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Mobile Entrepreneurship and Employment

Given its strong recent growth, the global mobile industry is now a major source of employment opportunities. Mobile industry jobs can be categorized into direct and indirect ones, with a diverse labor force supplying each category. Direct jobs are created by mobile operators and manufacturers in professions that range from engineers to managers to sales support staff. The International Telecommunication Union (ITU) estimates that around 1.5 million people are directly employed in the industry worldwide (ITU 2011). The total number of jobs fitting this narrow “direct” description may begin to decline as the industry becomes commoditized. Indirect jobs, however, show strong potential for growth, in professions related to mobile application development, content provision, and call center operations. Indirect jobs can be created by mobile operators and manufacturers, as well as by third-party content and device producers, including entrepreneurs. In some emerging markets, outsourcing of mobile content development also creates significant numbers of indirect jobs. In India, the mobile industry is expected to generate around seven million indirect jobs during 2012 (COAI 2011). This report argues that faster mobile networks and more capable smartphones make mobile communications a platform for innovation across different sectors (such as health, agriculture, and financial services), supporting overall employment numbers in an economy. The greatest potential for employment growth derives from demand for services enabled by mobile phones.

For many entrepreneurs in developing countries and rural areas, a mobile device is a tool not only for contacting customers and accessing the internet, but also for making financial transactions, establishing a client database, or coordinating just-in-time supply-chain deliveries. Such critical business functions can enable small firms to thrive in locations where accessing markets or selling new products would otherwise be impossible. It is difficult to estimate the number of

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people establishing new companies or the employment generated as small and microenterprises expand, but mobile phones increasingly contribute to this process. It is also difficult to say with certainty how much the mobile communication sector has contributed to employment and entrepreneurship to date, because no global count exists. It seems clear that the sector is a net generator of jobs, however, even though it can occasionally eliminate employment opportunities. For example:

- In the United States alone, the mobile app industry provided an estimated 466,000 jobs in 2011, with annual growth rates of up to 45 percent from 2010 to 2011 (TechNet 2012).
- In Canada, a large proportion of mobile apps are games. The gaming sector is expected to expand by 17 percent over the next two years, driven by increasing mobile broadband access; as a result, mobile games are likely to generate a significant number of employment opportunities. Of the 348 gaming companies in the country, 77 percent expect to hire new graduates in 2013 (Secor Consulting 2011).
- Mobile money schemes have generally proved to be net generators of jobs. Safaricom's M-PESA system supports 23,000 jobs for agents in Kenya alone.¹ Airtel Kenya, the second-biggest mobile operator, plans to recruit some 25,000 agents for its mobile money service, Airtel Money.²
- By boosting access to information about market demand and prices, mobile phones can also improve conditions for entrepreneurship.³ A number of recent studies have shown that cell phones make entrepreneurial ventures less risky, mainly by reducing information search costs.⁴

This report showcases some of the mechanisms by which the mobile sector can support entrepreneurship and job creation, with the aim of informing policymakers, investors, and entrepreneurs themselves. Some of these approaches share similarities with traditional donor initiatives, but many are novel ideas for which the "proof of concept" has been demonstrated only recently. In an industry evolving as quickly as the mobile sector is today, it is vital to tailor support to the local circumstances and to evaluate impact regularly. As a framework for entrepreneurial activities, this article examines open innovation and considers one particular way of supporting entrepreneurial activity in the mobile industry, namely, specialized business incubators, or mobile labs. The article also reviews mobile microwork and the potential of the virtual economy, and considers mobile phones as a tool for job seekers. Finally, it summarizes suggestions to support entrepreneurship and job creation in the mobile industry.

OPEN INNOVATION AND MOBILE ENTREPRENEURSHIP

The rapid pace of innovation in the mobile sector is creating uncertainty and disruptive technological change while lowering barriers to entry and generating

opportunities for new firms and entrepreneurs.⁵ The rise of entrepreneurship in the mobile industry is unsurprising. The lack of vertical integration and direct competition between operators, handset manufacturers, and content providers has resulted in a complex environment of different technological standards and innovation in business models, with ample space for growing new businesses. New information-sharing and collaboration practices that transcend the closed communication channels are characteristic of newly establishing markets. Similar information flow dynamics were present in the early stages of other high-tech industries, including the semiconductor industry in the 1970s, PC software in the 1980s, and the Internet in the 1990s.

In today's open innovation model, partners, customers, researchers, and even competitors are finding new ways to collaborate in the product development process. The paradigm of open innovation assumes that firms can, and should, use external as well as internal ideas and paths to market as they seek to advance their technology.⁶ Today, firms in many sectors must complement internally oriented, centralized approaches to research and development (R&D) with more open, networked methods because useful knowledge has become more dispersed (both within and outside firms), while the speed of doing business has increased. Collaborative approaches to innovation also offer new ways to create value, especially in fast-changing industries. To capitalize on fresh opportunities, innovators must find ways to integrate their ideas, expertise, and skills with those of others outside the organization to deliver the result to the marketplace (Chesbrough 2003; Aldrich and Zimmer 1986; Teece and Ballinger 1987).

One of the most promising areas for entrepreneurship is in mobile software applications, where the barriers to market entry for individual developers and small and medium enterprises (SMEs) are generally low. Mobile apps can be written by programmers working for device manufacturers, network operators, content providers, or software development firms, and they can also be created directly by individual freelance professionals. In emerging markets, as in those more developed, there is no "natural" place where applications originate; for the most part, network operators and device manufacturers provide their own apps, with other apps supplied to market directly by developers. This room for independence allows developers who also have entrepreneurial ambitions to start their own app-based businesses.

This ambiguity is accompanied by an array of choices of platforms and distribution models, which can be challenging for entrepreneurs to navigate. For example, most apps for lower end phones are written for SMS (short message service), while apps for midrange devices often rely on mobile internet access and may be written in Java or PHP programming languages. Smartphone applications must be customized for each platform, including, for instance, the proprietary Apple iOS, BlackBerry, or Windows platforms, or for the open source Android. According to a 2011 survey, developers used an average of 3.2 platforms concurrently, which was a 15 percent increase over 2010 (Vision Mobile 2011). Thus, developers must hone these skills in multiple platforms because no one knows which one of them—if

any—will become dominant in the future. In other words, developers choose to diversify their skills because the market, at the moment, demands variety and flexibility. Making decisions related to marketing and distributing apps is especially challenging: app stores based on operating systems compete with those managed by handset manufacturers and major global brands, and programmers must decide which store, or stores, will be most effective as a delivery vehicle of apps to their potential customers.

INFORMAL INDUSTRY NETWORKS FOR MOBILE ENTREPRENEURSHIP

The lack of formal information channels and uncertainty mean that mobile entrepreneurs must take the initiative to keep up with changes in standards and industry developments, resulting in frequent socializing and informal networking between mobile entrepreneurs and developers. Informal social networks, consisting of acquaintances, mentors, investors and other mobile entrepreneurs, serve three distinct purposes in the development of new ventures—discovering opportunities, securing new resources, and obtaining legitimacy—all of which are necessary for the survival of a young firm (Elfring and Hulsink 2003). Entrepreneurs may have initiative, an appetite for risk, creative ideas, and business acumen, but they may also need complementary resources to produce and deliver their goods or services. Social networks are important sources of support and knowledge and can provide access to distribution channels, capital, skills, and labor to start new business activities (Greve and Salaff 2003).

One way to support jobs created through entrepreneurship in an era of open innovation is through structured social networking events that can help define business opportunities, identify talent, and draw investment into the mobile sector in emerging markets. Networking events can also graft best practice lessons from the ground back into the development and donor communities. An early example of an informal social networking organization is Mobile Monday (www.mobilemonday.net), an open community platform of mobile entrepreneurs, developers, investors, and industry enthusiasts. Mobile Monday fosters business opportunities through live networking events. It provides a space for entrepreneurs to demonstrate new products, share ideas, and discuss trends from local and global markets. Founded in 2000, in Helsinki, the community has grown to more than 100 city chapters and is managed by 300 volunteers around the world.⁷ More narrowly focused organizations, such as Google Technology User Groups (GTUGs) (www.gtugs.org), cater to participants interested in a particular developer technology. These groups provide training for developers using the open Android mobile platform, followed by minimally structured networking events.⁸ GTUGs vary in format, from a dozen people who may get together to watch a corporate video, to large groups involved in product demos, lectures, and competitions dubbed “code sprints” and “hackathons.” Smaller, local networks have also been formed in many cities. For instance, Nairobi-based AkiraChix provides networking and training for women and girls unfamiliar with software design. It cultivates the careers of young

developers of both genders by providing training in programming and mobile application development. In Nepal, Young Innovations, the group behind the Kathmandu-based organization Mobile Nepal, regularly hosts “bar camps”—open conferences where entrepreneurs and developers give presentations and provide feedback.⁹ In Georgia, the business social network mTbilisi promotes corporate partnerships, coordinates events focused on incubating mobile start-ups, and provides a space for testing new ideas and designs.¹⁰

FEATURES AND DYNAMICS OF INFORMAL NETWORKS OF ENTREPRENEURS

Mobile developers and entrepreneurs interviewed for this report identified both informal gatherings and more structured social networking activities as helpful to innovation and entrepreneurship in the development of mobile applications. Respondents from Kenya, Nepal, and Uganda indicated that they are initially cautious about sharing ideas and information but that they freely provide lessons and support once they are established and have begun implementing their business ideas.¹¹ Entrepreneurs may first test options for starting their own business within a circle of carefully selected contacts. As a second step, during the planning stage, entrepreneurs often mobilize a large, informal network of friends, colleagues, mentors, and other acquaintances, since they may not know who exactly can help them (Berglund 2007). Information exchange in informal environments carries risks for fragile new businesses, including the threat of idea theft: promising ideas risk being taken over not only by peers and direct competitors but also by larger companies, which, instead of hiring the idea generator to complete the work, may assign an internal team to develop the project in-house. To mediate such risks, once the project design stage has begun, entrepreneurs choose smaller, trusted groups from a wider social network to form product development teams. Entrepreneurs recognize that ideas are only relevant when they are accompanied by a plan for execution: many people may identify demand for a specific product or service; however, it is execution, in particular functional design and an intuitive user interface, that makes or breaks an app.

Developers and entrepreneurs tend to rely on their informal networks to identify potential partners, mentors, or peers who can be consulted in confidence and relied on to help move a viable product from mind toward market. Once collaboration is under way, individuals may come back to the network to talk about their example of successful partnership and to share challenges. In other words, the interaction pattern seems to circle from a group setting to one-on-one interaction and back to the wider network. The rewards of networking usually greatly outweigh the risks. Many mobile entrepreneurs note that collaboration is essential, because few applications can be successfully brought to market by a single developer, let alone expanded to additional platforms and maintained afterward. Market information, idea validation, and partnerships are among the most frequently cited rewards of participation in social networks, according to more than 80 percent of

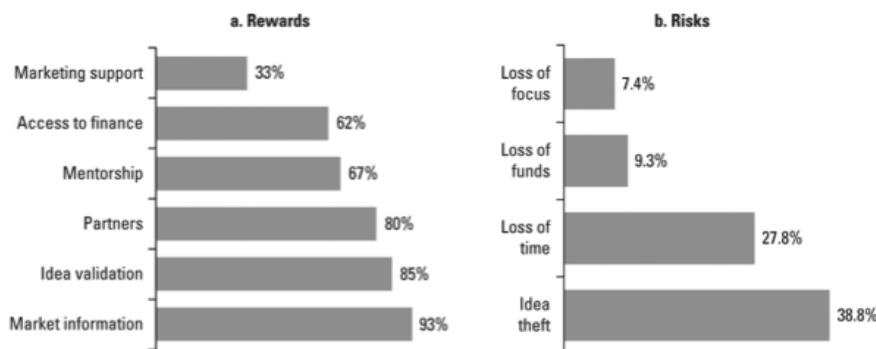


Figure 1. Rewards and risks from entrepreneur participation in social networks

Source: Author interviews. Note: Risks and rewards as perceived by mobile industry entrepreneurs, based on a sample size of 54, split between Kenya, Nepal, and Uganda.

respondents to our survey (Figure 1). Access to finance (including small amounts raised from friends and family) and mentorship opportunities were other important rewards, listed by more than 60 percent of respondents. Finally, marketing support is another benefit of participating in informal peer groups. On the risk side, more than 35 percent of respondents are concerned about idea theft, in particular by more established businesses; however, even these entrepreneurs recognize the necessity of vetting or validating ideas with their peers and consider the risk of idea theft to be tolerable. Loss of time, funds, and focus are concerns for 28 percent, 9 percent, and 7 percent of respondents, respectively.

The marketing of mobile applications is typically the biggest expense and the activity about which developers are often the least enthusiastic. Developers often rely on partners or enterprise customers for all aspects of marketing, which, if executed poorly, can stall the adoption of an otherwise successful app. For small teams of developers working on mass market apps, marketing strategies can include dissemination and awareness-raising through word of mouth, Twitter, Facebook, email, and SMS. Successful incubators, such as iHub Nairobi,¹² act as useful “amplifiers” of marketing efforts, because local media and investors tend to follow their announcements and activities closely.

Participants report that small groups (from 4 or 5 people up to 20) are the most helpful form of networking in discussing ideas and execution. Larger groups can be too impersonal or too strongly driven by formal presentations. As a result, many organizers (including Mobile Monday Kampala¹³) use breakout groups to ensure more meaningful conversations at their events. Network sponsors can help strengthen social networks by attracting well-known figures or VIPs to the meetings as much as by direct financial support. Attracting respected experts to address attendees can assist organizers in drawing out participants and broadening the number and scope of conversations within the network.

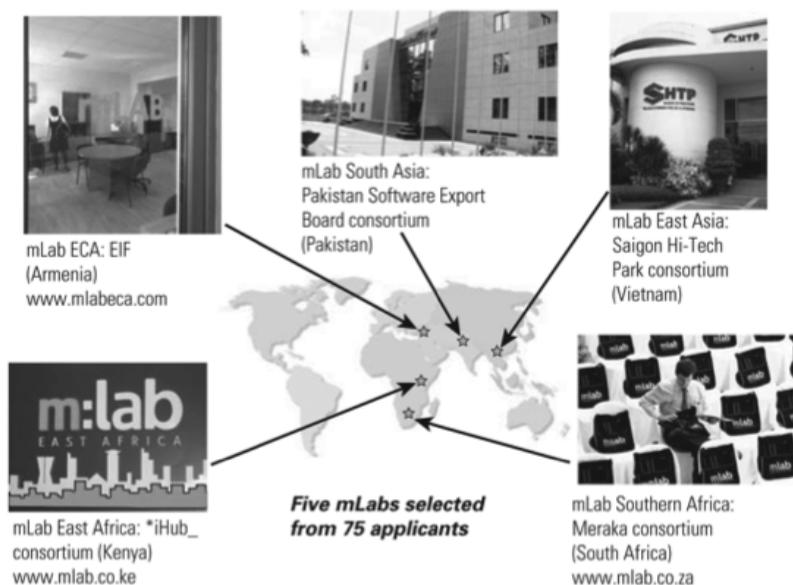


Figure 2. Incubators in emerging markets

MOBILE LABS AND HUBS

While the informal networks of mobile entrepreneurs and developers described above can provide many resources, including knowledge and connections to investors, demand for more formal, hands-on learning spaces and supportive office environments is also strong.¹⁴ A typical business incubator may house 5 to 20 start-up companies in a shared space offering common office equipment and conference facilities. Most employ a resident manager who coordinates business assistance, training, and other services, such as business plan development; accounting, legal, and financial advice; coaching and help in approaching investors; marketing; and shared services, such as administrative support. Once a client or resident business is deemed financially viable, it moves its operations outside the incubator, enters the market, hires new staff, and expands its contribution to the economy (Lewis 2001).

A number of incubators, or “labs,” focused on mobile entrepreneurs have been established in emerging markets, including Grameen Foundation’s AppLabs in Uganda and Indonesia, and infoDev’s regional mobile applications laboratories, or “mLabs.” (Figure 2; Box 2). Launched over the past five years, these labs are still in an experimental stage, but they offer several early lessons.

Each mLab is a technology-neutral physical space with testing facilities for developing the technical skills and business sense needed to build scalable mobile solutions into thriving businesses that address social needs. In addition to providing state-of-the-art equipment, the labs offer technical training and workshops, and they connect developers and entrepreneurs with potential investors, experts,

Services for Entrepreneurs Provided by mLabs and mHubs	mLabs	mHubs
Informal networking, e.g. thematic monthly presentations followed by informal discussions	X	X
Multistakeholder national-level conferences, e.g. Nepal Forum on the Mobile Ecosystem	X	X
Online learning and discussions, including virtual incubation	X	X
Mentorship by successful entrepreneurs and investors	X	X
Technical and business skills training from one day up to 18 months in length	X	X
Competitions and hackathons to identify most promising product ideas and prototypes	X	X
Acceleration “bootcamps” aimed at rapidly building capacity and increasing venture value	X	X
Office space at subsidized costs for limited periods of time	X	
Mobile app testing facilities	X	
Assistance with marketing apps (e.g. advice on pricing, facilitating delivery channels)	X	X
Assistance with access to early-stage finance	X	X

Table 1. Services for entrepreneurs provided by mLabs and mHubs

and public sector leaders. The labs are complemented by a network of mobile networking hubs, which do not provide physical space. Together, through regular informal events, workshops, and conferences, they act as convening spaces for the mobile industry and allow entrepreneurs to access advice, mentorship, idea and business plan competitions, and investors. Both the mLabs and mHubs are run and used by local communities working to increase the competitiveness of enterprises in mobile content and applications, and they are part of a wider mobile innovation program that is seeking to develop talent and produce successful companies with strong growth potential.

Mobile labs facilitate demand-driven innovation by grassroots entrepreneurs, so breakthrough low-cost, high-value apps can be brought to market. Although specialized incubators are not unusual, those focusing solely on mobile app businesses are a recent phenomenon. That presents an opportunity to integrate lessons and best practices borrowed from related ventures, while tailoring new service offerings specific to the mobile sector. Ideally, mobile labs should be designed in a way that enables them to remain open and adaptable to their environment, so lessons can be incorporated continuously throughout the lab’s existence.

Mobile lab managers identify their members’ greatest needs as start-up capital and opportunities to network with mobile ecosystem players and other technology entrepreneurs. In addition, many mobile app entrepreneurs need specialized business training to understand the mobile ecosystem, market demand, or both.

Furthermore, because mobile app development needs a special set of technical abilities, many app developers need specialized technical training to continuously update their programming skills. Networking with local business professionals can enhance the incubation experience, providing entrepreneurs with highly customized advice that can accelerate the growth of their business. Mobile labs can offer a wide range of services, including “business accelerators”—intensive training and direct mentoring meant to quickly increase the value of a company and to help management develop a viable growth strategy. In poor or remote areas, virtual incubation—business training, advice, mentorship, and networking over a distance and without a dedicated workspace, as well as links with knowledgeable diaspora members—can be particularly helpful. The service offerings implemented by any given lab or incubator should reflect the environment and characteristics of the region where it is located. These characteristics often dictate the services that can be offered and the most likely mix of revenue streams. Incubators may be instituted as nonprofit organizations, for-profit companies (usually when they do not receive grant funding), or foundations. The business models and regulations of a given country usually dictate the most advantageous status for an incubator. Regardless of the regulatory environment, however, partners are essential to the ultimate success of a mobile incubator through their support of the organizations’ development and distribution efforts. That is because, ideally, the incubator is near or at the center of the value chain for mobile content creation and, in its role as an integrator, brokers essential partnerships with all key mobile ecosystem players (Vital Wave 2011).

Even in developed countries, mobile incubators are a recent phenomenon. In the United States, the prominent mobile incubator Tandem Entrepreneurs was launched in 2011 to enable a group of experienced entrepreneurs to provide resources and mentorship to early-stage mobile start-ups. The incubator also offers each resident company seed funds and a collaborative workspace in Silicon Valley.¹⁵ As mobile services become more sophisticated and widespread, the potential of mobile entrepreneurs to contribute to the economies of both developed and developing countries is likely to grow. Most businesses based around mobile app technology are at an early stage of development but may offer enormous employment and economic potential, similar to that of the software industry in the early 1980s. Supporting networking and incubation of entrepreneurs in this space is an important way to ensure that such potential is tapped.

MOBILE MICROWORK

New employment opportunities in mobile communications are not restricted to highly skilled developers and entrepreneurs but can also extend to a relatively low-skilled labor force. “Microwork” refers to small digital tasks (such as transcribing hand-written text or determining whether two photos show the same building). Typically, such tasks can be completed in a few seconds by a person without spe-

cial skills or training, but they cannot be readily automated. Workers are paid small amounts of money for completing each task.

For such work to be broadly accessible to workers from developing countries, it should be performed via mobile devices as well as PCs. However, the mobile microwork market is still very much in its infancy.

Currently, microwork employs more than 100,000 people and contributes to a virtual global economy valued at \$3 billion a year, according to a recent infoDev study (Lehdonvirta and Ernkvist 2011). To understand how a mobile user may be able to tap into additional sources of income, consider, for instance, the growing gaming industry, which enables online gamers to become microworkers compensated in virtual game currency that can often be cashed in for real monetary gains. Today's online game market is very competitive, with monthly subscription fees for some games nearing zero. Instead of charging players, leading online game producers can earn revenue by selling virtual currency to players. The players buy virtual goods and value-added services inside the game using virtual currency. Third parties—monetization service providers—facilitate the exchange of real money into virtual funds. Two such monetization services providers, Gambit and TrialPay, allow gamers to pay for purchases by carrying out microtasks. After completing assigned microwork, the player is paid in virtual currency, which can be traded for virtual goods or converted to real money.

Because virtual workers come from a global pool, international microwork aggregators must be able to provide compensation in foreign countries. This is complex in any market, but it is especially challenging in developing regions, where traditional financial infrastructure can be limited. Mobile money schemes, which are more advanced in developing than developed countries, provide a viable option for payment for microwork via mobile phones.

Leila Chirayath Janah of Samasource works with refugees in Dadaab, Kenya, who are paid for performing small tasks for Samasource's clients, including Google and CISCO. She suggests that microwork may be a natural complement to microfinance, noting that, whereas microfinance can enable entrepreneurs to operate small businesses serving local needs (such as producing chickens on a small farm), microwork allows them to reach beyond the local market and develop a variety of skills. Samasource now facilitates virtual assistance via microwork, including for clients from the developed world. Janah also notes that, while typical microwork tasks are not necessarily intellectually stimulating, they encourage interaction with technology and access to global online social networks, which is "vital to having a voice in the modern world."¹⁶

Although third-party gaming services have existed for more than a decade, the general microwork industry remains relatively new and undeveloped, with mobile microwork in an even earlier stage of development. And despite the relative simplicity of tasks required, microwork faces the challenge of breaking down larger business procedures or analytical problems into smaller components that can be executed by microworkers. This is a technical as well as a procedural problem that warrants further research by the development and business communities alike. A

number of new ventures are considering potential solutions in the hope of entering a market that is likely to grow into billions of dollars a year over the next five years. Easier-to-use interfaces and better distribution channels are also needed, if mobile microwork is to prove a viable employment option for some of the poorest and least educated workers in developing countries (Lehdonvirta and Ernkvist 2011).

MOBILES AND RECRUITMENT

In many countries, coordination and information failures arise between the demand and supply sides of the labor market. While the demand for employment exists in both the formal and informal sectors, information on recruitment is often limited to those with a strong social network or access to job postings via the Internet. The mobile phone can extend this access to those job providers or job seekers for whom PCs are an ineffective or unavailable channel of exchange. A number of emerging business models are using mobile communications for improving coordination and information flows in the labor market. At least four such services are already running: Babajob (India), Assured Labor (Latin America), LabourNet (India), and Souktel (Middle East and North Africa). Two others, Pakistan Urban Link and Support (PULS) and Konbit (Haiti), have developed their systems and will soon start operating.

Skilled, educated workers may already have access to existing web-based job-matching services such as Monster.com, but job-matching services that are mobile-based will be even more important for people without access to web-based services. Mobile-to-web technology will be beneficial for people with basic literacy but not enough knowledge to create a resumé or access online resources. Employers also find it hard to identify low-skilled workers for entry-level jobs in developing countries because existing job-matching services mainly target highly skilled candidates. Mobile-to-web technology promises to bridge some of these gaps. Building trust among users is the most challenging task for the job-matching business. Each of the new organizations mentioned above offers additional and customized services to meet the specific needs of local users, including interview, resumé writing, and networking skills training for job seekers, and access to a special database for employers.

Depending on the job seeker's target market and country of operation, mobile phones may be used for different aspects of the job-matching business process. Most of these organizations use mobile phones for registration and job-match notifications for job seekers. The actual job-matching service is conducted mostly via web-based databases. Of course, such technology cannot fully replace the traditional interview process. Once employers become interested in certain candidates, they can access job seekers' information and then contact them directly for an interview. Use of SMS text messaging can be popular where its cost is significantly lower than that of voice services; however, in multilingual environments with illiterate populations, calls and voicemail remain particularly valuable.

Perhaps the greatest impact of mobile communications on jobs lies not so much on recruitment techniques but on the structure of employment. Beyond creating more vacancy notices, mobiles can stimulate entrepreneurial activity, as the demand for mobile industry hubs and mobile incubators has shown, and it can create many more opportunities for self-employment, part-time work, and flexwork. In a mobile-driven economy, second and third jobs will become much more common—and much more important.

