Mobile Health: Mirage or Growth Opportunity?

A comprehensive analysis of the market for mobile health highlights the opportunities and risks for the pharmaceutical and medical technology industries in Germany.
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Executive Summary

With chronic disease on the rise in an aging population and advances in medical technology straining the system, Germany’s healthcare system is facing rising costs.

Mobile health (m-health) is a technology that will not only help ease this situation for companies in the health industry, but also revolutionize patient care and bring long-term growth. A branch of the e-health market that includes the use of mobile technologies for health services, m-health is applied primarily in the remote monitoring of patients with chronic diseases.

As the Internet becomes ubiquitous through smartphone and tablet use, the hopes for m-health are high. This paper examines the true potential of m-health for various players in the German healthcare system—particularly those in the pharmaceutical and medical technology industries. Among the key questions answered are:

- What is the mobile health promise?
- Why is mobile health still waiting for its big breakthrough?
- How attractive will the mobile health market be for the German health industry in the future?
- How can the pharmaceutical industry profit from the mobile health market and what opportunities does m-health present for the medical technology industry?

Results

Mobile health promises to:

- Improve patient care, treatment and safety—for example through early disease diagnosis, improved patient compliance, and improved disease testing
- Achieve sustainable cost reductions for the healthcare system using existing technological infrastructure such as smartphones to treat disease and monitor chronically ill patients better, and reduce hospital admissions.

Although the mobile Internet has firmly taken root in Germany, m-health has not kept pace, nor has it been integrated into primary healthcare. We have identified three pivotal obstacles to m-health in Germany:

1. In Germany, m-health is confronted with a complex, tightly regulated market in which the various stakeholders have conflicting interests.
2. Difficulty producing evidence of m-health’s benefits hampers remuneration.
3. The legal framework surrounding m-health remains ill-defined.

As yet, the true attractiveness of the m-health market remains unknown. Little has been published about the market’s definition, segmentation, scope, and growth, and the descriptions available are inconsistent. This comprehensive market analysis and assessment for Germany covers the period from 2012 to 2017 and gives m-health a more concrete definition.

The m-health market comprises five segments: hardware, software, services, sales and transactions, and advertising. The total market in Germany in 2012 was €906 million, and by 2017 it will grow to €3 billion—roughly 1 percent of the total healthcare market in Germany.
Hardware, at €427 million, is the largest segment at 47.1 percent of the market, and it will grow 33 percent through 2017. Devices for fitness- and health-conscious consumers make up the majority of this segment.

As health insurers have not yet introduced comprehensive reimbursement for m-health applications, the market will first focus on younger, healthy consumers who are willing to pay the costs for their own benefit. We estimate that adjustments to standard health insurance payments and more flexible legislation could help the m-health market grow by an additional 30 to 45 percent over the next five years.

Looking at the skills and expertise needed to develop and successfully commercialize suitable end-to-end solutions, no single player fulfills all of the requirements. Strategic partnerships, alliances, and corporate mergers will be necessary to ensure successful marketing of m-health solutions suitable for mass consumption. For widespread success, the development of m-health must move away from small applications toward large-scale platform solutions.

We believe the fate of mobile health rests partly on establishing an improved policy framework and partly on intensifying cooperation among companies and political decision-makers. Without a clear legal framework, m-health will not meet its full potential. Additionally, the various stakeholders must augment their currently inadequate competencies by adopting courageous strategies.

Over the next five years, m-health will not achieve great relevance to sales, especially for the pharmaceutical industry: consumers and startups, rather than insurers or other key actors, will drive the market’s growth. For now, the pharmaceutical and medtech industries will respond only cautiously. As long as m-health is not clearly represented in insurers’ reimbursement catalogs, doctors and other medical service providers will also stay cautious because they fear income loss and increased costs.

Today, pharmaceutical companies in particular are still reluctant to enter the market with end-to-end solutions. In the current situation, they would indirectly cause income losses for doctors working outside of hospital settings and would become direct competitors for their existing customers.

In Germany, m-health is no longer a technical issue but rather a socio-political one. An aging society, an increasing rate of multiple morbidities, cost concerns, and the success of the mobile Internet make for an excellent starting point for the next stage of development for in m-health. Nevertheless, an m-health revolution will be thwarted early if m-health is not incorporated into the existing reimbursement system, with corresponding incentives for medical service providers. For now, this would prevent its introduction and integration into primary health services. As a result, growth in the m-health market over the next five years will likely be limited to the secondary healthcare market and use by younger “digital natives.”
The M-Health Opportunity

Germany’s healthcare system faces both rising costs and declining income from health insurance contributions (see figure 1). Increasingly confident and well-informed patients with ever-growing expectations are posing additional challenges. The result is a paradigm shift in patient care: Rather than seeking the best medical care at any price, patients are now seeking the best medical care at a given price. It is only possible to meet patient expectations if costs can stay in check—even as the industry’s main cost drivers, particularly the increase in chronic diseases and advances in medical technology (medtech), aggravate the situation even further.

Figure 1
The gap between costs and income is widening

Index: 1991 = 100

While the online health (e-health) movement has stagnated, mobile health (m-health) has emerged as a path forward within the context of the healthcare system’s digital transformation. Mobile technology promises a revolution in patient care and unique growth opportunities. Existing hopes are nourished by the inexorable pervasiveness of the Internet and huge increases in the usage of smartphones and tablets. Despite this expected growth, m-health remains in its infancy, with many obstacles in its future.

The market potential of m-health in Germany remains largely unclear at this point. One complicating factor is that even though terms such as m-health, e-health, telehealth, telemedicine, telemonitoring, and personal health are well defined in principle, they are not clearly distinguished from each other in reality. Any assessment of the potential of m-health is subject to a degree of variability in comparison to other markets. However, one of the most reliable predictions, from the GSM Association, estimates that global sales of m-health services will reach €18.8 billion in 2017, with more than €5.6 billion coming from Europe and €5.3 billion from North America.

To estimate the true potential of mobile health for the various players in the German healthcare system—particularly pharmaceutical and medical technology companies—this paper will examine several questions:

- What is the mobile health promise?
- Why is m-health still waiting for its breakthrough?
How attractive will the mobile health market be for the German health industry in the future?

Which players have the capabilities to exploit m-health’s full potential?

How can the pharmaceutical industry profit from the mobile health market?

What opportunities will arise for the medtech industry?

How relevant will mobile health be to the health industry’s growth over the next five years?

What Is the Mobile Health Promise?

The definition of m-health has evolved in recent years. Today m-health is considered a sub-area of e-health, and the term includes the use of both classic mobile communications technologies and also any mobile technologies through which health services can be offered or received. As such, m-health can provide added value for patients and consumers on top of e-health. As m-health spreads, the traditional health services market will converge with secondary health services, which includes prevention and wellness. Consequently, from a technological viewpoint, the boundaries between patients suffering from disease and healthy consumers are gradually blurring.

M-health’s development is particularly apparent in the spread of application-oriented innovations. For example, m-health links existing technologies such as mobile Internet and blood glucose monitors to solve complex issues and cut out unnecessary steps in the treatment pathway. By making use of readily available infrastructure, m-health will offer lasting improvements in the quality of care, the comfort patients’ experience during care, and the costs to the healthcare system.

M-health addresses a wide range of fields. Figure 2 shows the various categories of m-health solutions—including information, assessment, intervention, monitoring, and coordination—with their applicability distributed along the entire treatment path.

Figure 2
M-health can be applied across the entire treatment path

<table>
<thead>
<tr>
<th>Wellness</th>
<th>Prevention</th>
<th>Diagnostics</th>
<th>Therapy</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>Communicating with and analyzing interest groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment</td>
<td>Remote monitoring of healthy people</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>Remote monitoring of diseased patients</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td>Compliance management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination</td>
<td>Healthcare management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supporting practice management</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: A.T. Kearney analysis
Previously published literature on mobile health indicates that its primary use is in the remote monitoring of patients suffering from chronic diseases, and this indeed appears to be an area where m-health can generate the greatest benefits. As figure 3 shows, text messaging gets the most discussion in relevant m-health publications, even as smartphones add to the technological possibilities.

As a rule, combining higher quality and lower costs is unusual for innovations in the healthcare system. Up to now, advances in medical technology have mostly resulted in rising spending for services. Mobile health, however, may be an important exception to this rule that could radically change the health services market. Not only can it play a part in improving patient care and halting the familiar spiraling of costs, but it may also tap entirely new market potential.

Following are some reasons why.

**Mobile health can improve patient care and safety.** In contrast to other service sectors, healthcare is still characterized by direct physical interaction between patient and physician. Increased complexity and specialization in treating chronic diseases has resulted in a corresponding rise in the number of specialist doctors and other service providers (such as hospitals, pharmacies, and healthcare supply stores) involved in diagnosing, treating, following up with, and monitoring a patient. Coordinating services among various players requires significant effort and often also involves patients traveling significant distances, especially in rural areas. In addition, patients are becoming better informed and more confident about exercising control of their medical data and actively participating in shaping the course of their treatment.
M-health opens up new avenues for doctors to make care even more patient-centered, and to overcome difficulties posed by the location or timing of appointments. In situations where a physical intervention is not strictly necessary, the virtual world can provide a viable lower-cost option. For example, chronically ill patients who need to consult their doctor regularly can avoid burdensome traveling and receive care in their own homes; those patients who need intensive support and care can be closely monitored. Other patients who may benefit from interactive consultations are those with what might be considered embarrassing illnesses (such as sexually transmitted diseases) who may not want to see a doctor in person.

