The Opportunities and Security Risks of Mobile Applications in the Context of Local Economic Development[1]

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The spread of information and communication technologies has created an incredible level of dependency in societies nowadays. The efficient functioning of the State and the economy is now unthinkable without these tools. It is undeniable that the Internet and ICTs make a significant contribution to economic growth and play a vital role in all social subsystems. People expect technology to resolve the problems they face, most typically through an application for a smart mobile device. Whether it is elderly care, shopping, public transport, or government administration, mobile apps are the first choice for a growing percentage of users. As a result, they are also playing an increasingly important role in local economic development. In this paper, the authors examine the potential for using these applications and the associated risks.

Keywords: *smart mobile device, application, economic development, cybersecurity*

Introduction

In the context of globalisation and increasingly digital societies, the role of smart devices and applications are gaining ground, not only in the private sector but also in the public sector. This trend has been reinforced and intensified by the pandemic caused by Covid-19 and the closures related to its responses. On the one hand, "home office" has been enhanced, on the other hand, there is a need, both at the state and international level, to verify easily and quickly that a person has a specific trait or capability (vaccination). However, this increasing digitalisation creates various challenges. On the one hand, teleworking has, in many cases, made it unnecessary for a person not only to be at work but also to be in the country of work, which can affect the GDP of different countries, as people who work remotely to earn a living do not contribute even a tiny portion of their expenditures to the

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economy of the country where the company is headquartered.[4] There is a tendency that the emergence of electronic services and their spread has also had to be considered by the states. These have given new types of security challenges (fraud, cybercrime, peer-to-peer encrypted electronic messaging applications, et cetera) and opportunities for the State to perform its core functions effectively (public services, law enforcement, health, economic development, et cetera). In particular, e-government and m-government are a way for the State to provide services to citizens or even third-country nationals that facilitate their administration. In the context of e-Government and m-Government, the question always arises as to which applications and procedures can be carried out remotely, even from the customer's home, with an appropriate computer and Internet environment. Some services can only be accessed after personal authentication, which is important to reduce fraud. However, remote authentication and the associated electronic procedures can facilitate central public or even local authorities and private companies, ultimately increasing their economic capabilities. For example, the hotel industry has been negatively affected by the pandemic and ongoing energy crises. Companies have needed to realise costs and modernise their energy management. In this context, an application on a smart mobile device could be a suitable solution, for example, to provide the above-mentioned personal authentication and identification.

In addition to the above, smart mobile device applications can contribute to local economic development in many ways, both in the public and private sectors. The link between local economic development based on public engagement and related applications will be demonstrated and proven in this context.

The aim of the research

This study aims to demonstrate the role of smart mobile device applications in local economic development and to show that e-government is a catalyst for economic development. The aim is to raise awareness that smart mobile device applications, including e-government/e-government supporting m-government/public administration, strengthen a country's economy and thus stimulate local economic development at the local level. Furthermore, we aim to present the general threats and potential challenges of applications for local economic development.

Hypotheses

In our research, we formulated the following hypotheses:

Hypothesis 1: e-Government and m-Government contribute to (local) economic development.

Hypothesis 2: There are more opportunities than risks in mobile applications related to local economic development.

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[4]   OECD 2020.

Research methodology

As regards Hypothesis 1, the main research methodology used is the analysis of statistical sources, specifically the Human Development Index (HDI), based on Eurostat's survey of the amount of GDP devoted to research and development, and innovation in each country and statistics on the GDP of each country measured in purchasing power parity. We analysed international statistical data to support the above hypotheses – interviews with experts in addition to the analysis of the literature test hypotheses 2 and 3. In addition to the international and national scientific literature and legislation, we interviewed experts based on the TAM2 (a technology acceptance model). In addition to the above, several case studies from studies on the African continent will further support this thesis.

The conceptual framework

In order to understand the topic, it is necessary to define the conceptual framework that arises and to define the main terms. The following main concepts are thus relevant and facilitate the interpretation of the following chapters: local economic development, mobile applications, smart city concept, e-government and m-government and HDI.

Local economic development

The dependence of local governments on outmoded paper-based procedures is exhausting limited resources and restricting their capacity to adequately serve the people in today's era of fast modernisation, heightened public expectations, diminishing budgets and unforeseen external disruption. Overall, local governments must embrace digital transformation and go paperless by installing a contemporary, cloud-based government administration platform. In essence, via digital transformation, local governments may genuinely drive local economic development. To begin with, digital revolution considerably enhances convenience. Consumers in modern culture are accustomed to buying, ordering food, booking travels, banking and other activities on their screens. They anticipate being able to conduct business online. Paperless procedures provide clients with on-demand access to applications, information and other services that would otherwise necessitate a trip to city hall. Municipalities may handle applications, requests and permit applications more effectively by digitising processes, resulting in increased voter satisfaction.

Local economic development can be viewed as a component of national and regional development, predicated on adopting best practices and the innovative and resourceful use of existing assets. Local economic development differs from general economic development not necessarily in its resources or instruments but in its methodology, which is based on local initiative, participation and control so that the local community is involved in both the planning and implementation processes. Local governments can thus be identified as the most significant stakeholders, interacting with the local populace and the federal government. Smart applications are considered an infrastructure tool for this

study; therefore, their introduction and development in local economic development must be coordinated with other factors (human and financial).[5] For example, there are several forms of local economic development:

- promoting and selling local products
- promoting the consumption of local products
- local "money" – exchanges, money substitutes
- local alternative energy, autonomous small community energy supply
- micro, small and medium enterprise development[6]

Regulations and related facilitating applications to help local economic operators can also be included in promoting local products as a special infrastructure.

Smart mobile device apps and the smart city concept

A smart device is any device with extra convenience features compared to the original object (fridge, TV, et cetera) that can be implemented through a separate application(s) or connected to the internet. Applications are the software that runs on smart devices and complements their functionality. Applications can be differentiated according to their field of use and their tasks:

- "user applications: programs that make everyday tasks (such as note-taking, file sharing, messaging) easier for the user
- background applications: programs that help the mobile operating system work or extend its capabilities (e.g. scheduling tasks)"[7]

In addition, the smart city concept, whose methodology is defined in Government Decree 314/2012 (XI.9.), should be highlighted. "In its methodology, the concept refers to a methodology for the development of a municipality that improves its social, natural, and built environment, its digital infrastructure, the range, quality, and efficiency of public administration services, public services, utility services, municipal services, and private services, using modern technologies and methods, sustainably, with the increased involvement of the population and local social and economic partners."[8] Based on the above, the smart city concept and its development is a type of local economic development along the digitalisation and e-government.

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[5]   KÁPOSZTA 2018: 62–69.
[6]   ÁLDORFAI 2022.
[7]   BELÁZ 2020: 38.
[8]   NYITRAI 2022.

E-Government and m-government

E-Government is an interdisciplinary field of study involving a wide variety of disciplines and is essentially a way of accessing public services. E-government is the electronic way of conducting administrative business, primarily through electronic, online services. Some researchers classify m-government under e-government, while others consider it a separate category because of the potential of applications and other features (e.g. SMS-based notifications).[9] Of particular relevance to this study are application-based m-administration services. There are two broad categories of administrative mobile applications: informative and administrative applications.[10] Both informative and administrative programs can be relevant for local economic development.

Human Development Index

The statistics consider the economic development of a country, the level of happiness of its population, and other relevant data from several perspectives. For example, GDP is measured in purchasing power parity. GDP is one of the most popular indicators of a country's economy and is well-weighted by purchasing power parity (PPP). However, each statistic may also measure other things that are relevant to a country's population. These include technological development, life expectancy, illiteracy levels, the budget allocated to research and development, et cetera. Taking several of these aspects into account, the statistic that best describes human development and living standards – and which nevertheless has many shortcomings – is the Human Development Index or HDI.

The HDI is a composite statistical indicator of life expectancy, educational attainment (average years of schooling and expected years of schooling at entry into the education system), and per capita income indicators that classify countries into four levels. Its value ranges between 0 and 1; the more developed a country is, the closer it is to 1. A country achieves a higher HDI if its life expectancy is longer, educational attainment is higher and the gross national income per capita is higher.[11]

The potential and opportunities of applications in local economic development

Smart tools and related solutions can now help municipalities and businesses to operate, whether in local government (e.g. Customer Portal, document management), energy, transport, education, health, commerce, or agriculture.[12] Technology can make everyday operations more efficient, contributing to education, employment and health sectors.

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9   BELÁZ 2020: 34.
10   BELÁZ 2020: 41.
11   KSH 2008.
12   BÁNYÁSZ 2019: 49–69.

It also has the potential to create a strong partnership between local people, civil society, local economic actors and various public administrations.[13]

The different applications can contribute to local economic development by promoting the product of the local business, which can reach people who were not aware of it, and by integrating services and putting them on one platform, the local service industry can be boosted, and in some cases, for example, creating a payment method, introducing discount applications can not only raise awareness but also stimulate consumption among residents and boost tourism revenues.

A few related statistics

As mentioned above, there are several ways of measuring the development of a country and its economy – one of the most common statistics is commonly referred to as gross domestic product or GDP. Table 1 below illustrates the top 10 states with the highest GDP (PPP) in 2021.[14]

Table 1: Top 10 states with the highest GDP at purchasing power parity per capita in 2021 (int. US$)

Rank	Country	Value (int. US$)
1.	Luxemburg	120,038.97
2.	Singapore	106,032.22
3.	Ireland	103,102.56
4.	Qatar	95,340.3
5.	Switzerland	70,764.02
6.	Macao SAR	64,739.16
7.	United Arab Emirates	64,697.99
8.	Norway	64,697.99
9.	United States of America	63,014.33
10.	Brunei	62,276.64

Source: Compiled by the author based on Statista 2021.

Remarkably, there is very little overlap between the top ten global HDI statistics and the below Table 2 (Norway, Switzerland, Ireland), despite the HDI being also based on per capita income.

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[13]   Orbók 2020: 70.
[14]   Statista 2021.

Table 2: Top 10 states with the highest HDI in 2021

Rank	Country	Value
1.	Switzerland	0.962
2.	Norway	0.961
3.	Iceland	0.959
4.	Hong Kong, China (SAR)	0.952
5.	Australia	0.951
6.	Denmark	0.948
7.	Sweden	0.947
8.	Ireland	0.945
9.	Germany	0.942
10.	Netherlands	0.941

Source: Compiled by the author based on United Nations Development Programme 2021.

It is clear that although the country's income is an important consideration when looking at a combination of factors looking at other interests and values of citizens, the ranking can easily change. In the HDI rankings, Hungary was 46th in 2021, with a score of 0.846. The average world score is 0.721, which puts our country at the very high end of the scale.[15]

E-Government development

The so-called e-government development index (EGDI) is used to assess e-government development (see Table 3). It assesses countries using the online services index, the telecommunications infrastructure index and the human capital index.

According to the UN, e-government is a key factor in advancing Sustainable Development Goals (SDGs). Despite some investment and development achievements, many countries still fail to take advantage of information and communication technology. These have a detrimental impact on the further development of e-government in low EGDI regions, such as Africa, as technological development accelerates.

Table 3: Top 10 states with highest EGDI in 2022

Rank	Country	Value
1.	Denmark	0.97
2.	South Korea	0.95
3.	Finland	0.94
4.	Estonia	0.94
5.	Netherlands	0.94
6.	New Zealand	0.94
7.	Sweden	0.94

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[15]   United Nations Development Programme 2021.

Rank	Country	Value
8.	Australia	0.94
9.	Iceland	0.94
10.	United States of America	0.92

Source: Compiled by the author based on Statista 2022.

It can be seen that the present table no longer forms a common intersection with the common intersection of the two statistical sets discussed earlier. The HDI shows a very high overlap, with half of the top ten countries in the other list (Denmark, the Netherlands, Sweden, Australia, Iceland), (see Table 2 and Table 3) while the overlap between the previous table on GDP is very low (one country: the United States) (see Table 1 and Table 3).

Digital development and e-government are also measured by the Digital Economy and Society Index (DESI), but this is a regional statistic comparing 36 European countries (the last being Montenegro with 37%). This statistic measures e-government maturity by averaging scores on four dimensions: user-centricity, transparency, key drivers and cross-border services.[16]

Table 4: Top 10 European countries with the highest DESI in 2021

Rank	Country	Value
1.	Malta	96%
2.	Estonia	92%
3.	Denmark	85%
4.	Finland	85%
5.	Luxemburg	84%
6.	Austria	84%
7.	Iceland	84%
8.	Portugal	82%
9.	Netherlands	82%
10.	Latvia	82%

Source: Compiled by the author based on European Commission 2021.

Compared to the data in Table 1, we also have a narrow cross-section (one country: Luxembourg). Interestingly, the European countries in the joint cross-section of the HDI and EGDI are fully included in the list of the ten countries with the highest DESI values (see Table 2, Table 3 and Table 4). The overlap is even greater for the EGDI, where, as in the above comparison, there is a 50% match, even though this table only includes European countries (Estonia, Denmark, Finland, Iceland and the Netherlands) (see Table 3 and Table 4). Our country scores 63%, which is 22nd in this ranking. Although Hungary scored below the median compared to previous years, it should be stressed that this is a European statistic, not a global one, which makes it look like Hungary scored lower than before.[17]

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[16]   Statista 2022.
[17]   European Commission 2021.

Based on Eurostat data (also not a global statistic, 30 countries surveyed, but no data available for Switzerland), we can see how GDP expenditure on research and development is currently correlated with the figures presented in the tables above, bearing in mind course and bearing in mind that the return on R&D expenditure is not immediate but much prolonged. For comparison, our country spent 1.65% of its GDP on research and development in 2021, while the EU average is 2.27% (see Table 5).

Table 5: European countries investing the most in research and development in 2021 (percentage of GDP)

Rank	Country	Value
1.	Sweden	3.35
2.	Austria	3.22
3.	Belgium	3.19
4.	Germany	3.13
5.	Finland	2.98
6.	Denmark	2.81
7.	Iceland	2.79
8.	Netherlands	2.25
9.	France	2.21
10.	Slovenia	2.15

Source: Compiled by the author based on Eurostat 2021.

There is no overlap between this data and Table 1, but there is an explicit overlap between Table 2 (HDI) and this statistic, as there is also a 50% overlap, as there has been in the past (Sweden, Germany, Denmark, Iceland, the Netherlands). There is also a 50% overlap in Table 3 (EGDI) (Sweden, Finland, Denmark, Iceland, the Netherlands) and Table 4 (EGDI) (Sweden, Finland, Denmark, Iceland, the Netherlands). Three countries are not included in Table 1, but all the others are (Denmark, Iceland and the Netherlands). Table 4 (DESI) (Austria, Finland, Denmark, Iceland, the Netherlands). The above shows that although government revenues play a decisive role in the development of a country and its overall standard of living and digitalisation, many other factors are just as important.

The following is a comparison of KSH data comparing regional GDP, poverty rate and Research and Innovation GDP as a proportion: Central Transdanubia (Fejér County, Komárom-Esztergom County, Veszprém County), Western Transdanubia (Győr-Moson-Sopron County, Vas County, Zala County), Southern Transdanubia (Baranya County, Somogy County, Tolna County), Northern Hungary (Borsod-Abaúj-Zemplén, Heves, Nógrád). The Central Hungary region was not utilised since it has not been included in all of the data tables published by KSH after 2018.

