The Mobile Wave

By Michael Saylor

Technological change in the second decade of the twenty-first century is both disruptive and transformational and is amplified by two major technological currents: the universal access to mobile computing and the pervasive use of social networks.

The mobile phone has become a mobile computer and apps are the way these devices interact with people. This is a seismic shift away from brick-and-mortar, paper, credit cards, and the keyboard-mouse. The mobile computer will be the way people will receive services from businesses and governments, as well as the way they will interact with each other.

The mobile computer allows manufactures to establish a 1-to-1 relationship directly with their customers. Businesses and meetings will/do have an immediate access to information, similar to social networks today.

Disruption of existing technologies:
- Destruction of paper
- Instant entertainment
- The intelligent wallet
- The showroom world
- Hyperfluid social networks.
- Worldwide availability of medical care
- Universal education
- Jumpstart for the emerging world

Three great economic revolutions in human history
1. Agricultural Revolution: the domestication of plants and animals – creating a food surplus and allowing for the development of farmers, builders, craftsmen, and shopkeepers. Timeline: thousands of years
2. Industrial Revolution: Harnessed chemical energy from coal and oil to replace animal power – allowing for the manufacture of innumerable new products on a mass scale. Electricity was the tipping point for the Industrial Revolution, placing mechanical energy in every corner of the society. Timeline: a few hundred years
3. Information Revolution: Harnessing information energy – allowing everything we do in our economy to be more productive and efficient. Mobile computing puts information in everyone's hands, reducing time, streamlining processes, cutting out middlemen, enhancing coordination. Timeline: estimated at decades

Just as electricity was the tipping point technology that accelerated the lumbering Industrial Revolution past the limits of petrochemical fuels and steam-driven machines, mobile computing is the tipping point technology that will accelerate the Information Revolution past the limitations of traditional computing.

Every revolution has brought disruption to the social structure, political systems, and economics and there is no reason to think this revolution will be any different. Change is coming – quickly.

The computer has come in five waves so far: the mainframe, the minicomputer, the personal computer, and the Internet PC, leading to mobile computing via the mobile internet.

- The power source for mobile computing is the lithium-ion battery, developed in 1991. This allowed the evolution of far longer battery life.
- The evolution of flash memory in the 1980s allowed for data storage on a chip.
- The development of a multi-touch interface allowed shape processing (i.e. rotating or zooming an object with multiple fingers) instead of symbol processing (selecting an object to zoom in), using an entirely different area of the brain. Shape processing is ancient and basic to the human animal and much more natural than is, say, reading.
- Access to mobile phones became widely affordable as their prices dropped well below those of a laptop.
- Mobile devices have an almost instant on capability that separates a tool from a personal accessory.
- Apps have become essentially free and provide not only a way to interact with the computer that replaces traditional programming, but the essence of a manufacturer's ability to interact with the customer 1-on-1.
- The GPS facility of mobile computers not only is a way to track people, but it is a way for people to interact with the physical world around them, i.e. find good restaurants in their immediate vicinity.

PAPER
Paper is one of the most filthy and environmentally destructive industries in the world. The computer increased the use of paper by putting more information in more people's hands. The growth of email then started the decline in the real use of paper, but the introduction of the e-reader was the real assassin. Paper mills and the middlemen distributing paper have begun to shrink and retrench – their time is nearing an end, and the trees are celebrating. The paper industry has also been the third largest user of fossil fuels in the developed world.

Writing moved from the dirt, to clay tablets, to papyrus, and finally to paper. Publishing moved from handwritten scripts, to the Gutenberg Press, to desktop publishing, to e-books. Along the way the publisher is squeezed and the retailer can be almost eliminated with self-publishing. The only things that cannot be replaced are the author and the editor/marketing advisor. Law libraries pretty much ceased to exist as separate entities in individual companies in the 1990s and traditional libraries will have to change to places where people who cannot afford the hardware/software or need the privacy of an independent space can gather to learn or keep current. Their storage of e-books will be another place global information can be accessed. Near Field Communication (NFC) technology can direct mobile devices to access information much more quickly than any card catalog.

Raw materials account for 70% of a newspaper's production costs and these can be eliminated by taking the paper on-line. Newspapers are already becoming an endangered species and the future may belong to specialized on-line magazines with audio capabilities. Offices face the same costs in archiving information and will quickly go completely on-line.

