

- WORK IN PROGRESS -

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Strengthening citizen agency through ICT: an extrapolation for Eastern Africa

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ABSTRACT

Rationale

Since the late 1990s, the prospect of using ICT (Information Communication Technologies) to improve accountability, transparency, access to information, and monitoring authorities has attracted general optimism. However, early hopes that e-initiatives would be the panacea of all the problems have given way to more modest claims. An aspect that has not received much attention so far is the use of ICT in support to citizen agency; to involve and inform communities and interact with and influence authorities. There are quite a few examples of successful smaller projects in this realm, also in developing countries. But new emerging technologies (e.g. mobile phones) create new momentum for strengthening citizen agency at larger scale. This paper focuses on the how ICT is already being used for this, and where the possibilities for the future lie.

Aims and Objectives

The main objective of the study is to analyze how active citizens can interact with society - and more specifically authorities - more efficiently and effectively by making use of ICT tools. The geographical focus is on Eastern Africa (Kenya, Tanzania, and Uganda), where there is a diverse and vibrant civil society sphere, and where the boom in telecommunications is large. The key questions that we investigated include:

- Which conditions enable citizen agency in developing countries?
- How can ICT support citizen agency in order to influence the authorities?
- Based on technological projections, how will ICT support the efficiency and effectiveness of citizen agency in 5 years time?

Methodology and data

The study has been conducted using qualitative and quantitative data. More than 40 relevant experts on ICT and development have given their contribution in an open questionnaire designed for this study. The technological scenarios are forecasted by estimating logistic and Gompertz models and using secondary data. An essential literature review on citizen agency in developing countries builds the theoretical framework on which the analysis is based.

Results

The analysis on citizen agency in developing countries allowed to identify the fields where ICT can be used in support of citizen agency and the main obstacles that prevent ICT projects from going to scale. Overcoming issues around resource allocation, political interference and design, ICT can be used in support of (organized) citizen action. Econometric analysis shows that Eastern Africa will reach a level of mobile phone subscribers not dissimilar to the current level in OECD countries. Those findings allowed to sketch new possibilities of use at scale in the near future.

Conclusion

Understanding *how* ICT can support citizen agency can be an important contribution to the design of development strategies. In fact, citizen agency potentially creates action at a scale that more institutional development structures could not manage, and this can be supported even further by technology, that has scale intrinsically build into it. To the best of our knowledge, this is the first study on ICT and citizen agency. The main aim is then to throw some light on this issue and open a debate for further researches.

INTRODUCTION

Since the late 1990s, the prospect of using ICT (Information Communication Technologies) to improve accountability, transparency, fairness, and effectiveness in authorities has attracted general optimism (World Bank, 1998). However, early hopes that e-initiatives would be the panacea of all the problems have given way to more modest claims. An aspect that has not received much attention so far is the use of ICT in support to citizen agency; to involve and inform communities and interact and influence authorities. There are quite a few examples of successful smaller projects in this realm, also in developing countries. But new emerging technologies (e.g. mobile phones) create new momentum for strengthening citizen agency at larger scale. This paper focuses on the how ICT is already being used for this, and where the possibilities for the future lie. To the best of our knowledge, this is the first study on ICT and citizen agency.

The main objective of the study is to analyze how active citizens can interact with society - and more specifically government - more efficient and effective by making use of ICT tools. The geographical focus will be on Eastern Africa (Kenya, Tanzania, and Uganda), where there is a diverse and vibrant civil society sphere, and where the boom in telecommunications is large.

The key questions that we will investigate include:

- Which conditions enable citizen agency in developing countries?
- How can ICT support citizen agency in order to influence the authorities?
- Based on technological progress, how will ICT support the efficiency and effectiveness of citizen agency in 5 years time?

The paper is structured as following. The first part encompasses an essential review of literature focused on citizen agency in developing countries. It will result in an overview of the pre-conditions that enable citizen agency. This will help us to determine and analyze the condition that brings citizens to become active citizens and how ICT can relate to this. Extensive examples from the field will be added to illustrate, and clarify the theory behind citizen agency and ICT. In the second part we will build a scenario on the new technological possibilities for access and use of ICT in Eastern Africa in 5 years time. The theory, the current use of ICT and the technological scenarios will make it possible to sketch new uses and applications of ICT in support of citizen agency. The paper will also outline the institutional and economic challenges around ICT growth that will need to be solved in order to achieve scaled, reliable and efficient citizen agency actions.

The study has been conducted using qualitative and quantitative data. In July 2008 Hivos (International Humanist Institute for Cooperation with Developing Countries) published an online open questionnaire and asked relevant experts on ICT and development their contribute. The questionnaire was sent to 30 people and 3 mailing list selected through the Hivos network; there were 43 respondents (Annex I). The technological scenarios are forecasted using logistic and Gompertz models and secondary data collected by international organizations.

1.0 CITIZENS AGENCY AND ICT IN DEVELOPING COUNTRIES: A THEORETICAL FRAMEWORK

Civil society has received enormous interest among researchers, policy-makers and donors since it has been seen as an essential actor for promoting democracy in developing countries and especially in Africa. This conception rose during the 1980s, after decades of development policies that were characterized by a top-down approach which turned out the unintended result to empower the authorities and marginalize the participation of the citizens (Easterly, 2006). Corruption and economic powers were alienating the authorities even further from the citizens. At the same time, different social movements claiming for justice and equality were still active and growing along Africa (Bratton, 1989). Hence, development donors recognized that building and strengthening the African civil society was a necessary change in order to achieve democracy and economic development. In implementing those development strategies, a conceptual limitation was the given meaning of civil society; although the term civil society is widely used in policy environment and even in academic literature, its definition is not unambiguous. In fact, from its origin in the ancient Greek philosophy, the meaning has continued developing across centuries and cultures: each social epoch has given rise to particular questions about human conditions and the value of social existence (Mafeje, 1998). Consequently, donors often used the term civil society with a “western” connotation and a normative mean, resulting in the identification of civil society as civic organization such as advocacy groups working mainly on public causes in the sphere between the State and the market. This definition and description of civil society seems limited and cannot be completely appropriate in the African environment. The main reason lies in the fact that the concept of civil society born and developed in a specific historical period in Europe and that it may be not relevant in different cultural and political situations (Lewis, 2002). As a matter of fact, in Africa traditional organization and self-managed groups of people have been *de facto* excluded by development policies, even if they have had an important role in the social and political environment. To increase the efficiency of policy and projects, policy-makers and development donors should use the term “civil society” with a wider meaning, taking into account those realities that traditionally have not received broad attention, i.e a wide range of societal groups that work to protect “collective” interests. They include a wide variety of movements that traditionally are generically called interest groups, such as NGOs, labour’ and student’ unions, and communal associations. The main difference between these organizations and what at the beginning of 1980s has been defined as civil society is that these organisations can work at an informal level, in self-help activities and they are often embedded in the social and traditional environment (Maina, 1998 cited by Lewis, 2002). We call this broader and more inclusive definition of civil society, “citizen agency” and the actions of those group “citizen actions”.

The richness of citizen agency movements in Africa, specifically in Eastern Africa, and the new technological spread we are assisting are the two “leit motifs” that together motivate this paper. In fact in the last years new telecommunication technologies have had a massive penetration in developing countries. Mobile phones are becoming available and affordable to billions of people that are at the margin of the economic and political system. This increase in access raises the questions of: how technologies can be used to empower people, and more importantly how they can make use of technologies for self-empowerment? The first part of the paper looks at four dimensions of citizen agency and ICT. The first section aims to shed some light on these questions and defines the expression “citizen agency”. In the second section the conditions that allow for citizen agency are analysed. Then the third section will look at how ICT supports citizen agency through a wide review of examples from the field.

Finally, the main obstacles that block the up scaling possibilities of most of these applications are investigated.

1.1 Who can be citizen agent?

With the expression “citizen agency” we refer to the activities of people that participate at the social and political life and somehow have the capability to influence the decision making process. Rajani (2008) adds “citizens agency is not only the purpose – or the ends – of development and democracy, it is also its most effective means.” People that act as citizen agents are initially moved by injustice, inequality or discrimination. Those people can be “activist citizens”, engaged in writing scripts and creating the scene, but also just “active citizens”, which follow scripts and participate in scenes that are already created (Isin, 2008). Both characters are fundamental for effective actions. For citizen agency to work people need to be in good health and educated, have confidence and rights secured, be able to access information and express themselves in order to make things happen and fight against injustice and unfairness. Additionally they must have the conviction that they can make changes. Historically in developing and developed countries activist and active citizens have driven all the big important changes – women’s equality, racial equality, ending apartheid, concern for environment. Without those acts driven by courage and creativity, it is not possible to imagine social transformation or to understand how people become citizens as claimants of justice, rights and responsibilities (Isin, 2008).

Participation and empowerment are strictly connected and both are pushed and motivated by the feeling to be part of a community. These communities can be a State or communities based on culture, tradition, religion, or social groups. Hence, people can participate in the public life not just because of personal empowerment but also in terms of citizenship rights and responsibilities. In that perspective, Lister (1997) argues that citizenship can be seen as the formal right to enable people to act as agents. From a vision of democracy in terms of representation, where citizens are voters and rights-bearing individuals, the concept of democracy has moved to an idea where the authorities’ role is to enable participation and community feeling (Boyte, 2008). This idea can reflect the restricted meaning of civil society described earlier in this paper. As soon as we think in terms of citizen agency, the role of citizens in a participatory democracy may become rather reductive. A new form of democracy might be necessary, in which citizens are co-creators and the main active actors of social and political changes. This is what Boyte defines as developmental democracy. If a representative democracy is based on structures and participatory democracy focuses on processes, developmental democracy “*focuses on the work of growing capacities for self-directed collective action across differences for problem solving and the creation of individual and common goods*” (Boyte, 2008:2). It conceives of a democracy as a society, promoting action across state, civil society, and market and where, as Sklar (1987) points out, authorities are clearly responsible and accountable for their actions in front of the membership.

Developmental democracy is then made by organized and informed people. Formally, we can identify two main organizations through which citizens can act: mutual benefit organizations and public benefit organizations (Bergdall, 2001).² The mutual benefit organizations are formed to benefit its members. In principle they are shaped by and accountable to its members. These organizations include cooperatives, trade unions, and professional associations. On the other hand, public benefit organizations are formed to serve the common interest of society, and their mission is based on common perceptions and values of self-

² Although this distinction origins from legislation fields, it clearly explains the different components of citizen agency.

selected citizens who are assumed to be public spirited. They are including philanthropic organizations, civic organizations, advocacy groups, and welfare and development NGOs, both local and international.

1.2 Conditions that enable citizen agency

According to the definition, citizen agency is driven by people but it needs some form of accountability from the authorities to take place. On the one hand individuals' actions are moved by needs, ideas and belief; people need a situation which forces them to act: an injustice, or something that threatens them in their livelihood or well being. On the other hand authorities need to find a common place for discussion and interaction with citizens. For that reason, some basic conditions are needed in order to allow people to be citizens with the capabilities to actively participate at the socio-political life. In the literature several studies³ are found that analyse those preconditions; still two main strands are found:

- Community identity: People must feel part of a community with shared concerns and interests that will eventually lead to collective actions for claiming rights. The agency is not just the capability to choose and act but also about the conscious capacity that to be involved is important to the individual's self-identity (Lister, 1997).
- Individual and community empowerment: Community empowerment is a prerequisite for community participation (Sen, 1999): citizens need to have a local authority worth taking charge of. Individuals are willing to participate at the political life only if they feel that somehow they are able to make a difference. People must be empowered in order to feel able to influence the decision making process: local governments or decentralization is seen as a way of empowering communities through the mechanism of participation (e.g. local level planning, resource mobilization, administrative and judicial powers) (Simeen, 2004).

The freedom of press and speech is an important condition; still research on its relation with citizens agency is not unambiguous. From the theory of Lipset (1959) that media's access is one of the essential preconditions for mass participation, many studies have been conducted but yet with not strong evidence (Norris, 2009). Nonetheless, examples around the world suggest that information is a necessary condition but not sufficient for citizens participation. Information may be not a pre-condition, but it still remains an important factor that helps citizens acts.

The preconditions that allow citizen agency do not imply that the citizens are active. In Simeen (2004) the main capabilities that make citizen participation possible are found:

1. Participation and engagement require basic social and human resources.
2. Deliberation and participation necessitate physical and institutional resources; apposite rules for deliberation and conflict resolution and information.
3. Mechanisms for building trust reduce inequality and increase access.

