Mobile Applications Support for Managers

Miroslava Boneva, PhD
Faculty “Business and Management”
University of Ruse “Angel Kanchev”, Bulgaria
E-mail: mboneva@uni-ruse.bg

Abstract: The purpose of this paper is to discuss the function of mobile apps and their use in business managers’ trivial round. The realization of this aim is possible through the accomplishment of following tasks: (1) analysis of mobile apps, which are designed for managers; (2) exploring attitudes of managers to mobile applications. In this paper popular mobile business applications available on Google Play and GetApp have been analyzed. A classification of mobile apps has been formulated according to different criteria: purpose, initiator for creation, operation system, mode of operation and possibility for integration. It has been ascertained through expert assessments that mobile apps support 65% of managers’ activities and they have varied applications for business activities (time and tasks optimizing; monitoring and / or control; finance, commerce and marketing operations).

Key words: mobile apps; business management; management decisions; results of an empirical study.

I. Introduction

Mobile applications provide users with access to the data they need at the right time and at the corresponding location.

Timely and adequate information is a valuable business resource with the potential to support managers in their making justifiable decisions.
The paper aims at discussing the purpose of mobile applications and their usage in the everyday life of modern business managers. To achieve this purpose, the following steps have been taken: (1) analysing mobile applications designed for managers; (2) studying the managers’ attitudes to and relationship with mobile applications.

The scientific interest in the impact of mobile applications supporting the work of managers can be defined as a study of effects in the context of information and communication technologies, common in the second decade of the 21st century. And this is some kind of logical extension of the well-known effects (technical and economic, social and multiplier) from introducing automation systems for manufacturing, engineering work and management, based on computers and other equipment (Yordanov, 2010).

II. Exposition

Millions of mobile applications are constantly being created and used and thousands of them are business oriented, but the numbers are times less numerous when it comes to research papers on the issues of mobile applications and even fewer are the papers on business applications. Two examples can support this claim:

In July, 2016 the applications selected and recommended by the editor in Google Play are 176; the new and recently updated ones are 42; the top business applications are 300, with 20 added in the last week.

At the same time, 6930 results, with 393 published in 2016 appear in Google Scholar with key words “mobile applications” in the title, but when the key words are changed to “business mobile applications”, the total number of publications is 4. When we look at the full text of the paper, the result is 76, of which only one paper was published this year.

The search in Bulgarian yields 55 occurrences of the key phrase „mobile applications“, of which only one in the title and only three issued in 2016. These papers cover technical and technological issues, and this is some kind of logical extension of the well-known effects (technical and economic, social and multiplier) from introducing automation systems for manufacturing, engineering work and management, based on computers and other equipment (Yordanov, 2010).
related to development, software architecture and various optimisation algorithms. Using key words combining “business”, “control” and “management” with “mobile applications” did not yield a single result.

The above-mentioned arguments serve as sufficient motivation for the author to investigate the special features of mobile applications, the different types, as well as the attitude of users to the mobile software products, designed for business.

1. Features and usage of mobile applications

1.1. Development and characteristics of mobile applications

During the last three decades, the use of mobile phones and other portable electronic devices has created preconditions and has become a kind of catalyst for the development and spread of innovative mobile services, which upgrade and expand the understanding of electronic business and the opportunities in other environments beyond business.

It is no longer a luxury, but a necessity and even a priority to use various mobile applications through devices, with decreasing size and increasing capacity and computational ability, as well as better user interface. According to Kraeva (2013, p. 73) and other researchers she has quoted, “Due to the wireless communications, the access to a great part of the corporate network is in the ‘pocket of its employee’. Thus mobility increases the productivity of business through a greater flexibility of routine business processes, irrespective of time and space.

Thanks to the advance on wireless and mobile technologies, numerous applications have been developed in various fields: health care, entertainment, education, insurance, etc. They aim at bringing services closer to the users. In addition, these technologies allow the public and private sectors to organise, control, distribute and provide services (information, transactional, advertising, navigational, tracking, payment ...) to the community more effectively and economically (Georgiev, Ts., свързана с разработка, софтуерна архитектура и разнообразни оптимизационни алгоритми. С ключови фрази, комбиниращи понятията бизнес/управление/мениджмънт и мобилни приложения няма нито един резултат.

Посочените аргументи са достатъчно мотивиращи и насочват автора към проучване на особеностите на мобилните приложения, видовете им, както и отношенietо на потребителите към мобилните софтуерни продукти, които са предназначени за бизнеса.

1. Особености и предназначение на мобилните приложения

1.1. Развитие и характеристики на мобилните приложения

През последните три десетилетия използването на мобилни телефони и други преносими електронни устройства създава предпоставки и е самообразен катализатор за развитие и разпространение на иновативни мобилни услуги, които надстройват и разширяват разбирането за електронен бизнес и възможностите не само в бизнес средата. Вече не е лукс, а необходимост и приоритет използването на разнообразни приложения през мобилни устройства, които са с все по-малки размери и същевременно с по-голям капацитет и изчислителни възможности, по-добър потребителски интерфейс. Според Kraeva (2013, с. 73) и други изследователи, на които се позовава „Благодарение на безżyczните комуникации достъпът до голяма част от корпоративната мрежа се намира в „джоба на нейния служител“. Така че мобилността увеличава продуктивността на бизнеса чрез по-голяма гъвкавост на рутинните бизнес процеси без оглед на тяхното място и време.”

Благодарение на напредъка в безчижните и мобилните технологии, много приложения са разработени в областта на различни сектори: здравеопазване, развлечение, образование, селско стопанство, образование, застраховане и т.н. и целят предоставяне на услуги по-близо до потребителите. В допълнение, тези технологии дават възможност на публичния и частния сектор да се организират, ръководят, разпространяват и предоставят услуги (информационните, транзакционни, рекламни, навигационни, проследяващи, разплащателни ...) на обществеността и то чрез по-ефективен
Mobile applications are characterised with the advantage that they provide timely access to resources, greater flexibility in the work of institutions, producers, traders and other business agents, as well as more efficient interaction in their joint activities. That is why, security and information protection is an essential problem, since this advantage means working with confidential data of financial or personal nature. The successful solution of this problem means using standards when developing mobile device browsers for data transmission and encryption. Therefore, the mobile application developers’ primary concern is to protect their users’ personal space and they are doing their best to prevent non-authorised access to personal data (Kraeva, V., 2013).

Mobile applications evaluation can be conducted, using criteria such as: (1) means for synchronisation with corporate databases, supporting tools, control of versions, two-way data transmission, etc.; (2) means providing access to corporate servers, using various ways of connection, including wireless; (3) high security level of data transmission; (4) means for integration, allowing exchange of information through various applications and data sources, which provide compatibility with the management information systems already installed and (5) centralised administration of mobile devices, as well as of applications and data used. Besides, in order for the mobile applications to function efficiently, the availability of mobile services portals, or the re-setting of existing ones is necessary. Another must is the possession of personal information control instruments for mobile communication and user location, so that the latter could be offered the most suitable service (Kraeva, V., 2013).

Historically, the first digital App Store was created by Apple Inc. and started working on 10.07.2008 with 500 applications. The first weekend brought 10 million downloads, with the number of applications growing dramatically. The same trend is
followed by their consumption – in May, 2013 the number of downloads reached 50 billion. In 2010, some companies, producing mobile phones, develop their own mobile applications stores such as Nokia, Samsung, etc. The Wholesale Applications Community was set up to offer applications that can work for telephones with different operating systems, under the initiative of operators all over the world - AT&T, Sprint, Verizon Wireless, China Mobile, NTT DoCoMo, Orange, Vodafone, etc. Gartner has established its own subsidiary, Nubera eBusiness S.L., which has developed the digital store GetApp, offering mobile applications for devices with different operating systems. The competitor Google Play (with the merger between Android Market, Google Music and Google eBook store) started on 06.03.2012. A few years later, App Store and Google Play offer over one million applications. All of them have their specific features, parameter, functions and purpose, but nobody needs the whole range of applications. For the convenience of users, the mobile devices are sold with a number of apps installed in advance, besides, most websites and services, known to the modern man, have their own mobile applications. Furthermore, in every store you can look for and easily install the software needed (PC World, 2010), (Stoyanov, K., 2013), (Ivanov, T., 2014), (Nubera eBusiness S.L., 2016).

The developers of modern mobile applications are facing the challenge of finding ways of attracting the attention of their users and providing them with emotional experiences. To some extent, this is achieved through blurring the boundaries between social networks and e-stores, including possibilities for purchases directly from Facebook Facebook, Instagram or Pinterest. Parallel to this, the business organisations, striving to win the attention, trust and loyalty of their clients, offer them special discounts through accumulating bonus points in a special mobile application, which, in its turn, provides priceless marketing information to the trader. The information about the clients, accumulated in this way, aids decision-making for future proposals.
to the respective client or a group of users with similar interests. In this way, the seemingly boundless data flow is transformed into useful information, serving for successful business management.

The trends for future development of mobile applications can be found in different fields (development, purpose, target results, etc.) depending on the authors’ points of view.

A Chinese scholar determines the trends for development of mobile applications depending on the development platforms, business sectors, branding, socialisation, personalisation and monetisation (Yong, 2012).

A Bulgarian researcher (Kasakliev, N., 2015) reviews the modern trends for development of mobile applications and finds their expression in (1) standardisation of development tools (2) differentiation of approaches for the development of “universal” applications and applications whose popularity is growing fast such as the so called “smart clothes” (measuring the pulse, signalling theft, changing the temperature), automotive systems (signalling an accident at 112 with localisation and specifying the number of casualties, etc.), various consumer electronics, etc.

The development of the functions and purpose of the mobile applications is changing the routine of modern man in some unexpected aspects, which so far have looked like fantasies. Today, using a smart phone and the respective application, it is possible to: measure vital signs; switch on household appliances remotely; synchronise a fitness programme; take advantage of the most lucrative offers in the nearest store or restaurant; direct payment, etc.


Респективно събраната информация за клиентите подпомага вземането на решения за бъдещи предложения към съответния клиент или група потребители със сходни интереси. По този начин необятният на пръв поглед поток от данни се превръща в полезна информация, която да служи за успешно управление на бизнеса.

Тенденциите за бъдещо развитие на мобилните приложения се търсят в различни направления (разработка, предназначение, целеви резултати и др.) в зависимост от гледните точки на авторите.

Български изследовател (Kasakliev, N., 2015) разглежда съвременните тенденции при разработката на мобилните приложения и констатира, че те се изразяват в (1) уеднаквяване на инструментариума за разработка, (2) диференциране на подходите за разработка на „унiversalни” приложения и приложения за набираещите популярност мобилни устройства от категории на т.н. „умни дрехи” (измерващи пулса, сигнализиращи кражба, променящи температурата), автомобилни системи (сигнализиращи за пътнотранспортно произшествие на тел. 112 с локализация и конкретизиране на броя пострадали и др.), разнообразна потребителска електроника и др.

Развитието на функциите и предназначението на мобилните приложения променя ежедневието на съвремения човек в неочаквани аспекти, които до сега са изглеждали като фантазии. Днес е възможно с помощта на смартфон и съответното приложение да се осъществи: измерване на жизнени показатели; дистанционно стартиране на домакински уред; синхронизиране на фитнес програмите; възползване от най-изгодните оферти в най-близкия магазин или ресторант; директно разплащане и т.н.

seemingly futuristic achievements such as “smart home”, “smart agriculture”, “smart health care”, “smart industry” is the concept of Internet of things – IoT. According to this concept, in the near future, all devices will be connected in the global network (from home appliances to production lines) and will be controlled via the Internet, by means of communication between the different devices and information systems. According to Gartner, in 2016 there will be 6.4 billion devices in the world, connected via the Internet, i.e. 30% more than the previous year.

The mobile software plays an essential role in the implementation of the “Internet of things” concept. In order to fulfill the necessary functions between remote devices, thanks to wireless Internet connection. This shows that it is reasonable to consider this concept as a potential for developing applications, whose purpose will be to perform online control of business not only through remote control of equipment, but also through processing of data for processes and markets.

1.2. Classification of mobile applications

The numerous and diverse mobile applications, offered in the publicly available platforms for their distribution, create a sense of vastness and chaos. Their grouping and classification by specific signs can neutralise the chaos to a certain extent. For example, filters for easy selection of target applications, meeting criteria, desired by the users, function in GetApp while in Google Play orientation and finding a specific group of applications by using key words is more complex and time-consuming.

A small number of authors have systematised classifications of mobile applications with a scientific and applied focus. The majority of classifications concern technological aspects while the purpose, the users and other criteria can be used to determine the grouping.

An international team of researchers from Nokia Research Centre and universities 2016) в основата на футуристичните на пръв поглед постижения, като „умен дом“, „умно земеделие“, „умно здравеопазване“, „умна индустрия“ стои концепцията за „Интернет на нещата“ (Internet of things – IoT), съгласно която в близко бъдеще всички устройства ще бъдат свързани в глобалната мрежа (от домашните електроуреди до производствените линии) и ще могат да бъдат управлени през интернет чрез комуникация между различните устройства и информационни системи. По данни на Gartner през 2016 г. в света ще се използват 6,4 млрд. устройства, които са свързани с интернет, т.е. с 30% повече отколкото са били през предходната година. Мобилният софтуер има основна роля за реализиране на концепцията „Интернет на нещата“, за да се изпълнят необходимите функции между отдадечени устройства, благодарение на безжична интернет връзка. Това показва, че е необходимо да се счита, че тази концепция притежава потенциал за създаване на приложения, чието предназначение се изразява в осъществяване на онлайн контрол в бизнеса не само чрез дистанционно управление на оборудването, а и чрез обработка на данни за процеси и пазари.

1.2. Класификация на мобилните приложения

Многобройните и разнообразни мобилни приложения, които се предлагат в общодостъпните платформи за тяхното разпространение създават усещане за необятност и хаос. Тяхното групирание и класификариране по определени признаци може да неутрализира хаоса до известен степен. Например в GetApp функционират филтри за лесно селектиране на целеви приложения по желани от потребителя критерии. Докато в Google Play ориентирането и намирането с ключови думи за конкретна група приложения е по-сложно и времеемкмо. Класификации на мобилни приложения са систематизирани с научно-приложна насоченост от няколко брой автори. Преобладаваща част от класификациите засягат технологични аспекти, а е възможно да се групират и от позиция на потребителите, предназначението и други критерии. Международен екип изследователи от центъра за изследвания на Nokia и университети в САЩ и Китай анализират
from the USA and China have analysed the consumption of mobile applications, after having developed a model, used to classify the various mobile software products, according to their functions, context information and the operation of mobile devices and search engines (Zhu, H., Cao, H., Chen, E. & Tian, J., 2012).

Scientists, studying the development of medical instruments and the use of mobile applications in aid to wireless monitoring and diagnostics, as well as decision-making, offer classification of those applications into three main categories: open code, commercial and research. Two subcategories have been added: for patients and for medical personnel (Martínez-Pérez, 2013).

Researchers from India, studying the life cycle of mobile applications development, divide them into three groups: (1) “native” – software products developed for a special platform and installed on a respective device; (2) “hybrid” – combining elements from the other two types (native and web) and (3) “web” – web-based applications accessible through a device browser or a browser, installed on a third device (Kaur, A. & Kaur, K., 2015).

A team of Portuguese researchers classify the mobile applications into two main types – “native” (conventional applications, developed and optimized for the specific platform) and web-based, accessible through the browser of the mobile device (Fernandes, J. & Ferreira, A., 2016). A year earlier, a Bulgarian scientist categorized and explained in more details the applications (Kasakliev, N., 2015).

For the purpose of the present paper, a classification (fig. 1) of the types of mobile applications is offered, according to five criteria: (1) purpose; (2) subject – initiator of the development; (3) operating system, (4) behaviour and (5) ability to integrate with other information systems.

In the subsequent parts of the paper, the mobile applications have been reviewed in the context of their business purpose. This work can be improved in subsequent papers by going deeper into other aspects of the use of mobile applications, by comparing results of the above research with other studies and by suggesting future research directions.
1.3. Analysis of mobile applications with business focus

The analysis directed to the popular mobile business applications, offered in two large online stores for mobile applications – Google Play and GetApp, groups them according to their purpose and involves a study of quantitative indicators and presenting examples of top products (Table 1).

1.3. Анализ на разпространените мобилни приложения с бизнес насоченост

Анализът е насочен към популярните мобилни бизнес приложения, предлагани в два големи онлайн магазина за мобилни приложения – Google Play и GetApp. Той представлява групиране на приложенията според тяхното предназначение, проучване на количествени показатели и представяне на примери за топ продукти (табл. 1).
These two digital stores have been chosen because one of them is very popular in Bulgaria and the second one offers applications for various operating systems.

The applications offered in Google Play are compatible with Android operating system. The prices of business applications in this platform vary from a few Euro cents to several dozens of Euros. The cheapest apps are priced 0.75 € – CamCard-Business Card Reader and Sicilia Lavoro, while the highest price is 43.99 € for FineScanner Pro and the most common prices reach up to 5 €.

Business applications in GetApp are either free or offered for a single license fee or a subscription plan. In this platform there are apps with an open code, for Android, iOS or web-based. Those created with an

