Quantitative Study on the Usefulness of Mobile Learning Platforms in Organisations

Anamaria-Catalina Radu, PhD, Ivona Stoica (Rapan), PhD
Romanian Academy, Institute of National Economy, Bucharest, Romania,
Email: anamaria_radu15@yahoo.com, stradivonas@gmail.com

Andra-Luisa Preda, PhD
Romanian Academy, Bucharest, Romania
Email: luisapreda@yahoo.com

Ana-Maria Nedelcu
Romanian Academy, Institute of National Economy, Bucharest, Romania
Email: ana_maria_ned@yahoo.com

Abstract
Mobile learning platforms have started to be used more and more in Romanian companies, managers using these tools to make it easier to provide all the details the employees need to operate in good conditions but also to gain new knowledge needed in the work process. In this paper, we have conducted a quantitative study on 128 respondents through which we wanted to identify the main factors that are able to influence the perception of respondents about the usefulness of mobile learning platforms that they use in organisations where they work. Data analysis was performed using IBM SPSS Statistics 20.
Keywords: E-learning, Mobile Learning, Online Survey, IT & C, Mobile Platforms.

Introduction
The mostly present in the last years, mobile usage data has provided extraordinary awareness into hyper-customized content information tailored exactly on the customer, brings a lot of details about the individuals for specialists to design more relevant marketing strategies and well-timed and targeted campaigns.
The current mobile technologies still transform business and consumer behaviors in critical ways as we find ourselves in a year of transition, however the impact of 5G wireless, the future major technology won't likely occur this year.
Forrester Researcher is making a forecast for the technology 5G that will have a great influence on the industrial players, although for the consumers it will be felt like 4G was in 2010. (go.forrester.com)

Mobile-commerce is not a novelty, as it has been used to make online purchases since a few years now, instead for Romania, in the meanwhile has grown rapidly during the period of Coronavirus restrictions.

According to BusinessInsider, in December 2019, mobile-driven sales are expected to reach $284 billion in 2020, about 45% of US' total e-commerce market.

(www.businessinsider.com)

Traditional methods of mobile marketing mostly rely on the user-profiles and recommend contents with the aid of similarity matching methods. These methods match both contents and users.

The methods of various ways of data usage are distributed into four types: context-based methods, content-based methods, knowledge-based methods and collaborative filtering methods.

There are content-based methods that supply contextual data for recommendations applied to exploit the users' interest data for content and products as comments, ratings, etc. in order to make recommendations. The content information is not limited to geographic areas, time and social data, emotional state and behavioral data but embodies them and can also lead to intricate measurement difficulties, that critically deteriorate the recommendation system's effectiveness. The items recommended to a user by this method are greatly compatible with the interests of the user.

User interest data is easy to access, particularly in a mobile social network environment in which users give a considerable amount of tags, ratings, comments so on and so forth. Alternatives of these methods arise relying upon the way of user interest data' exploitation. Knowledge-based methods are especially used in recommending scenarios which demand professional domain knowledge and have a narrow usage.

Collaborative filtering methods are involving the users' interest data in order to make recommendations and can benefit from collective wisdom, which is a very powerful tool. They can be divided into three categories: project-based, user-based and hybrid collaborative filtering. These methods have a wide range of usage, however if there is a shortage of historical records, these methods could create difficulties.

Literature Review

A distance learning alternative, which uses modern information technology, is *m-learning* (*mobile learning*). This concept refers to the use of mobile (smartphone, PDA, iPod, etc.) or wireless devices in the learning process, anywhere and anytime, while users are moving (Traxler, 2007). M-learning is gaining more and more notoriety due to its portability feature (El-Hussein, Cronje, 2010, p.12). In order to be able to access educational materials, mobile devices must support the technologies shown in the figure below (Chicioreanu, 2008, p.62).

Figure 1 - Map of m-learning technologies
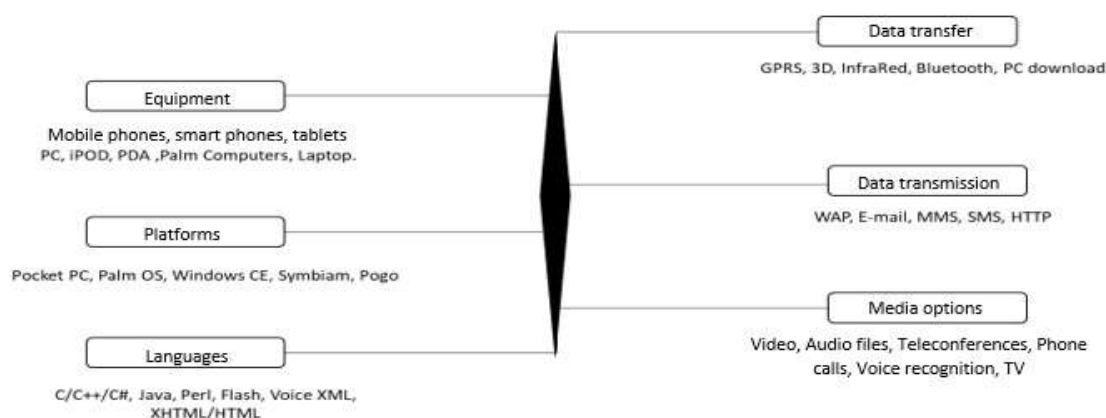
Source: Adapted after: Chicioreanu, 2008, p.63

Mobile 2.0 technology stands out, a characteristic of the Web 2.0 generation. It creates a dynamic environment, where the point of interest is directed towards socialising and communication involved in the synchronised or asynchronized community (Wang and Higghins, 2008, pp. 234-237). Mobile 2.0 educational activities are most often performed through SMS, blogs, wikis, iPods (Thorne and Payne, 2005).

The next generation of the Internet has led to the previously presented learning model, mobile 2.0, benefiting from considerable improvements in integrated applications and technologies. Thus, the transformation from mobile 2.0 to *mobile 3.0* will integrate in portable devices the elements of artificial intelligence of the Semantic Web, smart interpretations of semantic searches, technologies that allow the transposition from classrooms to virtual classrooms and more. Therefore, the educational process with the help of mobile 3.0 will be performed anytime, anywhere, with anyone and on any type of device (Rubens, et al., 2014).

The WWW generation was a powerful tool for research and education, but did not allow users to easily navigate over a huge amount of information. The Semantic Web partially solves this problem by allowing content and semantics (or related metadata) to be accessed by web agents, thus generating smart answers to user questions. In practice, the Semantic Web has a stratified structure: an XML layer to express web content (data structure), an RDF (Resource Description Framework) to represent the semantics of content (meaning of data); an ontology - layer for describing the domain vocabulary; and a logical layer to allow intelligent reasoning with meaningful data (Zilli, 2008, pp.126-127).

Methodology

In this paper, we conducted a quantitative research through which we aimed to identify the perception of employees in Romania regarding the usefulness of mobile learning platforms within the organisations in which they work. The study was conducted on a sample of 128 respondents. Of these, 72.7% were women, and 27.3% were men. Analysing from the perspective of the age of the individuals, over 90% of those who participated in the study were aged between 18 and 35. The last form of education the respondents graduated was high school in 51.6% of cases, the bachelor cycle in 27.3% of cases, college in 1.6% of cases, and master's studies in 19.5% of cases. In terms of income distribution, 59.4% of respondents have incomes between 2,001 and 3,000 RON, 27.3% between 1,500 and 2000 RON, 5.5%

between 3,001 and 4,000 RON, and between 4,001and 5,000 RON, while only 2.3% of the respondents have incomes lower than 1,500 RON.

The quantitative study was carried out in the period 2019-2020. For this quantitative research, data were collected from both primary and secondary sources. The collection of primary data was done using a questionnaire that was posted on an online platform. The sampling method used to perform this study was the snowball method.

Table 1.
Sample structure

Characteristics		N	%	Characteristics		N	%
The last form of education the respondents graduated	High school	66	51.6%	Income distribution	< 1500 RON	3	2.3%
	College	2	1.6%		1.500-2.000 RON	35	27.3%
	Bachelor cycle	35	27.3%		2001 - 3000 RON	76	59.4%
	Master's studies	25	19.5%		3001- 4000 RON	7	5.5%
Respondent age	18-25 years old	121	94.5%		4.001-5.000 RON	7	5.5%
	26-35 years old	2	1.6%	Respondent gender	Male	35	27.3%
	36-45 years old	5	3.9%		Female	93	72.7%

Source: Statistical survey made by the authors

Multiple Linear Regression Model
In this analysis, we wanted to identify the influence of the factors that were subjected to the analysis on the usefulness of existing m-learning platforms within the organisations in which respondents work. For this, we decided to create a multiple linear regression model to explain the existing influence. According to the literature, the multiple linear regression model is defined as:

$$Y = a + b1 * X1 + b2 * X2 + b3 * X3 + Ɛ, \text{ where:}$$

Y – represents the dependent variable (respondents' perception on the usefulness of the organisation's m-learning platform) **a** – represents the point of origin of the line (the constant); **b1, b2, b3** – represent the coefficients b for the independent variables (the possibility to obtain an accreditation after completing a course on the m-learning platform, the possibility to obtain feedback on the m-learning platform, the possibility to upload homework during the course, the frequency of information updating on the m-learning platform, the design of the m-learning platform);

X1, X2, X3 – represent the estimated value of the model parameters;   **Ɛ**   – represents the standard error related to the estimation.

Following the data analysis process, it can be seen that the value of the *R Square* determination coefficient is 0.516, which shows that there is a positive and quite close link between respondents' perceptions on the usefulness of m-learning platforms within organisations, and the factors that were considered in this analysis: the possibility to obtain an accreditation after completing a course on the m-learning platform, the possibility to obtain feedback on the m-learning platform, the possibility to upload homework during the course, the frequency of information updating on the m-learning platform, the design of the m-learning platform. This means that 51.6% of the variation in respondents' perception on the usefulness of m-learning platforms developed in organisations is explained by the way they are made both functionally and in terms of design.

Table 2-
Multiple linear regression model

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics F Change	df1	df2	Sig. F Change
1	.718[a]	.516	.496	1.116	.516	25.976	5	122	.000

a. Predictors: (Constant), Design of the m-learning platform, Possibility to obtain an accreditation after completing a course on the m-learning platform, Possibility to upload homework during the course, Possibility to obtain feedback on the m-learning platform, Frequency of information updating on the m-learning platform
Source: Statistical survey made by the authors

From the ANOVA table below, it can be seen that the value of Sig. = 0.000<0.05, which suggests that the multiple linear regression model achieved is statistically significant.

Table 3.
Linear regression model – ANOVA

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	161.848	5	32.370	25.976	.000[b]
Residual	152.027	122	1.246		
Total	313.875	127			

a.   Dependent Variable: Respondents' perception on the usefulness of the m-learning platform
b.   Predictors: (Constant), Design of the m-learning platform, Possibility to obtain an accreditation after completing a course on the m-learning platform, Possibility to upload homework during the course, Possibility to obtain feedback on the m-learning platform, Frequency of updating information on the m-learning platform

Source: Statistical survey made by the authors

The values obtained for each independent variable can be seen in the coefficients' table. Thus, the following variables registered significant values (Sig.<0.05): the possibility to obtain an accreditation after completing a course on the m-learning platform, the possibility to upload homework on the m-learning platform during the course, and design of the m-learning platform. For the other variables that were subjected to the analysis, the value of Sig. was higher than 0.05, which means that they are not statistically significant, and therefore cannot be considered in the linear regression model performed.