Areas in which m-health is useful are found all along the treatment pathway:

- Providing access to information relevant to patients’ medical needs to improve early detection of disease
- Reminder functions and personalized patient information that improve patient compliance and, accordingly, medication efficacy
- Optimized administrative processes and simplified data collection that offer more direct access to essential patient data
- Automated, structured data management that reduces unnecessary duplicate testing and improves patient safety
- Remote monitoring that improves quality of life as consultations occur online and improves access to specialists in places where care often is difficult to obtain.
- Optimized disease management by remote monitoring of chronically ill patients (such as those with chronic heart failure and diabetes)

M-health gives patients a new role along the care pathway, with more participation in medical decision making, and the interest in m-health solutions is intensifying as smartphones and tablets proliferate. There are already more than 30,000 health-related smartphone applications that have been downloaded and installed more than 200 million times. Figure 4 uses the example of a heart patient to demonstrate how m-health services can offer specific improvements across the care pathway.

**Figure 4**

**Using the example of a cardiac patient to highlight m-health’s advantages**

<table>
<thead>
<tr>
<th>Prevention</th>
<th>Diagnostics</th>
<th>Therapy</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increases “points of contact” with doctors and the healthcare system.</td>
<td>• Provides early diagnosis.</td>
<td>• Opens beds by allowing quicker hospital discharge.</td>
<td>• Monitors patients closely, resulting in fewer emergencies.</td>
</tr>
<tr>
<td></td>
<td>• Provides awareness of and information about disease and lifestyle.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Connects mobile devices with corresponding back-end solutions to make earlier findings and diagnoses possible.</td>
<td>• Utilizes intervention and remote monitoring to enable earlier discharge from hospital.</td>
<td></td>
</tr>
</tbody>
</table>
**Mobile health can sustainably reduce healthcare costs.** Apart from the qualitative advantages of m-health discussed above, new technology will reduce costs and increase service efficiency. New m-health solutions are far cheaper to purchase and maintain than previous e-health solutions. As most m-health services use mobile communication devices, they can make use of existing technological infrastructure. Moreover, the latest smartphones are considerably more capable and less expensive than portable PCs were just a few years ago. These phones use communication technologies (such as Bluetooth and near field communication) that enable complex networks to be set up among several mobile devices, a clear advantage over the traditional mobile devices from the days of telemedicine.

Various other actions can reduce costs (see figure 5).

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**Figure 5**

**How m-health can increase the healthcare market’s efficiency**

**Examples of mobile health solutions**

- **M-health improves patients’ treatment compliance and reduces the danger of emergencies.**
- **M-health provides an automated data pool of patients’ devices and delivers information to doctors. Patients do not have to record data on their own and deliver it to their doctors.**
- **M-health consults on prevention so that fewer people have to visit a doctor or hospital.**
- **M-health enables remote monitoring of patients suffering from certain diseases, thus reducing the number of outpatient follow-up visits.**
- **M-health enables patients with portable devices that are connected to their mobile phones to be discharged sooner.**

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- Preventive educational and awareness-raising measures that cut the number of patients needing consultation services
- Early detection of diseases and their timely treatment at early stages
- Close monitoring of chronically ill patients to detect critical abnormalities early and help avoid hospital admission in some cases
- Remote-monitoring solutions that reduce the number of outpatient follow-up consultations after hospital treatment
- Remote-monitoring solutions that enable some hospital patients to be discharged sooner

Automated, structured data collection would give doctors immediate access to relevant patient information, simplifying communication and speeding up contact time with patients, especially in cases when patients see multiple specialists from different disciplines. According to the World Health Organization (WHO), chronic diseases account for about 80 percent of today’s health expenditures, and we believe this is where m-health solutions will provide the greatest benefits and biggest cost reductions.
Why Is M-Health Still Waiting for Its Breakthrough?

Although the mobile Internet is already a part of many people’s everyday lives, m-health services have not yet enjoyed much success in Germany. M-health promises great medical and economic benefits, but thus far it has not been introduced on a commercial scale nor become firmly integrated into primary healthcare.

Around the world thousands of m-health applications are available; in Denmark, for example, patients’ care regimes are recorded digitally and prescriptions sent electronically. In Germany, however, patient-doctor interactions take place primarily in the form of direct personal contact. In many cases, consultations and medical findings are still handwritten. Although Germany has the second-highest prevalence of diabetes in Europe, it has no established m-health for diabetics—in spite of the fact that hundreds of smartphone applications are available, with the capability of wirelessly connecting to more than 10 blood glucose monitors, 15 blood pressure monitors, and more than 30 heart monitors. Globally, the average IT expenditure per employee is much lower than the worldwide industry norm (see figure 6).

Why has m-health not caught on yet in Germany? What must happen in order for m-health to broaden its scope across all health service providers? We see three primary obstacles present in Germany that are partly responsible for m-health’s lack of success. These obstacles are interrelated, which is an additional complication.

Figure 6

**Compared to other industries, healthcare IT expenses remain far below average**

<table>
<thead>
<tr>
<th>Average IT expenses per employee in comparison to global industry (€, 2012)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insurance</strong></td>
</tr>
<tr>
<td><strong>Finance</strong></td>
</tr>
<tr>
<td><strong>Software and Internet</strong></td>
</tr>
<tr>
<td><strong>Supply</strong></td>
</tr>
<tr>
<td><strong>Government</strong></td>
</tr>
<tr>
<td><strong>Telecommunication</strong></td>
</tr>
<tr>
<td><strong>Media</strong></td>
</tr>
<tr>
<td><strong>Energy</strong></td>
</tr>
<tr>
<td><strong>All industries</strong></td>
</tr>
<tr>
<td><strong>Services</strong></td>
</tr>
<tr>
<td><strong>Pharma</strong></td>
</tr>
<tr>
<td><strong>Electrical engineering</strong></td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
</tr>
<tr>
<td><strong>Consumer goods</strong></td>
</tr>
<tr>
<td><strong>Transportation</strong></td>
</tr>
<tr>
<td><strong>Machinery</strong></td>
</tr>
<tr>
<td><strong>Health and medicine</strong></td>
</tr>
<tr>
<td><strong>Food</strong></td>
</tr>
<tr>
<td><strong>Retail</strong></td>
</tr>
<tr>
<td><strong>Building sector</strong></td>
</tr>
</tbody>
</table>

Sources: Gartner IT Spending and Staffing Report 2012; A.T. Kearney analysis
Mobile health faces a complex market in Germany. The German health sector’s strict regulation severely delays the comprehensive and widespread introduction of technological innovations. The healthcare system is characterized by extraordinary complexity and, in some cases, conflicting interests for individual stakeholders.¹

The health industry tends to be cautious when faced with groundbreaking innovations, primarily because of the need for long-term evidence for critical factors such as patient safety and the efficacy of novel diagnostic tools and treatments. However, this culture of caution and restraint can hamper innovations and halt their full development.

Whereas innovation cycles in the mobile communications sector are measured in months, the average time for a drug to be developed is roughly 10 to 15 years. The history of the development of statins, cholesterol-reducing drugs, is a graphic example, particularly when compared to the mobile phone. Statins were first discovered around 1973—roughly the same time as mobile phones—and their efficacy was proven as far back as 1994. Today more than 40 million patients in the United States alone take statins regularly; global sales are more than €20.5 billion. However, in spite of this success story, only half of American patients who would theoretically be eligible for treatment with statins actually take them (see figure 7). Compared to mobile phone penetration—which is currently at more than 140 percent in Germany—statins have made much slower progress.

Figure 7
The healthcare market and mobile industry have moved at different paces

Statin industry development compared to the mobile industry

<table>
<thead>
<tr>
<th>Year</th>
<th>Statin Event</th>
<th>Mobile Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>Research on cholesterol-lowering drugs begins in Japan</td>
<td>Study proves connection between cholesterol and cardiac disease—but is not widely accepted</td>
</tr>
<tr>
<td>1979</td>
<td>Merck launches Mevacor (Lovastatin)</td>
<td>Bell Labs makes its first mobile phone call</td>
</tr>
<tr>
<td>1984</td>
<td>Simvastatin is shown to reduce the number of heart attacks by 42 percent</td>
<td>NTT starts first mobile network for commercial purposes</td>
</tr>
<tr>
<td>1991</td>
<td>Lipitor (Atorvastatin) patent expires</td>
<td>IBM shows first smartphone demonstration</td>
</tr>
<tr>
<td>1992</td>
<td>Merck launches Zocor (Simvastatin)</td>
<td>First GSM network starts in Finland</td>
</tr>
<tr>
<td>1994</td>
<td>Zocor patent expires</td>
<td>Nokia Communicator smartphone</td>
</tr>
<tr>
<td>2000</td>
<td>Global revenue of statins exceeds €20.5 billion</td>
<td>First 3G network presented by NTT</td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td>First Blackberry smartphone</td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td>iPhone</td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td>iPad</td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: NTT is Nippon Telegraph and Telephone Corporation. GSM is Global System for Mobile.
Source: A.T. Kearney analysis

¹ A recent A.T. Kearney study, “Deutsches Gesundheitssystem auf dem Prüfstand—Kostenfalle Komplexität (Putting the German Healthcare System to the Test—The Complexity Cost Trap)”, analyzed the consequences of this complexity in detail.
Bad experience with health-related IT projects is also an impediment for m-health. One well-known example is the German electronic health card. Originally scheduled for a 2006 introduction, the launch date has been regularly postponed. The system’s extraordinary complexity, conflicting interests, and changing targets are just a few reasons for delays. Because of medical services providers’ numerous misgivings, the official stance of the Deutsche Ärztetag (German Medical Assembly) since 2007 has been to reject the card’s introduction. Many believe the project is on the brink of failure and, as occurred in the Czech Republic, will eventually be abandoned entirely.