If ICT can be integrated and implemented in those steps, it becomes a tool to give capabilities to the users (UNCTAD, 2006). If so, ICT is not only a tool to empower people, it gives people the capacity for self-empowerment. How to utilize ICT in this way is discussed in the next section, examples will be shown in which ICT is used to organize people, to involve activists, and to get and share information.

³ For a review, see Lister, 1997 and Simeen, 2004.

1.3 How ICT is supporting citizens agency? Examples from the field

When citizens want to be engaged, they need information to be aware, communication to organize actions, organisation to make their action more effective and feedback to have results. ICT can be then used in those fields as a new tool in support of citizens' actions. The main innovation of the new information technologies is on the fact that they are bidirectional – or multidirectional in case of Internet - and real time tools. Bidirectionality empowers the users and makes information updated in real time. Taking advantage of these characteristics, ICT can support the capabilities that allow citizen agency pointed out by Simeen (§1.2) and in general the three main pillars of civic engagement (Norris, 2001): what people learn about public affairs (political knowledge), the public's orientation of support for the political system and its actors (political trust) and conventional activities designed to influence authorities and the decision-making process (political participation). In the questionnaire Hivos sent out to relevant experts of ICT and development the following question was raised:

“What examples from the field do you know are strong in enabling citizens through new technologies to make their voices heard and/or influence the societies they are part of (e.g. monitoring election, accessing media, monitoring the quality of local service delivery)?”

Supported by the answers received, we can identify two main ICT uses: the use of ICT as a tool to get or spread information or monitoring and the use of ICT to organize citizen actions.

1.3.1 Information and Monitoring

Scientia potentia est: According to Mundy *et al.* (2001) “information is useful only if it is available, if the users have access to it, in the appropriate form and language”. Information then should not be the abstract supply-driven kind; it should be concrete, practical, and user-friendly. By definition information has to be demand driven and responsive, not only at national level, but it should also be at very local scale. Ordinary people must have the possibility and ability to search whatever they want and getting the information in a quick, reliable and affordable manner (Rajani, 2008). An essential use of information is for monitoring authorities. Often people do not have a chance to know or track what the governments are actually doing. Access to information and independent media will help; but in addition it is necessary to develop tools for citizen monitoring of public bodies and public resources.

Examples of use of ICT as information and monitoring tool include:⁴

- Ushahidi.com (Ushahidi, which means "testimony" in Swahili) is a mash-up map, developed and deployed after the election in Kenya in 2007-2008 to crowd source reports via email, web submission, and SMS about incidences of violence. Ushahidi's roots are in the collaboration of Kenyan citizen journalists during a time of crisis. Ushahidi plans to make the Ushahidi mapping tool available globally for free.
- Bunge SMS (www.bungesms.com) is a mobile phone based service that combines the internet and mobile telephony with the aim of empowering every Kenyan to influence local governance in their constituencies. You can report corruption and environmental degradation, influence constituency project choices and monitor development activities, and it will be shared with members of parliament.
- Behind the Mask (www.mask.org.za), is a communication initiative around LGBTI rights and affairs in Africa. The organization considers information and communication technology (ICT) and independent journalistic activism as its main

⁴ The following lists have not the aspiration to be exhaustive; they are meant to show different uses of ICT. A good source for examples can be found at <http://mobileactive.org>. MobileActive.org is a community of people and organizations using mobile phones for social impact.

tools. By way of publishing a website magazine the organization gives voice to African LGBTI communities and provides a platform for exchange and debate for LGBTI groups, activists, individuals and allies.

- Global Voices (globalvoicesonline.org) is a leading participatory media news room for voices from the developing world. It bases its coverage on the words, images, and videos of ordinary people across the globe that use the internet to communicate and broadcast their thoughts, analysis, and observations. Global Voices seeks to aggregate, curate, and amplify the global conversation online - shining light on places and people other media often ignore.
- Mzalendo.com (Mzalendo means “patriot” in Swahili) is a volunteer run project whose mission is to “keep an eye on the Kenyan Parliament.” The project was started by two young like-minded Kenyans, who were frustrated by the fact that it is difficult to hold Kenyan Members of Parliament (MPs) accountable for their performance, largely because information about their work in Parliament is not easily accessible.
- Jamiiforums.com is an East African platform that labels themselves as the ‘home of great thinkers’. Its strength is the use of Swahili in its discussions. It provides a platform for debate on a wide range of user-generated issues, ranging from popular to political.

1.3.2 Organization

ICT can be also used to facilitate and make work of organisations more effective. Often activists are far from each others, and in environments where infrastructure are poor ICT can provided a revolutionary tool to organize and get in touch with people at very low scale costs. Moreover, the fact that ICT are immediate and bi/multi-directional, give flexibility and interaction. Phone numbers also create a new form of identity; it provides a stable fixed point of reference to the outside world where before was not possible due lack of infrastructure (Chipchase cited by Rees, 2008).

Examples of ICT as organizational tool include:

- Dgroups.org is the home for groups and communities working to achieve international development goals. It primarily provides groups with an e-mail list and a webplace to share resources. It caters for over 1 million users from the development industry.
- Tactical Tech (www.tacticaltech.org) is an international NGO helping human rights advocates, use information, communications and digital technologies to maximise the impact of their advocacy work. It provides advocates with guides, tools, training and consultancy to help them develop the skills and tactics they need to increase the impact of their campaigning. Their toolkits are designed to meet the specialised technology needs of non-profit organisations such as NGOs, activists, independent journalists and community groups. It includes boxes on running an organisation, making use of mobile phones, secure communication, audio-visual skills etc.
- FrontlineSMS.com is free software that turns a laptop and a mobile phone into a central communications hub. Once installed, the program enables users to send and receive text messages with large groups of people through mobile phone
- Nabuur leverages the internet to enable people around the world to connect and collaborate on concrete issues, using the wisdom of the crowd. Online volunteers (Neighbours) are matched to and linked with local communities (villages) in developing countries through www.nabuur.com.

Other websites and services, such as Twitter, Facebook, and Youtube, that have not primary been designed to support citizens’ actions in developing countries, are widely used by activists.

1.4 Why so far is ICT not used for citizen agency on a large scale? Evidence from the panels.

We encompassed wide examples from the field where ICT has been used to organize more people, influence authorities and make the changes happen. Most of the examples are small scale or even pilot projects. Therefore the following question needs to be addressed; how to overcome those and get to scale? What are the main blocs and obstacles that prevent pilot project to go to scale? Often pilot projects are relatively successful, as the officers responsible for the implementation focus attention, energy and enough resources on it. To really change the world at scale, much larger efforts are needed. The promise of ICT in this sense is embedded in the technology itself. Mobile phones for example are everywhere, and bottom up innovations show its possibility for success at scale (e.g. m-banking). Citizen agency potentially creates action at a scale that development structures could never manage, and this can be supported even further by technology, that has scale intrinsically build into it. The combination of the two could foster change at scale.

The questionnaire included the following question:

“Worldwide we can see many successfully ICTs pilot projects. In your opinion, what often obstruct their implementation to scale? Please, in case refer examples from the field.”

From the respondents output, the main reasons are threefold: economical, political or due to bad design/implementation. Table 1 summarizes the main issues.

Table 1: Main blocks and obstacles that prevent pilot project to go to scale.

REASON	EXAMPLES
Lack of resources	<ul style="list-style-type: none"> • Economic and financial sustainability: economic resources are enough only for piloting scale. • The fact that ICT does not directly improve key indicator (health, livelihood, literacy) make the funds jeopardized.
Political interference	<ul style="list-style-type: none"> • Political interferences can change project’s aims. • Corruption between stakeholders can jeopardize efforts and efficiency.
Bad design or wrong implementation	<ul style="list-style-type: none"> • Wrong technologies do not solve real needs of people. • Beneficiaries are not involved in the projects implementation. • Consider technologies’ externalities. • Lack of entrepreneurship model or the unskilled qualities.

2.0 A PREDICTION FOR 2014

So far this paper has explored how the interactions and the participation between active citizens and effective governments can be at the base for political development, which often is associated with economic growth due the concession and conquest of political rights.⁵ In developing countries and especially in Africa, in order to build up fruitful conditions for the development of democracies it is necessary to promote a social and political environment in which people are not empowered by leaders but rather empower themselves, developing skills

⁵ Still there is not yet full evidence and clear correlation between economic and political development. In fact, we find exceptions where Countries with high economic development in terms of GDP (PPP) per capita does not follow political freedom (e.g. Singapore, China, Saudi Arabia) or when wide political freedom does not follow economic development (e.g. Papua New Guinea, Mongolia, Namibia) [own analysis based on Freedom House and World Bank data].

and habits of collaborative action, changing institutions and systems to make them more supportive of citizen agency (Boyte, 2008).

The next part of the paper aims to think and image how ICT can be used in the future to support and empower those citizens. We draft a scenario for the next 5 years and base our analysis on the current use of ICT and its applications, in light of the estimated technological spread. We consider the demographic development but we assume that there will be not unforeseen political and social changes. The forecast is geographically focused on Eastern Africa. Before advancing to the technological scenarios, it is important to revisit the conditions that allow the spread of ICT in developing countries. There are five critical points:

- Energy: new technologies are electrical equipments that need electric power to work. In many areas in developing nations, electric supply is irregular or not available.
- Connectivity: Mobile phones and PCs require a network to connect to Internet. Rural area and remote areas often lack of network infrastructure.
- Literacy: ICT requires skills and literacy to be used. In that context, the use of mobile phones is easier than a PC.
- Income: New technologies need money to be purchased (or rented) and to be used (electricity and fees).
- Need: ICT must solve real needs. ICT should be part of the solution and not a so-called “boomerang tool”.

2.1 2014: The technological scenarios

2.1.1 Mobile phone penetration

At the moment mobile phone networks in developing countries cover 45% of the population and in the whole Africa the mobile cellular subscribers are 28.1% of the inhabitants (ITU, 2007).⁶ From 2007 Africa has become the fastest growing mobile market in the world. In Eastern Africa mobile phone subscriptions grew by 67% over one year to September 2007; the sub-region recorded the highest growth in Africa over that period. Table 2 summarizes the key data for Eastern Africa. The main form of fee is pre-paid contract; in Kenya and Uganda, only 3% of the mobile phones are fixed contract (Gillwald, 2008).

Table 2: Mobile phones penetration in Eastern Africa (2007).

	MOBILE PHONE SUBSCRIBERS ^A					% COVERED ^B	
	2002 (000s)	2007 (000s)	CAGR ^c 2002-2007 (%)	Per 100 inhabitants	As % of total telephone subscribers	Area (2006)	Population (2006)
Kenya	1,187.1	11,440.1	57.3	30.48	97.7	32.1	91.8
Tanzania	606.9	8,252.3	68.5	20.4	97.2	13.1	55.7
Uganda	393.3	4,195.3	60.5	13.58	96.3	79.3	96.9
Tot. Eastern Africa	2,187.3	23,887.7	62.1	21.48	97.2	41.5	81.5
Africa	37,036.5	270,595.7	48.8	28.11	89.3	-	-

Source: a. ITU Database, b. Buys *et al.* (2008), c. CAGR is the acronym for “compound annual growth rate”.

Based on the current mobile phone penetration, an estimation on the number of mobiles subscribers in 2014, is made by the logistic and the Gompertz models: both models have been widely used for forecast the telecommunication sector because of their S-shaped curve that well reproduces the technology adaptation.⁷ For the analysis the approach used by Singh (2008) to estimate the diffusion of mobile phones in India is followed.

⁶ This figure is comparable to the OECD level in 2000.

⁷ For a literature review on models and technology diffusion, see *inter alia* Geroski, 2000.

The logistic model can be written as:

$$Md_t = \frac{\alpha}{1 + \exp(-\gamma - \beta(\text{time})_t)} + \varepsilon_t \quad (1)$$

In this model Md_t is the mobile density at period t , α the saturation level, β the shape of the curve, γ its location, and ε is the error term.

Using the same terminology, the Gompertz model can be written as:

$$Md_t = \alpha \exp(-\exp(-\gamma - \beta(\text{time})_t)) + \varepsilon_t \quad (2)$$

The main difference between the models is the inflection point, i.e. where the marginal growth starts to decrease. Setting α equals to 1, the inflection point is 0.5 for the logistic model and 0.37 for the Gompertz curve.⁸

The data used are available from the ITU database⁹ and they measure the mobile penetration in Kenya, Tanzania, and Uganda for the years 1995-2008. We estimated models (1) and (2) using a non-linear least square method and each model has been run with seven different saturation levels (α): 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, and 1.¹⁰ The saturation level is the maximum level supposed that mobile phones penetration can reach within a country (e.g. 0.4 is equivalent to 40% of the total population are subscribers).