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Number</th>
<th>Most common</th>
<th>Purpose</th>
<th>Number</th>
<th>Most common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimising the time and tasks</td>
<td>34</td>
<td>Mind Tools, Time</td>
<td>Finansical operations</td>
<td>200</td>
<td>Economy, Finance</td>
</tr>
<tr>
<td>(self-organising, project management)</td>
<td></td>
<td>Management Tips,</td>
<td>and Business</td>
<td></td>
<td>aAccounting, Lloyds</td>
</tr>
<tr>
<td>Оптимизиране на времето и заданич</td>
<td></td>
<td>Chaos Control - GTD</td>
<td>Bank Business, Tablet Business,</td>
<td></td>
<td>Bank Business,</td>
</tr>
<tr>
<td>(самоорганизиране, управление на</td>
<td></td>
<td>To-Do List</td>
<td>Mobile Business</td>
<td></td>
<td>Mobile Business</td>
</tr>
<tr>
<td>проекти)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finansical operations (mobile</td>
<td>99</td>
<td>Concur Mileage</td>
<td>Tracking and/or control</td>
<td>84</td>
<td>Workable</td>
</tr>
<tr>
<td>banking, invoicing, budgeting...)</td>
<td></td>
<td>Log GPS Tracker,</td>
<td>Проследяване и/или контролиране</td>
<td></td>
<td>Greenhouse, Bamboo</td>
</tr>
<tr>
<td>Финансови операции (мобилно</td>
<td></td>
<td>Sales Tracker</td>
<td></td>
<td></td>
<td>HR, HireSelect</td>
</tr>
<tr>
<td>банкiranе, фактуриране, бюджетиране</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>100</td>
<td>Lifestyle Tradie,</td>
<td>Trade</td>
<td>466</td>
<td>eRep CPQ +</td>
</tr>
<tr>
<td>Търговия</td>
<td></td>
<td>Google My Business</td>
<td></td>
<td></td>
<td>Insightly Stitch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Promarket b2b sales</td>
<td></td>
<td></td>
<td>Labs Canvas</td>
</tr>
<tr>
<td>Marketing goals (mobile organisation</td>
<td>199</td>
<td>Online Marketing,</td>
<td>Marketing goals (mobile organisation</td>
<td>515</td>
<td>Campaign Monitor</td>
</tr>
<tr>
<td>and management of research,</td>
<td></td>
<td>QuickBooks Online</td>
<td>and management of research,</td>
<td></td>
<td>Wrike; Talkdesk</td>
</tr>
<tr>
<td>motivation of loyal users,</td>
<td></td>
<td>Accounting, Best</td>
<td>motivation of loyal users,</td>
<td></td>
<td>bpm’online marketing</td>
</tr>
<tr>
<td>relationship with costumers.)</td>
<td></td>
<td>Business Card</td>
<td>motivation of loyal users,</td>
<td></td>
<td>Infusionsoft;</td>
</tr>
<tr>
<td>Маркетингови цели (мобилно</td>
<td></td>
<td>Organizer Base CRM</td>
<td>motivation of loyal users,</td>
<td></td>
<td>RingCentral bpm’online</td>
</tr>
<tr>
<td>организиране и управление на</td>
<td></td>
<td>Zoho CRM, Dynamic</td>
<td>motivation of loyal users,</td>
<td></td>
<td>CRM; Salesforce</td>
</tr>
<tr>
<td>процуачване, мотивация на лоялни</td>
<td></td>
<td>CRM for Phones</td>
<td>motivation of loyal users,</td>
<td></td>
<td>Sales Cloud;</td>
</tr>
<tr>
<td>потребители, взаимоотношения с</td>
<td></td>
<td>Customer Events</td>
<td>motivation of loyal users,</td>
<td></td>
<td>Clicktools</td>
</tr>
<tr>
<td>клиенти)</td>
<td></td>
<td>Records CRM-L</td>
<td>motivation of loyal users,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>motivation of loyal users,</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Grouping and comparison of mobile business applications in the most commonly used platforms

| Таблица 1. Групиране и съпоставка на мобилните приложения с бизнес предназначение в най-използваните платформи

These two digital stores have been chosen because one of them is very popular in Bulgaria and the second one offers applications for various operating systems.

The applications offered in Google Play are compatible with Android operating system. The prices of business applications in this platform vary from a few Euro cents to several dozens of Euros. The cheapest apps are priced 0.75 € – CamCard-Business Card Reader and Sicilia Lavoro, while the highest price is 43.99 € for FineScanner Pro and the most common prices reach up to 5 €.

Business applications in GetApp are either free or offered for a single license fee or a subscription plan. In this platform there are apps with an open code, for Android, iOS or web-based. Those created with an
Mobile Applications Support for Managers

open code, form a community of developers, who have access to various information and create high added value.

Google Play is a platform popular among Bulgarian users since mobile devices with Android have more affordable prices but the analysis shows that there are over 1000 more business applications in GetApp. Some apps can be used with different operating systems. The following example supports this claim: the total number of applications for sale is 444, and after choosing separate criteria, depending on the operating system, 71 applications are assigned for Android, 97 for iOS and 376 web-based, so the sum total is 544, which means that 100 applications are multi-platform. The ten most common cross-platform tools for applications development, which can be used by several operating systems and get rid of the dilemma „Which platform is the application for?” have been classified in the specialised blog of thinkapps.com, with the first three places belonging to Sencha, PhoneGap and Appcelerator Titanium (Balduin, 2015).

In subsequent papers it is possible to analyse applications for other operating systems, for example Blackberry, to expand the comparative analysis with other mobile applications stores (App Store, etc.), upgrading the current results and existing analyses (Halliwell, 2013).

2. Empirical study of managers’ attitude to mobile applications

2.1. Methods of study

The study to establish the attitude of managers to mobile applications has been conducted using methods, which are subject to the general methodology of research (Nedyalkov, A. & Boneva, M., 2015) and are presented on fig. 2, together with the relevant elements with the following numbers: (1) general setting and restrictive conditions; (2) object and subject of the study; (3) thesis and hypothesis of the study; (4) set of people under study and sample size; (5) structure of survey card; (6) implementation; (7) approaches

coihto se създават с отворен код форми- рат общност от разработчици, които имат достъп до разнообразна информация и създават висока добавена стойност. Google Play е популярна платформа сред българските потребители, тъй като мо- билните устройства с операционна сис- tema Android имат по-достъпни цени, но анализът показва, че в GetApp има над 1000 бр. повече бизнес приложения. Ня- кои приложения позволяват да се използ- ват с различни операционни системи. В подкрепа на това твърдение е следният пример: общият брой на приложенията за продажби е 444, а след избиране на отделни критерии в зависимост от опера- ционната система от същата група при-ложения се посочват 71 бр. за Android, 97 за iOS и 376 уеб-базирани, следова-телно сумата е 544, а това означава, че 100 приложения са мултиплатформени. Десетте най-разпространени кросплат-формени инструмента за разработка на приложения, които могат да се използват от няколко операционни системи и спес-тяват дилемата „За коя платформа да бъде приложението?” са класифицира- ни в специализиран блог на thinkapps. com, като първите три места са заети от Sencha, PhoneGap и Appcelerator Titanium (Balduin, 2015).

В бъдещи разработки е възможно да се извърши анализ и на приложения за дру-ги операционни системи, например за Blackberry, да се обогати сравнителният анализ и с други магазини за мобилни приложения (App Store и др.), като се надградят настоящите резултати и съ-ществуващи анализы (Halliwell, 2013).

2. Емпирично проучване на отно-шението и нагласите на мениджъри към мобилните приложения

2.1. Методика на изследването

Проучването за установяване на отно-шението на мениджърите и техните на-гласси към мобилните приложения е из-вършено, съгласно методически апарат, който се подчинява на общата методика на научни изследвания (Nedyalkov, A. & Boneva, M. 2015) и е представен на фиг. 2 заедно с релевантните елементи, на които съответстват следните номера: (1) обща постановка и ограничителни усло-вия; (2) обект и предмет на изследване; (3) теза и хипотеза на изследването; (4) изследвана съвкупност и обем на извад-ката; (5) структура на анкетната карта;
to data processing; (8) analysis of results; (9) conclusions and recommendations of the study.

Figure 2. Methods of the empirical study

1) The general setting of the study includes its main goal, which is to determine the attitude of manager-experts to mobile applications. For achieving this goal, objectives have been set, related to (1) identifying the fields for which mobile applications are used; (2) specifying the purpose of business applications used and (3) studying the intentions for future use of similar mobile applications. The restrictive conditions boil down to the fact that the survey is designed for managers, whose organisations function on the territory of Ruse.

2) Managers at strategic, tactical and operational level are the object of study. Mobile applications and their purpose are the subject of the current study. There is close connection between the object and the subject of study.

3) The study thesis is related to the object and subject of study. Its formulation sounds as follows: Managers use mobile business applications, which aid their activities. Besides, they will continue to use them and expand this usage. To prove the thesis, two hypotheses have been raised. The first hypothesis (H1) is expressed in the assumption that more than half the managers at all management levels use mobile business applications. The second hypothesis (H2) assumes that the interest of managers to business applications with various business orientation will be growing.

4) In the set of people under study are included managers of companies that

1) Общата постановка на изследването включва основната му цел, която се изразява в установяване на отношението на мениджъри – експерти към мобилни приложения. За постигане на тази цел са поставени задачи, които са свързани с (1) идентифициране направленията, за които се използват мобилни приложения; (2) конкретизиране целите на употребяваните бизнес приложения и (3) проучване на намеренията за бъдеща работа с подобни мобилни приложения. Ограничителните условия се свеждат до обстоятелството, че анкетата е насочена към мениджъри, чиито организации функционират на територията на гр. Русе.

2) Мениджъри на стратегическо, тактическо и оперативно равнище са обект на изследване. Мобилните приложения и тяхното предназначение представляват предмет на настоящото проучване. Съществува тясна връзка между обекта и предмета, към които е насочено изследването.

3) Изследователската теза е свързана с изследвания обект и предмет. Нейната формулировка звучи по следния начин: мениджърите използват мобилни приложения с бизнес предназначение, подпомагащи тяхната дейност освен това ще продължат и разширят употребата им. За доказване на тезата се издигат две хипотези. Първата хипотеза (H1) се изразява в предположението, че повече от половината мениджъри на всички управленски равнища използват мобилни приложения за бизнес дейности. Чрез втората хипотеза (H2) се предполага, че ще се увеличава интересът на мениджърите към бизнес приложенията с различна бизнес насоченост.

