Analysis - America Invents with Innovation Moving Upstream

By Keith Mallinson Saturday, December 3, 2011

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Global technology vendors, over-the-top players and application developers are all driving the next phase of innovation in wireless.

The last 15 years have brought cellular voice and SMS communications to the masses with 5 billion connections worldwide. An extensive supply ecosystem is facilitating a new revolution in wireless with smartphones and mobile broadband. Innovation in wireless, as with the Internet, is being driven by “upstream” specialists including global technology vendors, over-the-top mavericks and a plethora of applications developers in all shapes and sizes. Carrier innovations tend to be commercial rather than technological.

UNDER NEW MANAGEMENT

Until the 1980s, telecommunications developments were centralized with standards and technologies emanating from phone company laboratories. National champion manufacturers vied to produce what was conceived and specified by the monopoly service providers. For example, the Minitel information terminal and service, from France Telecom’s CNET laboratory, were deployed universally with withdrawal of phone books.

Deregulation in telecommunications transformed everything. The significance and ownership of phone company laboratories have changed. With the break-up of the Bell System in the U.S., R&D was split between AT&T Labs and Bellcore for the Regional Bell Operating Companies. The former was spun off together with network equipment company Lucent in 1996; the latter also became independent with the new name Telcordia that year and its acquisition by Ericsson was announced in June 2011. Meanwhile, many new fixed and wireless operating companies entered carrier services markets. These companies did not have the means or desire to support significant R&D functions.

Economies of scale dictated that R&D as well as manufacturing for network equipment and terminals needed to be done on a global basis. This precipitated manufacturer consolidation. For example, the merger of Lucent with Alcatel was announced in 2006. Many handset vendors did not survive. The last bastion of the old ways is NTT, including NTT DoCoMo. According to a 2009 study counting patents declared possibly essential to 3GPP standards, DoCoMo ranks 6th with 3 percent of these. It is the only carrier among the top 15 companies.

UPSTARTS UPSTREAM

Technological change and deregulation have also fostered market entry by new companies, diversifications by existing companies into new markets and some disruptive business models. With the Internet’s origins in government and academia and a rapid shift to patronage and supply from the likes of Cisco in hardware, Microsoft in software products, Google and Facebook in services, the traditional telecoms players were somewhat subordinated to their traditional roles in bit-hauling.

In wireless, it is both new and old (i.e., wireline) carriers that obtained the scarce spectrum operating licenses. Similarly, with wireless technology development and manufacturing, it is both long-standing telecom incumbents
such as Ericsson, and relative newcomers including Qualcomm, Android and Apple that have come out on top. In all cases, technological innovation is based on global R&D scale and is rapidly rolled out across different carriers in many nations worldwide. This also enables global economies of scale in manufacturing, network integration and device marketing.

Carriers can be bold, fast, strategically astute and successful with innovative new technologies and products, but it is principally by employing the wares developed by others. Even network design, integration and operations are increasingly taken care of by suppliers. For example, Sprint outsourced 6,000 staff to Ericsson this year. The seven-year contract includes operations and maintenance for the carrier’s CDMA, iDEN and wireline networks.

WHO INNOVATES AND WHERE?
Carriers generally implement the standardized and proprietary technologies and products developed by their suppliers in extensive and costly R&D programs. They also accept – in some cases reluctantly – the OTT applications and services from the likes of third-party applications stores, Twitter, YouTube and even Skype cannibalizing their voice services cash cows.

Wireless is probably the most intellectual property-rich market sector with thousands of patents essential to standards including GSM, CDMA, HSPA and LTE. Other network and handset functions, such as those for scrolling and zooming on smartphones, are also generally considered valuable and patentable.

However, carrier innovations in the last decade or two are mostly commercial rather than technological; such as in pricing, bundling and with new operating business models such as with contract-free service. These innovations are rare events in comparison to the thousands of large and small technical innovations. They are typically based on technologies developed by the above that are made easily available to all comers. Carriers have tended to fare poorly in other areas of innovation, such as with mobile web portals and applications stores.

Commercial innovations in wireless are business methods that are relatively easy to copy from among hundreds of other carriers worldwide. For example, the AT&T Wireless Digital One rate, a nationwide calling plan introduced in 1998, allowed subscribers to pay a flat fee with no extra charges for roaming or long distance. It soon became the widely adopted approach for wireless carriers selling minutes by the “bucket” in the U.S.

Similarly, per-second billing was a commercial innovation as well as a technical feat when Orange UK claimed to be the first to offer it in 1994, but this also soon became the norm with many carriers worldwide. MCI’s “Friends and Family” with free calling among selected numbers, introduced in the early 1990s, has been copied by many fixed and wireless operators. Business methods are not generally protectable with copyrights or patents, as illustrated in the U.S. Supreme Court’s denial of patent protection in the Bilski case.

DIVIDE, NOT CONQUER
The most commercially valuable innovations are increasingly occurring upstream of the wireless carriers with vendors of network equipment, handsets, chipsets, applications and content providers. A variety of different companies, each specializing in its own particular way, can finance its R&D organization from global revenues. Costs are recouped in licensing fees and through product sales by vertically integrated players. Some companies, including InterDigital, depend on licensing fees from manufacturers and others downstream to fund their R&D and other business costs. Large software product companies such as Microsoft and small developers have similar business models.

The division of labor in telecom has changed dramatically in the last 30 years with technology innovation moving upstream from carriers. This supply-side revolution has helped accelerate developments and growth of the carriers services markets. It is important that government agencies such as the Federal Trade Commission ensure their policies on innovation and licensing of intellectual property do not interfere with market-based structures and forces for change. They must be careful not to discriminate among business models – including upstream developers and licensors; downstream manufacturers, integrators or users; and vertically integrated players in between.

Mallinson is founder of WiseHarbor, solving commercial problems in wireless and mobile communications, www.wiseharbor.com. He can be reached at kmallinson@wiseharbor.com and on Twitter: