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# CONVERGENCE OF MOBILE TECHNOLOGIES IN CONTEMPORARY ORGANIZATIONS

BEATA BUTRYN, PIOTR MACHURA

*Management, Information Systems and Finance, Wrocław University of Economics*

Mobile technologies have become an indispensible functional element of modern organizations. They provide continuous access to information, regardless of the user's location and time of connection. The dynamic development of mobile technologies results in gradual overcoming spatial barriers, increased productivity, and new business opportunities. Article identifies the impact of mobile technology on developments inside and outside the organization, presents the key features and benefits of mobile technologies, devices and applications. Paper presents the convergence of mobile technologies, converging solutions and their benefits. Document is enriched with analysis of case studies showing the practical application of this subject.

Keywords: mobile technologies, the convergence of mobile technology, e-economy

## 1. Introduction

Mobile technologies have become an indispensible functional element of contemporary organizations. The term 'mobile technologies' represents a class of devices operating independent of user's geographic location. Mobile devices offer the capability of sending, receiving and processing of data without the constraints of a wired connection to telecommunications networks. They provide continuous and largely uninterrupted access to information, regardless of the user's location and time of connection. Practical use of mobile technologies requires not only investment in contemporary mobile devices and applications, but also proper design of mobile infrastructure, providing users with remote access to company resources.

Rapid development of mobile technologies has the effect of gradually eliminating spatial constraints. It offers time-saving benefits and increases employee mobility, thus promoting cost-optimization and dispersion of business operations. The main goal of the study was to answer how the convergence of mobile technologies appears on the market, and to show the benefits for companies that are achievable through new mobile solutions. Literature research on the convergence of new technologies has led to the formulation of the following research problem: what are the benefits brought about convergence of mobile technologies and what are the real cases of this occurrence.

## 2. Internal organizational changes related to the use of mobile technologies

Mobile devices eliminate the spatial barriers of Internet access, typical in desktop systems, thus forming a good basis for development and propagation of communications systems closely related to virtual company model of small business units operating without physical contact with the 'base of operation'. Changes brought about by the introduction of mobile technologies in contemporary organization include the following [1]:

- organizational integration; facilitated contact between employees, independent of time and space constraints,
- leveling (decentralization) of organizational structures; direct contact with associates, customers and contractors largely eliminates the need for elaborate hierarchies and structures,
- global scope and global reach; direct access to remote places and locations,
- time as measure of performance; focus on speed of accessing information; data, information and knowledge can be generated almost instantaneously – from the viewpoint of organizations, it means that required information is up to date and that decisions based on such information are effective and relevant,
- flexibility, adaptability, susceptibility to change; reduction of distance and time facilitates prompt reaction and rapid adaptation to changes; effective contact between communicating parties (e.g. business partners),
- innovation, entrepreneurship; dynamic development of new technologies, conceptual evolution and continuous improvement of applications,
- quality of management; fast and direct contact facilitates and improves operations, both within the organization and outside its structure,
- focus on customer; fast and direct contact greatly reduces transaction time and purchase procedures,

- interactivity; since employees can access relevant information instantaneously, they can tackle operational problems as they arise,
- cost reduction; mobile devices allow for easy input, analysis and processing of data 'in the field', with results updated in real time and ready to be used both for operational purposes and long-term strategic goals.

The most notable benefit of mobile devices is their potential for increasing work effectiveness and productivity. Mobile employees, with the help of contemporary mobile devices, can access company data, information and knowledge just as easily as those working in company headquarters. Empirical research shows that employees with remote (wireless) access to information gain, on average, 8 to 12 hours of productive time per week [2].

The use of mobile devices offers a range of benefits for the organization, most notably [2]:

- reduction of document circulation times; tasks such as signing of documents, submission of motions and offers, reporting and effecting bank transfers can be done in (or close to) real time, without the usual constraint of direct physical contact or scheduled meeting between the parties,
- reduction of paperwork; laptops or handheld devices with wireless Internet connection offer easy access to electronic versions of trade documents, contracts and forms – they can be read, edited and printed from any location,
- facilitated communication; employees are well-informed – this helps them make appropriate business decisions,
- improved customer satisfaction; by responding promptly to their questions and needs, we can build better relations with customers.