**Limited evidence of m-health’s benefits complicates remuneration.** The body of evidence for the clinical and economic benefits of m-health is simply not strong enough yet. A.T. Kearney’s analysis of roughly 500 relevant mobile health publications between 2000 and 2010 finds that only 2 percent of those publications could show sufficient proof of the superiority of m-health (see figure 8). It would obviously be wrong to conclude that m-health does not and will not generate any added value; rather, the underlying cause is usually found in the study design.

This lack of evidence is an important reason why m-health solutions have not made it onto the official list of reimbursable medical services. Another complication is the fact that remuneration for diagnostic and therapeutic measures is higher than for prevention and health education. Because of this, it is crucial that m-health be seen as more than just another technological innovation, and rather as a process-driven revolution in the provision of medical services. Only then will it be possible to integrate m-health into basic healthcare. In some countries this process has already successfully begun. Doctors in many U.S. states, for example, can bill health insurance companies for the costs of email-based consultations. In the United Kingdom, doctors will soon be allowed to “prescribe” medical apps, with the health service bearing the costs in the usual way.
In Germany, antiquated laws stand in the way of m-health. For example, there is a ban on doctors treating patients other than in person-to-person settings.

**The legal framework surrounding mobile health is generally unclear.** M-health remains in the early stages of development, and in Germany the legal situation is largely nebulous. As a result, m-health service providers find it difficult to make a true assessment of the potential legal risks (see figure 9). Although the U.S. Food and Drug Administration (FDA) recently published a directive related to this issue, there are still questions, for example, about when a smartphone or app is subject to strict medical products laws. Such uncertainty hampers the introduction of innovations and reduces the general level of acceptance. Therefore, adequate clinical and legal risk management is crucial for supporting the development process at an early stage.

**Figure 9**

*The more important the m-health application, the more clinical and regulatory risks will come into play—and the more potential value that can be realized*

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**Clinical risk**

- **Critical**: Life-threatening surgery
  - Remote monitoring – ambulance
  - Regulatory risk threshold: developed countries
- **Ill**: Treatment monitoring
  - Diagnosis support
  - Regulatory risk threshold: developing countries
- **Vulnerable**: Diagnosis
  - Remote monitoring – wellness
- **Healthy**: Wellness
  - Prevention
- **Healthy**: Health information

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**M-health value chain areas**

- **Network**
- **Hardware**
- **Software**
- **Services**

- **Transfer**
- **Encoding**
- **Mobile phone**
- **Medical devices**
- **Data management**
- **Monitoring**
- **Content**
- **Clinical support**
- **Consulting**

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**How Attractive Will Germany’s M-Health Market Be for the Health Industry?**

Assessments to date of the m-health market do not show a uniform picture in terms of its definition, segmentation, scope, and growth. Most describe the global market and remain at a high level of aggregation. A study by the GSMA estimates that the entire German m-health market is worth about €800 million; another study finds that Germany’s hardware segment alone has a market value of €800 million. Ambiguity like this demonstrates the uncertain potential and attractiveness of the m-health market. Before a final assessment can be presented and appropriate steps for implementation initiated, several questions must be answered:
Is m-health merely a passing fad that will never materialize nor become established in the long term?

Are novel innovative business models the only way to realize the market potential? Will these models require interdisciplinary cooperation (such as alliances, joint ventures, or takeovers) among various players?

What influence do regulatory frameworks have?

The total market for m-health in Germany was worth €906 million in 2012, and will grow to roughly €3 billion by 2017.

As part of a comprehensive analysis and assessment of mobile health for 2012 to 2017, we defined the m-health market as hardware, software, services, sales and transactions, and advertising specifically related to the medical sector that came about because of technological innovations associated with mobile Internet. Existing infrastructure, such as networks, were not included.

Based on this definition, the total market for m-health in Germany in 2012 was worth €906 million and will grow to roughly €3 billion by 2017 (see figure 10).²

Figure 10
Assuming the legal framework remains the same, Germany’s m-health market will grow in the next five years—but not to its full potential

² The 2017 total assumes there are no major changes to the legal framework for data protection and liability risks.
Let’s look at the m-health market’s segments:

**Hardware.** This segment comprises mobile sensors and medical devices and has the highest sales of any segment, €427 million, or 47.1 percent of the market (see figure 11). Technical medical devices that support monitoring (for example, for pulse rate and blood pressure) are already on the market. And with estimated growth of 33 percent through 2017, the hardware market will remain the major contributor to the m-health market over the next five years, with the largest subsegment targeting fitness- and health-conscious consumers. Because health insurance companies have not yet introduced comprehensive reimbursement for m-health applications, the market will primarily focus on healthy consumers willing to pay the costs for their own benefit.