CONCLUSIONS AND CONSIDERATIONS FOR POLICYMAKERS

Overall, the rise of mobile technology carries great potential for employment, but with the increased reach of powerful and affordable mobile devices, jobs also may be lost. Mobile technology can occasionally eliminate jobs, especially where efficiencies are created or resources made available that replace human input. For example, as more individuals acquire their own mobile phones, the demand for “village phones,” teleshops, and other phone-sharing services may disappear in many countries (matching the demise of public pay phones in many countries following the widespread adoption of mobile phones), taking away with it an important source of jobs. In sum, however, with growing mobile penetration rates, the mobile industry is widely expected to produce a net increase in jobs:

- The direct number of jobs in the mobile industry from 1996 to 2011, as reported by governments to the ITU, shows a clear upward trend in most (although not all) countries (ITU 2011).
- As the adoption of mobile technology increases, new jobs are needed to support sales of prepaid cell phone minutes, mobile money transactions, and other mobile-based services.
- The introduction of mobile broadband is expected to generate significant revenues and jobs, especially in related spinoff industries, including the development of mobile applications.
- Nontraditional business plans (such as those based on microwork) are a source of potential growth in jobs enabled by mobile technologies.
- The labor market can benefit from the ability of mobile apps to improve efficiency and lower costs in matching job candidates and employers.

This chapter has outlined a number of tools for enabling the growth of employment opportunities in the mobile ecosystem, including:

- Supporting informal community networks and activities such as business competitions and hackathons to promote open collaboration, mentorship, and introduction of entrepreneurs and investors, and to identify viable new business ideas.
- Investing in mobile hubs and incubators, or mobile labs, in order to

equip entrepreneurs with updated technical skills, to provide them with tools necessary for product prototyping such as testing facilities, and to identify businesses with growth potential through business evaluation and acceleration programs.

- Facilitating creation of micro- and virtual work opportunities.
- Investing in mobile platforms for recruiters and job seekers as well as platforms that extend work beyond traditional work spaces and times.

To capitalize on the potential of mobile technologies to support entrepreneurship and employment, policymakers may consider whether current regulation supports an enabling environment for mobile broadband and entrepreneurship, whether to provide financial support for entrepreneurs and incubation systems, and whether to incorporate some of the aforementioned tools in their public service offerings, such as schools and vocational training institutions, in order to increase employment opportunities in the mobile ecosystem.

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1. These could be considered part-time or supplementary jobs, because M-PESA agent tasks are often combined with other merchant duties. See <http://www.safaricom.co.ke/index.php?id=252>; <http://www.bloomberg.com/news/2010-10-14/safaricom-of-kenya-will-boost-access-to-credit-insurance-for-unbanked-.html>.
 2. Bharti Airtel took over Zain Kenya's network in 2010. Some of the Bharti Airtel agents will also be M-PESA agents, but others will be new.
 3. Mobile Entrepreneurs in Ghana. See <http://www.webfoundation.org/projects/mobile-entrepreneurs/>.
 4. As but one example, see Aker 2008.
 5. This environment can be contrasted with one of stability, continuity, and homogeneity of the more established economy. The link between entrepreneurship and economic performance at the individual, firm, and societal levels has been shown in numerous studies that provide a framework of dual causality between a strong period of entrepreneurship and a growing and rapidly innovating economy. See, for example, Audretsch and Thurik 2000, p. 26, and Wennekers, Uhlaner, and Thurik 2002.
 6. The phenomenon of open innovation is explored, among other things, at the Open Innovation Africa Summit, organized jointly by infoDev and Nokia. The first two summits were held in Nairobi, in November 2010 and in May 2012; see <http://www.infodev.org/en/Article.640.html>.
 7. See www.mobilemonday.net.
 8. See www.code.google.com.
 9. See www.younginnovations.com.np/.
 10. <http://www.facebook.com/mTbilisi>.
 11. Nairobi and Kampala interviews conducted by the authors. See also Pfeiffer and Salancik 2003.
 12. See www.ihub.co.ke.
 13. See www.momokla.ug.
 14. Globally, the shortage of employees with information technology skills has persisted in recent years. See, for instance, <http://us.manpower.com/us/en/multimedia/2011-Talent-Shortage-Survey.pdf>.
 15. See <http://techcrunch.com/2011/11/01/mobile-startup-incubator-tandem-opens-new-“mobile-home”-in-silicon-valley-now-accepting-applicants/>.
 16. See <http://www.socialedge.org/blogs/samasourcing/archive/2009/08/25/microwork-and-micro-finance>.

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