4) В изследваната съвкупност попадат
function in Ruse. For the purpose of the current study, no official information has been purchased from the National Statistics Institute, so the size of the general setting cannot be determined. That is why we have used experts and a sample size, formed by “volunteering respondents”. According to the method of expert evaluation, the optimal number of experts to respond is between 7 and 20 (Hristova, 2007), (Kunev, 2012), (Boneva, M. & Petkov, A., 2013).

5) The survey card consists of five closed answer questions and one field for entering a free opinion and feedback contact if the respondents want to be informed about the summary of results. The questions are structured in two sections, which correspond to the characteristics of the setting under study. The first section includes two demographic questions, which help identify the manager position of the respondent and the region, where the organisation that he/she represents is functioning (material production, services or other – for example, NGOs). The second group of questions (3) are directed to the purposes of using mobile applications by the respondents and the purpose of business applications, which the managers are using or will be using in the future. The survey is anonymous so that a greater number and more sincere answers are obtained by the respondents.

6) The study is conducted with the support of societies and organisations, which unite representatives of different business sectors. The survey questionnaire is web-based, using a Google form (an option from Google Forms). The link to this form is sent by e-mail to Ruse Commerce and Industry Chamber; Ruse Chamber of Commerce; Bulgarian and Romanian Commerce and Industry Chamber; Regional Trade union of KT “Podkrepa”, Ruse. Representatives of these organisations serve as mediators, distributing the questionnaire to the experts, who express their opinion. The answers are collected in the online form.

7) The following approaches to data processing have been used: (1) automatic summarization of the results from the form; (2) additional processing in
matic summary of results from the form; (2) additional processing in Excel, through applying statistical and mathematical functions; (3) testing hypotheses in the online statistical calculator.

8) **The analysis of** results is expressed in text and graphical presentation of the results obtained and statistical test of the hypothesis raised.

9) According to the **conclusions of the study, recommendations** to the object of study are prepared, taking into account the state of the object and aiming for future development in an upward trend.

**2.2. Analysis of the study results obtained**

In the period 12 – 19.07.2015 answers from 17 (seventeen) respondents have been registered. Of them 12 experts represented business organisations if the service sector, four were from the production sector and one from an NGO.

The structural distribution according to the management level of the participating experts is shown on fig. 3. Strategic managers prevail (8). Operational managers are one less than the senior experts while the tactical level experts are two. There are no participants at a position other than managerial, participating in the study.

The answers to the question „What do you use mobile applications for?” are shown on fig. 4. They show that all experts resort to mobile applications for various purposes. Managers use mobile applications mostly for social contacts and business; half the respondents relax from stress, using mo-
Mobile applications for fun; about 1/3 look for target objects and optimise the work of their mobile devices through the respective software products; ¼ get some training thanks to the opportunities offered through mobile applications and only two (almost 12%) express their civil position by signing petitions and taking part in studies from their mobile device.

Figure 4. Purposes, for which managers use mobile applications

On fig. 5 the results from the answers to the question „What business applications do you use?” are shown. From them it can be established that almost 60% of the experts surveyed optimise their time and the distribution of tasks with the help of the respective mobile applications. Almost half of the respondents carry out monitoring and/or control processes and employees. 41% (7) of the managers claim that they use mobile software for marketing, i.e. for mobile organisation and management of studies, motivation of loyal users and relationships with customers. About 30% conduct mobile trade. Approximately 12% (two) of the experts surveyed conduct financial operations, i.e. use mobile banking and the same number share that they do not use mobile applications in their job.

Figure 5. Purpose of the mobile applications used

На фиг. 5 са изобразени резултатите от отговорите на въпроса „Какви бизнес приложения използвате“. От тях се установява, че почти 60% от анкетираните експерти оптимизират своето време и разпределението на задачите си с помощта на мобилни приложения за тази цел. Почти половината респонденти осъществяват проследяване и/или контролират процеси и подчинени. 41% (7 бр.) от мениджърите заявяват, че използват мобилен софтуер с маркетингова насоченост, т.е. за мобилно организиране и управление на проучвания, мотивация на лоялни потребители, взаимоотношения с клиенти. Около 30% осъществяват мобилна търговия. Приблизително 12% (два) от анкетираните извършват финансови операции, т.е. използват мобилно банкиране и също толкова споделят, че не използват в работата си мобилни приложения.
The intentions of experts for future use of mobile business applications are shown on fig. 6. The answers show that the values, concerning the applications, supporting time and task optimisation are the same. The second position is occupied by intentions for using applications, focused on marketing, followed by those for mobile trade. After them come the applications for financial operations and monitoring and control, both with a bit under 30%. Only one respondent claims that he does not intend to use mobile applications in his business.

