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Building Virtual Environments for Optimizing Learning Processes inside the Modern Organization

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Abstract: This article presents different ways in which new virtual reality technologies can be used in the development of software applications dedicated to supporting organizational learning/training processes. Thus, virtual reality can offer employees of enterprises in the Romanian economy access to an advanced training system by creating virtual environments that simulate real scenarios in which users have total freedom of movement and interaction with the constituent elements. Virtual Reality addresses to senses and perception. The VR technologies presented in this article address not only basic senses such as vision or hearing, but also senses such as balance or intuition. Thus, the brain is helped by the entire sensory system to receive a rich flow of information that starts from the environment and comes to mind. Therefore, if we present the artificially created information to the senses, the way in which reality is perceived will also be altered. In this context, we will also present the current state of the virtual reality technologies that can be used to implement VR applications as well as the essential principles applicable to the development of virtual reality applications. At the same time, the article shows how the use of virtual reality can support the three important aspects of vocational training: work experience - users having the opportunity to be in unfamiliar workplaces in a 360 degree perspective, learning skills – virtual reality helps to identify the balance between acquiring knowledge and training the experience, allowing the same scenarios to be scanned several times, without additional costs or inconveniences, access to a different perspective - allowing the user to perform actions normally performed by experienced employees .

Keywords: virtual reality; organizational learning; virtual environments; refresh rate; VR glasses

1. Introduction

Although virtual reality has been discussed since the late 1980s, it has taken a major stance in 2010 with the first version of Oculus Rift. Since then, various projects have been created and developed that have contributed to the development of the VR domain. Virtual reality is by no means a new concept. This combination of words emerged before the 1950s, first through illustrations and texts describing an alternative reality and then machines that mimicked the consumer's journey into unknown worlds. From the very beginning, VR was introduced to be able to immerse the user into an alternative world,

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including him and allowing him to interact with the environment, giving him the feeling of being elsewhere, and being able to move and make decisions in real time. In the 1970s there were attempts to build the "magic theater", with a rather small success. The world of video games was the one that, in the late 1980s and early 1990s, gave a new impetus to this technology. Releases such as Sega VR or Virtual Boy Nintendo have tried to bring the user into the game with rudimentary headphones (compared to today's), but have enjoyed rather limited success. These, however, were just the beginning of what was to come. The world of entertainment continues to spur the creation of a new technology that will change the way we enjoy the content. Virtual reality can be defined as a set of technologies and devices that, combined, are used to create immersive simulation in a three-dimensional environment. The virtual environment is a real-world replica and is achieved using three-dimensional settings, such as in-depth perception, sound and tools such as consoles, to allow the user to interact with it. The user's movement is tracked using either a head-mounted device or sensors. Virtual reality is used in a wide range of applications such as video games, engineering, education, psychological therapy, e-commerce, marketing, etc. For example, virtual reality is used in games as a third person to interact with separate parts of the virtual world. At the same time, both in engineering and education, mechanical modeling, using CAD software, allows engineers, students and students to develop and manipulate models created in a way similar to physical objects (Neelakantam, 2017). Designing a fair virtual reality implies a good understanding of both perception and technology. It involves good communication between man and machine, indicating what are the possible interactions, what is happening at the moment or what might happen in the future. The design of human-centered virtual reality is based on real-world observations and is not based solely on software/hardware and engineering considerations, but is also based on the understanding of human behavior and how our mind works. Achieving an ideal virtual reality allows the user to physically walk around objects in the virtual environment as well as in the real world. A number of major products have emerged in the market in 2016, from companies like Oculus VR, Sony and Google. Since the acquisition of Oculus, Facebook has already bought 11 AR/VR companies, which indicates its intention to make the VR and AR the next border. The large investments and acquisitions of the giants suggest that these technologies will become an integral part of the platforms that provide us with content. According to recent estimates by Goldman Sachs, the AR and VR markets will grow to 95 billion by 2025. The greatest demand for this type of technology comes from the creative industries - the gaming industry, live events, video entertainment and retail - but will find even wider applications in sectors such as health, education, military and real estate.

2. Virtual Reality Technologies Review

First category of Virtual Reality technologies is represented by PC based systems. HTC Vive is the VR system created in collaboration with the Valve giant. It attaches to a PC and works through the well-known gaming system Steam by Valve. Currently it is considered to be the best VR system in the market. The 70 sensors that Vive comes with offer the 360-degree headset location and a 90 Hz refresh rate, which reduces the delay between frames (decreasing the latency), delay that could cause motion sickness. Normally, threshold for compelling VR must be at or below 20 milliseconds of latency. When latency exceeds 60 milliseconds, disjunction between one's head motions and the motions of the virtual world start to feel out of sync, causing discomfort and disorientation. Fortunately, this is not a very common problem with the applications available for HTC Vive. Users should consider not only the price that is not very friendly (not including your PC here), but also the generous space that HTC Vive needs.

The next important VR system is Oculus Rift. Developed by Palmer Luckey, funded by Kickstarter and enthusiastically taken over by Facebook for a modest $ 2 billion, Rift connects to the PC's DVI and USB slots and tracks the user's head to produce 3D images on stereo screens. The Rift Edition for the general public uses a resolution of 2160x1200, working at 233 million pixels per second with a 90 Hz refresh rate. It does not give the user the same freedom of movement as HTC VIVE, still their applications are better rated, as Oculus has its own application/games production studios that provides the best interactivity and VR user experience. Unlike HTC Vive, Oculus is not a VR system as much focused on motion. Being connected to a PC, Oculus has much more power than the Playstation VR. Oculus offers not only games, but also varied applications such as Discovery VR, which allows the exploration of wrecks or other places around the world through 360-degree video. In fact, most applications are based on 360-degree photos, reminiscent of Samsung Gear. The new Fove 0 implements what we call "interactive eye tracking", differentiating itself from Oculus Rift or Playstation VR. Interactive eye tracking is a way of looking interactively. The infrared sensor in the headset monitors the eyes of the wearer, providing a new way of control when it comes to realism. Fove allows to simulate the depth of the visual fields, thanks to the system that knows exactly what the user is looking at. The result is the one expected: the virtual seems more real. The Fove Setup is a 5.7 inch, 1440px display, with a field of view above 100 degrees, 90 fps frame rate and eye tracking measured at 120 fps.

Figure 1. VR headsets

Second category is represented by console-based systems. Playstation VR is what most of the general public perceives to be a "decent virtual reality." It is not a perfect VR system, being an accessory for PS4, but it has as target audience console lovers. It is an accessible VR system, a reference for virtual mainstream reality. Even if the technology does not compare to that of its competitors, the Playstation VR remains a possibility to consider. Mobile phone-based systems: The cheapest way to experience virtual reality is Google Cardboard.

Practically, you insert the phone into a pair of cardboard glasses. The phone contains some gyroscopic sensors and positioning systems that track the movements of the head to a decent level. The quality is lost in terms of lenses, processing and video card, a problem that is true of all VR systems for mobile phones. The new Samsung Gear VR does not look very different from its predecessor, but has had some improvements to justify the investment. New vents reduce much of the steaming phenomenon. The experience of VR depends on the type of Samsung phone used and does not compare to the experiences of headphones that connect to a PC. It is compatible with: Galaxy Note 7, S7, S7 Edge, Note 5, S6, S6 Edge or S6 Edge +.

One of the best VR systems is Google's Daydream VR platform. It's currently only compatible with Google's new Pixel Phone, but it's likely to be compatible with the rest of the phones. Microsoft Hololens brings together the virtual reality with the augmented reality, the helmet combining real-world elements with virtual holographic images. To recognize gestures or voice commands, Kinect technology

is used. The helmet has around 34 degrees' visual field on both axes being very high definition, but it is still at a low level compared to Vive or Oculus. The helmet has its own Windows 10 embedded system and works on batteries, so there is no need for a PC connection. HoloLens 2, announced on February 24, 2019 at MWC in Barcelona, represents the next generation of mixed reality smart glasses developed and manufactured by Microsoft. These smart glasses represents the evolution of the pioneering Microsoft HoloLens, being more business oriented compared to its predecessor there were three main improvements of this device as highlighted by Microsoft: immersiveness, ergonomics and business friendliness. HoloLens 2 has a diagonal field of view of 52 degrees, improving over the 34 degree field of view of the first edition of HoloLens, while keeping a resolution of 47 pixels per degree.

Figure 2. VR glasses and google cardboard

The direct competition for Microsoft HoloLens 2 is represented by a pair of AR glasses coming from Magic Leap company. The Magic Leap One is equipped with an LCOS screen manufactured by Omnivision, offering a definition of 1280 x 960. The Magic Leap One is equipped with a Nvidia Parker SOC, and its CPU includes two 64-bit Denver 2.0 cores and four 64-bit ARM Cortex A57 cores. The GPU Magic Leap One is a Nvidia Pascal with 256 hearts CUDA. The Magic Leap One comes with its controller that provides six degrees of freedom of movement without the need for additional external sensors. The Magic Leap One also offers eye tracking and hand tracking features. This last point allows to interact using his hands in a natural way.

Even if Microsoft comes only with Hololens as a MR solution, their Windows 10 operating system is heavily used by VR head sets producers. As such, we can further present a number of six windows-based VR devices that are available to global consumers: **Samsung HMD Odyssey** is probably the best Windows Mixed Reality (WMR) headset. It has two 3.5-inch AMOLED displays, each with a resolution of 1440 x 1600 pixels with an immersive 110-degree field of view. The headset supports 360-degree spatial sound, which is made possible by built-in AKG headphones. HMD Odyssey is the only Windows Mixed Reality headset to have integrated headphones. There's also a built-in microphone array, which you can use to communicate with other users. The headset has an IPD range of 60-72mm, and features inside-out position tracking. There are two cameras, with each having six degrees-of-freedom (DOF) support for improved motion control accuracy. The included wireless controllers also feature six degrees-of-freedom support, and the headset can be controlled via Xbox One controllers as well. **HP VR1000-127il** represents another WMR headset solution. It has two 2.89-inch displays, with a per eye resolution of 1440 x 1440 pixels and a 95-degree field of view with two front-facing cameras for inside-out motion tracking, complete with six degrees of freedom (DOF). In order to connect with a Windows 10 PCs, HP VR1000-127il uses the standard HDMI and USB ports. **Asus HC102** is a luxury device conceived to enhance the comfort of the user(s). It has fabric-like finish and quick-drying materials with antibacterial properties, while featuring adjustment mechanisms, which makes it easy to adjust the headset with one hand. It has two 2.89-inch displays, each with a resolution of 1440 x 1440 pixels. The combined display has a brightness of 100 nits and a 95-degree field of view. The HC102 uses two

cameras for inside-out tracking, and the included wireless controllers (x2) come with six degrees-of-freedom (DOF) support. Its integrated sensors include an accelerometer, a gyroscope, a magnetometer, and a P-sensor. **Dell Visor** has a wide 110-degree field of view allowing the visualization and interaction with an expanded Virtual Reality space (and all of its elements), at all times. Its dual display is comprised of two 2.89-inch LCD (RGB subpixel) panels, each with a resolution of 1440 x 1440 pixels and a pixel density of 706ppi. Having a refresh rate of 90Hz, the panels are comprised of Fresnel lenses that deliver sharp focus and enhanced focal depth. Dell Visor features inside-out tracking, and the bundled controllers come with six degrees-of-freedom (DOF) support, allowing for seamless movements in VR environments. **Acer AH101-D8EY** is probably the best-looking WMR headset on the market. It features a visor done in a glossy shade of blue and the rest of the headset having a matte black colour. Also, it has two 2.89-inch displays, with a per eye resolution of 1440 x 1440 pixels and a refresh rate of 90Hz. The device features inside-out tracking using B+W VGA cameras The visor can be flipped up easily, allowing a quickly transition between the real and virtual worlds. AH101-D8EY is fully compatible with all the Mixed Reality applications available from the Microsoft Store, It has a 100-degree field of view, and a maximum IPD of 63mm. **Lenovo Explorer** weights' only 380 grams, being the lightest Windows Mixed Reality headset. It has two 2.89-inch LCD panels, each with a resolution of 1440 x 1440 pixels. The display has a refresh rate of 90Hz and a 110-degree field of view. As sensors, it includes a magnetometer, an accelerometer, a gyroscope, and a proximity sensor. Lenovo Explorer comes with two wireless controllers having six degrees of freedom support. Apart from that, it can be handled via Xbox controllers, and even keyboard and mouse. Lenovo Explorer includes also support for Cortana. The main element of the VR is the virtual reality glasses. When using this headset, the user sees only the contents of a display. The helmet is equipped with sensors (gyroscope, accelerometer) that detect the movements of the user's head, and the display shows the image in the direction it looks at, so as to create a sense of virtual reality as if the user were inside the scene. There are currently two types of virtual reality glasses on the market. The first type, with no built-in viewfinder, requires a display phone, and the second type with a built-in screen. From the first category, devices are available on the market in a wide range of prices and capabilities. In fact, anyone can make their VR glasses at home using Google Cardboard, a model that can be printed to manufacture this device. Of course, the experience is not the same as the more sophisticated glasses, but you can get an idea of the VR experience using Google Cardboard. On the other hand, there are devices designed for the mobile phone. They are usually similar to plastic glasses and include adjustable lenses and ergonomic accessories. With a decent screen, the experience is more than pleasant. To enjoy content, just search in the app store (App Store or Google Play) using "VR", where there are many applications suitable for these devices. In the middle category, there are also some devices like the Samsung Gear VR, which includes some additional sensors to improve the experience but still require a mobile phone (in this case, Galaxy). Samsung has an agreement with Oculus, so the experience is enhanced by Oculus applications with quality seal. Finally, we have VR headphones with affordable screens. The last one was the Playstation VR, released in October 2016. It connects to the PS4 to deliver unique video games and experiences through its OLED screen, with a 100-degree field of view and reduced latency. The most important device on the market today is the virtual reality product of Taiwanese company HTC Vive. This is a system that incorporates two multi-function, battery-powered controllers, visible in the VR, two sensors that are installed in the room and are in charge of tracking controllers and helmets, and a headset. The helmet supports all intelligence, has two OLED screens with a resolution of 1024 × 1200 pixels each and a 90 Hz refresh rate.

In 2019, the most important VR related companies proposed a new generation of VR headsets based on inside-out technologies, where the environment sensors are located on the headset, bringing a completely new level of mobility when performing VR actions. Among the best headsets that were

announced we can mention: a) Oculus Quest, a standalone headset that offers 6 degrees of freedom on 3 axis of rotation and 3 axis of translation powered by a computing architecture similar to the one found on Samsung S8, b) Oculus Rift S – a connected headset that is using inside-out technology, c) HTC Cosmos – a PC based headset with inside-out technology, that can connect to other devices, having new controllers and a 2880x1600 resolution , d) HTC Focus Plus – an inside-out headset which supports six degrees of freedom tracking, being powered by a Qualcomm Snapdragon 835 and equipped with a 3K AMOLED display, e) HP Reverb - A headset outfitted with two 2.89-inch screens with a 2160×2160 resolution per eye (4320×2160 combined resolution), a 90 Hz refresh rate, and a 114-degree field of view, 6-degree-of-freedom (6DoF), positional tracking with no need for any external sensors. It has its own spatial audio headset, and two front-facing cameras to enable augmented reality applications, f) Valve index. A headset that uses two custom 1440×1600 LCD panels with full RGB subpixels where each pixel has three subpixels instead of just two. The refresh rate of Index increases to 120Hz. The pixel persistence is down to 0.33 ms, the lowest of any headset that should entirely eliminate motion blur. The maximum field of view is around **130** degrees.

3. Developing VR Environments for Optimizing Organizational Learning Processes. Study Case: PSI Application

The developed framework application, based on the use of interactive 3D concepts, is an application designed to train industrial personnel in the field of labor protection, prevention and firefighting. Virtual training, with the help of the developed application, has the advantage of being available to a practically unlimited number of trainees, safely, at low cost. The instructional method used aims to expose trained individuals to situations that may occur in the real work environment, but comes with the advantage of offering the possibility of resuming and exercising actions and procedures until learning the knowledge and acquiring the skills necessary for employees in similar situations at work.The proposed scenario includes two work variants: assisted and free. In the assisted demo, the learner is explained the use of the specific virtual reality devices used, together with theoretical rules and notions related to concrete fire protection and fire fighting procedures. Then he is instructed to go through the steps required to stop the fire, receive feedback and end up with the application only if the required steps are performed correctly. The free option leaves the learner to act in the VR as if exposed to the real situation at the workplace. He can make mistakes, has unlimited time, the application runs to the end, and finally gets a score for the time and extent to which he has achieved the goal. The chosen field, dealing with procedures related to labor protection and firefighting, is applicable to all industrial sectors, and the developed application can be used in personnel training, regardless of the activity carried out. Learning in the virtual environment is well suited to the training of hired personnel.

Adults learn best when they have a concrete purpose, they are focused on problem solving, and they do their own practical action. Virtual reality provides a learning environment, increases motivation, maintains user interest and results at least as good as conventional methods. The PSI application begins with the user entering a space called holodeck. In this space, the user is presented with the content of the experience he/she is about to have, namely the three segments that he/she can access according to his/her interest. The three segments can be accessed in any order and unconditionally. A user who is just experiencing the VR for the first time has the opportunity to access the VR Tutorial, explaining all the commands he will need. A user who wants to go through the free VR experience can do so without having to go through the assisted Demo.

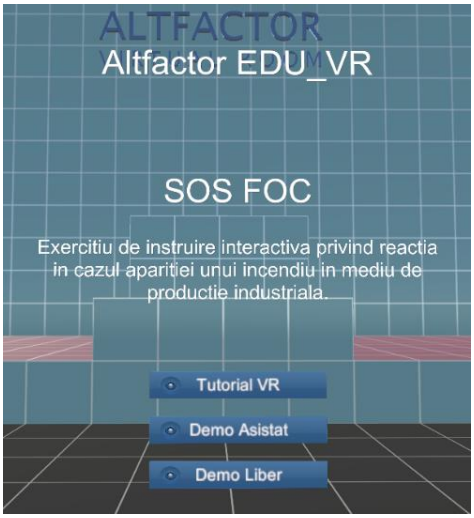
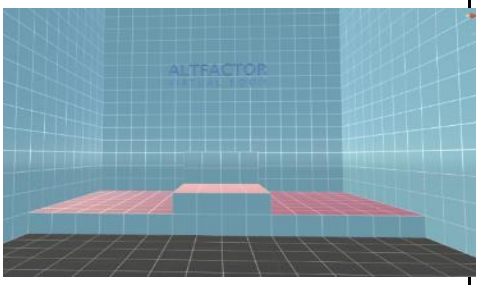
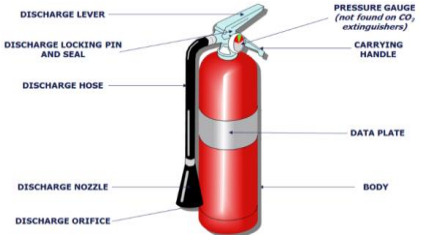


Figure 3. Choosing VR experience type

In the VR tutorial, the user learns how to teleport, manipulate and interact with objects. The following table describes the different interactions the user can have in the VR environment.

Table 1. Tools for VR environment interactions

Written message	**What the user sees**
Welcome! For starters, be aware of the use of navigation aids.	
The clue controller must be in the right hand. Check now! How do you move? It's simple. Use the Teleport button. Try it!	
In this application you will need to pick up objects. You will do this by using the Trigger. Pick up the extinguisher near you.	

Observe the components of a fire extinguisher. **Texts in the print screen:** Discharge lever, Discharge locking pin and seal, Discharge hose, Discharge nozzle, Discharge orifice, Pressure gauge, Carrying handle, Data plate, Body	
Remove the pin with your right hand	At this point, the user removes the extinguisher's pin
Press the Trigger to release the fire extinguisher	At this point, the user should press the button and the white jet exits the extinguisher
You want to drop the extinguisher? Press here:	
Here's how an extinguisher works in real life.	Hint of animation: https://www.youtube.com/watch?v=w4jHpHoYZhk de la 1:14 - https://www.youtube.com/watch?v=f4FEirH8kCE de la 0:40 - 0:58 https://www.youtube.

In the demo-assisted scenario, the user can not fail/burn (the fire stays constant or will be extinguished but will not include the same scene as the unguided simulation). Thus, the user will be able to go through the following sequence of activities: 1) the entrance is made on a walkway; 2) when entering the workshop, the user sees the fire (which has already been triggered). To enhance the sensation, a sound will be use that will attract the user's attention. The user will need to find the right fire extinguisher and use it by directing the extinguisher correctly. Once in the workshop, the following actions will be available: 3) the user sees the fire already produced; 4) there are 3 extinguishers on the wall. Above them, there are some metal tabs, placed above each fire extinguisher, showing the graphic elements of the black and white icons for A, B, E; 5) if the user chooses the appropriate extinguisher and uses it correctly, he extinguishes the fire. The scene is over; 6) if the user chooses the extinguisher that is not suitable for the given situation, it must go through Learning Step 1; 7) if the user chooses the wrong extinguisher, he can use it (he can act on the extinguishing agent) but can not extinguish the fire; 8) if the user chooses the appropriate extinguisher (no longer passes through Learning Step 1) and goes to the extinguishment of the fire; 9) extinguishes the correct fire. The exercise is over, 10) does not use the extinguisher correctly, it must go through Learning Step 2. The inability to extinguish fire may be due to the fact that he did not act in any way or failed to remove the pin or did not correctly direct the extinguishing agent (at the base of the fire). The table below presents the events that can take place during the assisted demo scenario.