ENTERTAINMENT
Entertainment is moving away from the camera, the board game, the theater, the TV and toward the mobile computer and apps. Mobile devices now all have cameras built in and DVRs and video on demand (VOD) have made scheduled programming obsolete. Spare time is now something people have in smaller, less scheduled, and less contiguous timeframes. Therefore, their entertainment must be delivered in small chunks and on their time schedule (i.e. while waiting in line).

WALLET

The wallet is becoming invisible and contains all identification and cash links. With its ease of use, NFC is an ideal fit that doesn't require 'line of sight' (barcodes) or pairing (Bluetooth) to implement 'tap and go' applications such as swapping photos, making mobile payments, or exchanging ticket/coupon information. Security is enhanced by the requirement for physical closeness, making eavesdropping or intercepting data very difficult.

Both the driver's license and the password will vanish as forms of ID, in favor of a mobile technology equivalent. Mobile touch devices require people to leave their fingerprint and apps can easily be adjusted to require this form of identification to function. Retinal scanning is another natural identifier, since the phone will be scanning things anyway. Mobile devices can become security cameras, identifying the face against a database. Voice recognition, not speech recognition, is an easy addition to a mobile device. A combination of any or all of these things insures that you are who you say you are and can be used to identify you. You will make hotel reservations and gain access to your hotel room and check out, all via your mobile device. In a world where your phone provides the keys, and you can reprogram them in seconds, you will be able to grant access to rooms in your house on a timeframe basis, even to other members of your family.

Digital cash eliminates all the tokens and costs virtually nothing, enabling money to move instantaneously across the globe, and its negotiability can be programmed – you could give your child funds that could only be used on school supplies.

Who still relies on cash? The poor pay cash because they have been refused credit, but they have also adopted the mobile phone as an inexpensive way to access the internet, making them early adopters. Anonymity is another reason to rely on cash, but if all transactions are electronic, they cannot be hidden. The emerging markets also depend on cash, but the proliferation of mobile devices and their declining cost will force these rural areas to adopt them because of the enormous savings from the elimination of the physical requirements of cash. Today more people have access to a mobile network than have access to clean water and this disparity is growing rapidly – making the adoption of digital cash an almost certainty.

The potential impact of the increase in security and reduction in friction costs, if everyone had a free mobile device, is demonstrated by the fact that credit card issuers would earn back their investment in these devices through the drop in fraud alone.

Banks will remain, for the very reason they arose in the first place – security of funds and transactions – but they will have a different form. Banks will keep your monetary value as records stored in a digital vault, allowing you to lose your mobile phone while not losing the information accessed by that phone. They will also exist to handle debit and credit transactions and serve as a credit reference, but branch banks will collapse. Banking will be global and accessed through your mobile phone. Ultimately Amazon and Apple will likely be the banks of the future, because they can currently debit and credit people's accounts electronically to provide services.

SOCIAL NETWORKS

Mankind's social patterns evolved in tribal settings over the course of millions of years because tribes could better resist predators, hunt, and employ individual talents. They worked because all the members of the tribe could interact and there was an optimal size that related to this interaction. With the rise of large cities large scale social structures evolved and political alliance arose. The dense concentration of people in cities made this network of networks possible and groups of people interacting with other groups made things like kings or dictators possible. Technology like the telegraph and railroad increased communication distances, but communication was still essentially one-to-one, or one-to-many, and many-to-many two-way conversation was not possible until the advent of social network technologies like Facebook and Twitter.

Our biological brains work by firing millions of signals through a dense, constantly changing network of synapses that, in aggregate, galvanize to form a thought or memory – many-to-many communication. Because of this fact, the arrival of many-to-many communication among separate humans is an evolutionary flash-point and may be the beginning of a worldwide social consciousness. Perhaps continuing brain research will help us understand our probable social future.

The evolution of social networks using mobile technology…
- Allows each user to send personal news and content to his or her friends, providing a podium.
- Allows for rapid social coordination of planned or spontaneous events.
- Creates a direct connection between business and consumers.
- Provide the societal equivalent of a biological central nervous system that extends its nerve endings to all corners of the globe, sensing what is going on and reporting it to the rest of the "body."
- Harnesses the "Wisdom of Crowds" in that a broad crowd experience and reaction will provide valuable insights, even if no one member has explicit expertise. With social networks, wisdom can be gathered without explicitly asking questions or even requiring participants to respond – see Facebook information as an example.
- Allows for a secure universal identity system, because it relies on a volume of data and not a single, identifying document.