**Figure 11**

**Hardware revenues will grow through 2017**

**Share of m-health market**

(%, € million)

<table>
<thead>
<tr>
<th>Year</th>
<th>Promotion</th>
<th>Sales and operations</th>
<th>Services</th>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>1%</td>
<td>36%</td>
<td>4%</td>
<td>47%</td>
<td>1%</td>
</tr>
<tr>
<td>2017</td>
<td>2%</td>
<td>26%</td>
<td>6%</td>
<td>59%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Source: A.T. Kearney analysis

There are two different types of hardware. The first includes relatively simple devices such as pulse meters, which help fitness fanatics monitor their training status and can be linked to online exercise diaries. The second group is technologically advanced yet user-friendly medical devices aimed at patients who need devices to monitor their well-being continuously. One example of the latter is a handy ECG vest that can be worn unobtrusively under clothing and monitors the heart rate. M-health makes it possible to link such devices to the Internet and transmit real-time information to the doctor or to an online diary.

**Software.** The software market is an important component of m-health, yet it remains a relatively small market (€110 million) with only 12 percent growth expected through 2017.

The market for m-health software has essentially two subsegments. One includes medical apps for smartphones and tablets that offer direct links to information about important health topics, allow a user to manage important data (tied closely to hardware), or issue reminders to take...
medication at regular intervals. The other involves mobile solutions for data management. Both subsegments will play an increasingly important role in hospitals and will contribute to the ubiquitous availability of patient data.

The main reason for such limited growth is the fact that apps typically do not generate much revenue. Many apps are free, offered as extra services for promotion or customer loyalty—particularly in the pharmaceutical industry; while many others have become much cheaper in recent years. Furthermore, regulatory restrictions and patient and provider skepticism about apps’ reliability also hamper growth, not just in Germany but also in the United States, where the government has not yet a clear statement on the value of apps.

Still, interesting developments in the United States present opportunities for Germany’s market as well. For example, companies such as Happtique are working to create an official m-health app certification process. The objective is to review apps’ data protection, safety, user-friendliness, sources, and documentation and in turn strengthen user confidence.

**Services.** In the context of m-health, services include the personnel required to conduct and process online consultations, monitor patients in real time, and deal with fitness and prevention. The services sector will experience significant growth, expanding from €36 million in 2012 to €186 million in 2017. That said, the legal framework and reimbursement issues remain obstacles.

Looking at the overall picture, it becomes clear that if present circumstances remain the same, the much-trumpeted m-health boom will not likely happen in the next five years.

Medically trained staff must be available to answer general questions about health and also to guarantee that the mobile solutions are offering proper support for chronically ill patients. The first projects, such as those monitoring patients with heart failure (for example, Zertiva), have already been successfully launched. User-friendly applications can be purchased as part of a subscription or bought individually on a pay-per-use basis.

**Sales and transactions.** Sales and transactions is the second largest segment, at €322 million (35.5 percent of the market), based primarily on over-the-counter drugs and wellness products through mail-order pharmacies. So far, revenues generated by in-app purchase options have been minor. However, this business model has real prospects for the future, especially if pharmaceutical and medtech companies are permitted by law to gain direct access to patients.

**Advertising.** This segment, which comprises roughly 1 percent of the m-health market, includes advertising revenues generated by mobile display advertisements by the sale of advertising space (such as banner ads) in medical applications.

Looking at the overall picture, it becomes clear that if present circumstances remain the same, the much-trumpeted m-health boom will not likely happen in the next five years. The market’s
complexity, reimbursement issues, and the lack of a legal framework make it difficult to develop and provide integrated solutions. Consumers and patients, too, will find it hard to navigate their way through the variety of applications to find a suitable product.

That said, Germany’s m-health market is still expected to account for about 1 percent of the total healthcare market by 2017, with a sales volume of around €3 billion. Even if long-term developments are difficult to predict, it is safe to say that m-health will play a role in shaping the healthcare market over the next few years. Because a considerable proportion of sales will result from replacing existing services and products with new apps, companies that get a head start and take strong early positions in the emerging m-health market will be able to shape it. We see great opportunities for enterprises of all shapes and sizes, depending on their individual possibilities and needs. By playing wait-and-see—and disregarding m-health as mere hype—companies run the risk of missing the boat and being forced into a passive role down the road.

In coming years, many of these opportunities will appear within the secondary healthcare market. A more fitness- and health-conscious society—particularly among younger adults—is investing in personal health, and more opportunities will open up. The present m-health market already offers many interesting and easy-to-use applications, from those that keep track of fitness and training regimens to mobile sensors that monitor heart rate or blood pressure.

Even if long-term developments are difficult to predict, it is safe to say that m-health will play a role in shaping the healthcare market over the next few years.

This makes for intriguing options, not least for medical services providers. Combining personal, exercise-related interest with prevention campaigns would be rather easy. People who keep regular fitness diaries could be rewarded with bonuses from their health insurance companies, offering them an additional incentive to continue.

Furthermore, as more “digital natives” enter the market, more people will be introduced earlier on to the possibilities of m-health technologies. As they age and the incidence of chronic diseases increases, it is important to target this generation of patients now and stimulate their interest in and understanding of technology. By the time they reach an advanced age, legislation may have long caught up with developments, creating the necessary regulatory framework for an expansion of m-health into the primary healthcare market.

