 2009:607).

The economical-social realities demand the assumption of the social responsibilities of the organization and this can be made through marketing integrated communication, with whose help it can be established the equilibrium between profitability, public utility and client's demands satisfaction (Kitchen, Schultz, 2003:66). From here to the rational communication it has been only one step in which the marketing integrated communication became an appropriate concept for the operational marketing (Holmlund, 2004:279; Finne, Grönroos, 2006:179; Rindell, 2007:64). Because in the 90's it had became very popular the concept of management of the relations with the clients (CRM), it appeared a new debate regarding the public relations role (Smith, 2009:263). Some researchers consider the public relations as being a support function for the marketing (Gronstedt, 1996:290; Hallahan, 1996:307; Kitchen, 1998:24; Kotler, Mindak, 1999:351; Keller, 2003:321-322; Debreceny, Cochrane, 2004:45; Hendrix, 2004:197) and others sustain that the public relations are a strategic function of the relations management with the clients, whose main purpose is to build two ways advantage relations to an organization (Hon, Grunig, 1999:7; Dozier, Lauzen, 2000:4; Grunig, Huang, 2000:23-54; Heath, 2000:2; Cutlip, Center, Broom, 2005:284; Grunig, Grunig, Dozier, 2002:548; Ledingham, 2003:182). Beyond these opinions, the reality and practice prove that the public relations are included in the integrated communication thanks to the way in which this activity that takes place on the communication field is designed (Windahl et al., 2008:116) and which achieved through the integrated communication a meant role in the strategic management (Caywood, 2012:4). What is very clear for everybody and no longer is a secret that the integrated communication

includes and uses all the communication activities (Hallahan, 2007:320-324). The integrated communication represents the perfect harmonization of the internal and external organizational communication activities, ensuring the strategic success of any organization, no matter of its activity domain (Fig.1).

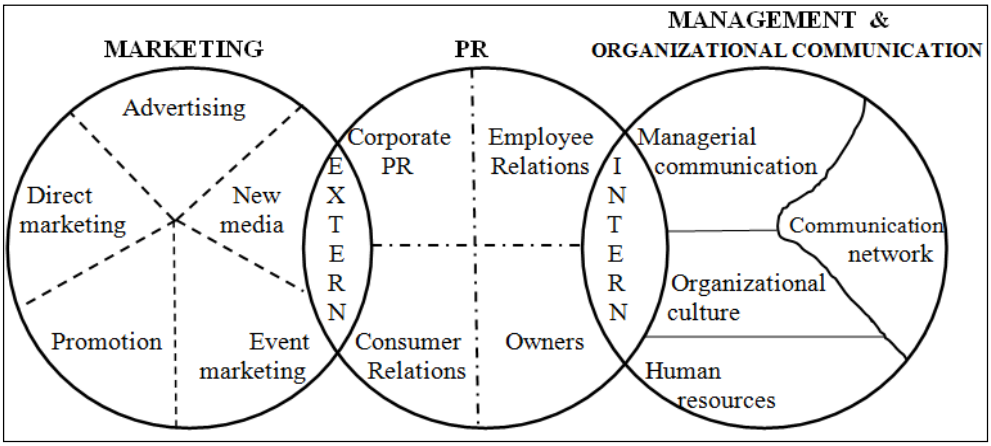

Figure 1. Integrated Communication

Processing after Barat Thomas, 2008, Integrated Communication, slide 7, http://www. slideshare.net/tombarat/integrated-communication

In fact it is a planning process through which there are applied communication concepts in different domains as marketing, public relations, management, organizational communication, to develop the relations with the interested parts and building the brand relations (Stuart et al., 2007:154-155). In the last years, the most useful instrument of the integrated communication proved to be social-media (Drury, 2008:274), that successes the almost instant connection of the service suppliers and with the wide public (Weinberg, 2009:2-3) and so a significant change took place regarding the communication strategy with the interested publics and the establish of some emotional connections with these, by adopting some important causes for the public (Mangold, Faulds, 2009:363-364). This is the prove that regarding the integrated communication all that is about the information, the knowledge, innovations and improvements, all these know very fast changes and the organization's efforts to get to the B2B and B2C public can be simplified by knowing the current realities but mostly by permanent upgrade to the technological evolution.

2. Research based on questionnaires, regarding the implementation of the integrated communication concept in the county councils from the south area of Romania

Context

For an organization to speak in one voice it is needed that all the communication forms to be united in an organizational strategy that establishes in a clear mode who, when and how communicates to serve the organization's objectives. Either we refer to the internal communication or to the external one, the advantages of the integrated communication make that the adoption of this communication form to be imperative necessary, known and used. The new communicational technologies support the application of the integrated communication, and the way in which the organization's management chooses to use them or not, can bring services or disadvantages to the organization's interests. The initial acceptance by the big corporations, the integrated communication can be practiced by any type of organization including by the public institutions as those that make the object of this study and from which we intend to find out in what measure they are interested by the practice of this type of communication. The communication in the public institutions is conditioned by transparency, efficiency and responsibility to the citizens, which means a double sense discussion, a constant preoccupation for the offered feedback to the interested publics and by the opening of the institution regarding the public's influence and contribution to the welfare of its activity.

The identified problem that determined us to proceed to a research theme is the existent confusion between the marketing integrated communication concept and the integrated communication concept in business and especially the low implementation rate of the integrated communication, mostly inside the public institutions. The quantity empirical research present in this article represents a part of a bigger research, whose results will be included in the doctoral dissertation that I prepare.

The research methodology

Our *research subject* is the integrated communication.

The purpose of this research is to determinate in which measure the managers decided to use the integrated communication inside the county councils in the South of Romania, starting from the theory that the communication abilities are essential qualities for professionals in the administrative domain, qualities through which they can make the activity take place without problems.

The study had as *objectives*:

- The analysis of the implementation stage of the integrate communication inside the county councils in the South of Romania;
- The identification of the knowledge level and of the interest regarding the integrated communication.

The hypotheses of our research are:

- The integrated communication concept is understood especially by the organization's managers;
- The integrated communication is part if the general strategy of the organization;
- The organization's management is preoccupied with the assurance of the strategic coherence to apply the integrated communication plan.

The research method was the sociological investigation, made by survey. The data were collected by *interview*, using as technique *face to face investigation*.

The collecting data questioner was the questionnaire, which among the identification data contained 22 questions. For the research it has been used the *semantic differential*, variable with five stages.

The processing of the collected data was made with the help of Excel program.

To obtain a more exact image regarding the integrated communication image inside de county councils in the south of Romania, the questions were grouped in *three analysis domains* as follows:

1 - The evaluation of the integrated communication situation inside the studied organizations;
2 - The management preoccupation of the integrated communication;
3 - Relevant questions.

The sample of our analysis was represented by the 370 managers from the county councils in the south of Romania.

The observation unit is represented by the county council.

The study unit is established as being the person with lead function, no matter of gender.

The period of collecting the data was between 03.25.2014 and 06.30.2014.

The study was made using a sample, simple and random scheme.

The appreciations for each answering version to the questionnaire's questions were evidenced by calculating the score after the weighted average formula:

$$\bar{X} = \frac{\sum x_i * n_i}{\sum z_i}$$

where: x_i = is relative frequency,

n_i = is the grade given to the answer and

z_i = is the total answers to the analyzed question.

There were applied 300 questionnaires, from which 292 were validated.

To establish the size of the representative sample for obtaining significant statistical data, it was used the Taro Jamane formula, method that starts from the total population volume without calculating the characteristics of the population and it is recommended for small collectivities. The total number of the persons with leading functions inside the county councils in the south of Romania is 370.

$$M_E = \frac{N}{(1 + N * e^2)}$$ where: e = is the maximum admitted error,
N = researched community size

$$M_E = \frac{370}{(1 + 370 * 0{,}03^2)} \cong 278$$

The maximum admitted error degree is 3%.

The medium scores and the global one, obtained after analyzing the answers obtained from the respondents represent the values on which bases we did the interpretations of the received answers in the sample of this study.

3. The results of the research

The 292 questioned managers in this study form a heterogeneous sample which reflects the reality at the 19 county council's level from the south of Romania.

The respondent's age is between 33 and 70 years, and there were 164 males and 128 females that occupy leading functions inside the county councils. At the hole sample's level the situation looks like this: the male managers are about 56%, they are between 35 and 70 years old, the age average being 50 years; the female managers are about 44%, they are between 33 and 60 years old, the age average being 47 years.

The study had in sight, by grouping the contained questions, the analysis of the next domains of interest:

- The evaluation of the integrated communication situation inside the studied organizations;
- The management preoccupation over the integrated communication;
- Relevant questions.

1. - *The evaluation of the integrated communication situation inside the studied organizations* (questions 1-6)

The main audience of any public institution is the citizen, which from this type of organization, beside the services this offers, awaits to be informed and to be able to easily relate with that organization, every time it is necessary. Used

with the easy access to the information thanks to the internet, the outside audience of the institution expects from this one the integration of the new communicational technologies through which can save time and nerves. On the other hand, the internal communication can face many difficulties regarding the difference between the context of the message or the impact they are expecting and the way the other members of the organization receive the message. All these communication problems can be elegantly solved by the implementation of the integrated communication, which by using all the tools, approaches and communication resources, succeeds to maximize the desired results.

The respondents' opinion regarding the main aspects that highlights the integrated communication situation from inside the institutions they lead (Diagram 1), shows that three of the numbered aspects in the questionnaire had been evaluated as being unimportant for these: the communication audit (1.88), the integrated communication plan (2.01) and the communication strategy (2.1).

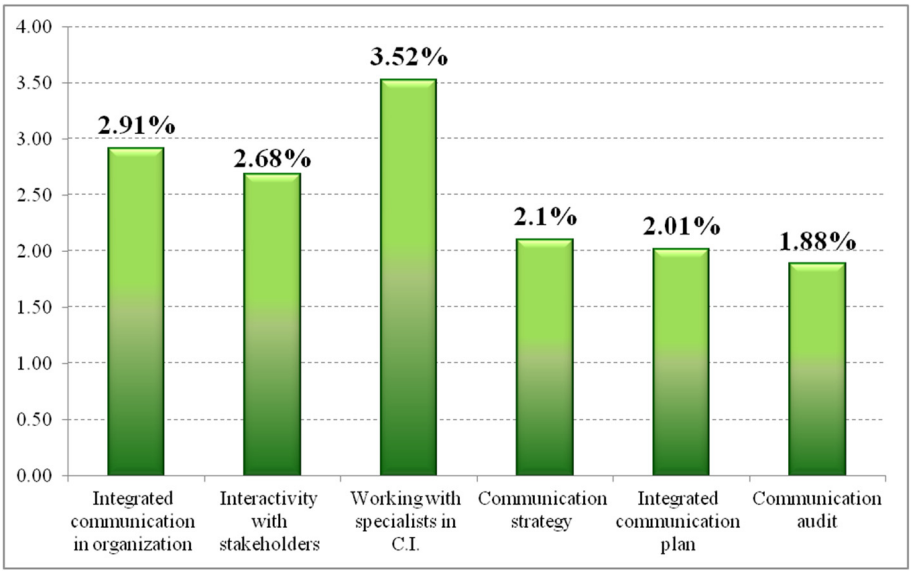

Diagram 1 - Managers assessments on the integrated communication

Source: own projection

They are undecided about the importance of the interaction with the interested parts (2.68) and of the integrated communication for the organization (2.91). The only aspect that has been proved as being important for the study's subjects is the collaboration with the experts in integrated communication, aspect that obtained a medium score of 3.52.