Table 2. VR events in assisted demo scenario

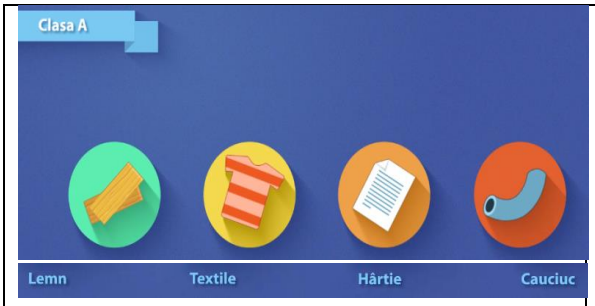
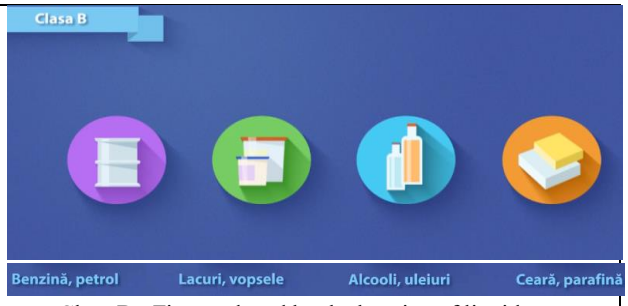
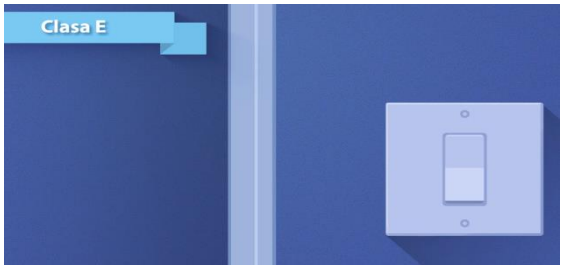
Scene	Written messages
	Welcome! Cross the walkway and descend the stairs. You have to get into the workshop.
	Continue on the teleport points.
	Open the left door with your right hand.
	Flammable liquids fired. Safely extiguish the fire. You only have two minutes for that. After 5 seconds without action, the message appears: Choose the appropriate fire extinguisher.

	Pay attention to the labels on the wall.
The user chooses the wrong extinguisher (class A or E) Learning Step 1:  Clasa A - Incendii produse de arderea materialelor solide: lemn, hârtie, textile, cauciuc, mase plastice.  Clasa B - Incendii produse de arderea lichidelor sau solidelor lichefiabile: benzină, petrol, alcooli, vopseluri, uleiuri, ceară, parafină.  Clasa E - Incendii care implică echipamente și instalații electrice: tablouri electrice, transformatoare, calculatoare, servere. Texts from the print screen: Class A - Fire produced by the burning of solids: wood, paper, textiles, rubber, plastics. Class B - Fire produced by the burning of liquids or liquefiable solids: petrol, petroleum, alcohols, paints, oils, wax, paraffin. Class E – Fire produced because of electrical equipment and installations: electrical panels, transformers, computers, servers.	In this environment you could be confronted with the following types of fires. Each type of fire corresponds to a type of fire extinguisher.
The user selects the correct extinguisher (class B) but does not act. After 10 seconds of inactivity, the message appears:	Act the extinguisher!
After another 5 seconds of inactivity:	Remove the pin and act!
The user operates the extinguisher correctly, but does not direct the jet to the fire base. Here is Learning Step 2: 	The extinguishing agent must be directed to the fire base.

	Press the anti-panic bar to exit.
Finish	You have finished the exercise. You can repeat the assisted tour or try Free Demo from the original menu.

Learning Step 1 refers to the three classes of fire the user needs to know. The following images are suggestions for presenting the three classes of fire in this demo. Through this presentation, the user receives information about the materials that are part of certain classes of fires.

Table 3. Materials and fire classes

 Class A - Fire produced by burning solid materials: wood, paper, textiles, rubber, plastics.	 Class B - Fire produced by the burning of liquids or liquefiable solids: petrol, petroleum, alcohols, paints, oils, wax, paraffin.
 Class E – Fire produced by electrical equipment and installations: electrical panels, transformers, computers, servers	

Learning Step 2 refers to instructing the user about how to use the extinguisher (essentially because the triggered jet has to be directed fire base rather than at the top of it). Steps to operate the extinguisher must be performed in the following order: a) The user must take off the pin - Use the right hand to remove the pin; b) The user has to press on the lever (to release the extinguisher) - Press the trigger to switch off the fire, c) The user has to turn the extinguisher towards the fire base - Turn the jet to the fire base. In the free demo scenario, the user will end the mission without any help tools. Therefore, in this

case there will be no written messages, no other pointers to the user. The successful end of this journey must be to extinguish the fire by using the appropriate extinguisher correctly.

4. Evaluation of Interfaces in Virtual Reality

Interestingly, during all these years of IT development, the methods for improving user experience have focused on making it easier and more interesting for a human to interact with the computer, by using limited devices available, like a mouse. All industry's effort to facilitate the connection of man to the computer begun with the need to adapt the way in which man can naturally interact with the surrounding objects, taking into consideration the constraints imposed by the computer interface: flat screens, 2d views, mouse, etc. But now, for the first time in human history, man has the ability to interact with the computer as he naturally does with other components of the environment or life: grab objects, speak natural and respond physically to events.

Virtual Reality (VR) systems may suffer from serious usage problems such as conceptual disorientation and inability to manipulate objects (Kaur et al, 1996); however, no methods of assessing the usability of VR systems have been reported. There is a need for better-designed VR systems (Bolas, 1994, Loeffler & Anderson, 1994) that support perception, navigation, exploration and engagement (Wann & Mon-Williams, 1996). Significant problems of using current VR systems have been reported by Miller (1994);

In addition, Kaur et al (1996) in a field study of design practice found that designers did not have a coherent approach to design, especially interaction design, lack of understanding of the concepts of use underpinning the VR, and did not use conventional HCI methods or instructions. Standard evaluation methods (for example, Nielsen, 1993) may reveal some usability problems, but as Hook and Dahlback (1992) note, no current evaluation method matches the specific problem of VR applications. It can be argued that conventional usability assessment methods exist, such as heuristic evaluation (Nielsen, 1993) or cooperative assessment with users to diagnose problems (Monk et al, 1993) or cognitive walkthrough (Wharton et al., 1994) reality. However, Nielsen's heuristics, for example, does not address problems locating and manipulating objects or navigating in 3D worlds; while cognitive visits (Wharton et al., 1994) were not designed to address perceptual orientation and navigating and interpreting change in the virtual world.

The assessment of the use of the laboratory (Monk et al., 1993) can identify failures and interaction problems, but these methods offer little guidance for a solution. It is therefore necessary to support the usability assessment process addressing the new issue of the VR as well as the link between problem identification and the specific interface design guidelines. In order to achieve a successful interaction, the user needs knowledge of the field and environment, on the one hand, and the availability of the machine on the other hand. Table 1 shows the stages of interaction with sources and supplies of knowledge, which we call "generic design properties" (GDP). GDP expresses abstract requirements in a design to ensure successful interaction, but needs to be specialized in concrete design guidelines. The GDP specialization was described in Kaur et al (1999), and the space limitation excludes a broad description in this paper.

Table 4. Stages of interaction with sources and supplies of knowledge

Steps	Question	GDP	User knowledge
1. Objective	(i) Can the user form or remember his/her task? (ii) Can the user formulate an intention?	1. Compatible task flow	Task knowledge Domain knowledge- appropriate situation
2. Location of active environment	(iii) Are the objects or part of the environment visible?	2. Clear environmental structure	Knowledge of the field - the layout of the environment
3. Locating objects	(iv) Can objects be localized?	2. Clear environmental structure 5. Recognizable objects	Knowledge of the domain - objects and their location
4. Approaching and orientation	(v) Can the users get closer and orientate themselves in order to accomplish the task?	6. Object that you can approach 7.Components of the object 4. Flexible operation	Knowledge of the field - object structure, knowledge of the task - orientation actions
5. Specifies the action	(vi) Can the user decide what to do and how?	3. Purpose of the action	Knowledge of the task - details
6. Manipulation of objects	(vii) Is manipulation easy?	4. Flexible operation 7. Deleting objects components 8. Locating areas for handling	
7. Feedback recognition	(viii) Are the consequences visible?	9. Visible effects	Knowledge of the field - expected effects
8. Feedback evaluation	(ix) Can the user interpret the change?	10. Interpretable effect	Knowledge of the field, Knowledge of the task - expected effects
9. Next action	(x) Can the user decide what he does next?	3. Purpose of the action	Knowledge of the task

Questions are directed to determine potential users' issues, then the answers are cross-referenced to GDP indicating the possible causes of usability issues. The evaluator passes through the task for each subgroup in the sequence, progressing around the cycle of action illustrated in Figure 1, with the following questions:

a) Can the user form or recall his/her goal of activity? The answer to this question will be yes, unless the user has poor knowledge of the task. In this case, a load support memory can be displayed as a list of step points; otherwise, training should be provided under this task. The goal-building stage requires user knowledge of the task, while locating the active part of the virtual environment (VE) requires indications of where the appropriate objects (GDP 2) are. These can be delivered by the environment itself or by other design features, such as overall maps. The distribution and appearance of objects should correspond to the user's expectations based on their real-world task (GDP 1) memory;

b) Can the user specify the intention to do what they need to do? At this stage, the user needs either a procedural memory of how he can perform the task or the clues and supplies of the VE to suggest the best way to act. There should be offers, otherwise it should be mentioned where the user might find them;

c) Are the objects or part of the environment necessary for the realization of the action visible? If they are not, the user will have to look for them;

d) Can the objects required for the task be located? Objects may be hidden or not visible even if the user is sure that the appropriate part of the environment has been reached. The necessary object should be highlighted or shown. Important objectives should be detailed in order to help recognize them. If highlighting violates criteria of nature for the environment, speech indices may be used. Object

localization requires knowledge of user domain and clear indications by system representation (GDP 2, 5);

e) Can the users approach the object so that the required action can be performed?;

f) Can the user decide what action to take and how? Objects may not suggest clues or challenges for action. If the user can not decide, then the problem may be either a lack of detailed knowledge of tasks, or the design of virtual objects may be unclear. The detailed representation of the object should be improved. If naturalness is not vital, the object can be animated to suggest actions to the user, otherwise speaking or texting instructions can be displayed. Self-fulfillment must perform the intended operations of users so that the action is planned and made as natural as possible. Objects should have easy-to-recognize subcomponents and should be accessible by providing clear indications of orientation so that the user can position himself/herself;

g) Can the user easily perform manipulation or action?;

If action is difficult, it may exceed the physical capabilities of users (for example, manipulations are too precise or require special perceptual-motor coordination); alternatively, the user may not have acquired the necessary physical skills. Additional details are required for successful handling, e.g. clues showing the parts that can be grabbed, handled, turned, etc. (GDP 7, 8). If the scale of the object is not vital, its size can be resized by scaling, so it will be easier to manipulate; alternatively, the required action can be simplified or automated. Also, the design of the object can be improved so that manipulations are easier to control by the user. If the user uses a virtual tool, this may require changing the object in 3D to make it more natural. Evaluating this stage usually involves taking feedback into consideration.

h) Is the consequence of user action visible? Feedback may be absent, ambiguous, or hidden (meaning that it happens but it does in another part of the environment outside the user's field of view). Changes to the shape of objects should be true to the real world. The ways in which the object can be modified are important because, ideally, feedback should include haptic representations as well as audio and visual representations. Remote feedback must be signaled to the user and his location displayed. If the feedback is unclear, the subject can be highlighted to indicate a change. If forcing the feedback is not possible, a trans-modal substitution may be used, e.g. changing the tone of the sound or changing the color to visualize an action. Text and/or textual clarifications may be necessary to explain the complex changes. Once the action takes place, the objects in the environment and their characteristics must be easily maneuverable within the normal limits of human physiological-motor skills. This implies not only the design of the objects on which they act, but also the representation of the ego and eventually of a virtual instrument. All three must be easy to operate in order for the interaction to be successful;

i) Can the user interpret a change? If the principle of naturalness is not violated, feedback should always be clear and unambiguous. The user should be able to interpret the effect in the light of the knowledge of the tasks/domains and the relationship between effect and Observable Virtual Environment. If the effect of the change is unclear, the feedback may be clarified or possibly explained to the user. Explanations may be required for complex effects; alternatively, the global effect can be shown in slow motion (slow or slow motion) to facilitate interpretation. Moreover, feedback, which is recognizable and easy to interpret (GDP 9, 10), is an important ingredient in the success of user action. Operations may be visible, but without this forced feedback, the limits of actions and manipulations of the user are often difficult to quantify;

j) Can the user decide what to do next? At this stage, the tree structure bifurts. If the user completed a task, then the next step is to form the next goal, so repeat the protocol starting with (i). Alternatively, if

the user is in a procedure, the next step is to select the action to be taken. The failure of this step can be caused by obliviousness or inadequate knowledge of user tasks; however, failure can also be due to a misleading virtual environment that gives inadequate hints. In this case, the environment must be redesigned to suggest the next action so it is compatible with the user's task. Note that this step may be related to iterations between questions (vi) and (vii) for closely related interconnected actions. When the user is qualified, the next action decision is automatic.

Conclusions

The flexibility provided by a VR system most likely will atract those people responsible with managing the learning processes inside an organization. Even the costs are still high compared to conventional multi-media systems it is easy to see how many different applications it can support. It is possible to imagine that a time will come when current training procedures will be enhanced by VR systems that will allow immersions in different realities, where different experiments can be performed. For example, VR based laboratories will be able to integrate chemistry, physics, engineering or human reactions sessions into a cohesive, unitary experience. At the beginning, desktop-based VR systems will be used in the first instance, followed by partial immersion VR systems where projection screens can be adapted to support wide screen representations. Finally, fully immersive systems will be introduced, but this will happen when acceptable head coupled displays will be available at reasonable cost. In terms of issues, there is a need to develop new skills related to the usage of VR tools in learning environments. It would be beneficial to be able to quantify/benchmark VR systems against more traditional methods of teaching. Among some other VR related issues that should be addressed, we can mention: costs, technology obsolescence, interaction in a 3D environment can be problematic with 2D devices such as a mouse, current tools may be good for creating virtual environments and object databases but these need to be linked to a carefully structured training programme with quantifying learning benefits. Still, by using VR based systems, the organization can obtain many key benefits like: flexibility, upgradeability, learning processes based on a sense of presence, that is important for many educational contexts and a high degree of interaction, 3D interactions and visualisations, easy to achieve a sense of true scale in 3D environments (which is important in fields such as architecture), safe processes with less restrictions (it is possible to experiment the implications of exceeding certain limits), access to otherwise dangerous situations, situations where observation of internal workings/structure is important to aid understanding.

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THE 14TH EDITION OF THE INTERNATIONAL CONFERENCE
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REALITIES AND PERSPECTIVES

Social Housing

Marsida Feshti (Muça)[1], Ela Golemi[2]

Abstract: Housing is a very important case as a common function of central and local government, as a consequence of the increased requests of the citizens for housing and finding the best policies to achieve the best realization. Actually in Albania is approved the law no. 22/2018 "For social housing", by the Assembly of Albania, which is a very important act for the realization of social housing programs. The object of this law is the definition of rules and administrative procedures for the ways of planning, insurance, administration and the distribution of social programs of housing, with the purpose of creating opportunities for suitable and affordable housing, relying on the paying capacity of families in need of housing and the assistance of responsible state institutions. This law is defined as a very important act because in the housing programs a part of them belongs to woman as victims of violence, as a further step towards meeting the standarts of the Concil of Europe Convention "For preventing and fighting violence against woman and domestic violence".

Keywords: housing; legislation; families; government

Introduction

Our society increasingly needs the design and implementation of Social Policies because our country, but not only, is currently facing social problems. One of the social problems facing society today is social housing. If we read about social housing, we will see that this service is provided to people in need, so in this sense it is necessary to draft and implement social housing policies. The social housing concepts originates from the human rights sanctioned in the Convention on Human Rights. Social housing is seen by many scholars as a mission of general interest, from where it is guided by certain social legislation. The provision of social housing includes the construction, development, allocation and management of social housing leasing schemes, as well as the ownership of social housing.[3]

Going further and deeper in the study on social housing we will come to conclusion that this service is provided by the government on behalf of the population benefiting from social assistance or individuals that are part of the Social Policy scheme. While the municipalities of the cities are responsible for the implementation of this plan. Social housing comes in the form of leasing schemes. Housing benefits are also provided in order to help the low-income rent-paying families.[4]

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[3] Social Housing in Europe France, Brussels, 27 Mars 2010: http://www.housingeurope.eu/resource-106/social-housing-in-europe.
[4] Social Housing in Europe France, Brussels, 27 Mars 2010: http://www.housingeurope.eu/resource-106/social-housing-in-europe.

Naturally, a question arises: what is social housing? The social housing provided by the law "On social schemes for the housing of urban dwellers" means all financial resources related to the economic resources (who invests in social housing and the capital invested), as well as the techniques and risk management (who constructs those buildings; we consider the criteria that need to be met, which dis specific for each country). We will focus on our country and social housing within the workplace. To keep up with social elements related to social justice, anti-poverty measures, the reduction of gap in income (it means the amount a family/individual can afford to pay the monthly rent of social housing). Social housing further incorporates into its concept the institutional elements (it means the management and allocation of resources on social housing to persons who really need institutions that deal with the identification of families who need this service).

Social Housing in Albania

In the Albanian society we often hear and come up with numerous debates on social housing. The government has set up three social housing schemes: social house leasing, low-cost housing and land-based infrastructure program.[1] In addition, the government has created housing subsidies, subsidized loans, small grants and immediate grants that have specific target groups.[2]

The problems that our country today faces on social housing are issues related to the accurate statistical data on families who need this service. Based on the literature regarding this issue, we can convincingly state that the institutional management capacity has a major problem with regard to the identification and implementation of the SOA strategy. In fact, we wonder if social housing is fairly distributed to persons who have applied for housing in the relevant institutions? In order to have the proper management, it can be said that the proper identification of the demand for social housing provides effective distribution for the families in need.

To continue, with another problem our country is currently facing with regard to social housing, is that of the financial institutions. The financial instruments as we argued o the first paragraph of this article, are the capital capacity to help the families in need. In our country the financial resources are small compared to the demands of the families in need.

It is important to note the vision, policies and strategic priority that the government, together with the relevant institutions, has undertaken to realize. When we talk about vision, policies and strategic priorities, we consider the strategies that will be used to improve the development of social housing, taking into account the design, implementation and monitoring of laws, regulations and directives issued by the Council of Ministers and other institutions that are responsible for social housing policies.

Law No. 22/2018 "On social housing" is one of the most important acts for the realization of social housing programs in Albania. The object of this law is the definition of administrative rules and procedures for planning, providing, administering and disseminating social housing programs in order to create affordable and convenient housing opportunities based on the ability to pay of the families that need shelter and support from the responsible state institutions.[3]

[1] Ministry of Urban Development, "Social Housing Strategy 2016-2025", Tirana, 2016, p. 13.
[2] Ministry of Urban Development, "Social Housing Strategy 2016-2025", Tirana, 2016, p. 13.
[3] Article 1 Law Nr. 22/2018 "On Social Housing".

Principles of Social Housing

1. The principle of home affordability. This principle determines home affordability based on the family income Average income families are considered those families which from the monthly income do not spend more than 25% to provide a suitable housing. Low-income families are considered those families which from the monthly income do not spend more than 20% to provide a suitable accommodation. Low-income families are considered those families which from the monthly income do not spend more than 15% to provide a suitable housing.[1]

2. The principle of appropriate housing. Housing is considered appropriate for an individual and/or family when it guarantees privacy, a safe and proper living, which also provides sufficient living space; basic services, within the residential environment; protection and security from the risks arising from human actions or omissions or natural and climatic factors; access to public services such as drinking water and electricity, wastewater disposal and waste management; etc.[2]

3. The principle of residence security. The right to be sheltered in a temporary or permanent residence is inviolable.[3]

4. Relocation procedure. If the stay in a house or shelter becomes impossible because of investments of public interest, the destruction of the building due to the exclusion from the legalization process or other cases as defined in this law or other laws, the unit of self-government: a) notifies in writing to the individual/family the reasons for the relocation 30 days prior to the issuance of the administrative act on removal from the house; b) informs the individual/family about alternative housing options; c) Issues the administrative act for removal from the apartment 45 days prior to the relocation, also notifies the approve document for the alternative housing. 2. Relocation, according to the provisions of this article, shall not apply without first providing shelter with suitable accommodation of the individuals/families. 3. Against the decision of the local administrative unit responsible for the relocation from the apartment, an appeal may be filed with the competent administrative court, in accordance with the legislation in force for the administrative courts and the adjudication of administrative disputes. 4. Individuals/families affected by the relocation, shall benefit from legal aid in accordance with the applicable law. 5. The relocation and institutional cooperation procedures shall be determined with the decision of the Council of Ministers.[4]

5. Principle of respecting the culture and traditions of communities. Local self-administrated units, during the procedure of planning of housing areas and housing schemes, respect the different traditions and cultures of communities. Housing construction should preserve cultural identity and diversity of communities, without prejudice to the necessary standards of housing quality.[5]

6. The principle of participation. Any subject that implements a social housing scheme shall involve, during the consultation process, the community affected and/or benefiting from the program, in accordance with Law no. 146/2014 "On Public Notification and Consultation".[6]

7. The principle of transparency and public information. The local administrative units should ensure: a) full, easily accessible, and understandable information about each individual/family. The information should include: i) the type of social housing program that applies to that local government

[1] Article 3 Law Nr. 22/2018 "On Social Housing".
[2] Article 4 Law Nr. 22/2018 "On Social Housing".
[3] Article 5 Law Nr. 22/2018 "On Social Housing".
[4] Article 6 Law Nr. 22/2018 "On Social Housing".
[5] Article 7 Law Nr. 22/2018 "On Social Housing".
[6] Article 8 Law Nr. 22/2018 "On Social Housing".

unit; ii) conditions to be met by the interested subjects to be included in the specific housing program; iii) the documentation required for verification of the data declared by the interested party; iv) the procedure to be followed by the local government unit for the approval of beneficiary parties; v. the appealing body for the subjects that have not been selected as beneficiaries, the deadlines and the form of appeal; b) Transparency in the selection and publication process, as well as the documentation available to the interested parties; c) assistance in filling in application forms for housing, for people with disabilities, through sign language interpreters or communication facilitators, including the elderly, for persons who do not understand the Albanian language or the illiterate ones, and to ensure that any individual/family with communication difficulties due to their health or social status receives the necessary information and assistance for this purpose.[1]

8. Principle of non-discrimination. The rights deriving from this law are guaranteed without any discrimination to any individual, regardless of gender, race, color, religion, ethnicity, language, gender identity, sexual orientation, political, religious or philosophical beliefs, economic, educational, social, pregnancy, parental responsibility, family or marital status, civil status, health status, genetic predisposition, disability, affiliation to a particular group and any conditions with discriminatory consequences. No one shall be denied the right to receive housing in one of the social housing programs for the reasons referred to in section 1 of this Article, unless a social housing program is specifically and expressly designed for to assist individuals or groups in need.[2]

Types of Social Housing Programs

Social housing leasing schemes.[3] The program of social housing leasing is the program by which the public apartments are rented from the public social housing fund, and dwellings under the ownership of social owners. Social housing leasing includes: a) social housing that is built or purchased from the free market by the local government units in order to be provided with a social leasing contract; b) existing dwellings in the market, owned by the social owner; c) facilities out of function as a result of the closure of an activity which have been transferred to the ownership of local government units and, in accordance with the local general plan, have been approved for transfer to a social housing leasing fund, which are subsidized.