Figure 6. Purpose of potential mobile business applications

Около ¼ от респондентите (24%, 4 бр.) посочват в анкетния формуляр адресите на своите електронни пощи, проявявайки интерес към обобщените резултати от проучването. Това показва, че научното изследване не е самоцелно, а има потенциал да придобие научно-приложен характер, щом представители на бизнеса желаят да се запознаят с цялата разработката.

Проверката на първата хипотеза (H1) се изразява в изследване на относителния дял на респондентите, използващи мобилни приложения за бизнес цели. По-вече от половината мениджъри (65%, 11 бр.) на всички управленически равнища използват мобилни приложения за бизнес дейности.

Изхождайки от презумпцията, че оперативните мениджъри имат пряк достъп до хора, процеси и информационни системи, т.е. те са пряко ангажирани в информ...
tion, conveyed at the higher management levels, it is perfectly reasonable that fewer operational managers may need to use mobile business applications.

Figure 7. Consumption of business mobile applications at the three management levels

Testing the second hypothesis (H2), related to the interest of managers in different business applications is graphically presented on fig. 8. The results show an increase of the interest in mobile banking more than twice (a change by 18 points, i.e. 12% current users, 29% intending users). The interest in mobile trade has grown by 12 points (from 29% to 41%). Marketing mobile applications would have an increased intended consumption by 6 points (41% → 47%). The use of mobile applications for optimising manager’s time and tasks remains without any change. A negative tendency is observed for the mobile software products for monitoring and/or control. The reasons for such future decrease in the setting under study are not known, so a future study is needed. The negative difference of 6 points (from 12% to 6%) for those not using business applications is actually a positive phenomenon. In fact it shows that only one of the respondents remains conservative, i.e. he isn’t using mobile business applications at the moment and does not intend to use them in future.
As a summary of the second hypothesis it can be noted that the managers will continue to use mobile applications for optimising of their time and tasks. Besides, they will increase the consumption of mobile applications for financial, trade and marketing operations, but they will decrease the use of apps for monitoring and/or control of processes and employees.

Figure 8. Comparison between current and future use of mobile applications in business

The results from the two hypotheses show that 65% of the managers surveyed use mobile applications with various business purpose, aiding their activity, and they will continue or even expand their use (with the exception of applications for monitoring and/or control).

The results achieved reach the objective of this development, but for greater certainty it is advisable to deepen the analysis by applying additional statistical methods for testing the consistency of opinion between managers from different levels of government and regarding the use of the mobile applications for business activities.

III. Conclusion.

In conclusion of this paper, the following contributions can be noted:

1) The characteristics of mobile applications have been studied and a classification has been worked out, according to various criteria: purpose, initiator for creation, operating system, behaviour and opportunities for...
Mobile Applications Support for Managers

integration.
2) The popular mobile business applications, offered in the leading software platforms in this class Google Play and GetApp have been analysed.
3) It has been proved and justified that the concept Internet of things outlines trends of development of mobile applications, which have the potential to serve as online control in business through remote control of equipment and data processing for processes and markets.
4) It has been established by expert assessments that mobile applications support the activities of 65% of the managers at different management levels and have a varied destination for business activities (optimising of time and tasks; monitoring and/or control, financial, trade and marketing operations). The applications in almost all target groups show a tendency of increase of future users.
5) It is recommended (1) further in-depth analysis of the data obtained in future development through statistical methods for consistency; (2) The results of this paper to be circulated to the members of business associations, who expressed sympathy to the study, as well as other industry associations in order to present to more managers the capabilities of mobile applications for business management.

dаване, операционна система, режим на работа и възможности за интеграция.
2) Анализираните са популярните мобилни бизнес приложения, предлагани във водещите платформи за софтуер този клас Google Play и GetApp.
3) Аргументирано е, че концепцията „Интернет на нещата“ очертава тенденциите за развитие на мобилните приложения, които имат потенциал да служат за онлайн контрол в бизнеса чрез дистанционно управление на оборудването, обработка на данни за процеси и пазари.
4) Установено е чрез експертни оценки, че мобилните приложения подпомагат дейността на 65% от менеждърите на различни управленски равнища и имат разнообразно предназначение за бизнес дейности (оптимизиране на време и задачи; проследяване и/или контрол, финансови, търговски и маркетингови операции). Приложението от почти всички целеви групи имат тенденция за увеличаване на бъдещите потребители.
5) Препоръчва се (1) допълнително задълбочено анализиране на получените данни чрез статистически методи за съгласуваност; (2) резултатите от настоящата разработка да бъдат разпространени до членовете на бизнес сдружения, които проявиха съпривеждането към проучването, както и до други браншови асоцииации, за да се запознаят повече менеджъри с възможностите на мобилните приложения за бизнес управление.
Reference/Литература