Analysis of changes within organizations shows that increased information flow (brought about, among other things, by the advance of mobile technologies) and enhanced coordination have an effect of leveling of organizational structures, as well as make organizations more flexible and better informed.

## 3. External organizational changes brought about by mobile technologies

Managing customer relations is one of the more significant aspects of operation in companies active on customer-oriented markets. This aspect applies mainly to forms and means of communication with customers in such areas as sales, marketing and post-sale servicing, i.e. areas where mobile technologies are increasingly useful and prevalent. Communication can be initiated both by company and by individual customers. In the latter scenario, customers typically expect prompt reaction to their requests or problems. Mobile devices seem ideal for this purpose,

since they do not require constant office duty on the part of customer relations specialists.

The above argument, coupled with rapid development of mobile devices with wireless access to the Internet, makes companies more aware and inclined to utilize mobile technologies as the main platform of communication with potential customers. In this context, supplementing general information published on Internet mobile platforms with data and functionality specific to customer's present location seems of particular importance. An estimated 30% of search engine queries initiated from mobile devices (tablets, smartphones, etc.) are made with reference to local business services. Mobile users of search engines and other Internet applets often seek localized services (e.g. local retail outlets) using online maps, and an estimated 70% of them are ready to finalize the purchase [3].

Another important aspect of company communication in the area under study is the need to supplement company websites with mobile-specific functionality and format. Advertising and marketing campaigns also require careful redesign of company websites, to make them accessible and manageable from mobile devices. Organizations intent on promoting their services through mobile platforms should also be aware of technological requirements of the most popular models, with the most important determinant being the type of operating system used in mobile devices. At present, the most popular mobile devices in Poland are powered by Android (Google), followed by iOS devices (Apple) [4]. Mobile Internet users in Poland are estimated at 4.38 million, with smartphone devices constituting ca. 45% of total mobile phone sales in 2011 [5].

Mobile marketing offers vast potential of increasing target audience by providing new communication tools, such as geolocalization, augmented reality, QR codes, mobile advertising (banners) and methods for targeting mobile device users.

Geolocalization, one of the more popular and widely used services on Polish market, offers easy localization of company outlets and via digital maps, custom content based on user's geographic location and reporting of user's current location on social networking platforms. Within the last 10 months of 2011, the increase of user locations reported by geolocalization services was estimated at an overwhelming rate of 2744 percent [6]. This dynamic growth can be attributed to the increased use of smartphone devices and tablets among Polish consumers, as well as the popularity of social networking services.

Augmented reality is a contemporary system integrating real world data with digitally generated content, giving users new ways of interacting with their immediate surroundings. One of the most popular applets based on AR technology is Layar. AR technology is widely researched by many organization, with Google Glass being the most advanced project in this area. QR code technology, on the other hand, is based on alphanumerical, two-dimensional codes that may be

scanned by cameras built into mobile devices to offer users fast and easy access to relevant information resources (such as company website). At present, the use of QR codes on Polish sites is scarce.

Despite the fact that mobile technologies in Poland are still in the infancy stage, many organizations have already made their move towards changing their mode of economic operation. Companies are more and more aware of the growing popularity of mobile devices and are intent on utilizing their potential in their business strategies, as platforms for e-commerce and other e-business applications. The number of mobile users grows at a rapid rate. In the year 2010, the number of smartphone users in Poland was estimated at 13%, while reports for 2012 place it in the range of 25% [7]. Rapid development of mobile market has caused companies to increase their spending on mobile marketing solutions. Mobility and remote access to company market offer is the most important argument for continued development in this respect. Mobile solutions play an increasingly important role not only in mobile marketing application, but also in other areas of contemporary business.

## 4. Convergence of mobile technologies

Changes in the sector of information and communications technologies are often referred to as 'convergence of mobile technologies'. Convergence means the occurrence of similar traits in unrelated individuals (in this case – companies) existing in similar conditions [8]. Integration of computers and telecommunication devices based on wireless Internet access has created a new information architecture. Convergence of mobile technologies allows companies to increase their business effectiveness, reduce cost of operation, simplify customer servicing procedures, reduce the time of product and service delivery to customers, improve coordination with suppliers and contractors, and – in effect – improve their competitive advantage.