Table 6: Gross domestic product per capita, thousand HUF (regions of Hungary)

Regions	2018	2019	2020	2021
Budapest	8,989	10,177	10,313	11,812
Pest	3,501	3,862	3,966	4,623
Central Transdanubia	4,128	4,498	4,478	5,303
Western Transdanubia	4,537	4,731	4,685	5,158
Southern Transdanubia	3,074	3,312	3,372	3,876
Northern Hungary	3,056	3,233	3,357	3,936
Northern Great Plain	2,856	3,13	3,281	3,701
Southern Great Plain	3,042	3,288	3,431	3,904

Source: Compiled by the author based on KSH 2023a.

Based on the available statistics, the capital, or the Central Transdanubian area, stands out among the rural regions as the most developed "region" in terms of GDP. In reality, compared to 2018, Budapest grew 31%, Pest County 32%, Central Danube Region 28.5%, Western Transdanubia 13.7%, Southern Transdanubia 26%, Northern Hungary 28.8%, Northern Great Plain 29.6%, Southern Great Plain 28.3%. The data presented above is then examined in terms of the proportion invested in Research & Development activities, alongside its growth and correlation.

Table 7: R&D expenditure (in-wall) as a percentage of GDP (regions of Hungary)

Regions	2018	2019	2020	2021
Budapest	2.5	2.39	2.52	2.76
Pest	0.91	0.92	0.83	0.62
Central Transdanubia	1.31	1.04	1.77	1.26
Western Transdanubia	0.74	0.73	0.78	1.13
Southern Transdanubia	0.64	0.71	0.85	0.86
Northern Hungary	0.61	0.65	0.76	0.65
Northern Great Plain	0.95	0.94	0.92	0.96
Southern Great Plain	1.16	1.27	1.22	1.37

Source: Compiled by the author based on KSH 2023b.

It is apparent that Budapest succeeds in this area as well, and not simply in terms of GDP. The South Great Plain and the Central Transdanubian areas stand out in terms of GDP investment. Notwithstanding the fact that R&D expenditure in Northern Hungary and Southern Transdanubia is comparable in terms of GDP, it is obvious that Northern Hungary's GDP growth was nearly double that of Southern Transdanubia. However, the growth in GDP is not completely attributable to R&D, but it is obvious that the region with the largest R&D investment has also been the capital city with the highest GDP throughout the four years under consideration.

Findings from the expert interviews

Our research involved face-to-face interviews with two nationally and internationally reputed experts in IT and e-Authentication. Áron Szabó is Vice President of MELASZ (Hungarian Association for Electronic Signature), and his main research topic is e-voting, direct democracy. Péter Máté Erdősi wrote his doctoral thesis on the measurability of electronic signatures, and he is currently a member of the Election and Representation Research Project at the University of Public Service, where he is investigating e-voting issues related to authentication.

The interviews were based on the TAM3, as mentioned earlier. The questions formulated in this way focused on the opportunities and challenges presented by smart mobile device applications, with a particular emphasis on the potential of m-government and e-governance in the context of local economic development.

According to the experts, the biggest problem is the disharmony between legal harmonisation and technological progress and development. The reason is that it is futile to develop an application method that can authenticate oneself remotely in municipal, public, or banking transactions if the necessary legal framework is not in place to allow its use (e.g. there is no lawful basis for processing the data to be requested). From a data protection point of view, they consider that one of the biggest risks is using biometric data, as the GDPR identifies it as a special category of personal data and its protection is crucial.[18]

They mentioned as an easy-to-use example the e-Identity model (DIGIDoc4) used in Estonia, which uses an electronic container and is authenticated by it, not the file itself. As a result, there was no need to deal with file authentication and digital signing on an extension-by-extension basis. The application is quick and easy to use, accessible to people with disabilities, and therefore, has a high level of social acceptance, and in Estonia, it is a generally accepted method, with the software provided free of charge by the State.

A risk that emerged during the expert interview was not only the interconnection of different profiles for service providers but also the risk that the different data handled could be passed on to whom. It is important to distinguish between legitimate and unauthorised data processing and bona fide and malicious data processing and to prioritise identifying unauthorised data processing. The experts agree that this can only be possible through a highly reinforced data protection authority.

The current German decentralised data protection has emerged as one of the best examples to follow, given that the individual provincial databases cannot be accessed by a competent authority in another province, making data processing more transparent and secure, but at the price of interoperability.