The forecast for the next years is build based on the model that fits the data better in terms of adjusted R-square and MAPE (mean absolute percentage error)¹¹ for the last eight observations (2000-2008). The analysis has been conducted with the econometric software Eviews version 6.

The annex II reports the main results for each estimated model. Both models have high values of adjusted R-square and significant parameters but the logistic model presents better MAPE compare to the Gompertz model. This can be derived from a homogenous growth of mobile adaptation within the countries. The best model for each country shows different saturation level: 0.4 for Tanzania, 0.8 for Kenya and 1 for Uganda. This is consistent with the economic and demographic characteristics of each country (table 3). The lower data for Tanzania depend on its network which covers 55% of the population. Kenya and Uganda have similar network coverage but Kenya presents a higher percentage of people living under the national poverty line.

Table 3: Economic and demographic parameters for Kenya, Tanzania and Uganda.^a

⁸ If we set $\alpha=1$, from equation (1) the maximum marginal growth is when $\alpha\beta/4 \rightarrow Md_t=\alpha/2=0.5$, i.e. it is symmetric to its inflection point. Instead, from equation (2) the inflection point is at $\alpha\beta/e \rightarrow Md_t=\alpha/e=0.368$

⁹ Data available at www.itu.int/ITU-D/ICTEYE/Indicators/Indicators.aspx and data.un.org.

¹⁰ Singh (2008) argues that in developing countries it is common having mobile phones penetration over 100% ($\alpha > 1$). This is due the fact that its level of saturation depends on many factors, but mainly on penetration of landlines; where landlines are not wide developed, the saturation level of mobile exceeds a 100%. In Eastern Africa income and network coverage are important factor for mobile phones penetration. For that reason and since in 5 years those factors will not notably change, we did not consider value of α greater than 1.

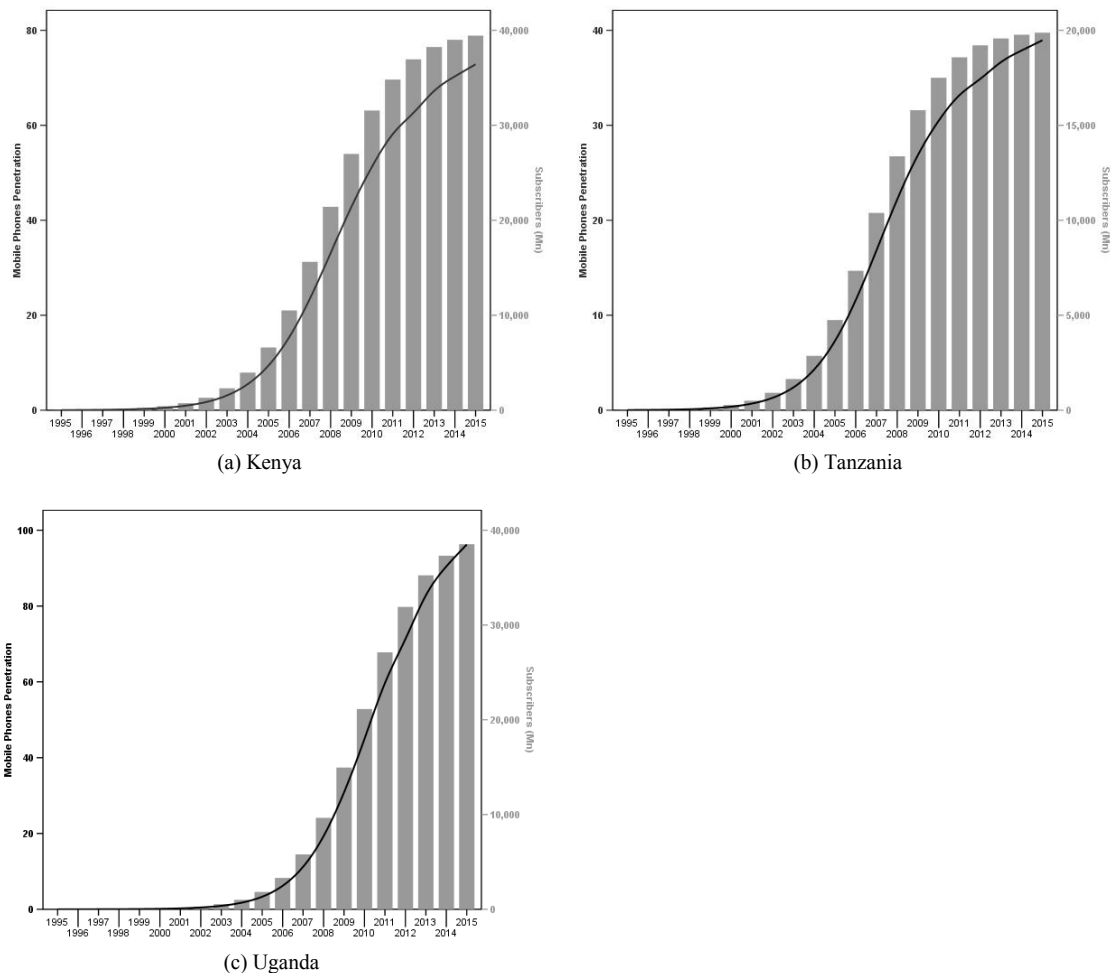
¹¹ The MAPE has been calculate as following: , where A is the actual value, F the forecasted value and time t .

	KENYA	TANZANIA	UGANDA
Current mobile phones penetration	0.43	0.27	0.25
2014 Forecasted mobile phones penetration	0.8	0.4	1
Network covered (% of Population)	91	55	96
Rural people (%)	41.3	75.1	87.1
People living under the national poverty line (%)	52	35	37
Density population (people per Km ²)	59	41	119

Source: a. United Nation Database (data.un.org).

Graph 1 shows the mobiles penetration and subscribers for the next 5 years for each country in Eastern Africa. The number of subscribers is weighted yearly on the estimated demographic growth based on the World Population Prospect 2006 by the UN Department of Economic and Social Affairs.¹² Table 4 summarizes the trend.

Graph 1: Forecasted mobile phones diffusion in Kenya (a), Tanzania (b), Uganda (c).



¹² Data available at <http://esa.un.org/unpp>.

Table 4: Mobile phones penetration (Pen.) and Subscribers (Sub.) in Eastern Africa, 2008-2014.

	2008		2010		2012		2014	
	Pen. (%)	Sub. (000s)	Pen. (%)	Sub. (000s)	Pen. (%)	Sub. (000s)	Pen. (%)	Sub. (000s)
Kenya	43.64	16,853	63.10	25,646	73.89	31,317	78	35,152
Tanzania	27.04	11,227	35	15,240	38.42	17,440	39.53	18,936
Uganda	25.00	7,764	52.83	17,987	79.78	28,517	93.29	36,176
Tot. Eastern Africa	31.9	35,844	50.31	58,873	64.03	77,274	70.27	90,264

Based on the estimations, Eastern Africa will continue to have a remarkable growth rate; this trend is also supported by qualitative analysis (Blycroft, 2008) and national telecommunications authorities (Communications Commission of Kenya, 2008).

It is important to remind that the mobile phones penetration refers to the number of subscribers and not the actual number of users. In the African context it is common that users own more than one SIM because companies apply different fees and can have different network coverage. Sutherland (2008) estimates that more than 18% of the total users' estimation are double or triple counting. Heeks (2009) hypothesizes that in Africa in-country mobile ownership is 75% of the subscription.¹³ At the same time, he adds that mobile phone subscription figures are underestimates for at least two reasons: private mobile phones are shared with family, friends, neighbours, and public mobile phones are accessible to large numbers of people.

2.1.2 Internet Penetration

There are almost 52 million (5.43% of the population) Internet users in Africa; table 5 summarizes the data for Eastern Africa. Internet penetration nowadays strongly depends on landline networks. For every three land telephones lines one is connected to the Internet.

Table 5: Internet penetration in Eastern Africa (2007): Subscribers (Sub.) and Users.

	INTERNET					BROADBAND SUB.
	Sub. (000s)	% Sub.	Users (000s)	Users per 100 inhab.	Users/Sub.	Per 100 inhab.
Kenya	186.8	0.53	3,000	7.99	16.07	0.05
Tanzania	50.0	0.14	400	0.99	8.0	-
Uganda	15.5	0.05	2,000	6.48	129.03	0.01
Tot. Eastern Africa	252.3	0.72	5,400	15.46	21.40	0.03
Africa	9,674	1.15	51,982.3	5.43	- ^a	0.20

Source: ITU Database. a. In the ITU database some data for Internet subscribers is missing. As a consequence, the rate would be not accurate

The gap between Internet users and mobile phone users is wide. The main reasons are infrastructural (landline network not wide, irregular electricity supply, slow transfer speed), socio-cultural (high literacy needed, lack of local content), and economical (hardware very expensive and costly fee).

The current level of Internet penetration in Eastern Africa is too low to use econometric models for a reliable forecast. Anyway, it can be estimated that in the next years PC users will increase in numbers but not as rapidly as the mobile phone rate. The growth will be driven by

¹³ As Heeks notices, this estimation can be inconsistent with demographic data. For instance, in Eastern Africa around 42% of the population is under 14 and unlikely half of them own a mobile phone. Data from World Population Prospect 2006 by the UN Department of Economic and Social Affairs.

lower hardware cost¹⁴ and cheaper Internet connections. The higher skills required to use a PC will be partially overcome by the use of advanced mobile phones. It can be expected that most of the Internet traffic will pass through mobile phone. Moreover, at the end of 2010 the Internet connection will improve when the Eastern Africa Submarine Cable System¹⁵ and its branches will be active. Currently in Eastern Africa there are trial tests of WiMAX technology but the estimations suggest that only less than 2% of population will be reached in 2012 (WiMax Forum, 2007).

2.2 2014: Imaging how devices will be developed

To foresee how technologies will be used by people it requires imaging on how technology itself will be. This section is based on the following question contained in the survey:

In 5 years time, what do you think will be the technology most used by citizens in developing countries to get information and to interact with others (including government)?

In the future, a predominance of mobile phones or laptops is not seen: the next generation of devices will be a mix of both technologies. It will have the user-friendliness and manageability of mobile phones and the advanced features of laptops. For the first time people will afford a unique device with embedded communication, informatics, media and photo tools. The envisioned convergence between old communication media (i.e. radio) and new communication (i.e. mobile phone) will be an essential and critical point in order to meet people's needs.

A further step that will revolutionize the use of communication tools is the shift to voice communication into IP (Internet protocol) network and then all the devices will be connected on the Internet. Realistically this will not happen before the critical infrastructure plans are realised, such as the Eastern Africa Submarine Cable System or new WiMAX technologies are developed.

Developing countries are a huge potential market for companies and the assumption can be made that they will increase the businesses and the choices of devices. On the one hand mobile phones will be more advanced with functions that in developed countries are usually offered by laptops (email); the advent of the Google mobile open operating system Android will move the markets to emerging applications. On the other hand they will be integrated with functions that will help share devices (multi-sim, multi-account, counter cost on screen) and that are not strictly related with communication (light and translation tool). Moreover, they will have better radio, camera, and GPS. Batteries with partially embedded solar panel will overcome the lack of electricity in remote areas.

Personal computers will be adapted to use under difficult environments. They will become shock resistant and waterproof; in addition they will be running a basic operating system in a local language. Due to lack of energy, high cost and expensive connection, we can expect that in the medium term PCs will still not be distributed widely within homes. Mobile phones will continue its penetration with very simple devices for first users and advanced ones for existing users. In the long term advanced mobile phones will help the "technological literacy" and the diffusion of PCs and PC applications.

¹⁴ See for example the initiatives of One Laptop per Child (<http://laptop.org/en/>) and the Indian case (www.ft.com/cms/s/0/e20415ac-f0c8-11dd-972c-0000779fd2ac.html?nclink_check=1).

¹⁵ The Eastern Africa Submarine Cable System (EASSy) is an initiative to connect Countries of Eastern Africa via a high bandwidth fibre optic cable system. These countries will no longer have to rely on expensive satellite systems to carry voice and data services.