Improving the legal situation and reimbursement and bringing it in line with new technological capabilities would considerably accelerate the growth of m-health and have a particular impact on the primary healthcare market (see figure 12 on page 16). Regulating reimbursement by health insurers, clarifying liability and data protection issues, and generating greater acceptance by healthcare personnel would open the door to widespread deployment of m-health in patient care. In such a scenario the market potential of hardware and patient services in
particular would increase dramatically. The secondary healthcare market would also benefit from such changes, although it is not affected to the same extent by health insurance companies and the legal framework. We estimate that adjustments to standard health insurance payments and more flexible legislation could help the m-health market grow by 30 to 45 percent over the next five years.

Which Players Have the Capabilities to Exploit M-Health’s Full Potential?

Another major challenge for m-health is bringing together a wide variety of stakeholders to harness its potential. In addition to introducing new technologies to the German healthcare system, m-health is also bringing new players into the ecosystem—primarily software startups. Mobile phone manufacturers and network operators have also started to turn their attention to this topic. Within the app segment, traditional health system stakeholders such as payers (statutory health insurers) and medical service providers are typically in the minority. In general terms, the established players in the health system will be challenged increasingly by new players and face growing pressures to begin offering their own m-health solutions. An additional complicating factor is that in some cases the various players are pursuing conflicting interests and targets.

Succeeding in the highly complex structure of m-health requires not only excellent industry expertise—in technology or software, for example—but also solid innovation, design, and style. Lastly, access to payers and important opinion leaders is crucial.

Which players will significantly advance m-health in Germany and reap the greatest benefits? Looking at the competencies needed to develop and successfully commercialize suitable end-to-end solutions, it is clear that no single player satisfies all of the requirements (see figure 13 on page 17). To ensure successful marketing of m-health solutions suitable for mass consumption, strategic partnerships, alliances, and even corporate mergers will be needed.
The challenge will be finding elegant solutions that bring those with the key qualifications together in one place. The appropriate solutions will vary by company but could include a combination of strategic measures such as alliances, acquisitions, or targeted acquisitions of specific competencies.

**How Can the Pharmaceutical Industry Benefit from the M-Health Market?**

The pharmaceutical industry faces huge challenges, including the threat of plunging over the patent cliff when patent protection expires, the absence of future novel blockbuster drugs, increasing costs for R&D, and intensifying price pressures. There are signs that the current business model, with its focus on blockbuster drugs, is now in danger.

We are convinced that m-health offers promising market potential for drug manufacturers. One benefit is that m-health will give the pharmaceutical industry direct access to patients for the first time, not only fundamentally changing the relationship between manufacturers and doctors, but above all improving the industry’s image as perceived by patients. The patient will increasingly become the industry’s focal point and, as such, a crucial element within the relationship network.
Nevertheless, the pharmaceutical industry has been cautious so far. Although interest in m-health solutions has grown for several years, currently less than 1 percent of all smartphone applications are offered by pharmaceutical companies, whether directly or indirectly (see figure 14).

Figure 14
Pharma manufacturers have made only limited moves into m-health

Overview: Basic features of pharmaceutical applications (as of July 2012)

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<th>Target group</th>
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<th>Product-specific</th>
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Source: A.T. Kearney analysis

At the moment, pharmaceutical manufacturers are mainly interested in m-health solutions that increase the market presence of their own drugs, facilitate the diagnosis of diseases for which these drugs are indicated, and improve patient compliance with respect to taking medication. This means that the industry is mainly active in the fields of marketing and patient education. The m-health applications offered by pharmaceutical companies cover a wide and diverse range and focus on different target groups. They are usually made available to doctors and patients free of charge. There are, of course, considerably more areas in which m-health technologies could prove...
useful for pharmaceutical manufacturers. Essentially a distinction can be drawn between two spheres of operation: optimizing the internal value chain, and developing new business models.

**Optimizing pharmaceuticals’ internal value chains.** M-health can enhance pharmaceuticals’ internal efficiency at several points in the value chain to boost R&D productivity and accelerate the commercialization process (see figure 15):

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**Figure 15**

**M-health offers several starting points to optimize the internal pharma value chain**

**Focus of m-health approach:**

- **Time reduction**
- **Cost reduction**
- **Quality improvement**

**Illustrative**

**Revenue**

1. **Data intelligence for R&D**

2. **Crowdsourcing for recruiting of patients**

3. **Optimizing study management**

4. **Compliance control of clinical studies**

5. **Health economic analyses**

6. **Optimizing risk management**

7. **Increasing customer loyalty**

8. **Optimizing lifecycle management**

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- **Data intelligence.** Linking early research and study results to additional patient data (such as electronic medical history) opens up new perspectives on medical research. Combining this access with all other available data sources in an intelligent way and understanding the interactions among these factors can open up entirely new routes to innovative products.