Programs for the rehabilitation of the existing housing conditions, until a new construction is made.[4] The Facility Rehabilitation Program for State Properties implies aid granted to the local government units from the state budget, to be invested in public housing. The process of investing the apartment fund is approved by a decision of the Council of Ministers. The program for improving the conditions of existing private or state-owned housing means the assistance provided to the local government units by the state budget for this purpose, with competitive grants. The rehabilitation of the existing housing conditions and, if necessary, even the new construction, means the entirety of the works to be carried out in order for the dwellings to be converted into a suitable housing, under the conditions pursuant to Article 4 of the Law No. 22/2018 "On Social Housing".

Housing program at low cost.[5] Low cost housing is considered a dwelling that meets all technical conditions, building standards and housing rates in force, which is predetermined to be owned by the

[1] Article 9 Law Nr. 22/2018 "On Social Housing".
[2] Article 10 Law Nr. 22/2018 "On Social Housing".
[3] Article 17 Law Nr. 22/2018 "On Social Housing".
[4] Article 40 Law Nr. 22/2018 "On Social Housing".
[5] Article 44 Law Nr. 22/2018 "On Social Housing".

beneficiary through various aiding forms from state institutions. Low-cost housing provided through construction, in local government units, where market values are higher than the cost of construction, are sold at a price below market value, but not below the construction. 3. In cases when the value of the apartment in the free market is lower than the cost of construction, these apartments are purchased and included in the UBC program if they meet the conditions set out thereof.

Program for the development of the area for the purpose of housing.[1] Local government units, based on the designation of residential areas, central and local planning documents, social housing needs assessment, and social housing construction requirements, plan the areas of land suitable for housing development. Development of the area for the purpose of housing is done for the construction of social housing, based on central and local planning documents. Development of the area for housing purposes involves the design and approval of the construction project, until its completion. The development of the area is done by investments from the state budget, the budget of the units of local government and/or in cooperation with the private sector, according to the legislation in force. The development program of the area for the purpose of housing is realized in state or private property. The development of the area for the purpose of housing can also be implemented in the areas: a) with non-legalized buildings that cannot be legalized; b) unfinished building, identified as such by local government units; c) old industrial, dysfunctional, occupied by homeless individuals, without appropriate housing authorizations. Land equipped with infrastructure, part of the development of an area for housing, may be offered for construction free of charge from local government units and beneficiary families who undertake to build a dwelling at their own expense according to the terms and conditions prescribed by the decision of the council of the local government unit.

Temporary housing program.[2] Temporary shelters are facilities and equipment that are easily assembled and dismounted and serve for temporary shelter. Temporary housing means housing for up to two years. At the time of application for temporary shelter, beneficiaries of this program should apply to other social housing programs. Temporary shelters serve for the housing of: a) refugees; b) individuals removed from their houses due to natural or man-made disasters; c) individuals who are relocated because of public or private investment and do not receive compensation, only in cases when the local government unit proves that it does not have any other housing alternatives within other social housing programs; ç) returnees; d) homeless people, residing in places not classified as residencial.

Specialized housing program.[3] Specialized dwellings are dwellings in which local government units address a specific housing need, which includes dwellings for: a) elderly and/or persons with disabilities; b) victims of trafficking/potential victims of trafficking; c) victims of domestic violence; d) children lacking parental care or have been taken under protection from state institutions, a minor from 14 to 18 years of age or young people from 18 to 21 years old after the programs related to criminal justice; e) mother girls.

[1] Article 50 Law Nr. 22/2018 "On Social Housing".
[2] Article 54 Law Nr. 22/2018 "On Social Housing".
[3] Article 58 Law Nr. 22/2018 "On Social Housing".

Conclusions

From the above it is possible to conclude that it is necessary to implement:

1. Effective management of institutions with regard to the identification of families in need. This is achieved through the updated infrastructure of government institutions as well as the effective training of the intellectual capacity.

2. Strengthening of the financial institutions. As stated above, capital capacity does not meet the needs of families in need. In order to meet the demand-supply needs, more cooperation is required:

a. in the institutional level;

b. Institution -Company;

c. Institution-donors;

d. Effective monitoring of institution-government cooperation;

e. Institution-donor monitoring to monitor the funds in order to ensure effectiveness.

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REALITIES AND PERSPECTIVES

Harmonizing Audit of Financial Situations to Romanian Companies with European Legislation

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Abstract: Regardless of the form of ownership or social capital, companies registered in Romania must prepare annual financial statements. Depending on the size criteria, these are mandatory to be audited. At thesame time, the auditing of the financial statements can be made outside the established size criteria. Given the development of the Romanian society and the integration of Romania into the European Union, the need to harmonize the legislation of our country with the European one has emerged. An important role for this purpose is the application of the European legislation in the Romanian legislation through the implementation of the European Regulations and the European Directives. Harmonizing national and European legislation, along with international accounting and financial reporting standards, lead to a better implementation of methods and techniques for detecting tax fraud and combating money laundering and terrorist financing. The need for auditing financial statements comes from the need for insurance - both for shareholders and for state institutions and business partners of companies - that financial reports objectively reflect the clarity and reality of the information contained, that they are prepared in accordance with legal requirements in the field and that the significant dangers of the information presented are excluded

Keyword: audit; fraud; statements; accounting; money

Introduction

In order to be able to talk about the harmonization of the audit of financial situations in Romania with the one in the European Union, I consider it necessary to make a minimal review of the "history" of the postdecembrist appearance of both commercial companies and accounting - and not only of institutions professionalism in the matter. At the same time, it is necessary to understand the regulation of drawing up and reporting the financial statements. The Aba under these conditions consider that reference can be made to the audit of the financial statements and the harmonization of the financial audit with the European legislation.

I. Historical and Legal Framework of Association Forms

The Revolution of December 1989 led to the liberalization of national economies, to the emergence of different forms of association - specific to democratic societies and market economies - and to the need to regulate them. Since 1990 Romania has gone through a transition phase, from the centralized economy to the market economy, which will be seen in the regulations that will appear in the next period of time. It is trying to destroy the old society and lay the foundations of a society based on democratic

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principles. In this context appeared regulations such as:

- Decret-law 54/05.02.1990 on organization and unfolding of economic activities based on free initiative; From the preamble and article 1 of the decree-law, we find out that "The development of the free initiative in the economic and social sectors that directly interest the population is able to lead to the growth and diversification of the range of products and services under the conditions of the free market". Taking into account the continuous development of demand for products and services, especially for citizens' consumption needs, economic and perspective imperatives, directly related to raising people's living standards and establishing the legal framework to promote free enterprise initiatives small and services, the National Salvation Front Council decides:

"Art. 1 - In order to satisfy in better conditions the requirements of goods and services of the population, the efficient use of resources of raw materials and materials, especially local ones, as well as the increase of the use of the labor force, can be organized, by free initiative:

a) small enterprises with a maximum number of 20 employees;

b) profit-making associations;

c) family associations;

d) activities performed by individuals independently.

Organization of the activities referred to in lit. a) -d) can be done only by citizens who are domiciled in Romania.

Art. 2. - The state guarantees the free organization and development of the production activities and services provided under art. 1. The organization of these activities is based on authorization, under the terms of this decree-law.

Art. 3. - The organization and carrying out of the production activities and services based on the free initiative can be done only in compliance with the legal provisions. Violation of the law results in material, civil, administrative, contraventional or criminal liability, as the case may be, of the guilty person." Along with the beginning of the legal framework for exercising some economic activities, there is also the Law 12 / 06.08.1990 on the protection of the population against illicit activities.

- Law 15/07.08.1990 on the reorganization of the state economic units as autonomous regies and commercial companies; The law mainly addresses:

"Art. 1 The state economic units, irrespective of the organ under their subordination, are organized and operate in accordance with the provisions of the present law in the form of autonomous regies or commercial companies. Also, economic units, goods or activities may, as the case may be, be leased or leased in accordance with the provisions of this law. Autonomous governments and commercial companies may, in the circumstances of this law, associate themselves with the joint realization of productive and commercial activities."

- Law 31/16.11.1990 on commercial companies, completed and modified in the years that followed, very many times and which became on this occasion the Romanian referential of commercial companies. Moreover, at art. 1 and 2 of the law it is said as:

"Art. 1. - (1) For the purpose of conducting business acts, natural persons and legal persons may be associated and may be incorporated companies, in compliance with the provisions of the present law. (2) Companies with headquarters in Romania are Romanian legal persons.

Art. 2. - Companies shall be in one of the following forms:

a) company in a collective name;

b) a limited partnership;

c) joint stock company;

d) joint stock company and

e) limited liability company."

- Law 26/05.11.1990 on the trade register, the main purpose of which is its very first article:

"1. Before commencing economic activity, the following natural or legal persons must be registered or, where appropriate, registered in the trade register: authorized natural persons, individual enterprises and family businesses, commercial companies, national companies and national companies, autonomous administrations, economic interest groups, cooperative societies, cooperative organizations, European societies, European cooperative societies and European economic interest groups headquartered in Romania, as well as other natural and legal persons provided by law."

The regulation of salary is done with the issue of Law 14/08.02.1991, the law of salary,

As a result of the reform policy already begun, the Law on Accounting, Law 82/24.12.1991, which will start in January 1993 on an experimental basis, but which will become mandatory as of January 1, 1994, the date from which the Romanian accounting plan will have another approach.

Regarding the implementation of the new accounting plan, the companies could - in the first quarter of 1994 - manage the accounting in parallel, both after the old accounting plan and the new one.

The Accounting Act thus promulgates a system in which financial accounting is disrupted by the analytical one but is adapted to the beginning of the market economy and which respects both the provisions of the European Directives and those of the International Accounting Standards Committee. It is noted that in the economy of market principles that govern accounting differ from those in the centralized economy and have to meet the planning needs.

II. Istoric of Financial Statements

Among the first references to the financial statements are the "property listings" of the parent of the accounting, Fra Luca Bartolomeo Paciolo and which are published in Venice in 1494 in the accounting treaty in the double game "Tractatus de Computis et Scripturis".

In the centralized socialist economy, where the state was the only owner, the financial statements wore the same form for all businesses, indifferent between them and not taking into account the size and importance of the business carried out. We will not insist on them.

During the transition period the financial statements kept the traces of the centralized economy, their format changing from one financial exercise to another.

Over time, they have undergone changes, both as content and as a presentation and way of filing and publishing.

Financial statements are synthesis documents that are primarily intended to meet the need for information from multiple addressers. These are, according to the FASB-Funancial Accounting Standards Board, the main element of financial reporting, with the purpose of transmitting information

of an accounting nature outside company.

We distinguish general financial statements and consolidated financial statements (a parent company and its subsidiaries over which it exercises power and control) to which International Financial Reporting Standards (IFRS) apply.

Under IFRS 1 "Presentation of Financial Statements"

"13. The financial statements shall present fairly the entity's financial position, financial performance and cash flows. Fair presentation requires accurate representation of the effects of transactions, other events and conditions, in accordance with the definitions and recognition criteria for assets, liabilities, income and expense set out in the Framework. It is assumed that the application of IFRSs, with additional information presented when necessary, results in financial statements that present a true and fair view.

14. An entity whose financial statements comply with IFRSs shall disclose in the notes an explicit and unreserved statement of such compliance. Financial statements should not be described as complying with IFRSs unless they comply with all provisions of IFRSs"

The accurate preparation and presentation of the financial position of the firm is the main objective that the financial auditor checks in the audit engagement. I am also subject to the auditing tests both the financial-accounting system and the internal control existing within the audited company.

Developing the system for the application of the audit tests in accordance with the requirements of the European Union and meeting the audit objectives (completeness, evaluation, reality and accuracy) may discover the existence of tax frauds.

In the field of national institutions with the right to regulate, guide and apply legislation in the field of accounting, financial statements and audit, we have:

1. CECCAR

In 1992, the Association of Chartered Accountants and Authorized Accountants in Romania (CECCAR) was established and in 1994, based on Government Ordinance no. 65 of August 19, 1994, the Body of Chartered Accountants and Authorized Accountants in Romania was re-established as an autonomous and public utility legal entity.

2. CAFR

The Chamber of Financial Auditors of Romania (CAFR) is the professional body that organizes, coordinates and authorizes the conduct of the audit activity in Romania. CAFR emerged as an imperative requirement for the development of Romanian society, in the context of the conditionalities arising from the connection of our country to the processes taking place all over the world.

The Chamber of Financial Auditors in Romania was established by Government Ordinance no. 75/1999 regarding the audit activity, which states and legitimates the profession of auditor and the professional organization of the auditors.

CAFR has been permanently involved in transposing Directive 2014/56/EC into our legislation. To this end, measures have been taken to ensure that in the rules to be adopted the audit activity is independent, strong and especially in the service of the public interest.

3. CCR

The Court of Accounts was re-established in 1992 and is present through the Chamber of Accounts in

all counties of the country.

The objectives of the Court of Auditors are:

- Ensuring compliance with the legal regulations of an economic, financial, fiscal and accounting nature, in order to identify any errors or irregularities in the preparation of the financial statements, in the correct and efficient management and use of public funds, and the application of the measures to remove them;

- Improvement of the harmonized legislative framework implemented in the field of external public audit as the evolution of the international practice, while ensuring the highest degree of coherence of the national legislation in force, while ensuring the compatibility with the international standards adopted by the International Organization of Supreme Audit Institutions INTOSAI (en) and the European Guidelines for their implementation; strengthening the institutional capacity of the Romanian Court of Accounts as an independent, professional and credible institution of external control and audit of public funds; creating the premises necessary to ensure the convergent functioning of public institutions in relation to their competencies; protecting the financial interests of the Romanian state and the European community

4. ASPAAS

ASPAAS-PUBLIC SUPERVISORY AUTHORITY OF STATUTORY AUDIT ACTIVITY-is a public authority having legal personality and competence in the field of statutory audit and performing its tasks in accordance with Law 162 / 2017. Thus, in this law:

"(1) The statutory audit is performed by financial auditors or audit firms that are authorized/authorized in Romania under the terms of this law, who are members of the Chamber of Financial Auditors of Romania, hereinafter referred to as CAFR, under the conditions of the law, and which is recorded in the electronic public register provided in art. 14 under the conditions established by this law and by ASPAAS regulations.

(2) Competent authority responsible for authorizing financial auditors and audit firms is ASPAAS.

(3) ASPAAS only authorizes as financial auditors the natural persons who fulfill the conditions provided in art. 5 and art. 7 - 11.

(4) Financial auditors may carry out statutory audits on behalf of an audit firm or in his own name, according to the law."

Of the European institutions with audit attributions, we have:

European Court Of Auditors

The European Court of Auditors, based in LUXEMBOURG, was created by the Budget Treaty of 1975 and was formally established on 18 October 1977 with the first session a week later. At that time, the CEC was not a formal institution; it was an external body to verify the finances of the European Communities. It has replaced two separate audit bodies, one dealing with the finances of the European Economic Community and Euratom and one dealing with the European Coal and Steel Community. [1]

The CEC did not have a legal status until the Maastricht Treaty, when it became the fifth institution, the first institution since the establishment of the Community. By becoming an institution, it has acquired new competences, such as the capacity to bring actions before the European Court of Justice (ECJ). At first, its audit power referred only to the pillar of the European Union (EU), but through the Treaty of Amsterdam it gained all the power to control the finances of the EU as a whole [

In order to perform the functions assigned to the Chamber of Accounts, auditors carry out on-the-spot

inspections at other EU institutions, EU countries or other countries benefiting from EU financial assistance. However, this institution has no real authority. If the auditors find violations, they inform them.

Duties of the Court of Auditors:

- audit the EU's revenue and expenditure to verify that the funds have been properly collected and spent, if they have been used in such a way as to produce added value and have been properly accounted for.

- verifies all persons and organizations managing EU funds, including on-the-spot checks in the EU institutions (in particular within the European Commission), in Member States and in countries receiving EU aid.

- formulate findings and recommendations in the audit reports for the European Commission and national governments. reporting suspicions of fraud, corruption or other illegal activities to the European Anti-Fraud Office (OLAF).

- draws up an annual report for the European Parliament and the EU Council, which Parliament examines before deciding whether or not to approve the way the Commission manages the EU budget.

- publishes expert opinions designed to help policymakers make the best decisions to make the most efficient and transparent use of European funds.

Contact Committee

The Contact Committee is a group bringing together the presidents of the Supreme Audit Institutions of the EU Member States and the President of the European Court of Auditors every year. This committee provides a framework for cooperation and exchange of professional knowledge and experience on the audit of EU funds and on other EU-related topics. The current contact between the participating institutions is maintained through the liaison officers designated by each institution. The Working Groups, Networks and Task Forces within the Committee have the role of contributing to the development of common positions and practices.

The Network of Supreme Audit Institutions in Candidate Countries

The Court cooperates with Supreme Audit Institutions in candidate and potential candidate countries to join the European Union to facilitate regular exchanges of information, develop audit methodologies and promote vocational training. These activities are being carried out in partnership with SIGMA, a joint initiative of the Organization for Economic Cooperation and Development (OECD) and the EU.

The main means of cooperation is represented by the Network of Supreme Audit Institutions in the candidate and potential candidate countries for accession to the European Union, which functions similarly to the Contact Committee. This network involves periodic meetings of Chairs of Supreme Audit Institutions and liaison officers, as well as working groups, seminars, workshops and parallel audits. The main purpose of the network is to promote the implementation of audit methods and techniques in line with international standards and good practices in the EU.

III. Harmonization

According to the EXPLANATORY DICTIONARY OF THE ROMANIAN LANGUAGE, to harmonize = to put or bring into harmony, to agree on the parts of a whole, to match, to agree; to be in full consensus; to frame; to match; fit; to agree.

Even before Romania's accession to the European Union, it was necessary to harmonize the legislation of our country with the legislation of the Union, establishing itself as an obligation under the Association Agreement, signed and ratified in 1993 by Romania. Thus, in "Chapter III, Harmonization of legislation"

Article 69

The Parties recognize that an important condition of Romania's economic integration into the Community is the harmonization of the present and future legislation of Romania with that of the Community. Romania will endeavor to ensure that its legislation becomes gradual, compatible with that of the Community.

Article 70

Harmonization of legislation will be extended especially in the following areas: customs law, company law; banking law, company accounts and taxes, intellectual property, labor and employment protection, social security, financial services; rules of competition, protection of health and life of humans, animals and plants, consumer protection, indirect taxation, technical standards and norms, laws and regulations in the nuclear field; transport and environment.

Article 71

The Community will provide Romania with technical assistance for the implementation of these measures, which may include, among others:

- expert exchange;

- providing the latest information, in particular on the relevant legislation;

- organization of seminars;

- training activities;

- aid for translating Community legislation into relevant sectors. Romania as a member of the European Union was supposed to adopt the acquis communautaire. The notion of acquis communautaire implies the legal norms, all of them, and which legislating the institutions of the European Union, an important role being played by the jurisprudence of the Court of Justice The European Union.

The acts issued by the Community authorities are norms and are issued mainly by the Council of the European Union and the European Commission in accordance with the competences established by the Treaty of the European Economic Community.

Of the binding acts we mention:

- Regulations - are the most important legal acts because they apply in their totality and are binding in all Member States, with priority over national legislation.

- The directives, like regulations, are binding, but it leaves every country the way it adapts it to national practice.

- The decisions are administrative in nature with direct applicability to a Member State, a natural person or a legal person. This is the way that a particular case is ordered to be solved in a certain way.

Until ASPAAS was set up in 2017, CAFR was responsible for financial auditing, which was responsible, among other things, for adapting national audit standards to those at European and international level.