CONCLUSION: NEW APPLICATIONS AND HOW TO UP SCALE THEM

In Eastern Africa there is a diverse and vibrant civil society sphere and understand *how* ICT can support citizen agency can be an important contribution to the design of development strategies in that region. Examples around the world suggest that the ICT's potential is enormous, it is not a matter of technologies anymore - it is already there! – it is more a matter of imagination, adaptability and mere time. This is not only limited to the context of citizen agency, it is likely that the wide success of ICT and its scale will not lie in complex devices or advanced usage, but whether or not the technology is usable and relevant to people. For this reason it is important that applications and software originate from the field, instead of merely importing them, and they should be in languages that every potential user could understand.

Based on the technological scenario, how will the basic conditions that allow the spread of ICT (§ 2.0) be met in 5 years time?

- Energy: Alternative sources (i.e. solar panels) will increasingly provide energy and its success will depend on how the solar technologies will be efficiently implemented in mobile phones' batteries.¹⁶
- Connectivity: The forecasting models have given evidence that in the medium term the mobile penetration will not be arrest, reaching in Eastern Africa levels of subscribers' number not dissimilar to the current level in OECD countries. There is not enough data to forecast Internet connection, in any case it is expected that most of the connection will be through mobile phones.
- Literacy: The uses of intuitive, simple devices will partially overcome literacy problems. Vocal and voice based systems partly overcome this problem as well. Next to that, making more use of local languages is related to this issue as well.
- Income: Manufacturers will produce cheaper devices that will become affordable for more and more people. However, in 5 years devices unlikely will cost under USD15-20. But a likely future reduction of governmental taxes on mobile phone fees may include additional users. East Africans currently pay taxes between 25% and 30% on mobile phone services, compared with an average of 17% across Africa (GSM Association, 2007).

Based on that income, literacy and connectivity will not be the main blocking points for the spread of ICT, the success of ICT in support of citizen agency will be based mainly on whether or not technology will be able to address real people needs and in minor part on how alternative source of energy will be adopted.

In the questionnaire we asked the respondent which ICT's uses will support citizen agency in the next 5 years. In general, it has emerged the importance of anthropology fieldworks¹⁷ on the uses of mobile phones and Internet applications. That because the key point is to know what people actually do with their mobile phones instead of what we hope they can do. From the respondents' point of view information and organization seem to remain the main field of new applications in the nearly future.¹⁸

¹⁶ Recent implementations suggest that solar batteries are ready to be commercialized. See www.geek.com/articles/mobile/round-up-solar-powered-cell-phones-at-mwc-so-far-20090218/

¹⁷ *Inter alia*, see the work of Chipchase (www.janchipchase.com).

¹⁸ It is important to recall that in any case social and political preconditions are needed for citizen actions (§ 1.2).

In the field of information two main developments are likely to be seen. On the one hand ICT will become further integrated into old media. Journalism will make use more of blogs, live coverage and real time video in addition to radio and newspaper. A new generation of bloggers is expected emerge, distributing information within their community as well as making it available for the rest of the world. Websites such as Global Voices already aggregate local news and make it available for the international audience. On the other hand ICT can play a more intensive role in the field of monitoring elections and the accountability of politicians. In Eastern Africa there have been some examples (e.g. Kenya¹⁹) of these applications at national level, but bigger changes can be made if ICT is used to monitor local elections because at that level the citizens can directly make changes. Moreover worldwide examples suggest that ICT has been used in citizen actions in both free, and more interestingly, in repressive environments.²⁰ In 2007 during the government repressions in Myanmar, live blogging and the use of mobile phone made the citizen voices heard outside the country. During the protests, the government attempted to block all websites and services that carry news or information, but blogger in Yangon circumvented this censorship and posted pictures and video in real time.²¹ Similarly ICT has been used in support of protests and manifestations in countries like Ukraine²² and Philippines,²³ where there is a relative freedom of press and voice. These examples, where ICT supports citizen action in repressive environment, seem to confirm a correlation between freedom of voice and press and citizen agency. There is a lack of comprehensive research into this topic and insufficient definition on this relationship (§ 1.2) but it is relevant notice how ICT can support citizen actions in repression environments.

The organization of citizen agency will be further supported by new ICT applications. They will reflect citizens' movements in their diversity: the development and the internal organization of such movements will drive the use of technologies. In this context the decentralization nature of citizen agency could make enormous advantage from the peculiarities and flexibility of ICT tools. Also geographical information will be massively used both for information's dissemination and for organization purpose; the live position of the authors and users will be included in the real time information. Integration of GPS information in software such as Twitter, Google Maps, FrontlineSMS or Ushahidi will expand their uses. Finally new software solutions²⁴ will be able to analyze all the contributions submitted by the users in case of special events (e.g. crises, natural disasters, etc.) and determine which ones are likely to be more relevant and reliable.

Finally, ICT may also change the traditional power balance between rural and urban areas. It can allow remote rural communities to directly interact, bypassing the centres of information and control. As a consequence, the "rural periphery" could directly network itself, not relying on the urban centres.

Reflecting on the considerations that Tandon (2008) makes on citizen agency, we think the main potentials and challenges for ICT in the next 5 years are twofold. First, a great potential of ICT can be found in the practice of networking, involving people and alliance-building

¹⁹ See Goldstein and Rotich, 2008.

²⁰ For a review of examples, see *Mobile Phones and Social Activism - An Ethan Zuckerman White Paper*. Document available at: <http://mobileactive.org/mobile-phones-and-social-activism-ethan-zuckerman-white-paper>

²¹ See Chowdhury, 2008.

²² See Goldstein, 2007.

²³ See www.time.com/time/asia/asiabuzz/2001/01/23/

²⁴ Currently Swift seems to be one of the most promising solution (<http://swiftapp.org/>).

from the local to the national (or even global) spheres. Here coalitions of growing spirals of connectivity among local initiatives of citizen can be built. Mobile phones, sms, and Internet are all new forms of such networking and coalition building initiatives. These technologies have a lot of potential ascribed to them and due their characteristics they have scale build into. The scale must be intended not just bottom-up but also horizontally; the value and the power of technologies is proportional at their diffusion. The second potential of ICT could be to raise the voice of visionary leaders, in order for them to give global visibility and connectivity to local initiatives. Taking the examples made by Tandon, imagine how the voices of Mahatma Gandhi or Nelson Mandela would have been amplified by the use of ICT – and how Barack Obama used it in his campaign – and how their charisma and their strength would have reached and inspired even more people than they already did. In the Presidential Campaign 2008, Obama used the citizen agency theme in a larger political term; citizen agency added a collective action dimension. Campaign volunteers strategically use new technologies to promote political actions and organize supporters at local level as well as national level.