Table 3 –
Multiple linear regression model – Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	5.112	.645		7.921	**.000**
	Possibility to obtain an accreditation after completing a course on the m-learning platform	.591	.079	**.653**	7.519	**.000**
	Possibility to obtain feedback on the m-learning platform	-.171	.103	-.139	-1.653	.101
	Possibility to upload homework on the m-learning platform during the course	-.361	.069	**-.362**	-5.235	**.000**
	Frequency of updating information on the m-learning platform	.037	.110	.032	.338	.736
	Design of the m-learning platform	.418	.148	**.261**	2.816	**.006**

Source: Statistical survey made by the authors

If we apply the multiple linear regression equation to the proposed model, we have the following:

Respondents' perception on the usefulness of the m-learning platform within the organisation =

5.112 +	0.653 * Possibility to obtain an accreditation after completing a course on the m-learning platform	- 0.362 * Possibility to upload homework on the m-learning platform during the course	+ 0.261 * Design of the m-learning platform	+ 1.116

The table above shows that one of the biggest influences on respondents' perception on the usefulness of m-learning platforms within the organisations in which they work is given by the possibility of obtaining an accreditation after completing an online course. In addition, the design of the m-learning platform also has the ability to influence how its usefulness is perceived. Thus, the more special, easier to use and attractive the design is for the user, the more efficient he or she considers the m-learning platform to be, this also influencing his or her willingness to access the platform to take an online course.

On the other hand, it can be noted that the possibility to upload homework / materials during the online course negatively influences the way in which the usefulness of an m-learning platform is perceived. Users may place more importance on the materials they receive in order to gain new knowledge, and consider writing additional materials to be an additional effort on their part.

Conclusions
Technological developments in recent years have led to the emergence of various mlearning applications and platforms through which organisations have the opportunity to conduct trainings and courses that can be viewed later on mobile devices. The emergence of mobile learning platforms has given companies the opportunity to streamline their training process, provide employees with a large amount of information, and give them the opportunity to obtain accreditation by simply taking an online course.

In Romania, many companies have developed their own m-learning platforms through which they offer employees the opportunity to complete various trainings to obtain new information in the field in which they work. Moreover, they use the existing information on these m-learning platforms to better understand certain processes or to acquire new knowledge in related fields in which they want to specialise.

In this paper, we conducted a quantitative study through which we identified the main factors that have the ability to influence the perception of employees in Romania on the usefulness of m-learning platforms within the organisations in which they work. Thus, we noticed that the possibility to obtain an accreditation after completing a course on such a platform, the possibility to upload homework during the course, as well as the design of this m-learning platform have the ability to influence largely how its usefulness is perceived. In the future, we believe that other, more detailed quantitative studies should be carried out to show how these m-learning platforms should be built so that their efficiency is as high as possible.

References

Chicioreanu, T. D. (2008). *Suport de curs: M-learning-a viable way of learning*, București: Universitatea Politehnica, Available at: https://ris.uvt.ro/wp-content/uploads/2009/01/tchicioreanu.pdf, [Accessed date: 15.02.2020];

El-Hussein, M. O. M., and Cronje, J. C. (2010). Defining Mobile Learning in the Higher Education Landscape. *Educational Technology & Society*. 13(3), pp. 12–21.

Husson, T. (2019). *Mobile trends for 2020*, https://go.forrester.com/blogs/20-mobile-trends-for2020/, [Accessed date: 20.02.2020];

Meola, A. (2019). *Rise of M-Commerce: Mobile Ecommerce Shopping Stats & Trends in 2020,* [Accessed date: 19.02.2020], https://www.businessinsider.com/mobile-commerceshopping-trends-stats

Rubens, N., Kaplan, D., Okamoto, T. (2014). E-Learning 3.0: anyone, anywhere, anytime, and AI. *New Horizons in Web Based Learning,* 7697, p.171.

Thorne, S. L., & Payne, J. S. (2005). Evolutionary Trajectories, Internet-mediated Expression, and Language Education, *CALICO Journal*, 22(3), pp. 371-397.

Traxler, J. (2007). Defining, Discussing and Evaluating Mobile Learning: The Moving Finger Writes and Having Writ..., *The International Review in Open and Distance Learning*, 8 (2), pp. 113.

Wang, S., & Higghins, M. (2008). Mobile 2.0 Leads to a Transformation in mLearning, *Proceedings of the 1st international conference on Hybrid Learning and Education*, pp. 225-237;

Zilli, A. (2008). *Semantic Knowledge Management: An Ontology-Based Framework*, Hershey: IGI Global.