Converging solutions are primarily noticeable in [9]:

- internal communication systems, through integration of mobile telecommunication and remote IT services, communications platforms (SMS, MMS, WWW, IVR – *Interactive Voice Response*), remote access to company Internet resources, mobile business representatives, sales reporting and supervision systems, telemetry and monitoring,
- mobile services for business, such as: Business-To-Customer services based on the use of electronic and mobile technologies as support for direct transactions with individual customers in m-commerce, e-commerce, IT services, marketing and sales; Business-To-Business services as support for relations between business partners in such areas as order fulfillment, settling of accounts, payment services, mobile financial services,

- integrated telecommunications systems that combine different forms of communication, from cellular telephony and SMS to fixed telephony and data transmission for a range of applications, including company internal communication (for telecommunications cost optimization and integration of company communications systems), communication with customers (call centers, information services, loyalty programs) and effective communication with external services (police, fire service, medical services),
- mobile applications to service database connectivity, such as intranet, accounting and banking systems, and remote networking of sales teams (mobile devices can be used to transmit sales reports, check inventory, place orders, access company e-mail system) and mobile financial services (mobile banking units, verification of banking balance and payment collection, booking and ticket sales).

Convergence of technologies facilitates creation of mobile organizations, offering, on the one hand, independence from time and space constraints and, on the other hand, personalization of company operation [10]. The former allows for effective information exchange and making informed decisions without the need for physical contact between the parties, while the latter helps manage employee and contractor identification in highly dispersed organizations.

Mobility of organizations brings a range of benefits, such as [10]:

- integrated overview of business needs as a result of increased communication, both in internal and external dimension,
- improving company operational effectiveness despite large dispersion of its resources,
- simplification of complex procedures and task distribution within organization,
- facilitated outsourcing of services,
- improving flexibility of decision-making processes in management,
- reduction of market fluctuation risk through active communication with business partners,
- enforcing continued and strict safety policy in response to potential breach of company information resources.

It must be noted that implementation of mobile solutions can also involve full integration with traditional structures of an organization. Consequently, convergence of mobile technologies makes it increasingly more difficult to demarcate the impact of mobile solutions on changes both within and outside the organization. In other words, the division between company internal and external structures becomes more and more blurred.

## 5. Case studies

### 5.1. Arizona Beverage Company

Arizona Beverage Company, Ltd. (often labeled AriZona) offers a wide array of iced tea beverages and energy drinks to customers around the world. The company employs more than 400 employees, is owned and operated in the United States and continues to expand its product line and global presence. Arizona has implemented Mobile Device Management (MDM) solution for equipment owned by the corporation, and allowed 'bring your own device' (BYOD) programs for employee devices [11].

Most of the benefits from the implementation of mobile technologies has been noticed in the sales department. The total number of sales representatives is a team of nearly 200 people, and they previously needed to make a business trip to customers, process orders on paper on site, with this information go back to the office in order to finalize the contract, and then once again go out to new customers. The implementation of mobile solutions has enabled access to the online inventory system in real time by the secure virtual private network (VPN) connection, access to email and contacts with detailed customer information. This allows sales representatives to place orders directly on their mobile devices, particularly tablets. This innovation made their sales department a step ahead of the competition. All devices are password-protected and equipped with Active Directory, ActiveSync, Wi-Fi and VPN connections, so that an adequate level of security of transmitted data is provided.

Product catalogs for business meetings are now available anytime, anywhere, enabling the presentation of new and existing products and their promotions in form of a digital presentation. The company also saved a lot of paper, which helped with AriZona environmental initiatives.

### 5.2. Mobile Banking

In the period from July to September 2010 Accenture (multinational management consulting, technology services and outsourcing company) done research on understanding the economics of mobile banking by in-depth telephone interview with 10 bank executives [13]. Banks and executives agreed to participate on condition of the case studies being blinded, however study population consisted of, among others, a major Western bank with high mobile adoption, a European bank with a focus on technology innovation, a South Asia bank with an extensive history of mobile banking, and a European bank focuses on meeting the needs of a demanding customer base through excellence in delivery of mobile banking services [12].