Concerning the social acceptance of e-signatures, the experts pointed out that the spread of e-signatures and the public trust in them cannot be increased unless they are part of a complex process (identification or authentication during a pre-contractual customer check). The experts considered that social acceptance is complicated because not only

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[18]   Erdősi–Kiss 2020: 214–248.

the lay public but also professionals often do not distinguish between the concepts of identification and authentication, which are often used synonymously in the vernacular.[19]

According to these experts, it is important to clarify the conceptual framework so that in a certain communication, a concept means the same thing, as confusion of concepts reduces knowledge of the subject, and many people are afraid of the unknown. In Estonia, the concept of e-signature and e-identification is gradually taught in secondary schools. In our country, e-signatures are not yet widespread, as the average user often does not understand the process that is carried out through them. The fight for awareness started in 2007, and it took five years of continuous communication and support from the minister responsible for the field to gain public acceptance of e-signatures.

The outbreak of the Russian–Ukrainian war on 24 February 2022 also highlighted the importance of smart mobile devices and their applications. One of these high-profile applications is a chatbot called eVorog, which allows Ukrainian residents to report Russian troop movements by providing real-time location data. In the early stages of the war, there were many reports in the international media that residents of Ukraine were sending geolocation data from their pictures and videos to attack Russian military forces with drones or artillery fire. However, this opens the possibility that the attackers could also upload disinformation to mislead Ukrainians or lead artillery fire on their forces. This is why it was important to develop eVorog to authenticate and identify the source of the reports and prevent botnets from overloading the system with images containing false information.

This also confirms that applications with real-time location data are gaining ground and are being used in more areas. One of the most important areas is geospatial information, where these applications can contribute to local economic development in several ways. One such area is the sale of real estate, the assessment of property values, and its role in local health applications, which is not a traditional economic development but a key factor in HDI.

According to the experts, New Hampshire is a good example to follow for the role of apps in local economic development.[20] In New Hampshire, there is no local tax on salaries or wages, and therefore no welfare – social safety net – but planned local developments are accounted for on a property tax basis, with the owners' views digitally sought, acting as a quasi-direct democracy locally. Experts believe that making e-voting (even at the local level above) reduces the ecological footprint of a community or country, so greener, more sustainable governance can be achieved; apps are an excellent way to support local referendums. It is interesting to point out that certain parts of the e-voting process could be implemented electronically even today, following the legislation: the anonymous step of collecting signatures in a referendum or election procedure (essentially equivalent to collecting signatures on petitions). According to the legislation, the signature collection

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[19]   Erdősi 2019: 66–91.

[20]   Overview of New Hampshire Taxes: New Hampshire has no income tax on wages and salaries. However, there is a 5% tax on interest and dividends. The state also has no sales tax. Homeowners in New Hampshire pay some of the highest average effective property tax rates in the country (further details at https://smartasset.com/taxes/new-hampshire-tax-calculator#makDmI576B).

sheet or recommendation form "shall be signed by the proposing voter in person" (see Act CCXXXVIII of 2013 and Act XXXVI of 2013), for which, since 27 May 2016, an ePassport and an NFC mobile phone are sufficient.

Experts believe that e-Authentication has many uses in local economic development. On the one hand, it can be used, for example, to speed up guest registration processes in the hotel industry, which can ultimately have a stimulating effect on the economy, not to mention reducing the workload of hotel staff and maximising their efficiency.

Case studies on the role of mobile applications in local economic development

The impact of smart mobile devices on the economy is not a new concept. Studies as far back as the early 2010s showed that the internet significantly contributes to economic growth.[21] This includes revenues from advertising, e-commerce, and other transactions and economic activities that can be carried out over the internet, but also the growth of GDP due to the spread of the internet and even the speed of the connection itself.[22] The growth of broadband internet penetration can significantly increase the productivity of an economy through, among other things, the spread of teleworking and flexible working and the expansion and efficiency of services. Some estimates support that a ten percentage point increase in broadband penetration boosts total domestic output by 1.1 percent and 1,000 new subscriptions create 80 new jobs.

The most striking examples of local economic development and related smart mobile device applications in the international scientific literature are from the African region.

Mobile applications in agriculture and rural development

Empirical studies show that mobile phones have the potential to contribute to the well-being of consumers and producers, as well as to broader economic development. Mobile phone use in sub-Saharan Africa has grown significantly over the past decade and now covers 60% of the population. The study finds that the dynamic growth of mobile communications technology creates opportunities for economic growth, social empowerment and grassroots innovation in developing countries. One of the biggest potential impacts is the contribution of mobile applications to agricultural and rural development, providing millions of people with access to information, markets and services. Mobile applications differ significantly in developing countries, as they typically run on second-generation (2G) phones rather than smartphones, which are more common in developed countries.[23]

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[21] McKinsey & Co. 2012.
[22] Ericsson – Arthur D. Little – Chalmers University of Technology 2013.
[23] QIANG et al. 2012.

The socio-economic contribution of mobile apps in Africa: The impact of local mobile apps

The cited research analysed the contribution of locally developed mobile applications in Africa and attempted to determine their impact on the development of the African region. The authors of the study surveyed five selected African countries. Descriptive statistics from the study showed that more than 71% of all participants use mobile apps. More than 60% of all participants considered mobile apps good innovations that they believe can contribute significantly to Africa's development. Many mobile apps have been developed and are being used in Africa, including in the following areas: text messaging, social networking, commerce, health, education, politics, agriculture and entertainment. In addition to the above, the researchers concluded that the adoption and use of mobile apps are contributing to some extent to Africa's development as they are actively used in various socio-economic activities. One of the study's main findings was that mobile applications significantly improved the health system, education, social activities, financial services, politics and agriculture. Innovation in mobile applications, therefore, has a positive impact on the development of the African region.[24]

Hungarian example: CityAPP

This is also a feature of the City of Kecskemét's CityAPP phone app. The free software allows users to explore restaurants, stores, current programs and events in the area, making it easier for locals and tourists to arrange their leisure time. The app also includes municipal and other local news, as well as the ability to hail cabs. Particularly appealing is the potential of learning about available parking spots in one of the city's squares, so that visitors arriving by automobile are not simply lucky if they locate a parking place. By simplifying and speeding up the search for parking places, this feature of the program not only saves time but also cuts air pollution. The software also displays the various destinations on a map. The disadvantage of the phone app is that it requires both mobile data traffic and location authorisation, so it is not fully free, and it also drains the battery. Yet, the live data connection and location information allow the user to search for different events and places, as well as information in general, more effectively.[25]

The risks of smart mobile devices

The smart mobile devices and the applications developed for them can create several risks from a privacy and information security perspective. Mobile devices in use today are, and are used as, computers because of their performance and often their functionality. This implies a whole range of cybersecurity risks. The old saying goes that he who has

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24   Chinedu et al. 2019: 191–198.
25   Nagy 2019: 50.

a hammer in his hand sees everything as a nail, and as cybersecurity experts, this is particularly true. However, we believe it is important to differentiate between the general threats and the technological and human risks. In our opinion, whatever the technical device or application (including security solutions such as a password vault, antivirus, et cetera), the decision to use it should always be based on the results of an internal risk analysis.

Given the restricted scope, it is not feasible to discuss the complicated threats of smart mobile devices in depth, as we did in our previous study from 2016, but the primary risks will be briefly outlined in the parts that follow. However, it is important to see that while serious risks can be identified, most of them can be minimised with awareness and a high level of cyber hygiene skills. One such method is the internal risk analysis mentioned above, which should consider several aspects: for example, the type of application you are requesting permission for, how it is protected, how often it is updated, and how other users rate it. During use, you should keep a constant eye on strong password rules, the risk of Wi-Fi networks, keeping the application (and the device) up to date, et cetera.