If ICT will be able to take those opportunities, it can become a visionary tool in the hands of active and creative citizens.

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ANNEX 1. Survey and list of respondents.

Email

Dear [name],

Hivos is undertaking a research aimed to think new applications of Information Communications Technologies (ICTs) in order to empower citizens in developing countries.

Because of your expertise and knowledge we believe you can give us inspiring ideas and valuable considerations. It would be very useful to us if you could fill the following questionnaire and send it back. You can also fill the form online at that link:

www.surveymonkey.com/s.aspx?sm=VUXPkUZdtRIU_2fBoYt0ALXQ_3d_3d . It takes just 5 minutes of your time but it can make the difference on our research.

If in your network you know people that can give us their contributions, please feel free to forward that email. It would be much appreciated.

Best regards,
Giacomo Zanello

Questionnaire layout: Questions

1. In 5 years time, what do you think will be the technology most used by citizens in developing countries to get information and to interact with others (including government)? Please, elaborate on your answer.
2. Worldwide we can see many successful small scale ICT/NGO projects. In your opinion, what blocks implementation at scale? Please, where possible refer to examples from the field.
3. What examples from the field do you know are strong in enabling citizens through new technologies to make their voices heard and/or influence the societies they are part of (e.g. monitoring election, accessing media, monitoring the quality of local service delivery)? And what do you expect to see in 5 years?
4. Your personal information:

Name:

Email Address:

Respondents

Babugura Fidelis
Bantebya Susan
Beatrice Mukasa
Carl Jackson
Charles Mangongera
Cheekay Cinco
David Dionys
Dorine Ruter
Dorothy Okello
Emmanuel Ediau
Ethan Zuckerman
Firoze Manji
Frédéric Dubois
Friederike Romer
Gala Diaz Langou
Humphrey Chinyama
Issmail Nnafie
Janet Haven
Jap Pels
Joitske Hulsebosch
Josephine Watuulo
Karel Novotný
Katrin Verclas
Lori Michau
Lut Laenen Fox
Maarten Boers
Manuel Flury

Margreet van Doodewaard
Michel Wesseling
Niels J.A. Huijbregts
Peter J. Bury
Petarca Karetji
Raquel Chacon
Ravi Palepu
Seema Nair
Senfuka Samuel
Shita Laksmi
Siegfried Woldhek
Silvia Pérez
Stephanie Hankey
Ueli Scheuermeier
Victor Mkolongo
Wilfried Theunis

ANNEX II. Logistic and Gompertz models: estimated parameters

		LOGISTIC	GOMPERTZ	LOGISTIC	GOMPERTZ	LOGISTIC	GOMPERTZ	LOGISTIC	GOMPERTZ	LOGISTIC	GOMPERTZ	LOGISTIC	GOMPERTZ	LOGISTIC	GOMPERTZ
	α	0.4		0.5		0.6		0.7		0.8		0.9		1	
KENYA	γ	-11.4488	7.6458	-9.7276	5.8575	-8.8269	4.9237	-8.3507	4.3853	-8.0825	4.0411	-7.9241	3.8035	-7.8288	3.6300
	(se)	1.6047	1.4297	0.6521	0.6713	0.3435	0.4147	0.2136	0.2962	0.1504	0.2299	0.1187	0.1879	0.1041	0.1591
	β	0.9832	0.6961	0.7935	0.5127	0.6885	0.4146	0.6270	0.3560	0.5875	0.3172	0.5601	0.2894	0.5401	0.2685
	(se)	0.1375	0.1257	0.0537	0.0570	0.0276	0.0345	0.0169	0.0024	0.0118	0.0187	0.0092	0.0152	0.008	0.1278
	Adj R ²	0.9682	0.9442	0.9876	0.9681	0.9940	0.9783	0.9970	0.9838	0.9980	0.9872	0.9980	0.9894	0.9990	0.9910
MAPE	9.8875	15.4966	5.6623	11.2945	3.2452	8.5212	2.5231	6.7280	2.3147	5.4948	2.3912	4.5939	2.5745	3.9977	
TANZANIA	γ	-8.0191	4.2879	-7.5247	3.7276	-7.3233	3.4217	-7.2405	3.2303	-7.2135	3.0997	-7.2154	3.0052	-7.2332	2.9337
	(se)	0.3014	0.3088	0.248	0.1999	0.2420	0.1509	0.2439	0.124	0.2470	0.1073	0.25	0.096	0.2524	0.088
	β	0.6228	0.3624	0.5506	0.2965	0.5115	0.2582	0.4870	0.2329	0.4704	0.2148	0.4582	0.2010	0.4490	0.1901
	(se)	0.0243	0.0259	0.0196	0.0165	0.0189	0.0123	0.0189	0.010	0.0191	0.0086	0.193	0.0076	0.0195	0.1190
	Adj R ²	0.9946	0.9263	0.9949	0.9884	0.9736	0.9990	0.9930	0.9920	0.9930	0.9930	0.9920	0.9940	0.9920	0.9940
MAPE	4.2428	8.2582	4.8318	7.3624	5.6901	6.7581	6.2205	6.2962	6.5810	6.0190	6.8418	5.9555	7.0387	5.9924	
UGANDA	γ	-11.368	6.4792	-10.6403	5.4869	-10.2979	4.9453	-10.1215	4.6029	-10.028	4.3659	-9.9804	4.1914	-9.9599	4.0571
	(se)	1.1822	0.9931	0.9319	0.7263	0.8097	0.5918	0.7378	0.5105	0.6907	0.4553	0.6574	0.4153	0.6327	0.3847
	β	0.8359	0.5030	0.7524	0.4097	0.7059	0.3566	0.6763	0.3218	0.6629	0.2969	0.6410	0.2781	0.6296	0.2632
	(se)	0.0904	0.0776	0.0705	0.0562	0.0609	0.0456	0.0554	0.0392	0.0517	0.0348	0.0491	0.0317	0.0472	0.0293
	Adj R ²	0.9609	0.9263	0.96797	0.9356	0.9770	0.9470	0.9790	0.9510	0.9800	0.9550	0.9810	0.9570	0.9820	0.9580
MAPE	21.3863	33.8547	18.7161	30.17	17.1753	27.8728	16.1807	26.3100	19.2621	25.1740	15.0187	24.3058	14.8497	23.6172	