Thus, the following have been integrated into the national legislation and practice - without being limited to their enumeration:

- Recommendation IP/00/1327 adopted in 2000 by the European Commission on the setting of minimum standards for the external quality assurance system for statutory audits in the European Union.

- In 2005 the European Group on Public Audit Bodies for Auditing was set up -EGAOB. -Directive VIII of the Council of the European Community -DIRECTIVE 2006/43/EC of 17 May 2006 on statutory audits of annual accounts and consolidated accounts, amending Council Directives 78/660/EEC and 83/349/EEC and repealing Directive 84/253/EEC Council of the European Union. In particular, this directive establishes a harmonized framework at the level of the European Community, licensing of financial auditors and quality assurance for the statutory audit in the European Union.

- Regulation (Eu) No. Regulation (Ec) No 537/2014 Of The European Parliament And Of The Council of 16 April 2014 on specific requirements regarding the statutory audit of entities in the public interest and repealing Decision 2005/909 / EC of the European Commission.

As proof of the transposition into Romanian legislation of the acquis communautaire, we note OUG 90/2008, which established the Public Audit Board for Statutory Audit (CSPAAS) and was approved by law 278/2008.This was later modified by OUG 78/2009, GO 23/2012, Law 187/2012 and Law 1479/2013.

As a result of the harmonization of the Romanian legislation with the European one, the necessary framework has been created in order to be recognized as financial auditors the natural and legal persons that have been authorized for this purpose in other EU countries. At the same time internal audit and internal financial control have gained new valences.

The reform of the European Union audit has resulted in the adoption of a new regulatory framework and is transposed into Romanian legislation by the adoption of Law 162/2017 transposing Directive 56/2014 and Regulation 537/2014. The most important elements of the Regulation are applied Public Interest Entities (EIP) and mainly addresses:

- Extension of the audit firm's attributions

- Services of a nature other than auditing are only allowed with the approval of the Audit Committee.

- Requirement of the audit firm (once a maximum of 10 years with the possibility of extending for a maximum of 10 years).

It should be noted that Law 162/2017 abrogates OUG 90/2008.

Entities choosing to audit financial reports are required to organize their internal audit.

The basic elements of the statutory audit concept are:

- competent and independent professional who can be a natural person or a legal person;

- the subject of the examination by the professional accountant is the situation financial statements of the entity in their entirety: balance sheet, profit and loss account and other components of the financial statements, according to the applicable accounting reference;

- the purpose of the examination: to express a reasoned opinion on the true, clear and complete image of the financial position (patrimony), the financial situation and the results obtained by the audited entity;

-the quality criterion according to which the review is being conducted and the opinion expressed is the audit standards and accounting standards.

European Accounting Directives - inevitably allow the questionable nature of many accounting figures

- accuracy of financial statements;

- business continuity and solvency;

- the existence of frauds;

- the firm's compliance with its legal obligations;

- the company's responsible behavior towards environmental and social issues.

IV. Fiscal Fraud and Fraudual Reports

Auditing financial statements is a laborious work, that involves performing many audit and analysis procedures for many documents, collecting information and confronting them, analyzing the financial-accounting information system on the basis of the information system reports. Although mainly information there is no internal control in the respective company and the evaluation of its preventive character, in order to express an adequate opinion on the quality of the financial statements.

In accordance with ISA 240, there is evidence of material misstatement in financial sutures and their nature, which may be by mistake or because of fraud. "In the process of planning and conducting audit procedures as well as evaluating and reporting audit results, the auditor should consider the risk of material misstatement in the financial statements as a result of fraud or error".

The error involves an unintentional misrepresentation of accounting information, which may be due to both the omission of registration of documents and the wrong evaluation of some information during their registration in the records of the respective company.

Fraud is an intentional action of one or more people in the leadership, those charged with governance, employees or third parties, which involves the use of deception in order to obtain an unfair or unlawful advantage.

Of course, in order to arrive at such a conclusion, the auditor proceeds first in accordance with ISA 315 "Identifying and Assessing the Risks of Material Misstatement by Understanding the Entity and its Environment", acting with professional skepticism, using the training and experience specific to its profession, in the existing context.

The granting of structural and investment funds by the European Union has led to the emergence of new methods of fraud and new possibilities of covering up some of the deceits, which have been legally feasible by including these operations in a financial reporting It may therefore be the case that the European Commission through the European Anti-Fraud Office (OLAF) has developed the manual for EU Member States "The Role of Auditors in Member States to Prevent and Detect Fraud in the Field of Structural and Investment Funds of the EU."

Financial audit originates in the need for insurance, both for shareholders and those charged with the company's governance, as well as for investors and other interested persons. Correct the preparation and reporting of financial statements, their integrity, auditor's certificates, give confidence in the real position of company on the market.

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Digital Transformation of Managerial Accounting - Trends in the New Economic Environment

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Abstract: Fluctuations and changes in economic power poles, past financial crises, but also signs of new recession periods, rising capital, multiplying variables and cause-effect factors outline the current economic environment. As an important part of digital transformation, the influence of artificial intelligence in the process of managerial accounting represent the future of taking the best decisions in organizations. The aim of the present study is to explore digital transformation frontiers using the lens of cyber accounting that will help leaders to increase the organizational performance through a clear vision of economic implications of their decisions. The current research contributes both managerial accounting and digital transformation fields by cross-exploring each phenomenon and revealing how digital transformation shape the nature of cyberaccounting as a collaborative research area.

Keywords: digital transformation; cyberaccounting; cybersecurity

JEL Classification: D83; M41; O33

1. Introduction

The global economic entities are facing growing transformation pressures - moving from product-driven business models to new models focused on creating and capturing different sources of new value (Agrawal & Tapaswi, 2017; Tiago, Manoj & Espadanal, 2014; Lee & Kim, 2017). As a result, innovation is becoming more and more complex. The Fourth Industrial Revolution 4.0 rewrite the new global architecture: Globalization 4.0 developing technology, skills and new innovation. And this unprecedented, exponential shift of rhythm is increasingly based on collaborative platforms to achieve more radical innovations driven by shifts in technology (Gandino, Celozzi & Rebaudengo, 2017).

The performance of the digital enterprise has exceeded its profitability boundaries, and any development strategy involves the KPI's performance indicators predictability and sustainability indicators, but also "digital platform business models, ecosystems and partnerships, as the important angles of responsibility, trust and governance, from multiple levels - corporate, national and international" (Katzenbach & Smith, 2015). Under the action of these forces the new performance concept is divided into three pillars of action: Sustainable Performance, Finding & Retaining Talents, as a source of added

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value in a global competitive market, and Research & Innovation. "High Performance Organizations" which "record exceptional financial results, have satisfactory customers and employees, high productivity, encourage innovation and leadership" are the result of their evolution, trough digital transformation in a Digital Economy (Wang & Hu, 2014).

To better understand why is necessary to develop a structured process of information security risk within the organization, it must be borne in mind that, regardless of the type of organization, the field of activity or form of organization, there is uncertainty both in organization and in the environment in which it operates (Andress, 2003; Stepchenko & Voronova, 2015). The uncertainty may take the form of either threats or opportunities. In this contest, each manager must handle threats, because otherwise the organization's objectives cannot be met, and, on the other hand, capitalize the opportunities to the benefit of the organization, proving efficiency (Collins & McCombie, 2012; Karim, 2007). Given that uncertainty is a fact of life, then the uncertainty response should become a permanent managerial concern (Landoll, 2010; Karanja, 2017).

Another aspect of knowledge management in the open digital era is a technology itself and opportunities it opens for better knowledge use. Thus, in the world of the rapid adoption of online communication, interactions and knowledge sharing, the question of cyber security technology adoption is indisputably important. Modern security-related technologies for, name a few, securing transmissions, verifying identities, enabling the safety of data, asymmetric encryption and digital certificates are more and more demanding by companies with open business models involving peer-to-peer communication and various stakeholders' interactions (Gandino, Celozzi & Rebaudengo, 2017).

The present research contributes to the understanding of cyberaccounting evolution through the lens of digital technologies development and their ubiquitous nature. The paper also contributes to the understanding of the digital transformation process happening in conditions of knowledge sharing and managerial accounting boundaries. The results presented in this paper can be used for mapping future research agenda or for contributing to the identified research topics. Finally, the research can have managerial implications for leaders by synthesizing knowledge on the cyberaccounting topic, shedding light on opportunities and challenges of the managerial accounting and digital technologies synergy, and analyzing in depth the most influential papers and findings.

2. Managerial Accounting in the Open and Digital Era

2.1. Impact of Digital Transformation on Business

The complete digitization of economic environment change the way that leaders of the future relate with their business (McQuade, 2006; Yang, Wu & Wang, 2014). Leading technologies, Artificial Intelligence (AI), Internet of Things (IoT) involve all the levels of the business, all the functions and all the stakeholders, transforming "the structures of economic interaction: the twin trends of digitization and virtualization are creating an economy of near-unlimited mobility in which cyberspace is home to all data" (Chen, Ge & Xie, 2015), including indicators, accounting and global financial data. Reports, Charts, Technical Indicators, Trend Analysis, Research, Cloud Computing and Mobile Application, today all are interconnected, vertical integrated "creating smart systems that are not just analytical but also predictive and prescriptive" (Hiller & Russel, 2013) in cross-country surveys with all stakeholders linked.

Recent research and studies are strengthening the opinion that "businesses are experiencing massive disruption as they respond and attempt to capitalize on the on-going changes (Schwab, 2019; Zangeneh

& Shajari, 2018; Lin, Lin & Pei, 2017). Digital transformation is more far-reaching than just technology (Hadžiosmanović, Bolzoni & Hartel, 2012). If we look at how the digital market is evolving, it is very clear that people are a constant and at the heart of digital evolution (Lee, Lee & Kim, 2016). Harnessing the collective intelligence of employees, partners and customers is a critical success factor for digital transformation" (Choi, Lee, Kim, Jung, Nam & Won, 2014; Khan, Gani, Wahab, Shiraz, & Ahmad, 2016).

In the opinion of Klaus Schawb, Founder and Executive Chairman of the World Economic Forum, these technologies have the power to connect the businesses in a "global digital and virtual system and the related flow of ideas and services" (Singh & Fhom, 2017). The impact of digital transformation on business is remove all borders and to replace old economies of scale (Yar, 2006; Kurosawa, Ohta & Kakuta, 2017).

In 2016, a study made by McKinsey & Company calculated that "digital flows—which were practically nonexistent just 15 years ago—now exert a larger impact on GDP growth than the centuries-old trade in goods" (Friedberg et al., 2016). The study reveal a "45-fold increase in the amount of cross-border bandwidth from 2005 to 2016 and predicted another 5-fold increase by 2022" (Kurosawa, Ohta & Kakuta, 2017).

In 2019, another study "Measuring the Digital Transformation - A Roadmap for the future" made by the Organization for Economic Cooperation and Development – OECD, reveal a roadmap with nine action step that if they are prioritized and implemented would help the countries to monitor the process of digital transformation and its impacts on economic environment (Schwab, 2019). First four action steps are directed to build with a new generation of stakeholders, a new generation of data and indicators capable of dealing with challenges of digital transformation: make the digital economy visible in global economic statistics, understand the cross-countries economic impacts of business digital transformation, measuring well-being in the digital age, and design new and interdisciplinary approaches to data collection. The next five action steps are directed towards specific areas of interests: fast accelerating transformative digital technologies, global data infrastructure, data flows, and skills in the digital era, trust in online environments, and governments' digital strengths and policies.

Digital Transformation is about cloud computing, mobility, Internet of Things (IoT), Artificial Intelligence related science and technologies, Big Data Analytics, replacing the power of one with the power of many and develop a new practical paradigm of economic value (Fischbacher-Smith, 2016).

A survey from 2019 reveal that between 2013 and 2016, 5 economies of the World – USA, China, Chinese Taipei, Japan, USA and Korea, develop between 70% - 100% of cutting-edge digital technologies. Digital business transformation under the digital are the based tech entities. In less than 25 years, Amazon grew from a startup e-commerce store to the world's second-largest traded company, revolutionizing retail, cloud computing, and other Web services. Apple became the world's first trillion-dollar company in 2018, barely a decade after it released the first iPhone. In Asia, Alibaba Group registered a market value of $ 499.4B (Schwab, 2019).

Digital Transformation subject has challenged practitioners and theoreticians to analyze this business expansion and to outline new horizons' (He, Chen, Chan & Bu, 2012; Broadbent & Schaffner, 2016; Liaudanskienel, Ustinovicius & Bogdanovicius, 2009). Business expansion is based on two directions (Malatras, Geneiatakis & Vakalis, 2016; Arukonda & Sinha, 2015). First is the economic entities that have included on their business model the new industries: cloud computing, healthcare, loans and payments. The second direction is represented by economic entities that have disrupted social patterns trough global tech platforms, without any physical assets as a support for their services, but having a

strong ally: Artificial Intelligence, Big Data and a capacity to build the necessity of their services (Peltier, 2010; Hjortdal, 2011; Agrawal & Tapaswi, 2017). Tech entities, including computers and mobile phones succeeded this in past 12 to 14 years and they continue expanding at global level, worldwide, becoming digital conglomerates, gaining market power and counting billion of users (Tropina & Callanan, 2015; Gaidelys & Valodkiene, 2011).

2.2. Cyberaccounting – New Force of Accounting in Digital Economy

The exponential growth of new technologies, sustained by the increasing number of mobile and wireless devices and services, the customers need to respond in real time at their demands represent an Artificial Intelligence vast exploration field for today and future economic entities, worldwide, medium size, small or start-ups. Artificial Intelligence became a powerful tool with critical impact on finance functions and workflows reshaping the accounting departments and connecting them with cybersecurity in a new intelligence perspective: Cyberaccounting (Schwab, 2019).

Studies and reports from the industry reveal the positive impact of Artificial Intelligence implication on accounting area, reshaping the vision of data on stakeholders based on the association between the Artificial Intelligence and natural language interfaces with high change potential (Mittelman, 2011; Smith, 2005; Lee & Kim, 2017). From the perspective of an economic entity, Cyber accounting is the new force of accounting in Digital Economy. The purpose is to make a significant, reliable and positive impact on the finance department, by redefining key performance indicators and especially real profits, creating new business models, develop revolutionary business solutions for all type of economic entities, covering Accounting Services, Bookkeeping, TAX filing and VAT reporting services as "technology building blocks" (Okamoto & Takashima, 2015) with the expansion in maximizing the value of financial data even if the threat of cybersecurity risk still exists.

In the vision of practitioners, Cyber Accounting will be the new language in which Accounting and Finance will speak to the world. The impact of Artificial Intelligence with innovations in technology include "bookkeeping apps, tax software, auditing automation, and platforms that generate financial projections and visualized data" (Willems, 2011). By adding block chain technology between them and financial institutions, auditing and anti-fraud race to automation, we sustain our opinion that Cyber Accounting will help the leaders of the future to build a strong economic entity by developing a better business model.

The classical accounting procedures in which accountants "processed invoices, purchase orders, or deliver orders on paper documents which manually were introduced in computer systems, coded, and finally transmitted to the managers for approval and payment" is replaced by "automated workflow process and software that analyzes, recognizes, directs, and exports data into a company's ERP/financial system"(Karanja, 2017).

Based on cloud solutions which are available in real time for millions of economic entities and users, the force of Cyber accounting is reflected in: the improvement of cloud-based software solutions (SaaS/software-as-a-service) for managing financial documents with variable structure, in automatically recognition with no prior configuration, in the usage of optical recognition of codes using OCR/optical recognition technology, processes and routes invoices, in accuracy to rebuild an automatized relation with suppliers and in the clear vision offered to leaders on payment deadlines, approval workflows, management decisions based on financial reports, in improvements in invoice processing time from 30 days to 2 days, processing costs per invoice reduced from $13.00 to about $2.00, and the opportunities to capture early payment discounts rise from only 20% of the time to 80% of the time (Chen, Ge & Xie, 2015).

The self-learning—machine learning—capabilities of cloud-based software solutions for data processing, verifications, referrals, and fraud detection are constantly improving and up-date. These solutions essentially learn from their mistakes and do not make them again once accountants correct them. Based on that, their productive time directed towards value-added for economic entities trough analysis, strategy, creative thinking, meaningful reporting and decision-making will increasing exponentially with the business force of Cyber accounting.

As practitioner and a cloud AP automation user, Bryan Schmidt, controller for Unite Here Health support the idea of a better business model through cyber accounting: "The improvements are due to capturing, automatically coding and storing invoices instead of handling paper or sending around PDF files. The system observes and learns from clerks' keystrokes, continuously improves GL coding, and reduces errors" (Tropina & Callanan, 2015). Therefore, another impact of cyber accounting is on human resource. Studies reveal that the jobs with repeatable actions will be replaced by automated: "bookkeepers have a 97.6 percent chance of seeing their jobs automated, accountants and auditors 93.5 percent chance and financial analysts 23.3 percent chance" (Zangeneh & Shajari, 2018), while those that require human resource skills, analysis and reporting capacity will become key positions looking for key persons.

3. Digital Transformation of Managerial Accounting – Tool for the Leaders of the Future

In practice, changes produced by business digital transformation are the result of digital technology waves: increase demand of cloud computing services, rise of AI and Big Data analytics, the necessity of building a global data infrastructure, mapping AI economic entities from all sectors, impact of digitization on operations, work process and young generations and the evolution of "digital divides" (Landoll, 2010). Digital Era Trends are the reflection of a new Digital Integrated Global Framework Policy where all the stakeholders are involved: The increasing of AI and the human replacement with algorithms who manage the financial documents, learning machine and deep learning lead to the emergence and development of new related concepts at the new digital economy: Accounting Intelligence or Cyber Accounting, a new force who will reshape the business financial information through use of "computers that recognize and analyze documents automatically" (Agrawal & Tapaswi, 2017) and improvement of accounts payable processes. Cyber Accounting is about capture the financial anticipation, about using Cloud, Edge and 5G Technology to build a new Modern Economic Infrastructure and about believe in the magic of tech innovations (Chen, Ge & Xie, 2015).

Still a question remain for the leaders of the future: "Is Accounting Information Systems capable to offer the answers according with their Vision?" In our opinion, based on latest theoretical interpretation of digital transformation and the emerging cyber accounting, we sustain that AI impact on accounting will increase and expand the volume of processed data with the help of algorithms in order to improve the process of making decisions in an empirical way.

Nevertheless, the predictions of the business future requires leader vision expansion until the core of the business, in a complex and intuitive medium, where all the business growth capabilities are waiting to be augmented (Kurosawa, Ohta & Kakuta, 2017). Real business growth is based on strategy, on the ability to develop a real, powerful and trust based relation between leader of the future and accountants, in order to reshape the business on digital transformation requirements.

Prevention means that the attack will be prevented (Fischbacher-Smith, 2016). Typically, prevention involves implementation of mechanisms that users not be able to counteract and are implemented correctly, unaltered, so the attacker cannot alter those (Singer & Friedman, 2014). Prevention

mechanisms are cumbersome and often interfere with the use of the system to the point that, sometimes hamper normal use thereof (Winkler, 2010). But some simple preventive mechanisms with as passwords (which are designed to prevent unauthorized users from using the system) have become widely accepted plan (Gandino, Celozzi & Rebaudengo, 2017). Once implemented, the resources protected by mechanisms not are monitored to identify any security issues, at least in theory (Ruževičius & Gedminaitė, 2007).

IBM vision on cyber security is that "Security doesn't need more tools. It needs new rules", while Patrick Buono in Cybersecurity for Accountants reveal that "global cost of cybercrime will reach $2 trillion by 2019" (Schwab, 2019). In the vision of Warren Buffett cyber-attacks represent "a bigger threat to humanity than nuclear weapons," and for Ginni Rometty, IBM President & CEO, cybercrime as "the greatest threat to every profession, every industry, every company in the world" (Schwab, 2019). Statistics conducted by The National Computer Security Survey, U.S. Department of Justice's Bureau of Justice Statistics, found 68% of cyber theft victims will incur losses of $10,000 or more, and victims of cyber-attacks will experience downtime of 24 hours or more" (Lee & Kim, 2017).

In our opinion, the leaders of the future are the key persons who will implement and encourage the emerging technologies of automating accounts payable processes in the economic entities, streamlining the entire financial process. Cyber accounting must be seen more as a driving force than a threat. The advantages that Artificial Intelligence create on the businesses are multiples: building a clear representation of financial incoming and outgoing with real time control on payment, offering the possibility of creating new business models in which a central role is played by algorithms. The solutions offered by Artificial Intelligence are flexible, adaptable at multiple variables, with the capacity of automatically "data recognition in an exhaustive and reliable way, with no prior configuration" (Stepchenko & Voronova, 2015). Is for the first time in the economic environment when "the value of financial data in an accounting information system is extremely high" and for the first time when Accounting Information Systems (AIS) is able to support all accounting functions and activities: financial reporting, auditing, taxation, and management accounting (Lin, Lin & Pei, 2017).

4. Conclusion

Business expansion and digital transformation have produced significant changes at all business levels, on vertical and horizontal plan (Hong, Kim & Cho, 2010). Therefore, on vertical plan the digital transformation change the perspective of stakeholders represented by" broad group interested in the success or failure of a business: shareholders, creditors and customers, employees, the local community, and the government" (Kesan & Hayes, 2012). At the top of pyramid the founders, investors and other shareholders and at the bottom the employees replaced step-by-step with different forms of Artificial Intelligence (Krombholz, Hobel, Huber & Weippl, 2015). On horizontal plan, digital transformation rewrite the organizational structure of economic entity, the organizational culture, the human resource participation and also the operations.

On that basis, IT and Accounting become the most powerful "defensive weapons" for the leaders of the future, and accountants have the mission to protect the economic entities in front of cyber-attacks, mitigate and help them recover. As a consequence, for all the economic entities that acts in actual and future Digital Economy, a guide adapted at the economic entity characteristics was developed: The NIST Cybersecurity Framework. A six core components correspond at five Cybersecurity Framework's Functions: Predict, Identify, Prevent, Detect, Respond and Recover. Around this Cybersecurity

Framework the business is organized with a cybersecurity management at first level of importance and with leaders decisions based on risk management analyses. The Cybersecurity Function represent three parts: "Framework Core, Framework Implementation Tiers, and Framework Profiles" rewriting the connection between stakeholders and the IT and Accountants representatives, who translate in reality the strategic directions of action (Schwab, 2019).

The present article provide to readers valuable information, new insights regarding the force of business digital transformation and its impact on accounting, reinforcing the beliefs that business digital transformation at the end is about: "Going Digital, Shaping Policies, Improving Lives."

On short term, cyberaccounting will improve the international compatibility of current performance indicators and make statistical systems more flexible and responsive to the introduction of new and evolving, disruptive concepts such as Cloud, Edge Computing and 5G Technology. The true digital transformation will be on long term achieved by the global economic community with redesign of a new, interdisciplinary, and protected from cyber-attacks platform and interconnected through partnerships between all the stakeholders involved with the powerful support of researchers.

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THE 14TH EDITION OF THE INTERNATIONAL CONFERENCE
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REALITIES AND PERSPECTIVES

Dimensions of the New Performance Standard in the Context of Digital Economy

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Abstract: The entity perspective to achieve and maintain sustainability performance imposes and forces the entity's leadership to synchronize managerial decisions with financial-accounting statements as well as industry predictability reports. This is about increasing the global level of an individual to increasing competitiveness by integrating sustainable innovation and defining by each economic entity what practitioners call the 2030 Purpose. The aim of the present study is to explore new approaches to performance emerging at the strategic level resulting from the interrelation of the economic plan with the managerial plan required to occur at the most profound level: core of the business. The results of this study show the need of framework to integrate an entity's sustainability and economic and financial analysis into strategy, governance and risk assessment, performance management and organizational culture.

Keywords: performance; competitiveness; benchmarking; sustainable economic model.

JEL Classification: D83; L25; O33.

1. Introduction

The performance of the economic entity has exceeded its profitability boundaries and any development strategy involves taking into account, in addition to the KPI's performance indicators and predictability and sustainability indicators (Yadav & Sagar, 2013). The fourth industrial revolution underway today develops technology, talent and new innovation ecosystems - resulting in greater complexity in the final offers of economic entities. Intelligent technology is fueled by this new industrial revolution (Chen, Li & Xin, 2017).

In this context, the division of the concept of performance takes place in 3 pillars of action: Pillar One "Sustainable Performance", Pillar 2 "Finding and Retaining Talents", as a source of added value in a global competitive market, and Pillar 3 "Research & Innovation" (Davila, 2012). High performance organizations that record exceptional financial results, have satisfactory customers and staff, high productivity, encourage innovation and leadership, open up a vast amount of research space for theoreticians and practitioners in the field (Meuer, 2017). The only certainty is that the economic

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performance is directly influenced by the evolution of the entity in a Digital Economy, and the increase in competitiveness can only be achieved by integrating sustainable innovation.

On the other hand, the pressure of emerging markets, competition in gaining competitive advantage, increasing the quality of consumers' expectations contribute to boosting technology and market innovation (Cameron & Quinn, 2011). They lead the leadership to adapt the Vision and Entity Strategy towards achieving new performance standards under the continual and hard-to-controlling influence of endogenous and exogenous factors on entities. The Concept of Performance in the context of the challenges of 2030 has new approaches in which the economic and financial performance is complemented by new valences: client orientation, emerging markets, sustainability, digitization, alignment of the existing economic model to the 2030 Purpose (Schwab, 2019).

These new approaches to the concept of performance outweigh the barriers to profitability, and the sustainability factor becomes paramount (Alstete & Beutell, 2018). For the leadership of new economic entities, performance is directly related to Resource Scarcity - resource reduction and Stewardship with a capital S - the new Stewardship concept that includes understanding the cost opportunity. Adaptability to the influence of these trends may not be possible without the direct involvement of theoreticians and practitioners whose concerns are directed towards clarifying the concept of performance in all its aspects, starting from economic, legal, technical and continuing social and environmental issues, thus supporting a multidisciplinary approach by modern entities under the conditions of an "Interconnected Global Economy" (Arsenault & Faerman, 2014).

The whole process of sustainable economic intelligence translates into actions that integrate into the following coordinates (Agha, Alrubaiee & Jamhour, 2012): defining the information needs according to the strategy of the economic entity concerned, in order to identify the priorities and to fix, consequently, guidance on information gathering; classifying the "wealth" of the information available in the enterprise, which it is not always aware of; collecting open information using appropriate research tools that will allow only the relevant information to be retained; taking into account informal information, which often offers the greatest added value for the enterprise; ranking and processing of information gathered, using information processing tools and consulting experts in the field; disseminating the information to the right people at the right time and in an appropriate form, putting into operation an information flow and implementing an exchange culture within the economic entity that allows for loss prevention and isolation of information; protecting sensitive data, knowledge and all strategic assets, using appropriate IT, organizational, human and legal measures. By achieving all the adhesion and putting into operation of the devices that allow the sharing of information inside the economic entity, according to a vertical hierarchical axis but also transversal, the sustainable economic intelligence represents from this point of view a vector of the organizational culture (Rowland & Hall, 2014).

The purpose of this scientific research is to achieve a systematization of the explore new approaches to performance emerging at the strategic level resulting from the interrelation of the economic plan with the managerial plan required to occur at the most profound level: core of the business. The results of this article show that the sustainability of an economic entity as desideratum in the context of the 2030 challenges can be determined by applying a dual-role research methodology: on the one hand to develop and reconcile its position in a global market and industry the economic entity being analyzed and, on the other hand, to provide leadership with pertinent information of a current context in order to justify and implement the best decisions needed to increase economic and financial performance.

2. Aligning the Performance Standard with Digital Economy Requirements

2.1. Performance Standard in Digital Economy

The business objective set by the companies, namely maximizing shareholder value, was replaced by a strategic change in the financial dimension by taking into account the environmental dimension and the stakeholders directly involved: stakeholders (Olson, Slater, Tomas & Hult, 2005).

Economic performance indicators present the entity's impact on the local, national and global economic system (Koksal & Orman, 2015). Economic indicators illustrate the flow of capital between different categories of users and the entity's economic impact on the company in which they operate (Zenner, McInnes, Chivukula & Le, 2017). The economic analysis allows managers of economic entities, but also internal and external partners to deepen and appreciate aspects such as: the degree of consistency between the level of activity, the result obtained and the means allocated; the ability of the economic entity to deliver results and to self-finance; the capacity to ensure financial equilibrium and to create economic value (Behery, Jabeen & Parakandi, 2014). At the same time, in order to be consistent with the alert evolution of the need of information of the various partners of the entity, the analysis should provide pertinent conclusions regarding: the performances achieved and their perspective; the financial situation and its evolution; resource management and management results, the ability of the entity to generate cash or cash equivalents (Tong & Arvey, 2015).

This new global context and entity perspective to achieve and maintain sustainability performance imposes and forces the entity's leadership to synchronize managerial decisions with the financial and accounting situations as well as the industry's predictability reports (Andriole, 2010). In this way, it is envisaged the escalation from the global level to the individual level towards increasing the competitive advantage, the global development, the counteraction of the threats of the external environment and the capitalization of the opportunities through the adoption of pertinent managerial decisions based on economic-financial indicators. The development of a set of industry-specific KPIs that provide a true picture of economic performance and add value in the future along with the implementation of a Performance Management System become "key elements" for new leaders whose management decisions must respect "The Vision of Entity - the Art of seeing what is invisible to others" (Weining & Qingduo, 2018).

In the digital economy context, KPI's is the tool that "provides visibility to the performance of entities as a whole, departments, teams" (Alhyari et al., 2013) and, last but not least, to individuals, and can be strategic, operational and managerial: strategic KPIs (are those who provide the entity's leadership with accounting information on: return on invested capital; profit on assets used; turnover, market share, price/shares; risk vs. opportunity; customer satisfaction and employee satisfaction); KPI's managerial (addresses the management to which they provide accounting information such as: planning, cost vs. income, availability of resources); operational KPIs (they are related to processes, activities, products, procedures and provide information on individual performance).

Practicing such an approach only has the role of highlighting sensitive areas with high risk potential, which, under the influence of fluctuations in the turbulent environment, may lead to economic imbalances. And here I mention the liquidity, the profitability, the solvency, the degree of indebtedness. Deepening these areas by leadership serves to prepare countermeasures and results can later serve to compare with similar entities in the same industry in the Benchmarking process.

2.2. Sustainable Business Models in Digital Economy Requirements

The business model has received from the specialists other interpretations such as: (1) the business model consists of interlocking the four elements together (proposal of customer value, profit formula, key resources, key processes); (2) the business model is defined as a revenue-generating approach at reasonable cost and incorporating assumptions about how both could create and capture value; (3) the business model is defined as the way a company processes its own activities to determine the concentration, location and way of doing business; (4) the essence of the business model lies in the way the company delivers value to customers, attracting customers to pay value and convert it into profit (Leyer, Stumpf-Wollersheim & Kronsbein, 2017).

In the new economy, in the case of insecure jobs, more and more people are opening their own business, to survive in the new, booming, small business market, they need to stand out, have their own luminous signal, and to be unique (Taticchi, Tonelli & Cagnazzo, 2010). Having an instant marketing relationship, you can grow quickly and easily by adopting a unique style. It gives you space to learn more about consumer needs, and to develop confidence with your own techniques, you do not have to match the model of someone else's business, you just have to be yourself and respond with confidence to your customers. Faces have changed since the media appeared, businesses have to change how they acted until that time, and have to focus on building relationships with people to enable them to improve their brand and create relationships lasting, which will lead to long-term profits.

Under these circumstances, managerial decisions need to be adjusted and strongly substantiated, considering the information required by internal and external stakeholders, including financial reporting (Henczel, 2002). The information requirements of customers and other stakeholders (shareholders, investors, population, various regulatory organisms, etc.) are steadily increasing, and some companies face certain problems in implementing the concept of sustainability and environmental reporting. Due to the differences between performance management systems and their users, it can be considered as a current challenge.

It is true that the most used are the financial indicators, but if we personalize the set of indicators for each entity, then we notice that besides the economic ones the specific indicators of the industry (trade, retail) and indicators related to functions (production, sales, purchases, HR).

As well, establishing KPI’s is required at each level: Company (turnover, market share, profitability, stock price, customer satisfaction); department (sales share, staff turnover, budget execution); working process (product development vs. time to product launch, customer satisfaction, stocks and acquisitions on stock turnover), individual (average number of processed items per day, training sessions per year).

In order for performance indicators to base management decisions, the sine qua non condition is to reflect as accurately as possible the current state of the entity, to be anchored in the entity’s dynamics and specificity, reflecting as accurately as possible the objectives of the company up to the core of the business (Davila, 2012).

Although even modern entities resort to the classic set of financial indicators in determining performance, the current trend highlights two guidelines (Rowland & Hall, 2014). The first refers to identifying by each entity the specific set of performance indicators that is able to reflect as effectively as possible the entity's strategy, objectives, mission, values and vision, and of his leadership. The second guideline promotes taking into account the measurement of performance and non-financial indicators by making a balance.

As these practitioners refer to as "value creation indicators" (Agha, Alrubaiee & Jamhour, 2012). Value creation indicators reflect "the entity's management orientation towards adding value to shareholders, with a direct impact on the development of new methods and pilots" (Cameron & Quinn, 2011).

Business today has evolved a lot, and companies are forced to adapt if they want to survive on the market (Yadav & Sagar, 2013). Using and interpreting information has become an essential one, and small organizations have begun to focus their attention on the business intelligence system in order to have an edge over competition. A business intelligence system is quite expensive, but due to the evolution of technology, prices have begun to decline, so those who have small businesses can afford to acquire this system and benefit from the benefits of business intelligence software (Andriole, 2010). It simplifies the working method and employees will no longer be stressed by managing the reports and everything will be at your fingertips, and with time you will be able to find solutions and plans for the future.

3. Performance Indicators - Support for Building a Sustainable Business Model

The concept of business model and its application was widely debated and explained by specialists (Zott & Amit, 2010; Sawy & Pereira, 2013), but the most widely used approach and recognition (Lewandowski, 2016) where an organization creates, offers and captures value (Osterwalder & Pigneur, 2010).

The performance pyramid is a tool for stakeholders to identify the strengths and weaknesses of the economic entity and make informed decisions (Leyer, Stumpf-Wollersheim & Kronsbein, 2017). The evolution of some indicators such as the rate of economic profitability, the equity analyzed from the point of view of the general financial autonomy rate, the rotational speed of the current assets, the stock, reflects different financial evolutions of the entity in different time frames and implicitly the economic and financial dimension of the performance with focus on sustainability, as the long-term objective of the economic entity.

The sustainability of an entity is based on the stakeholders' belief that it should generate value for those with a focus on achieving both long-term and non-financial performance objectives across all stakeholders, suppliers, creditors, human resources, and environment (Weining & Qingduo, 2018).

The main purpose of an entity is to maximize its value. This goal of maximizing the value of the entity in terms of sustainability can only be achieved if the interests of all stakeholders are taken into account (Tong & Arvey, 2015). Adding stakeholder value is not equivalent to short-term profit maximization because it would generate stakeholder risk growth and jeopardize long-term goals. Achieving the long-term goal of maximizing the value of an entity by creating value added for stakeholders is only by harmonizing their requirements and achieving a balance between shale performance and long-term performance with a focus on long-term performance. Achieving short-term profit maximization goals may affect the long-term outlook. And in this case, taking into account sustainability can intervene as a balancing element (Guo, Chen, Long, Lu & Long, 2017).

The multiple dimension of an entity's sustainability has generated the intersection of five interlinked economic, governmental, social, ethical and environmental dimensions. The power exerted by the 5 dimensions of the sustainability of an economic entity is reflected in their ability to collaborate, compete, or contradict each other (Alstete & Beutell, 2018).

Economic, governmental, social, ethical and environmental dimensions are complementary because an entity wishing to be effectively governed is required to adhere to ethical principles, carry out its work

based on the principles of social and environmental responsibility and also be able to generate long-term financial performance (Schwab, 2019).

Scope of performance research, performance and measurement methodologies target multiple, interdisciplinary and interrelated approaches. In order to generate a relevant framework for stakeholder decisions in relation to core of the business, focus on the two dimensions of the performance of an economic entity: the non-financial dimension and the financial dimension. This approach is intended to be inter-correlated, and in my opinion there can be no one without the other, and the decisions of the Stakeholders governing modern economic entities in the spirit and under the laws of Stewardship are based only on extensive financial analyzes, financial rate dynamics, specific performance indicators, quantification of endogenous and exogenous factors (Weining & Qingduo, 2018).

In practice, apart from the professional judgement, it could be pressures from the company's management over the evaluators, errors of statistic data used to determine the yield, temptation to put on the market studies showing a growing trend of real estate sector, as this will stimulate the investments and the consumption (if an increase of residential prices is expected, people will feel urged to purchase houses). All the above – including the professional judgement - could create a cascade effect and a growth on paper until the moment when the increase is not any more sustainable and the "bubble" explodes. The impact of the explosion could be small – a simple economic cycle of industry- or can trigger a global crisis – depending on how conservative the whole mechanism was. Again it is possible to discuss different approaches from stakeholders, this time the employees of real estate company, the evaluators, the state having similar interest that do not match the safety interest of shareholders – as they will be the ultimate stakeholders loosing from the above cycle if they maintained the investment for a long period based on market analysts opinion.

4. Conclusion

Most economic entities are aware of the need for accurate analysis of the potential for long-term value creation, backed by a relevant analysis of intangible assets management, risks and opportunities related to CSR policies and their potential environmental impact (Behery, Jabeen & Parakandi, 2014). Business model should provide greater consistency in their appreciation of the value of a company. Identifying the risks and opportunities arising from social and social responsibility and the clear vision of investments made for the preservation and development of intangible assets prove to be the structural elements of trust that a business plan can give. Thus, combining financial and non-financial aspects within the same analysis can be fruitful to better assess the viability of a company. The difference between the two analyzes should gradually fade in favor of a more global vision of the determinants of performance. In the same way that integrated reporting aims at understanding the value-creation process in all its dimensions to the best, it is hoped that in the long run, the assessment of an economic entity will also be based on an integrated analysis.

Theoreticians and practitioners in particular have understood that the external factors of the entity have a great impact on the accuracy of the quality of the transmitted new performance standard, especially since the economic environment in which the entities operate is governed by volatility, complexity, uncertainty and ambiguity. Current technologies have given the smaller players a better opportunity at being able to process data and collect it, but at the moment it is not providing the full landscape required to use data and big data in its most efficient or insightful form.

The results that economic indicators make available to leadership through financial statements and reports can facilitate access to the entity's current state, possible upward or downward trends that may

influence positively or negatively its evolution. A liquidity entity that generates cash from its activities to honor its current payments has a potential for confidence in the industry it is part of, being a threat to competitors precisely because it is performing.

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Quality of Domotic Goods

Dan Păuna[1]

Abstract: This article is a study focusing on an important area of appliances we inevitably use almost daily and which has a tendency of renewal, diversification and quality improvement – that is the television set. There is a discrepancy between the quality of the products on the market and the one required by customers. When the difference between them is minor, it has a stimulating role for the producer, but when it is considerable, there is a negative effect on the customer. Thus, this paper carries out a comparative analysis of quality on a segment of television sets traded in Romania which represents a main component of enterprise management by means of which decisions on quality strategy according to market variations are made.

Keywords: domotic goods; comparative analysis of goods' quality; non-quality

JEL Classification: D12; D22; L63

1. Introduction

"Quality is measurable" – this is an essential principle of goods' quality. In order to continuously improve quality, we need to know where we stand or what the present level of quality is, and we also need to know where we are heading or what level of quality we aspire to. There is a relevant expression that illustrates the importance of this key concept: "if you do not know where you are heading, then you will probably stop somewhere along the way".

Although the inherent quality of the product/service must be unique for both the producer and customer, there are different ways of measuring and assessing according to the standard we are considering.

If the specifications are "translated" to the quality requirements identified through the marketing studies carried out on customer segments that products are destined to, then there is a tendency to match the two ways of evaluating quality.

There is a discrepancy between the quality of the products on the market and the one required by customers. When the difference between them is slight, it has a stimulating role for the producer, but when it is considerable, there is a negative effect on the customer.

"*An important place inside the system of goods' quality indicators is held by the synthetic indicator of quality, which reflects the input of characteristics, balanced according to their importance and expressed either quantitatively (numeric) or attributively (notional)"* (Burtică & Negrea, 2006).

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The comparative analysis of product quality represents a main component of enterprise management by means of which decisions on quality strategy according to market variations are made.

"However, we need to highlight the fact that a strategic approach to quality should involve the compliance of the objectives regarding quality with the organizational strategy, while the implementation of changing/innovation projects can help organizations attain sustainable success" (Popescu & Mandru, 2016).

2. Domotic Goods. Concept

Domotic goods include the appliances and machines used in homes that are fitted with some modern appliances. They comprise all the electrotechnical, electronical and electrical equipment that a modern home is equipped with, holding an extraordinary tendency of diversification and quality improvement.

Domotics became a new branch of science at the beginning of the 90s and it deals with home modernization (intelligent homes controlled by a central unit).

The term "domotics" derives from the Latin word "domus, domo" (house) and the suffix "tics" characteristic to many other sciences (like mathematics, statistics, etc).

The term "domotics" or home automation represents the technique of continuous modernization of electrotechnical, electronical and electrical equipment in the modern home of each appliance, but also their cumulated control through complex remote controls, programming and automation controlled by a computer. From this point of view, we can consider that the term domotics derives from the words domo+tics (automation), that is an automated home or intelligent house.

In this sense, domotic goods represent all the new appliances (which are getting better and better) suitable for home use and not only and which are currently considered electrotechnical goods and appliances with different uses, as well as electronical appliances (audiophonic, radiophonic and videophonic), with individual controls or remote controls for each appliance, but which, in the near future, will be part of an integrated system, with programmed or automated controls for the entire house, including control and surveillance devices.

Domotic, office, IT and multimedia goods are dynamic from the point of view of their quality and variety. Their manufacturing process can take advantage of the latest technical and scientific discoveries, starting with design, choosing the raw materials, setting technologies, ensuring reliability and the best technical functional characteristics for each product. The electronic industry produces nowadays a large range of goods suitable to the household field, from radios and TV sets to complex equipment needed in various fields.

3. Quality of Domotic Goods. Theoretical Concept

The quality of a product or service defined as "*the ability to satisfy needs that are expressed or understood"* or as a "*degree of achieving*" those, determines naturally the requirement to objectively know this ability, that is the degree of achieving needs by assessing (determining value) or estimating (rating the size) it.

Therefore, there is a very subjective part of the concept of quality which is linked to the consumer's perception and which is influenced by the various features of the product. Assessing quality plays an essential role in the model, not as aim, but in as far as it satisfies the reasons for buying and the assets

associated with it. The way the features of the product is perceived has important consequences on consumers' expectations and, on the contrary, the consumers' required and expected assets have an impact on the most desired aspects of quality and on the way the different characteristics are perceived and assessed. The process which, starting with product assets and expected quality eventually leads to reasons for buying, brings about more and more abstract cognitive categories.