The bottom line is that mitigating risks is a key responsibility of the application developers. In many cases, the risks of smart mobile devices can be traced back to applications designed specifically for phishing purposes. Obviously, these risks can be mitigated in a dedicated application supporting local economic development. A cybercriminal who develops a phishing application to steal our personal data, our financial data, access our content to blackmail us (e.g. by using a camera or microphone in hidden ways), et cetera, will not care that the application does not meet basic security requirements, does not implement GDPR standards. However, in the case of an official application, these should be given special attention, as the protection design should be continuous, closed, complete and proportionate to the risks. If the developer implements these, the risks from the application can be significantly reduced. In addition to developers, it is equally important to ensure that users are alert. It is important to recognise that there is no such thing as 100% security, but much can be done to minimise risks.

Essentially, the security of smart mobile devices may be viewed from numerous perspectives, one of the most basic of which is the source of the threat, which might be data transfer, software, hardware, or indeed the user.

- Data transmission is the movement of information from one location to another by wired or wireless means. Bluetooth, mobile internet, and Wi-Fi networks, among others, can be used for wireless data transfer. They can all be dangerous. The BlueBorne attack vector, which allows remote access to the device, is worth discussing in the context of Bluetooth vulnerability.
- The programs you have installed on your smartphone expose you to a wide range of dangers. Attackers frequently replicate popular programs, inserting harmful code or infecting the original apps. Ransomware infections, which encrypt the data of infected devices and demand money to unlock them, are also popular on cellphones. In case of an application containing our biometric identifiers, which effectively limits our access to a given sector of the public administration, our proclivity to pay potential extortion costs may grow.

- In the area of hardware hazards, I believe the primary classification foundation is whether or not the specific hardware issue that compromised the device was directly included. Backdoor: A mechanism incorporated into software or hardware that may be exploited to circumvent an entity's authentication measures. An example of an accidental hardware risk was uncovered in 2018 when it was discovered that Intel, ADM and ARM CPUs possessed highly significant vulnerabilities that could be exploited to obtain access to data stored in the devices' memory.

- The operational system (a particular framework that organises and regulates the hardware's resources) may have a variety of vulnerabilities, for which various manufacturers offer updates that exploit the flaws that develop. This is why the so-called zero-day vulnerability, a security risk in which attackers exploit a weakness in a computer system that the creators are unaware of, should not be neglected.

- It is nearly conventional, but it is true that even if an application, system, or technology has the highest physical and logical protection available, the human aspect may always be a weak point. The user may be addressed as a security element in two ways. First, when an attack on a particular device or system is the consequence of inattention by one or more users, i.e. indirect harm by a given individual. On the other side, it may also be caused intentionally (particularly in the case of multi-user systems, such as a global corporation's or a municipality's network). The first scenario could be the opening of an unsolicited e-mail and the simultaneous loading of malicious code, but it could also be so-called social engineering, in which attackers use psychological manipulation to obtain information from genuine collaborators with little or no knowledge of information security. The opposite scenario is when the user causes damage on purpose.[26]

Summary

The data we have analysed shows that countries with higher GDPs also invest in technological development in areas where they are highly developed and where the digital literacy of their populations is high. There are many benefits of digitalisation for states, municipalities and companies. On the one hand, e-government and m-government can integrate knowledge that contributes to local economic development, and on the other hand, they can create the infrastructure that a well-developed e-government system can bring to a municipality to attract a large amount of investment. Although mobile applications may have many risks, they offer many more benefits. Distance personal authentication services can not only make eGovernment more popular but can also be used in other areas. Furthermore, most risks can be eliminated by raising user awareness; the first step is proper education at the right time.

The findings of our research are as follows:

Result 1: e-Government and m-Government contribute to (local) economic development.

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[26] BÁNYÁSZ 2018: 360–377.

Statistical resource analysis has shown that the technological development of invested capital and the development of e-Government overlap more with the human development index, which represents the livability of a state.

Result 2: There is more opportunity than risk in mobile apps for local economic development.

In addition to the interviews with experts, results were supported by the analysis of national and international literature, which is particularly confirmed by the data for the African region.

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