Key factors related to the convergence of mobile technologies in electronic banking were – according to surveyed executives [12]:

- in the area of competitive advantage that drove original mobile banking business case:
  a) making banking simple, convenience, and providing superior customer service,
  b) enabling self-banking,
  c) close integration into other bank channels and services,
  d) common user experience across channels,
  e) customer migration to lower cost channels,
  f) low cost of deployment through leveraging shared services,
  g) converting existing customers to mobile banking: customer time savings and experience,
  h) acquiring new customers, increasing retention,
  i) building the infrastructure to enable customer acquisition,
- in the current areas of competitive advantage that are driving evolution:
  a) driving economics through value-added services,
  b) increasing speed of transactions for greater customer ease,
  c) increasing transparency and control of transactions on an account,
  d) seeing tablets and touch computing as the next revolution,
  e) increasing power of mobile devices and network bandwidth,
  f) capturing unbanked (especially rural) population,
  g) providing exclusive product offers via mobile device,
  h) acquisition of new customer segments,
- in the current focus of activity to realize competitive advantage:
  a) international remittances,
  b) expansion of services to support on-device applications and next generation devices,
  c) increasing the variety of transactions available on the electronic wallet,
  d) developing alternative points of presence to supplement existing banking infrastructure,
  e) expanding marketing and selling products exclusive to mobile,
  f) expanding mobile marketing and cross-sell,
  g) improving usability.

Furthermore, the research shows that [12]:

- mobile banking investments have very high return on investments (ROI) – into the multiple hundreds of percent,
- measurement enables stakeholdering, which avoids the risk of mobile being seen as cost-only or generating pressure to generate revenues from mobile banking fees,

– minimizing fees drive greater engagement from customers, which will be critical for future opportunity capture (e.g. cross-selling of both financial and non-financial products).

Study shows that in the context of the development of mobile technologies, banks – even though the difference of their geographical location – are developing their mobile strategies in a similar way in the face of mobile and technological revolution.

## 6. Conclusions

Integrated approach to mobility allows for effective implementation and management of mobile business, mobile organization, mobile sales and security, as well as mobile financing services. Mobile technologies have become an important instrument for support of business endeavors, both from the viewpoint of company management and that of individual employees, setting up new standards of work and communication. They also define changes in company procedures. For example, new communications platforms improve functionality of micropayments (dues can be collected instantaneously via mobile devices), enable dynamic 'matching' of buyer and seller, or help manage and localize transportation units (tracking vehicle movement, monitoring and optimizing energy and fuel consumption).

It must also be noted that security risks inherent in mobile applications, although marginal, are still a force to be reckoned with. Managing company operations through mobile technologies is a great challenge. Equipping employees with contemporary mobile devices and providing them with wireless connectivity to company resources and application is fairly straightforward, but enforcing best communication practices and safety measures without affecting the comfort of remote connectivity may present a problem, since lax safety poses the risk of losing effective control over company processes. Mobile management strategies have become an important element of organizational management, setting standards and limitations for mobile use. For example, health care organizations offer mobile access to reception procedures, but restrict the practice of remote counseling and medical consultation, although such services are technically viable.

Mobile organization management involves implementation of mobile applications, mobile networking, mobile content of management systems and mobile safety restrictions to replace traditional paperwork bureaucratic procedures and solutions. It must be noted, however, that mobile technologies can in no way replace the benefits of personal contact, mutual understanding, interpersonal relations or traditional forms of social support and conflict resolution. In addition, contemporary organizations – by placing great emphasis on wireless communications and

technological innovation, may sometimes be perceived as technically inconsistent and unpredictable.

Despite the above limitations, mobile technologies are progressively becoming part of an integrated system in contemporary organizations. Business entities gradually adapt to new conditions by offering mobile versions of their corporate websites, keeping careful track of activities on their mobile platforms, measuring results of those activities and reaching for contemporary, interactive methods of communication.

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