The result of quality assessment is often expressed by specific indicators of statistical mathematical methods. These indicators either integrate a group of characteristics (measurable or notional, technical functional, economical, aesthetical) or a product's entire system of features. "*Some indicators that measure the quality of products are presented hereafter"* (Mandru et al, 2009).

3.1. Methods of Assessing Product Quality by Synthetic Indicators

3.1.1. Method of Scoring Values of Characteristics

This method involves giving a conventionally-set maximum score to values of characteristics considered optimal from the point of view of customers' requirements. "*Real values of analyzed product features, experimentally determined, can be at the level of the ones which are considered to be the best and, in this case, the maximum number of points can be granted, or there can be differences (variations) in regard to the optimal level and the score will be congruently decreased. Relating the score of the real level of each characteristic (Xr, Yr, Zr ...) to the maximum score allotted to the optimal level of the same characteristics (XN, YN, ZN ...) we can obtain the indicators of those features."* (Iloiu, 2013)

$$Ix = \frac{Xr}{Xn} \qquad Iy = \frac{Yr}{Yn} \qquad Iz = \frac{Zr}{Zn}$$

The indicators of the features that improve quality by decreasing their value are calculated by reversing the ratio (Iz). Each characteristic is then scored according to its relevance, so that the sum of the points given be 100. The sum of the features' indicators, balanced with the score given according to relevance constitutes a synthetic indicator of quality (Iq):

$Iq = Ix \cdot px + Iz \cdot py + Iz \cdot pz$

This method is suitable especially for the assessment of quality based on attributive characteristics evaluated by points. The advantage of this method is situating into various quality categories according to the synthetic indicator value, but its disadvantage is introducing some subjective elements when granting points for the real level of the analyzed product characteristics; that is the reason why it is recommended to use an average score obtained as an arithmetic average of the points granted by several subjects.

3.2.2. The Method of Scoring According to Reference Standard Quality

It is applied by following the same methodology, but by comparison against products considered to be the reference standard. Characteristics indicators are established in relation to the values of characteristics of the standard product, and the total score granted according to the relevance of characteristics can be 100. The score for a parameter of the analyzed product (Pa) will be:

$$Pa = \frac{Va}{Vi} \times Pi \text{ or } Pa = \frac{Vi}{Va} \times Pi$$

where:

Va – value of the analyzed product parameter;

Vi – value of the standard product parameter;

Pi – score of the standard product parameter;

The quality indicator (Ic) of the analyzed product compared to the standard one is calculated with the ratio:

$$Ic = \frac{\sum Pa}{\sum Pt} = \frac{\sum Pa}{100}$$

3.2.3. The Method of Quality Parameters Absolute Value

This method allows the determination of a synthetic indicator of quality which expresses an integrative system of parameters. The synthetic indicator is determined in relation to regulatory values (stipulated by standards or other regulatory documents) in order to determine conformity with other values which can be those of goods produced by prestigious companies in the field of the analyzed products, considered to be *standard values*.

The applied methodology allows quality analysis of products, processes and services which have quantifiable and unquantifiable parameters.

4. The Case Study: Quality Analysis of LED Television Sets

Study purposes:

The following study includes an analysis of five products based on the latest technology created with one aim: *to make your life more pleasant*. Technologies which are really advanced are easy to use since they are especially designed for nowadays needs.

LED television sets can offer a special visual experience at an accesible price. They have the advantage of a longer lifespan and of a very big width. In this case study the following aspects have been analyzed:

- Analyzing merchandise variety (5 LED TV models);
- Carrying out the study regarding the quality of analyzed products;
- Comparative analysis of evaluated products.

Study hypothesis:

Starting from the above mentioned objectives, the following hypothesis has been formulated: "*If we analyze and compare 5 LED TV models of the same type, we can determine price-quality ratio, that is the most reasonable model for the final consumer".*

Taking into account the variety of LED TV types available on the market, we have selected a few well-known brands for the comparative analysis, such as: Sony, Philips, Panasonic, Samsung, LG.

Each of the manufacturing companies put up models with technical functional and economical parameters which vary a lot on the Romanian market. In order to carry out a study of LED TV quality study we have chosen types with similar quality parameters. One of the first selection criteria was the width (43/108 inch/cm), the second one being resolution, the highest one for this width.

Within the study, ranging parameters represents a defining reference since it allows selecting characteristics which are in direct and indirect ratio to quality.

1. Parameters directly proportional to quality:

   LED TV size. (marked C 1)..... **C 1**

   LED TV brightness. (marked C 2) ..... **C 2**

   LED TV dynamic contrast. (marked C 3) ..... **C 3**

   LED TV viewing angle. (marked C 4) ..... **C 4**

   Maximum resolution the LED TV can display. (marked C 5)..... **C 5**

2. Parameters indirectly proportional to quality:

   LED TV intensity of sound output. (marked C 6)..... **C 6**

   Energy consumption while functioning. (marked C 7) ..... **C 7**

   Energy consumption in standby. (marked C 8)..... **C 8**

   Product weight (including stand). (marked C 9)..... **C 9**

For this analysis we have chosen five important LED producers. Among the hundreds of products they sell, we have chosen one product that belongs to the same segment, with similar qualities. These are the five models:

1. LG 43LH630V – Standard product;
2. Philips 43PUH6101/88;
3. Panasonic TX-40EX700E;
4. Samsung UE43M5602A;
5. Sony 43XD8088B.

	Parameters directly proportional to quality					Parameters indirectly proportional to quality				
Products / Parameter	C1	C2	C3	C4	C5	C6	C7	C8	C9	Preț
LG 43LH630V	109	1500	30000	178	2073600 pixels	20	35	0,5	9,45	2399
Philips 43PUH6101/88	108	500	7500	178	8294400 pixels	16	68	0,3	9,70	2499
Panasonic TX-40EX700E	108	1300	10000	178	8294400 pixels	20	63	0,5	12,50	2799
Samsung UE43M5602A	108	1500	100000	175	2073600 pixels	20	95	0,3	10,50	3249
Sony 43XD8088B	109	650	3000	160	8294400 pixels	10	95	0,5	13,30	3400

Chart 1. Ranking parameters

Source: Processed by author

4.1. Classical Comparative Analysis Method

The classical method involves drawing charts for each quality parameter under analysis and analyzing these charts to rank products, taking into account their quality.

Width:

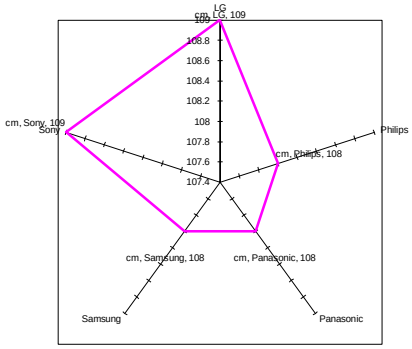

Chart 2. LEDs width

Source: Created by author

According to the chart above, all products have approximately the same width, with a difference of only 1 cm between LG and Sony LEDs, which leads to the following ranking:

1st place - LG and Sony;

2nd place - Philips, Panasonic, Samsung.

Brightness:

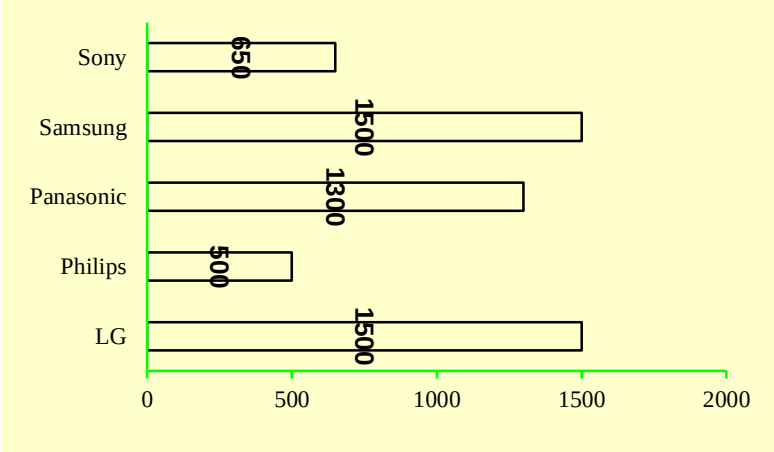

Chart 3. Brightness

Source: Created by author

Analyzing the chart above we can set up the following ranking:

1st place – LG and Samsung;

2nd place – Panasonic;

3rd place – Sony;

4th place – Philips.

Image contrast:

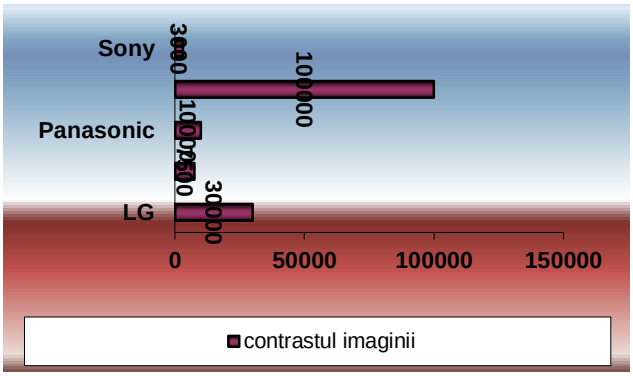

Chart 4. Dynamic contrast

Source: Created by author

After analyzing Chart 3, we can set up the following ranking:

1st place – Samsung;

2nd place – LG;

3rd place – Panasonic;

4th place – Philips;

5th place – Sony.

LED viewing angle:

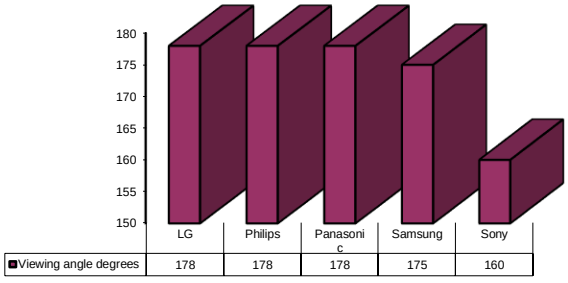

Chart 5. Viewing angle

Source: Created by author

Comparing the data in the chart above, we get the following ranking:

1st place – LG, Philips, Panasonic;

2nd place – Samsung;

3rd place – Sony.

Maximum resolution displayed:

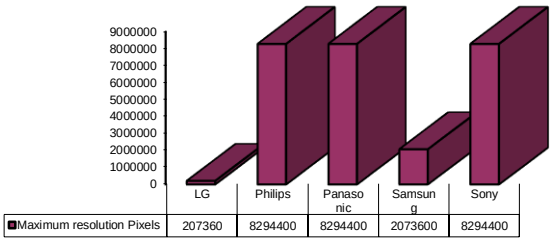

Chart 6. Maximum resolution

Source: Created by author

According to the data in chart 5, the ranking is as follows:

1st place – Philips, Panasonic, Samsung;

2nd place - LG, Sony.

LED TV intensity of sound output:

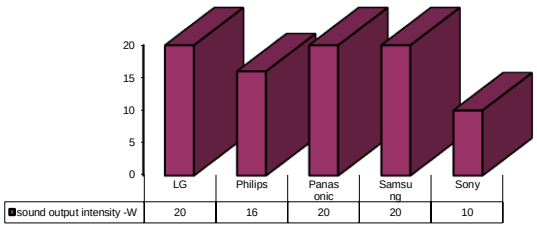

Chart 7. Sound output intensity

Source: Created by author

Judging by the analysis of chart 6, we get the following ranking:

1st place – LG, Panasonic, Samsung;

2nd place – Philips;

3rd place – Sony.

Energy consumption while functioning:

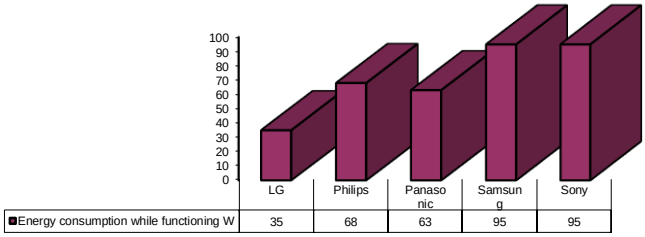

Chart 8. Energy consumption while functioning

Source: Created by author

The analysis of the data in chart 7 leads to the following ranking:

1st place – LG;

2nd place – Panasonic;

3rd place – Philips;

4th place – Samsung, Sony.

Energy consumption in standby:

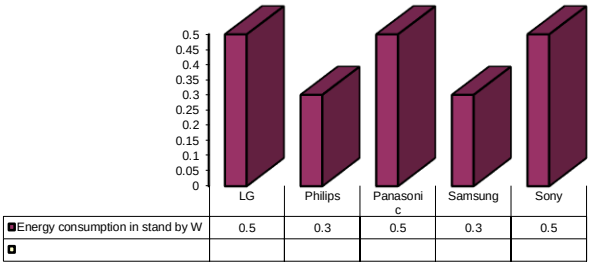

Chart 9. Energy consumption in standby

Source: Created by author

The analysis of the above chart leads to the following ranking:

1st place – Philips, Samsung;

2nd place – LG, Panasonic, Sony.

Weight of the product:

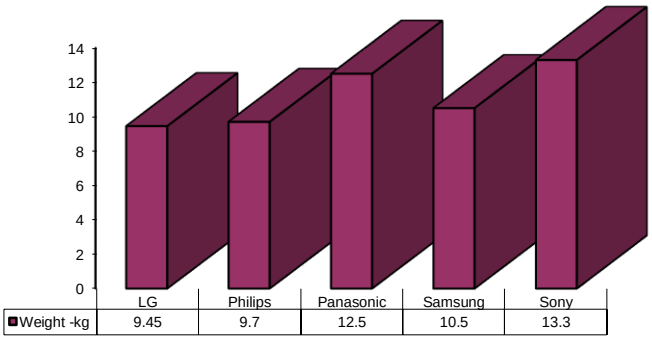

Chart 10. TV set weight

Source: Created by author

The following ranking is obtained after the analysis of chart 9:

1st place – LG;

2nd place – Philips;

3rd place – Samsung;

4th place – Panasonic;

5th place – Sony.

Product price:

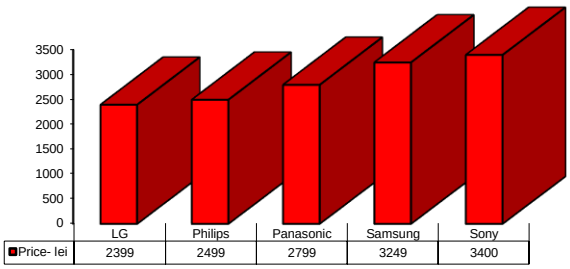

Chart 11. Product price

Source: Created by author

After we analyze chart 10, we get the following ranking:

1st place – LG;

2nd place – Philips;

3rd place – Panasonic;

4th place – Samsung;

5th place – Sony.

Analyzing the charts above and alloting 10 points for each product situated on the 1st place, 8 points for those situated on the 2nd place, 6 points for those on the 3rd place, 4 points for the products on the 4th place and 2 points for those on the 5th place, we obtain the following ranking:

LG: 10+10+8+10+8+10+10+8+10+10 = 94 points

Philips: 8+4+4+10+10+8+6+10+8+8 = 70 points

Panasonic: 8+8+6+10+10+10+8+8+4+6 = 70 points

Samsung: 8+10+10+8+10+10+4+10+6+4 = 80 points

Sony: 10+6+2+6+8+6+4+8+2+2 = 54 points

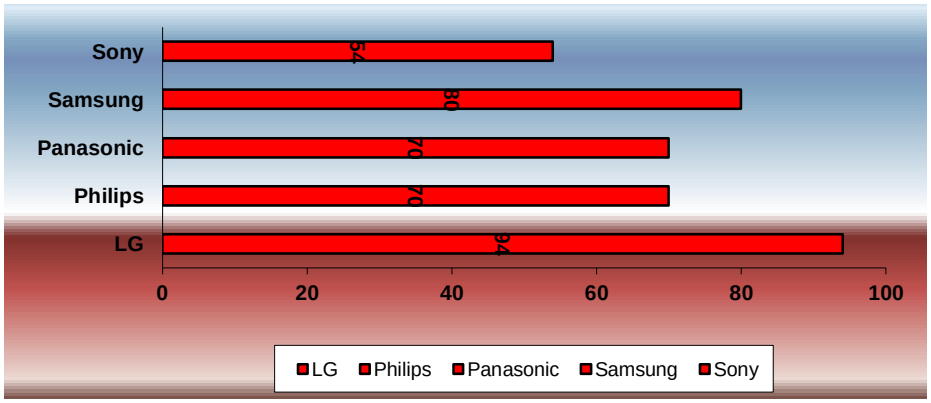

Chart 12. Summarizing chart

Source: Created by author

According to the parameters analyzed so far, the best product is LG 43LH630V.

The ranking, according to the classical method, is as follows:

1st place – LG;

2nd place – Samsung;

3rd place – Philips, Panasonic;

4th place – Sony.

5. Method Limitations

Applying this method is recommended especially for quality assessment according to the points allotted to attributive characteristics.

"*For many specialists and researches the method of value analysis may seem pointless. But the elements which are manifesting in turbulent economics denounce that it is necessary to "revaluate" the method of value analysis. The principal objectives which are at the base of the "revaluating" impose the intensification and the substantial renovating and amplify of its aptitude from different systems and ever a new conception about the method of approach"* (Aldea, 2005).

This method has the advantage of falling into different quality sections according to the value of the synthetic indicator, but it has the disadvantage of introducing some subjective elements when allotting points for the real level of the analyzed products' parameters; that is why it is recommended to use an average score calculated as an arithmetic average of the score granted by several subjects.

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ROBOR - a "Thumbscrew" of the Romanian Financial System?

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Motto:
"Inflation decreases when I decide."
(The Savior of the Dune, Frank Herbert)

Abstract: Although present in the banking business for several years, ROBOR has recently become a much discussed and disputed problem in the Romanian economic life. Even if - just recently, after many disputes, it was replaced, we try to clear the situation. What is and what is the use of this banking tool that influences financial activity and influences the lives of many of us? This paper intends to clarify – at least partly – the importance and the main aspects of this banking instruments that lately became a true, "thumbscrew" for the Romanian financial system. Thus, this research is meant to be an essayistic approach of this controversial matter, which has much influenced the economic and social scene in our country. The study refers to the functioning mechanism ROBID-ROBOR, to the reasons of which the interest rates are related to ROBOR, and tries to answer to the question like - what are the factors that influence the evolution of ROBOR, and how this bank index influences bank rates. Our study is addressing both to specialists, and also to the students and researchers which might be interested in this matter. It is a quantitative and qualitative approach of the subject meant to be useful for anyone would read it.

Keywords: interest; loan; average rate; bank institutions; indicator

JEL classification: E43; E44; E52; E58; G12

1. Introduction

For over half a year, ROBOR has become an apple of discord in Romanian society, and there is no day to appear in the media. Everyone talks with concern about ROBOR, making all sorts of scenarios more or less pessimistic about its evolution. A simple search on Google for the word "ROBOR" shows that there are about 1,890,000 results. Why and how did this phenomenon inflame the spirits? The cost of credit in Romania is anyway much higher than any other country in the European Union, or else Romania's financing costs, even as a country, are excessively high. Romania has been paying the highest interest rate for its foreign loans from all the countries of the European Union for several years. But because we cannot compare apples to pears, let compare apples to apples, and see how we face our neighbors of suffering in the former communist East and outside the Euro zone: if we borrow at 4.79% interest, the Hungarians interest rates are 2.68%, the Polishs at 2.69%, the Czechs at 1.76% and the

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Bulgarians at 0.68% (all these are interest rates on long-term loans - 10 years). In order to see the causes of this situation, we have to understand some elements even from there beginning of the phenomenon.

2. A Little History of ROBOR - an Abbreviation

In the mid-1990's, the wings had gained for the money market in our country. It was certain that this market would have a future, so we'll reach to have our "LIBOR" too! The model was the London Interbank Offered Rate (LIBOR). The prefix being "L" in London. And the root of the word - an abbreviation of the "Interbank Offered Rate". So they told BUBOR. By abbreviation, like LIBOR. The prefix is "BU" in Bucharest, and the root of the word "BOR" from the Interbank Offered Rate. Why BUBOR and not BUY? For aesthetic reasons. It does not sound good. Finally, as the money market grew and, with the prospect of joining the European Union, began to interfere with foreign markets, neither BUBOR sounded better. Because the Hungarian Monetary Market Index also bears the same name, BUBOR. At our neighbors, the prefix "BU" is a short term in Budapest. And so, BUBOR became ROBOR with "RO" in front. LIBOR stepped up on the London interbank scene in 1984, when bank-to-bank transactions grew and needed a benchmark for interest rates on loans. A time it grew slow; until the first quotations appeared, two years passed. And only three coins were measured: the pound sterling, the US dollar and the Japanese yen. But it took speed, soared as other coins were collected, including the Swiss franc, the Swedish crown, the Australian dollar, and the list could continue. As London were becoming a big financial market, so LIBOR has been enriched with many maturities, a total of 15, four representing short terms and eleven long terms, from one month to one year. In addition to the fact that umbrellas have been opened for about 15 currencies, interest rate developments have been "measured" for a large number of the most sophisticated operations, including financial derivatives. The model, therefore, was redundant. But our ROBOR just started on the road. It needed a lot of school. First and foremost, he had to learn to be an index in all the power of the word. Therefore: 1) act as a factor for analyzing the dynamics of the money market over time; 2) be a variable expressing distinct notes of a present period, comparable to another period, from a closer or distant past; 3) measure changes in a given time, one day, one week, one month, one year in the money market; 4) provide relevant statistical data for a correct interpretation of interest rates and a better understanding of them. A complex analysis, therefore, that cannot be done without performing synthetic indices. And ROBOR has, over time, learned to be such a synthetic index of the money market.