MEDICINE
In the United States, healthcare consumed 17% of the U.S. gross domestic product in 2009 – much higher than any other developed nation – yet the average life expectancy remains below that of most European nations. Mobile technology can streamline many of the processes and could save hundreds of billions of dollars. Doctors will move to mobile because it is available and can remove inefficiency and friction from their industry.
- Medical records will be digitized and centralized
- Prescriptions will become electronic
- Patients will be able to keep and track their own medical records
- Telemedicine will allow doctors anywhere to check or monitor patients through the patient's own mobile device and bring emergency care more quickly
- The hospital will not be a central building, but a global network
- The deaf and blind will be able to sense data wherever they go
- In the developing world mobile technology will educate and monitor users while bringing whole new populations into modern healthcare systems that require only small medical test centers in remote locations. In the U.S. life expectancy grew from 47yrs in 1900 to 68yrs in 1950 due primarily to the conquest of infectious diseases. This can be repeated in the Developing World.

EDUCATION
Singapore's rise from seedy, malarial island-city in 1965 to a country having the fifth highest GDP per capita in the world – the U.S. is eleventh – was dependent on developing an outstanding education system. Nothing has forecast the growth of city better over the last century than its education level – one extra average year of education correlates with a 25.8% increase in output per capita. Learning quickens the information flow and well-educated people tend to know a variety of things that are different from their peers, while less-educated people tend to be limited to the same knowledge as their peers, thus better-educated people have more information to pass along. Education breeds invention, which creates wealth; innovation usually requires a social web where ideas can build upon other ideas.

The tablet computer embodies education in all its involvements, as it is the best didactic technology ever invented and it immediately obsoletes all the paper and textbooks ever written. The learning experience becomes richer and more vibrant as everything is stored in one place,

backed up in a digital medium, and merged with multiple ways to present ideas. Learning becomes a form of play and it is in this environment that the brain absorbs information the quickest – the brain is a builder, not a sponge, and forges meaningful linkages around information. The tablet becomes a two-way communication device for the student and between students (teaching collaboration to the student).

Education becomes a world-wide network with the best teachers able to reach every corner of the globe on the student's schedule using open-source learning. This teaching process can now be made interactive, so that students can ask questions and receive answers from the best teachers using recorded information. Material could be recorded on a one-time basis, and cost, and then distributed free for a tremendous net savings in education for everyone. In the mobile future, the quality of learning you will be able to obtain for yourself will exceed the quality of the learning you would receive from a teacher in the classroom. The structure of our educational system will be radically changed. Home schooling allows parents to keep pace with brain research – i.e. 50min classes result in far less learning than do ten minute learning sessions, or that the younger you start to learn a foreign language (infant being best), the better you learn.

What holds a civilization back? Ultimately, it's a hundred people doing the work of one. When we free most teachers from the classroom, we will deliver far more learning, for much less. We will look back on the current college system as we do the old stock brokerage business of the early 1990's – wondering at its inefficiencies, and grateful to have escaped it.

Education undermines corruption and, since mobile technology is accessible to even the illiterate (the magazine that reads itself, etc.), situations like those occurring in Tunisia and Egypt in 2011 – two of the best-educated countries in Africa – will be repeated elsewhere. English is the global language of business and mobile technology excels at teaching English, with video and digital text, having built-in dictionaries. Infants are already using tablets and this will only expand in the future.

DEVELOPING WORLD
Mobile Technology has given the developing world what economists call the "Latecomers Advantage", in that they not only leapfrog technology the developed world is moving beyond, but also can enjoy a sustained year-to-year GDP growth far larger than previously deemed possible.

3G/4G technology not only provides voice communication, but it links people to the Internet at very high data rates and,using battery power, allows independence from electrical infrastructures that are prone to interruptions. Market efficiency increases dramatically as people are able to interpret data from many distant markets and choose the market of their choice – buyer or seller. This coordinates and flattens all markets, providing profit to the seller and price stability savings to the buyer. As app-phones and tablets replace cell phones, the markets will become further streamlined, with middlemen continuing to be eliminated – along with the corruption inherent in middlemen costs.

Financial services become available to rural inhabitants and the information pool – see Facebook again – will make all transactions less costly and more dependable.

Finally, mobile technology breeds more micro-multinationals – startups with no nationality at all and with the few employees spread all over the globe. Offices – a large overhead cost – become much less necessary and successful companies remain nimble and able to withstand changing conditions.

In essence, mobile phones are a massive progressive subsidy for the poor, a gift of more than 130 years of investment by the developed world.