2. - *The management preoccupation over the integrated communication* (questions 7-14)

The implementation of the integrated communication practices in an organization is the management decision, especially if we think that an organization's success depends and of the way the managers approach the problems regarding the communication process. The knowledge and, especially the use of the best communication practices is the main task of any manager and the integrated communication is no more than the application of the organization's strategy in communication because the integrated communication is built on the premise that between the internal and the external communication there is continuous, independent and synergistic interaction and has as main purpose to build relations that are profitable with the main clients and the interested party (Gronstedt, 2000:8).

Regarding the interest and the preoccupation of the questioned leading function persons we can say that the received answers show the fact that for these the integrated communication is not important, no matter of the aspects we presented. All the medium scores that we obtained are between 1.76 and 2.31, as it can be observed in the next diagram.

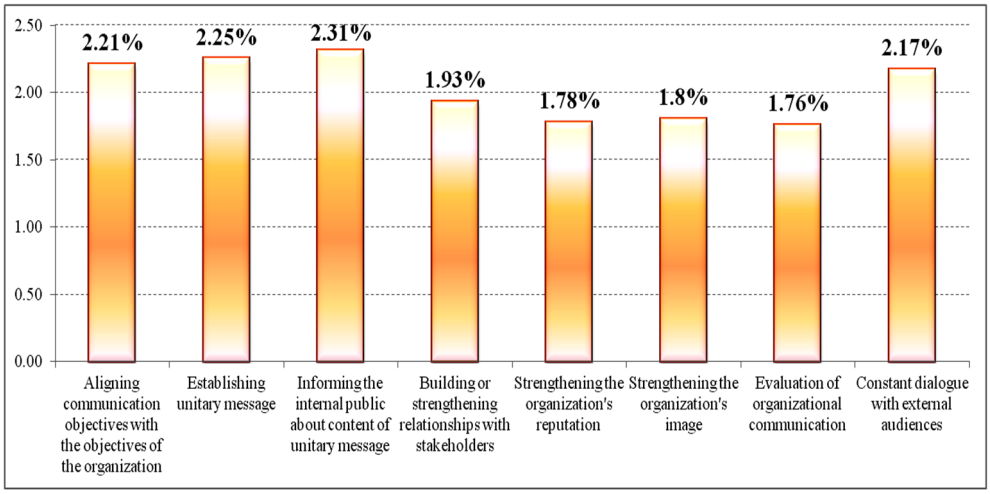

Diagram 2 - Management's concerns for implementation of integrated communication plan
Source: own projection

3. - *Relevant questions* (questions 15-22)

To be able to check the honesty of the received answers we considered that a number of control questions are welcomed in this study (Diagram 3).

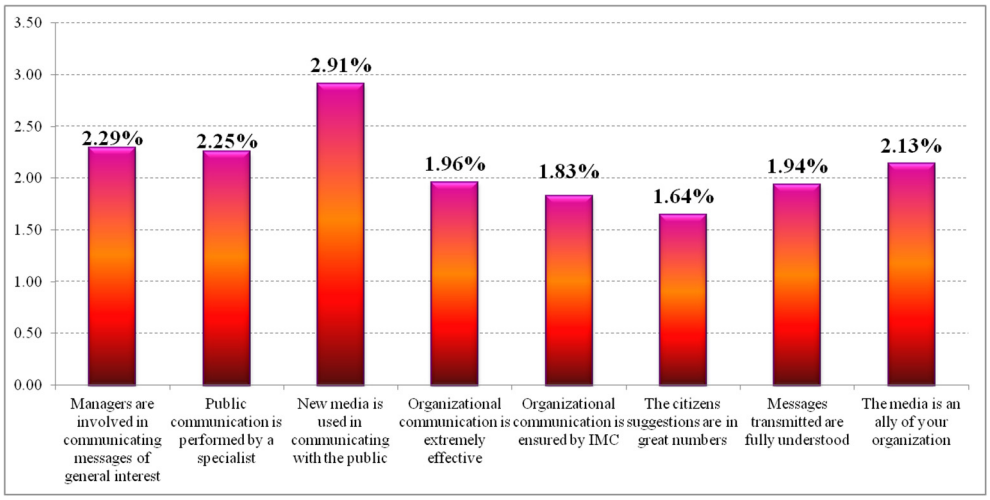

Diagram 3 - Relevant questions

Source: own projection

The obtained medium scores from seven of eight checked aspects and which are contained between 1.64 and 2.29 shows that our study's subject is not important for respondent, especially that at one of the question, in cumulative proportion of 62%, consider that the organizational communication is assured by the marketing integrated communication. The medium obtained score by one aspect, 2.91 (new media is used in the public communication), succeeded to make the respondents by undecided. Overall, the three interest domains targeted by the study, that obtained a global score of 2.22 proved to be, for our respondents, not important.

4. Conclusions

After making this study, getting over the convenience declaration's barrier that were received, the main conclusion is that at the county council's level from the south of Romania there is no interest for the integrated communication.

The study reached its objectives by making an implementation analysis of the integrated communication in the county councils in the south of Romania by identifying the knowledge and interest level over the integrated communication.

Regarding the hypothesis from which we started in this study, we can say that:

The first hypothesis - the integrated communication concept is understood, especially by the organization's managers – disaffirms

The received answers, especially at the relevant questions for the research, show that the persons with leading functions inside the county councils that were studied by us are far away from our expectations. More than half of the respondents don't understand the role and importance of the communication strategy, of the integrated communication plan and of the communication audit. Most probably, these persons that have a leading function inside the county councils have no manager talent and, more than sure, nor the required training.

The second hypothesis – the integrated communication is part of the organization's general strategy – disaffirms.

Considering that a big part of the respondents do not understand the concept of integrated communication nor interests them, it is obviously that from these reasons, the integrated communication is not a part of the organization's general strategy.

The third hypothesis – the organization's management is preoccupied with the assurance of the strategic coherence to apply the integrated communication plan – disaffirms.

The studied organization's management, over 70%, declared that they are the ones involved in the public communication, given that this is the communication's expert role. These declarations are checked by the fact that managers, in similar percentage, declare that there is no expert for public communication. The strategic coherence can be assured by very well thought and coordinated plans, after which the entire organization's efforts to materialize in reaching that organization's objectives. For our sample's managers, the interaction with the interested parts is an aspect with not so much importance, the same as the establishment of a unitary message. Overall, the preoccupations of the persons with leading functions inside the county councils from the south of our country regard anything other than the organization's interests from which they are a part. It will probably be necessary another study that can light the real interests of these persons. After our efforts to obtain a clear image of the actual situation regarding the integrated communication in the public institutions, we observed that the real situation is not encouraging and determined us to offer some propositions:

- It is necessary a sustained preoccupation for building some good relations with the public, it would grow the trust level that is granted to public institutions. Unfortunately, this preoccupation is present only in the isolated cases, which proves knowledge or interest deficit. It is a long way to work in the direction of the communication activity consolidation, of the integrated communication especially, to understand that it is one of the most important managerial instruments through which solid bounds between the institution and its publics are built.

- The existence of an expert in communication or the collaboration with a communication specialized agency can bring big advantages to the organization.
- A real preoccupation for the organization's image consolidation and of the relations with the interested publics can be obtained by using the information's technology which is accessible and used by a very large audience.

In conclusion of this empirical research, we can conclude that beyond the revealed problems, the foreseen perspectives are not encouraging at all and as we know for a long time and from many activity domains, it takes a deep modification in the way we understand the professionalism.

Acknowledgement

This work was supported by the project "Excellence academic routes in doctoral and postdoctoral research - READ" co-funded from the European Social Fund through the Development of Human Resources Operational Programme 2007-2013, contract no. POSDRU/159/1.5/S/137926.

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