3. Defining the Concept of ROBOR

ROBOR (Romanian Interbank Offer Rate) is the average interest rate at which the banks are borrowed between them in Romania in national currency (RON/RON). This indicator is set by the National Bank of Romania based on the information provided by the top 10 most active banks on the market[1].

ROBOR interest is calculated for the same day, the next day, as well as for one week, 1, 3, 6, 9 and 12 months. The most used bank indices for setting the level of variable interest rates on loans are ROBOR 3M (3 months) and ROBOR 6M (6 months), plus the bank's margin.

The question may be asked - how many quotations have ROBOR indices? The most used bank indices for setting interest rates for lei are ROBOR 3M (3 months) and ROBOR 6M (6 months). Another question would be: what type of interest is influenced by ROBOR? The only interest affected by

[1] NBR (National Bank of Romania). ROBID and ROBOR Rules. Accessed on September 5, 2018.

ROBOR is the variable interest rates in lei that have as reference the ROBOR index, i.e. they are made up of ROBOR + a fixed margin of the bank. The smallest value ever recorded by the ROBOR 3M indicator was on September 27, 2016, and on October 14, 2016: 0.68 percent[1]. A small value of the ROBOR index is correlated with a lower rate for loans contracted in lei.

4. Reference Indices

- ROBID;
- EURIBOR;
- LIBOR;
- ROBOR, EURIBOR and LIBOR are benchmark indices and represent the average interest rate for loans in LEI, EURO, USD and CHF;
- ROBOR comes from the Romanian Interbank Offer Rate and represents the average interest rate for RON loans granted on the interbank market and is set by B.N.R.;
- The EURIBOR or the European Interbank Offered Rate is the international rate of interbank interest for the EURO, i.e. the interest rate at which a large number of banks grant each other loans to finance their current operations;
- LIBOR or the London Inter-bank Offered Rate is the index used for loans to banks in the London market. It is mainly used for USD and CHF loans;
- ROBID (Romanian Interbank Bid Rate) is the average interest rate on deposits attracted on the Romanian interbank market.

5. Related Work

Baba and Nishioka (2005) evaluated the role of TIBOR/LIBOR, i.e. the "Japan spread" as an indicator of bank credit risk and investigated the interdependence of bank credit risk in money markets within and across borders since the 1990's. They find that observed risk premia constructed from TIBOR/LIBOR contain global and currency factors, which explain most of the variance of the risk premia. Furthermore, the correlations of the same bank groups' risk premia between the yen 12 ECB Risk measurement and systemic risk April 2007 banks' risk premiums in the same currency market are very high. Finally, they also document that the fundamental prices account for only a small portion of the total variance of risk premia.

Carling, Ronnegard, Roszbach (2006) propose a model that manages to follow both the trend in credit losses and produce industry driven, time-varying, fluctuations in losses around that trend.

Akram, Bårdsen and Lindquist (2007) evaluate two main views on pursuing financial stability within a flexible inflation-targeting regime. It appears that potential gains from an activist or precautionary approach to promoting financial stability are highly shock dependent. They find support for the conventional view that concern for financial stability generally warrants a longer target horizon for inflation.

[1] curs-valutar-bnr.ro. „Grafic si istoric ROBOR din 2005 pana in prezent". Accessed on September 5, 2018.

de Graeve, Kick, Koetter (2008) suggest an integrated micro–macro approach with two core virtues, as evidence on central banks' twin objective, monetary and financial stability, is scarce.

Balakrishnan, Danninger, Elekdag & Tytell (2009) studies how financial stress is transmitted from advanced to emerging economies, using a new financial stress index for emerging economies.

At the same 2009, Tovar emphasizes that the major weakness of the financial accelerator mechanism is that it only addresses one of many possible financial frictions.

Jacobson, Linde & Roszbach (2011) empirically study interactions between real activity and the financial stance; using aggregate data the authors examine a number of candidate measures of the financial stance of the economy.

Baxa, J.; Horváth, R. & Vašíček, B. (2012) examine whether and how selected central banks responded to episodes of financial stress over the last three decades. The authors employ a new monetary-policy rule estimation methodology which allows for time-varying response coefficients and corrects for endogeneity.

Giordani, Jacobson, von Schedvin, Villani (2014) demonstrate improvements in predictive power when introducing spline functions to take account of highly nonlinear relationships between firm failure and leverage, earnings, and liquidity in a logistic bankruptcy model.

6. Problem Statement

The matter which this study is intended to clear is why and at to which extend is this indicator – ROBOR -was influencing our financial system and economic life. For this reason we have to analyze the functioning mechanism ROBID-ROBOR. This is as follows: every day at 11:00, the banks that are part of the group of those who show prices for ROBID-ROBOR put their pricing on the page. For 15 minutes these prices cannot be changed. For clarification, the NBR was not involved in ROBID-ROBOR but as an observer, until it gave a law that set a higher limit for ROBOR. Specifically, each bank shows at what price it buys and at what price sells liquidity for each scandet: one day, one week, 6 months, etc. ROBID shows the price at which the bank wants to buy liquidity and ROBOR shows the price at which the bank wants to provide liquidity. The ROBID-ROBOR transactions are made in RON 5 million, the amounts are not very high relative to the market depth. The purpose of this benchmark is to give the real picture of the interbank market situation, and to offer a benchmark for the RON liquidity price at different maturities.

Of course, depending on the sum, the market prices may differ from ROBID-ROBOR. But in a market where liquidity is managed correctly these differences are not significant. Theoretically, an increase in interest rates on the interbank market shows that liquidity is expensive. The reasons why the liquidity in lei becomes expensive are multiple short term, a few days, but in the longer term the only one that influences the liquidity in the market is the central bank. So, if a bank does not want to offer liquidity puts a high price - ROBOR high, and if a bank wants to attract liquidity, then it puts a high ROBID price. In situations of liquidity crisis, we see an increase in ROBID-ROBOR. If a bank does not want to attract liquidity puts a smaller ROBID, and if it wants to give liquidity a dropping ROBOR. The interbank market works like any free market based on demand and supply, buying and selling liquidity. When liquidity is abundant, its price decreases and when it is rare its price rises.

The ROBOR 9-month index, representing the interest rate paid on ROL loans attracted by commercial banks from other commercial banks for a nine-month period, rose to 3.58%, from 3.57% on Friday. The

ROBOR 12-month index, representing the interest rate paid on ROL loans attracted by commercial banks from other commercial banks for a period of 12 months, remained at 3.62% on Friday. ROBOR represents the average interest rate at which Romanian banks borrow between them in RON. The index was set daily as the arithmetic mean of the quoted rates of 10 banks selected by the NBR.

But during ROBID -ROBOR some banks put low prices, but followed by the phrase "level" which means they do not want to trade at these prices. At the same time, the same banks traded before 11:00 and after 11:15 at prices ranging between 30% and 100% (attracting 30% liquidity and offering it at 100%). If all banks would display real prices - it only happened for a few days - we would have had a real and transparent picture of the situation on the interbank market and could have analyzed the role of monetary policy much easier. No scenario appears, and to understand what happened then a lot of inventiveness is needed. Especially since the central bank does not publish the data ever since. As an example, the mistake made by Reinhart and Rogoff was discovered because they provided data with which they worked. This is normal when we talk about empirical analyzes, but especially when the central bank is a public institution. Here is an example, as shown by the recent ROBID-ROBOR statistics: ROBID-ROBOR (11AM).

Table 1. Interest rates on the interbank market ROBID/ROBOR are calculated on a daily basis by Reuters

	ROBID								ROBOR							
Period	**O/N**	**T/N**	**1W**	**1M**	**3M**	**6M**	**9M**	**12M**	**O/N**	**T/N**	**1W**	**1M**	**3M**	**6M**	**9M**	**12M**
15/02/2019	3.35	3.36	3.38	2.99	2.84	2.97	3.08	3.13	3.66	3.67	3.68	3.30	3.17	3.35	3.47	3.52
14/02/2019	3.37	3.37	3.36	3.00	2.84	2.96	3.07	3.13	3.68	3.67	3.67	3.31	3.17	3.34	3.46	3.52
13/02/2019	3.32	3.33	3.35	3.01	2.84	2.96	3.07	3.13	3.63	3.64	3.66	3.31	3.15	3.34	3.46	3.51
12/02/2019	3.23	3.24	3.26	2.95	2.78	2.92	3.05	3.12	3.55	3.55	3.58	3.26	3.09	3.30	3.43	3.50
11/02/2019	3.22	3.23	3.26	2.95	2.77	2.92	3.05	3.12	3.54	3.55	3.58	3.25	3.10	3.29	3.43	3.50
08/02/2019	3.23	3.25	3.27	2.96	2.78	2.92	3.06	3.13	3.55	3.56	3.58	3.26	3.10	3.30	3.44	3.51
07/02/2019	3.25	3.25	3.30	2.96	2.79	2.92	3.05	3.12	3.56	3.57	3.62	3.27	3.10	3.30	3.43	3.51
06/02/2019	3.24	3.27	3.31	2.95	2.78	2.93	3.04	3.11	3.55	3.59	3.63	3.27	3.11	3.31	3.43	3.50
05/02/2019	3.20	3.23	3.23	2.95	2.77	2.92	3.05	3.11	3.53	3.55	3.56	3.26	3.09	3.30	3.44	3.48
04/02/2019	3.20	3.22	3.23	2.94	2.75	2.92	3.04	3.11	3.52	3.54	3.55	3.25	3.07	3.30	3.43	3.49

Source: NBR

7. ROBOR versus "greed"

This money market index measures with a maturity - of eight weeks from one week to one year the cost of money market placements, of course, between banks. A good family index: LIBOR for the US dollar or for the pound sterling; TIBOR for the Japanese yen; WIBOR for the Polish zloty, PRIBOR for the Czech crown; BUBOR for the Hungarian forint; and of course, many more, for other and other money markets in the world.

Nowhere, however, on Terra, nobody had the idea of taxing banks' assets from the level reached by this index. The exception, unique on the planet, is with us. Emergency Ordinance 114/2018 (issued by the Romanian Government) instituted a charge on bank assets if the ROBOR index exceeds 2 percent.

Therefore, in these early days, when ROBOR is listed as 3.50 percent, it is quite clear that all 35 banks in our banking system are subject to the extravagant charge called "greed". Among bank assets for which taxes would be paid this year if there is no change, including: 1) money in banks' cash desks; 2) the funds held in the accounts of the National Bank of Romania; 3) derivative financial instruments; 4) the volume of assets, with a huge balance in the balance sheets of 81.58 percent, amounting to the debts representing the money borrowed by state banks, companies and the population. Recalling, therefore, that banks would pay taxes on loans to the Ministry of Finance, businesses and the population.

8. Two Curves in Tandem

What is ROBOR looking for in this combination? This is the problem. Because ROBOR, if it would continue to remain the benchmark for taxing banks, would push the banking system to pay for shocks and risks in the economy. Since mid-September 2017, when inflation has begun to show its tides, after nearly three years of profound calm, ROBOR has also entered an acute growth process. And here's how a certain economic indicator, by nothing more than other indicators, has not only become a character of the public scene, but it has gained notoriety as well. But the truth is that since September 2017 and so far, ROBOR has, in particular, been following the footsteps of inflation. And inflation has reached the hill, being pushed at shocks by the regulated tariffs on heat or electricity, when the international price of oil that fuel has risen, when the price of some fruit of the earth in which we find the influences of the price transport, electricity and solar heat. The Central Bank, after each of the three inflationary shocks, in October 2017, January and April 2018, raised bottlenecks and dramatically reduced the force of inflation. Further, it has calmed the rise of ROBOR! Two curves go in tandem and are continuously compared: the interest rate curve and the inflation curve. And if at the turn of 2017-2018 inflation faded, it is certain that we could not have declining interest rates; so, he climbed the ROBOR. But here, while the 12-month rally rose up to 5.40 percent in May, the NBR halted the monetary policy rate to less than half: to 2.50 percent. Although, with an interest rate of more than 5.40 percent, life would have been easier. But would it have made life easier for the country? Of course not. Two examples are edifying. Because an interest rate of 5.40 percent or more, to cover inflation, would have hit economic growth. At the same time, a lombard interest rate of 6.40 percent, which would have corresponded to the NBR interest rate of 5.40 percent, would have widened the ROBOR movement corridor to the same level, and would have hit it all those who have to repay loans with flexible interest rates to banks.

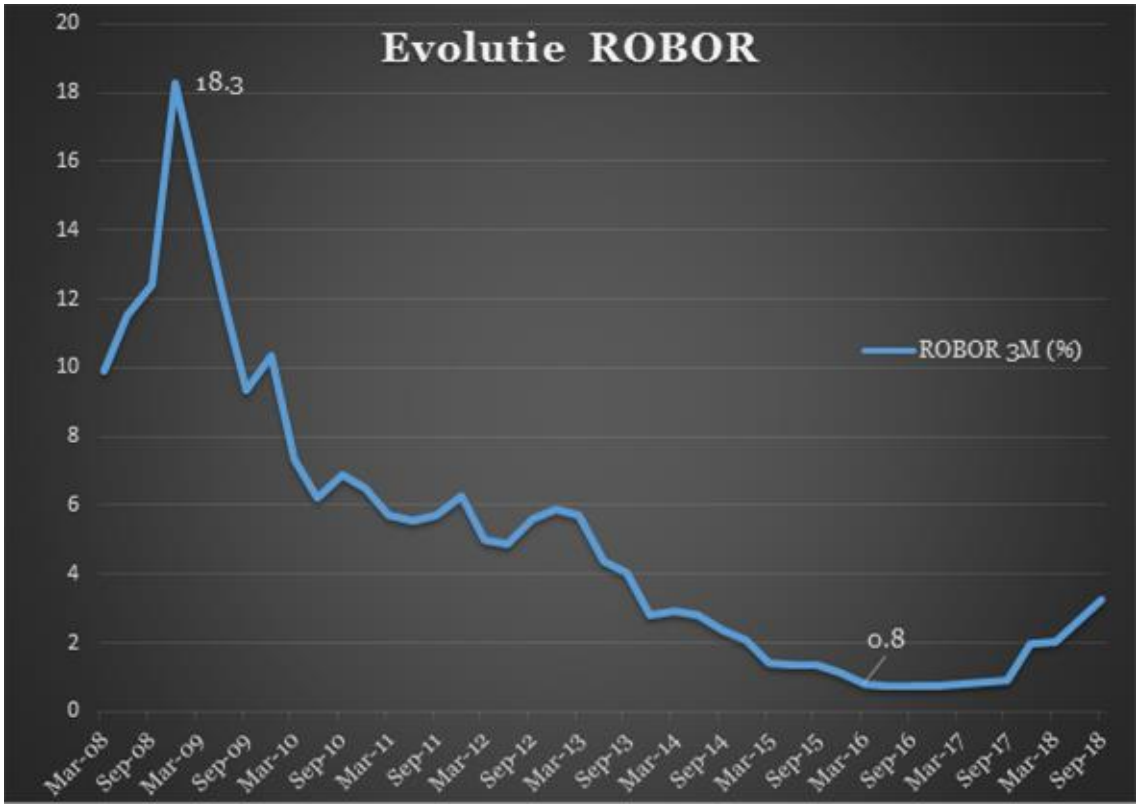
9. Why are Interest Rates Related to ROBOR?

It's simple - it was the decision of the Romanian State, which in 2010 enacted the conditions under which the credits can be granted by the Emergency Ordinance 50 (OUG 50). Thus, the State (following a European Directive) decided that loans could be granted either with fixed interest, or with the interest rate correlated to a reference index - ROBOR. This benchmark has been chosen because it is an internationally used practice, and its establishment is transparent. By this Ordinance, the State decided to protect the population from possible interest rate increases on loans resulting from unilateral decisions of banks. Thus, now (on the basis of the law's obligation), credit agreements, in lei, with variable interest, mention an interest composed of ROBOR + a fixed margin of the bank. In this way, for a bank, ROBOR is the cost of the raw material, and the margin is the gain from which the costs are covered (rents, consumables, ATMs, software, salaries, etc.) and eventually profit. Thus, ROBOR does not influence the profit of a bank.

10. What are the Factors that Influence the Evolution of ROBOR?

ROBOR fluctuates depending on the economic conditions, the inflation rate and the money available in the banking market. Banks have no interest in influencing ROBOR precisely because it reflects a cost for both loans and deposits. So, if ROBOR grows, it raises the income of a bank, but it also raises the costs for banks, because then banks will be more expensive to finance in the financial markets, or through deposits attracted from its clients. No one can predict exactly which level will have an average interest rate (ROBOR or EURIBOR) at a time, because it depends on a lot of factors that are hard to predict/measured or influenced. Including State interventions in the economy or economic and fiscal policy decisions radically influence the evolution of ROBOR, alongside inflation or external developments. What was the evolution of ROBOR? Over time, there have been times when ROBOR has also declined and ROBOR has grown. Here you can find out more about the ROBOR evolution in recent years.

Table 2. The evolution of ROBOR



Source: NBR statistics

For example, in the last 10 years, the highest ROBOR at 3 months was in March 2009 when a rate of 18.3% was recorded. The minimum was in March 2016 at a rate of 0.8%. It is just an example, but it shows quite clearly that ROBOR is a living interest rate that is constantly moving.

11. How was ROBOR Calculated?

ROBOR was an index calculated by a very complicated, clearly established formula under the supervision of the National Bank of Romania (NBR), and calculated by the help of the Thomson Reuters

financial company (a company that existed since 1851 and which also calculates interest reference EURIBOR used worldwide). More precisely, ROBOR was calculated daily as the arithmetic average of the interest rate quotations for lei used by ten major banks in Romania, being the interest rate at which a bank borrows liquidity from other banks. Calculations excluded extremes (highest and lowest interest rate) to be relevant to this index. Thus, we can say about ROBOR that it was a price of money in interest - a kind of reference - that is, a reference to the cost of money for a local currency. ROBOR was very transparent, it being a price tag and a benchmark for the evolution of interest rates on the banking market, calculated and published both on the Thomson Reuters platform and on the NBR website, in a clearly defined way and pursued by local/international financial institutions, by the authorities. ROBOR was announced daily by the National Bank of Romania on the website: https://www.curs-valutar-bnr.ro/robor.

12. ROBOR "handled" by Inflation

Robor grows as inflation rises. There are two categories of factors that explain this growth: some are the so-called "fundamental factors, which are related to inflation, which is increasing. The idea is that at an inflation of over 3% in the first part of the year, we could not expect Robor to be below 1%."

Conjecture makes the Robor Index to precipitate. The second category of factors, the conjunctural ones, which precipitated the growth tendency of Robor. This growth has been accelerated and precipitated by the fact that in recent times the excess liquidity we had in the money market has fallen sharply, because state companies have paid very large amounts of money to the state budget, in the money market, in bank deposits, and now they are no longer, are in the accounts of the Ministry of Finance, which has diminished the liquidity we had in the banking system.

What are the Effects?

They are that the ROL loans will be expensive because of the bad faith, the stupidity and the incompetence of the political factor. Loans in lei will rise because interest rates on ROL loans are rising. These are established by banks according to the Robor index. Many customers in lei, individuals, are on a margin of several percent, which will now be consumed. The effect will be that bad credit portfolios will appear in banks. Is it the problem of the banks? What is the significance of the fact that the Robor index has continued to increase in the last few months, after spending several days on a percentage basis. Behind this rise, symptomatic, there is a new REPO operation of the National Bank. There were times when the ROBOR index actually jumped into the air. The result was that the credits were up again.

The REPO index is a barometer of the state of the economy. There is, at the moment, a trend of Western ideas, according to which it is good for the economy to have a 2% inflation. The problem is that in us this growth does not indicate a well-being of the economy. On the one hand, an increase of several basis points on the Robor index is irrelevant. On the other hand, the overheating of the economy, due to political attacks on the prosperity of the economy, leads to inflation. Let us recall - for example - inflation in September 2018 was 1.8%. Given that the monthly inflation growth was 0.5%, we had an optimistic inflation expectation of 2.4%. The Robor Index and conjunctural factors. There are several factors that influence the Robor index. Some are fundamental, others are conjunctural. When we talk about the latter, we suddenly start making politics. And politics, as we shall see, influences the Romanians' loans, from the size of the interest. The question arises: what were these conjunctural factors this year? Payments to the budget are such a factor. And very important: the government has asked state-owned companies to pay a pretty big dividend. It pulled liquidity out of the market. As the money market is

quite limited to us, the super-dividend in the absence of money from the budget, contributed to the rise of the leu and the growth of Robor. Third, Finance, during the summer, continued to issue monthly - a relatively constant amount from month to month - of government securities. The Robor Index, influenced by overlapping factors. We will detail this subject and its meanings in the coming days on an essential theme. This issue of titles has been made on the background of relatively low maturity. That is, maturities of relatively small amounts - a billion-two billion lei. Finance has issued titles of 3-4 billion lei a month. And it extracted from the liquidity of the market about two billion lei a month. But the Finance Ministry is constantly in the market to finance its needs. But this is not the problem: there are still fluctuations in liquidity and because, on a monthly basis, some titles can be mature, which may be higher or lower. Obviously, this also influences liquidity on the money market. Now, there was an overlap of several factors (n.n: conjuctuals) besides the fundamental ones. Robor had begun to grow for a while, but not so fast.

13. Conclusion

The Finance Ministry proposes that Robor be replaced by the average interest rate, weighted by the borrowed amount. However, this average interest rate of transactions will fluctuate a lot in the situation where a bank or another will have conjunctural hunger. Under these circumstances, why do individuals or companies depend on the eventual volatility of bank lending rates? It would be right that interest rates on loans rise or fall depending on the general market context driven by macroeconomic developments. All these turbulences in the Romanian financial-banking system after a long period of economic upheaval ended with the replacement of ROBOR, with another indicator. But it seems that this does not solve the underlying problem - the sustained rise of this indicator - and with it credit rates, or, in other words, the increase in credit. The explanation would be that the average interest rate on interbank transactions instead of Robor is simply the replacement of an artificial benchmark with another artificial benchmark in the cost of credit to the population and companies. The fair benchmark is interest on bank deposits. Let's see to what extent and especially in what direction things will evolve in the future.

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Determinants of Rail Passenger Transport Usage: A Case of Buffalo City Municipality

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Abstract: This study investigated the determinants of rail passengers transport usage. Descriptive analysis in the form of Pearson-chi square and inferential analysis using probit regression were used in this study for data analysis. The study used closed-ended questionnaires and they were distributed to 100 people. The results of the study revealed that level of income, occupation, level of education, safety, and affordability are the common factors that influence the usage of trains for transport. The frequency of usage based on income was about 44%, with about 55% of people indicating they make use of trains because they find it a safe mode transport. The income level, safety, occupation and affordability were statistically insignificant. The level of education had a high frequency at 74% and it was statistically signifacant.004. The second part of the study assessed the incidence of train usage and results revealed that most of people (about 74%) travel by train daily. The policy recommendation from this study is that efforts should made to improve the rail transport services, like the facilities, speed and the time schedule. This study will contribute to generation of knowledge around these issues.

Keywords: Transport Economics; Transport usage; Economic Activities; Consumer Tastes

JEL Classification: D11

1. Introduction

Transport makes it possible for economic activities and social activities to take place in a particular place and time (Doll & Wietschel, 2008). It is divided into four modes which are road, air, sea, and rail. The focus of this study was on rail transport. According to Haglund (2010), rail transport has different features from other modes of transport such as large capacity and free from traffic jams.

For the past 150 years South Africa has been using rail transport, and this mode of transport was known as one of the pillars of South Africa's infrastructure (Africa & Point, 2010). Even today, South Africa still regards rail transport as suitable transport compared to other modes of transport since rail transport is mostly utilised for conveying of bulk freight over medium and long distances and for mass commuter traffic. Africa & Point (2010) considered rail transport as the important tool for growth and this was supported by Road, Nadu, Thavathivu & Thirumand (2014) who noted that it is suitable for both long distance travel and bulk mode. Today South Africa is still reaping the benefits provided by rail transport, which still occupies a critical role in the transport system of our country. In Buffalo City Municipality, rail transport plays a vital role to the residents due to population growth. There is ongoing demand for transport, particularly rail transport, since the area is dominated by poor people and they find rail

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transport as the best mode of transport due to its capacity and they have been utilising it for decades (Statistics of South Africa (STATS SA), 2016. Therefore, this study focused on the extent to which one uses rail transport, not the uses of rail transport compared to other modes of transport.

2. Problem Statement of the Study

Rail transport in South Africa has not received enough attention from the authorities (Mathabatha, 2015). A number of studies were done on this mode of transport such as that by Mokonyama, Venter, Letebele, Dube & Masondo (2013) who conducted a study on the analysis of modal shift in South Africa and Mathabatha (2015) who conducted rail transport and economic competitiveness of South Africa. In addition, Hermant (2011) who conducted a study on human movement behaviour in South African railway stations: implication for design. But none of the scholars looked at the factors that influence the use of rail transport.

Furthermore, Railway Safety Regulator Annual Report (2011) revealed that in South Africa's rail transport the major problem is poor conditions of infrastructure and personal safety which includes robbery, theft and crime and these are the major problems in rail sector.

The Eastern Cape Province is no exception to these problems. It has been claimed that the East London rail system has been plagued with inefficiencies and delays. Further, breakdowns and track theft have been a common problem in East London station (Marina, Cameron, Mokonyama & Shaw, 2007). In East London area, the Passenger Rail Agency of South Africa (PRASA) is still having challenges that include deprived maintenance practices, arguments with Transnet about access to its network and pricing of services. These unresolved matters with companies involve the refurbishment of coaches and the supply of key components.

3. Empirical Literature

Wijeweera & Michael (2013) from Australia, Heljedal (2013) from Europe, Paulley, Balcombe, Mackett, Titheridge, Preston, Wardman, Shires & White (2006) from Britain agreed that price is the main determinant that influences the use of rail transport. These studies pointed out that the reason many people use rail transport is because it is affordable. Moreover, these studies also found that price changes affect consumption or rail demand, since price is statistically significant to demand of rail. This means that when prices increase, people will shift from using rail transport and use other modes of transport.

In addition, Wijeweera & Michael (2013) examined a study on determinants of passenger rail demand in Perth Australia: A time series analysis. The study used annual data from the period of 1983 – 2008 and discovered population as the determinant of transport demand.

Haglund (2010) conducted a study on Analysis of train passenger responses on provided service Case study: PT. Kereta Api Indonesia, and Barnum, Mcneil & Hart (2007) conducted a study on comparing the efficiency of public transportation subunits using data envelopment analysis. Both results showed that service quality is one of the vital factors that influence the choice of travel

Mokonyama, Venter, Letebele, Dube & Masondo (2013) uses the quantitative approach and the study revealed that the modal shift is a result of personal choice, and also showed that the choice of modal transport depends on the income that the individual earns, since rail transport has been found as the mode of transport that is affordable.

4. Methodology

This paper sought to find the determinants of rail transport usage in the Buffalo City Municipality. The model estimated was as follows:

RTU=f (*DEMG, SE and PHYS*)

In this study (RTU) is the dependent variable that is rail transport usage, on the right side are independent variables such as (DEMG), the demographic factors, (SE), the socio economic factors and (PHYS), the physical factors

Where:

RTU= Rail transport usage

DEMG= Demographics factors

SE= Social economic factors

PHYS= Physical factors

The table below summarises the definition of the variable, usage of the literature.

Variables	Some application of the literature
Rail transport usage	Road et al., (2014)
Demographics factors	Nurdden et al., (2007) and Buehler (2011)
Socio economic factors	Bresson, Dargay, Mandre & Pirotte, 2003) and Mokonyama, Venter, Letebele, Dube & Masondo, 2013) and Road *et al*., (2014)
Physical factors	Nurdden et al., (2007) referred to Mokonyama et al., (2013)

4.1. Data Source

The data was obtained through a household survey conducted in 2017 (October-November) in Buffalo City Municipality in the Eastern Cape. In this study the Mdantsane and Berlin were the part of the survey. The researcher chose municipality of study because it is the second largest metropolitan municipality in the Eastern Cape. Close ended questionnaire was c and were distributed on door to door by the trained research assistance. A total of 100 households have responded fully to the instrument and with data usable.

4.2. Data Analysis Techniques

The study follows the quantitative approach. The descriptive and the inferential statistics were applied to in this study in order to understand it better the data. Regression analysis has been applied in this study to determine the significant factors explaining rail transport.

5. Results and Discussion

Demographics of the Study Sample

In terms of gender, from the sample about 54% females and only 46% males indicated that they are using train. Such divide reflects the proportion of gender within the population; therefore, it may not show any bias towards use of rail passenger transport. Regarding higher education, 76.0% of those with grade 8-12 indicated that they travel by train , 17.0% are have reached grade 1-7 and only 5 .0% those who obtained Bachelor's degree travel by train. The most educated are likely to get better paying jobs

and to reflect such status, may use private road transport or if not well paid may want public road transport. In addition, the results showed that 100% Africans travel by train. However, 73.0 % of single people travel by train, 21.0% that are married also use trains but only 3.0% that are widows travel by train. It is also shown that 98% of people that are using the train are without disability and only 2% are disabled. On the other hand, 32% of students travel by train , 34% of those working in town, 14% of business and trading people travel by train and only 6% of the private sector or NGO personnel travel by train. Interpretation of the regression analysis and inferences considers these demographics.

Mokonyama, Venter, Letebele, Dube and Masondo (2013); Wijeweera & Michael (2013) and Nurdden, Rahmat & Ismail (2007) agreed that the choice of mode of transport depends on the income that the individual earns. Most travellers use rail transport because of their income, 24% of those that earn between R1001-R2000, 14% people that earn from R5, 001-R10, 000 and only 2% of those that earn between R10000 to R 20000 travel by train. This could be due to the financial status of the person and the affordability, especially for people earning from R10000-R20000 and these results are reasonable when checking percentages.

Consequently, 74% of people travel by train daily, 11% of people travel by train once a week, 14% do not use the train at all and only 1% of people use train once a month. This reflects the dominants of rail passenger transport within the studied area. In addition, the results show that 67% of people are using the train for school or work purposes, 14% of people are not using train, 10% are those that use the train for business trip purposes, only 8% of people travel by train for leisure purposes and lastly, only 1% of people use train for other purposes. The table below shows the frequency for demographics

Table 1. Descriptive statistics table

	N	Minimum	Maximum	Mean	Standard deviation
Age in year	100	19	62	33.71	13.587
Number of years spent in school	100	0	16	10.72	3.668
Household size	100	1	13	5.32	2.478

Source: own creation table

The survey covered those from the age of 19-years and maximum of 62-years old and the average of age 34 and the standard deviation of 13.587. On education side, considering years spent in school, minimum is 0 number years (no formal education), maximum 16, and average of 11 and the standard deviation is 3.6. House size ranges from a minimum of 1 person and the maximum of 13, with an average of 6 people in one household and 2.478 as standard deviation.

Facilities Rating

The study showed that about 52.0% of people said that they are rather satisfied with the connection with other public of transport, 15% people that are very satisfied with facilities of train with connection with other public transport and only 7.0% that are rather satisfied. It is shown that 35.0% of people are rather satisfied with the facilities of car parking although 29.0% people are very dissatisfied, 16 are rather dissatisfied and only 6 .0% are very satisfied. Forty-nine percent of people are very dissatisfied with the quality of train facilities and service. Jaiswal & Sharma (2012) commented by saying rail transport needs to adjust their services to the attributes required by the travellers in order to become more attractive to their users. The study also found that many people are very dissatisfied with train facilities. People that are rather satisfied comprise 25.0%, and 2.0% people are satisfied with the quality of the train facilities. Due to the problem of lack of information about changes in the train schedules there is high number of

the people 34.0% that are very dissatisfied with the provision of information about train, rather dissatisfied equalled 33.0% and 7.0% stated that are very satisfied with the provision of information about trains. However, 61.0% of people are very satisfied with the train ticket, Wijeweera & Michel (2013) and Heljedal (2013) agreed that most people using trains are very satisfied with the train tickets, 23.0% of people are rather satisfied with the ticket train and 2.0% are rather dissatisfied. Only 45.0% of people are very dissatisfied with the way complaints are handled, 27.0% are rather dissatisfied, 10.0% are rather satisfied and 4.0% are very satisfied. Results indicate that 45.0% of people are very dissatisfied with the cleanliness of the station facilities, 20.0% of the people are rather dissatisfied and 5.0% of people are very satisfied with the cleanliness of station facilities. Then, 47.0% of the respondents indicated they are rather satisfied with the security at stations, 15 .0% are the very satisfied, 14.0% rather dissatisfied and only 10.0% are very dissatisfied with the security at stations.

Train Time Rating

The study revealed that 32.0% of people are rather satisfied with the frequency of train, 28% are very dissatisfied, 22 % are rather dissatisfied and 4% are satisfied. Whereas study results indicate that 32% of people are rather dissatisfied with the speed of train, 30% are very dissatisfied and only 9% are satisfied, Barlombe, Mackett, Paulley, Preston & Shires (2004) commented that many people are dissatisfied with speed of train. They said train speed should improve. According to this study, 59% of people are very dissatisfied with the punctuality of train. Jaiswal & Sharma, (2012) said that rail transport has the problem of not being punctual and the study also found that passengers are complaining that trains arrive late, with 15% being rather dissatisfied and only 2% being satisfied with the train punctuality. About 55% of people indicated they are satisfied with personal security whilst on board, 15% are rather dissatisfied with the security, 9% are very dissatisfied and 7% are satisfied. Also 51% are very dissatisfied with the cleanliness and good maintenance of trains, such as cleanliness of the train. About 20% are rather dissatisfied, 12% are rather satisfied and 3% are satisfied with the cleanliness of train. Rail transport has poor service quality. The study also commented by saying rail transport needs to adjust their services to the attribute required by the travellers in order to become more attractive to their users as many people are not happy with the maintenance of train transport (Jaiswal & Sharma 2012). In addition, 55% of people are very dissatisfied with the provision of information during the journey, 23% are rather satisfied, 5% are rather satisfied and only 3% are satisfied.

On the other hand, 40% are very dissatisfied with the sufficient capacity for passenger travelling by rail, 28% of the people are rather dissatisfied, 16% are satisfied and only 2% is very satisfied with the sufficient capacity. Therefore, 50% of people are very dissatisfied with the seating area, 26% are rather dissatisfied, and 3% are very satisfied. It is also reported that 41% are very dissatisfied with the train services, 23% are satisfied with the train service, 18% are rather satisfied with the train service and 4% are very satisfied with the train service. Fifty percent of the people are very dissatisfied with the train staff, 20% are rather dissatisfied, 7% are rather satisfied and 7% are the very satisfied with train staff. In addition. 58% of people are very dissatisfied with the assistance of the elderly, 21% are rather dissatisfied, 5% are rather satisfied and 2% are the very satisfied with the assistance of the elderly people in the train.

Meeting of Transport User Requirements

The results from the study demonstrate that only 20% of people strongly agree that when ticket prices increase they receive alerts by train attendants, 56% agree that they are being informed when ticket prices increase, 7% of people disagree with statement and 3% strongly disagree. According to the table, 46% of people agree that they are using train because it's affordable, 38% strongly agree with the

statement and 2% disagree. Sam *et al.* (2014) and Mokonyama *et al.* (2013) noted that many people are using transport because it is affordable transport. However, 44% of people disagree that they find comfort in using trains, 28% strongly disagree, and 4% of people strongly agree that they find comfort using trains. Sam *et al.* (2014) and Polat (2012) agreed that most people find comfort in using trains. Fifty three percent of people agree that comfort of passengers should be ensured, 24% strongly agree, 6% strongly disagree and 3% disagree that comfort of passengers should be ensured. Additionally, 45% of people disagree with the punctuality of time, 29% strongly disagree, 6% agree, and 6% of people strongly agree with the departure time. Jaiswal & Sharma (2012) pointed out that delay has become regular rail transport problems and these problems will result in passengers using other modes of transport.

Not Meeting Transport User Requirements

Regarding the statement that patronising rail transport makes passengers vulnerable to crime, 52% of people agree, 17% disagree, 12% strongly agree and 5% strongly disagree. The results showed that about 64% of people disagree that theft is a common challenge for rail transport, 18% agree, and 2% of people strongly agree. About 51% of people agree that they experience discomfort, 26% strongly agree, 7% disagree and 2% are disagree. Of people that have been experiencing discomfort in trains, about 52% agree, 24% strongly agree, 7% disagree and 3% strongly disagree. Also, 67% of people disagree with the statement of missing luggage, 16% agree and 3 % strongly disagree .People that agree with sufficient space for luggage make up 57%, 21% are disagree, and 8% strongly agree with sufficient space available for luggage. People that agree with the statement about delay experience make up 49% and Jaiswal & Sharma (2012) said that delay has become a rail transport which if not addressed, will result in passengers using other modes of transport. People that strongly agree with the statement of delay experience total 32%, 4% disagree, 1% strongly disagree with the statement of delay experience. People that agree with late arrival of trains make up 47%, 34% of people strongly agree, 4% disagree and 1% strongly disagrees with late arrival of trains.

Table 2 below shows the summary of descriptive statistics. The facilities score have the high mean (35) followed by the negative usage (26), positive usage (23) lastly followed by train time (20). The maximum value for train time is high than the positive value.

Table 2. Descriptive statistics for total score

	N	Minimum	Maximum	Mean	Standard deviation
Facilities score	86	21.00	55.00	34.6977	8.13861
Train	86	11.00	40.00	19.7209	5.73462
Positive	86	15.00	30.00	22.9884	2.65460
Negative	86	20.00	33.00	26.3372	2.75515

Source: Author's Computation

From the table above, the minimum of 21 facilities score and maximum of 55 , facilities score and 8.1 of the standard deviation . Minimum of 11 of train and maximum of 40 and the standard deviation of 5.7. Minimum of 15 positive usage score, maximum of 30 positive score and the 2.6 standard deviation. Negative score has 20 minimum, maximum of 33 and 2.8 standard deviation.

This following section presents regression analysis results. Only Probit regression results are presented here as results of multinomial logistic regression are not reported here given the limited cases in some instances as the sample was thinly spread across the categories

5.1. Probit Regression

Table 3 presents Probit regression results, showing five factors being statistically significant; namely number of years spent in school (proxy for level of education); quality of facilities; rating of train services; negative perception/attitudes (challenges with rail transport) as well as positive perceptions/attitudes.

Table 3. Probit regression analysis

Parameter estimates						
Parameter	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Age in years	-.004	.004	-1.015	.310	-.012	.004
Number of years spent in school	-.030	.017	-1.793	.073	-.062	.001
Household size	.014	.020	.696	.487	-.026	.054
facilities score	.019	.008	1.976	.048	-.030	.045
Train	.028	.013	2.456	.008	.002	.054
Negative	-.012	.018	-1.993	.014	-.024	.000
Positive	.031	.020	1.752	.079	.002	.053
Intercept	-1.610	.718	-2.244	**.025**	-2.328	-.893
PROBIT model: PROBIT(p) = Intercept + BX						

Source: Author's Computation

The dependent variable is dichotomous, with 1 being 'YES' to use of rail transport and 0 "Never". The coefficients therefore provide how much change in the probability of an individual responding "YES" compared to "NO" given each factor.

An additional year in school reduces the probability of using rail transport by 0.30 (3%). This may be explained by the fact that highly educated individuals can afford to buy private cars and therefore do not use rail transport, which more often is considered transport for the poor. With reference to the literature, Nurdden et al., (2007) and Road et al., (2014) agreed that educated people tend to buy their own private car since they can afford it.

The facilities increases the probability of travelling by rail by .019 (nearly 2%).Sam et al., (2014); Wijeweera & Michel, (2013) and Road et al., (2014) commented that many people use rail transport because of the facilities of the train. Also, the utility theory pointed out that people use transport because of the benefits the transport offers.

The rating of train service that includes schedule and being on time, among other things, also increases the probability of using rail transport. Each additional score increases the probability by .028 (2.8%). With reference to the literature, Polat, (2012) and Sam et al., (2014) and Michel (2013) agreed that individuals are using the train because they find safety and comfort. Utility maximisation theory pointed that before individuals make their choice of mode of transport, they look at the benefit that transport offers, such as comfort and affordability.

The challenges (negative) that individuals hear about reduce the probability of them using the train by .012. The challenges include crime, which is one of the serious challenges facing the sector – crime on board and on the facilities. Polat (2012) established that there are individuals that are not happy about the train, for example they complain about train delays.

On the other hand, any positive sentiments increase the probability of using rail transport by .031 (3.1%). With reference to the literature, the utility theory noted that the more benefits the transport offers, the

more people demand it. Sam et al., (2014) and Jaiswal &Sharma, (2012) stated that rail transport should more offer positive services to attract more passengers.

5.2. Qualitative Data Analysis (Time Schedule and Train is very Slow)

In this study, people that are not using trains were also evaluated and they reported the main reason for not using trains. The reasons are discussed below.

Time schedule for train – People complained about the time schedule for trains and suggested that if trains could change their time schedule or provide more trains, it would be better. Constantinos & Tyrinopoulous (2013) and Fenta (2014) said that time is a big constraint because people cannot change the time spent on travel indefinitely and time wasted can never return (Wale & Steenburgen, 2006). Travelling time includes three components such as access time, waiting time, and journey time. These three components have different values for passengers, depending on the purpose of travel and journey. The study added by saying time schedules for train are often not suitable and that the train is an inflexible mode of transport, unlike the taxi and bus.

Trains are very slow – People said that the train is slow and they cannot use it if they are rushing somewhere. They suggested that trains should be improved and upgraded to accommodate anyone who needs transport at a particular time. Bresson, Dargay, Madre & Pirotte, (2003) stated that trains should improve and upgrade their speed so as to avoid passengers being late for their appointments.

Stations are far – People commented that stations are far from their homes, so that makes it difficult for them to use the train. They said that sometimes you arrive late and it is not safe to walk from the station to home.

6. Conclusion

This study set out to investigate the determinants of rail passenger transport usage in Buffalo City Municipality. The study employed Probit regression to determine the incidence of rail transport usage in Buffalo City Municipality. A household survey was conducted and the data was analysed through the Probit. . For first objective the analysis was done and the findings showed that rail transport is used daily in Buffalo City municipality and is used by students and workers. The findings for the second objective showed that low income earners are the most people that travel by train, education level that someone attained determine the mode of transport that would someone use, because from the analysis that was done in this study most of people with bachelor were not using rail transport. Lastly the findings showed that the facilities of train are the factors that influence the usage of rail transport in Buffalo City Municipality. An assessment of literature on the rail transport was conducted and from it an empirical model was specified. The literature revealed the main determinants of rail transport usage, and also identified the key theories based on this field.

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