- **Patient recruitment.** Combining crowdsourcing technologies with m-health platforms enable targeted patient recruitment for clinical studies and speed up the development process.

- **Study management.** Although study data has been successfully collected and transmitted electronically for years using electronic data capture (EDC) systems, direct data collection remains a protracted procedure. As a rule, doctors and assistant staff responsible for studies still record patient information on paper and digitize it later using EDC. M-health can facilitate a direct switch from one medium to another and significantly shorten the time needed to complete the study.
• **Compliance control.** M-health sensors and applications can monitor patients participating in studies and detect patient errors quickly.

• **Health economics analyses.** During the commercialization phase, m-health data can be evaluated from a health economics standpoint to produce a sound cost-benefit analysis. This is a vital tool when it comes to negotiating appropriate prices.

• **Risk management.** Establishing a digital link to patient histories makes long-term monitoring of potential side effects significantly easier and also shortens response times.

• **Customer loyalty.** M-health gives the pharmaceutical industry direct access to patients, improving the relationship with patients and cultivating patient loyalty by using mobile platforms combined with social media and other marketing tools.

• **Life cycle management.** Intelligent interaction between m-health technologies and drugs can result in strong interdependencies between taking a drug and using the corresponding service that allow for premium pricing. This can mitigate the effect of expiring patent protection.

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**Future m-health solutions will be shaped by patient- and consumer-centered services.** This will give rise to new business models that will create additional sources of income alongside existing operations.

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**Developing new business models.** The future of m-health solutions will be shaped by patient- and consumer-centered services. This will give rise to new business models that will create additional sources of income alongside existing operations. Paid-for downloads of smartphone applications represent a small but measurable source of revenue in the m-health market; chargeable apps currently account for more than 70 percent of the roughly 17,000 health-related applications. Few pharmaceutical companies in Germany are tapping into paid apps; nearly all m-health applications are offered to patients and doctors free of charge. However, selling apps alone will not suffice.

Advances in body sensors and other mobile medical devices will lead to a large proportion of future revenues being generated from the combination of m-health services and medical devices for chronically ill patients. Currently, about 5 percent of all health-related applications available from Apple’s App Store are designated for managing chronic diseases, so there is substantial potential for growth in this area (see figure 16 on page 21). In the future, mobile applications may not be main sources of income but rather portals to new business models, similar to developments in other industries.

The pharmaceutical industry is well-positioned to make intelligent use of the opportunities offered by m-health and integrate them into existing business models. One of the industry’s main advantages is its widespread access to doctors, payers, and other important opinion leaders within the healthcare system. Pharmaceuticals are very familiar with heavily regulated markets. They know
how to provide evidence of new products’ medical and economic benefits and how to incorporate products into the complex reimbursement system. In addition, they already have the necessary infrastructure and distribution channels to commercialize innovative products in both the primary and secondary healthcare markets within a short space of time. Pharmaceutical companies are thus in a better position than companies in other industries and are the perfect partner for players that have only recently discovered the German healthcare market. Drug makers could also put their expertise and infrastructure to use at the interface between the life science and consumer healthcare markets, opening up additional areas of growth (see figure 17 on page 22). Recent A.T. Kearney research examining the opportunities of the consumer healthcare market found substantial potential for the pharmaceutical industry.

Overall, pharmaceutical companies have the means to capture large parts of the m-health market over the next decade if they adopt the right strategies for their situation. This would enable them to secure new sources of revenue and stand out from their competitors. In addition, m-health can be a significant stepping stone in transforming pharmaceutical manufacturers from suppliers to providers of services and solutions. For this to happen, however, pharmaceutical firms must make money on m-health services—either through reimbursement from insurers, or through patients’ willingness to pay privately.

What Opportunities Will Arise for the Medtech Industry?

The medtech industry is well equipped to enter the m-health market. This industry is generally characterized by innovation and short development cycles. No other industry files as many patents—10.2 percent of the total in 2009—with the European Patent Office. Medtech
generates one-third of its sales from products that are on the market for less than three years. Furthermore, 9 percent of turnover is channeled back into R&D. The industry also has solid expertise in hardware, a key attribute for tapping into the m-health market. However, medtech is highly fragmented and most applications and products are specialized, so m-health will not be equally relevant to all companies.

Medtech companies are already active in portable devices, such as blood pressure and blood sugar monitors. The crucial step, though, will be developing integrated concepts for transmitting the real-time data collected by these devices to a doctor or centralized patient monitoring system, and ensuring that the various devices and interfaces are compatible. The solutions available at present have plenty of room for improvement.

Monitoring still has strong potential for growth. Apart from patient care, the secondary healthcare market provides an important point of entry into the m-health market for medtech and can easily be combined with developments in the primary healthcare market. Some medtech companies are already working in this field, but even here, many approaches are still far from mature. The same applies to software. As is true of the pharmaceutical industry, medtech companies have so far mainly used applications for self-promotion and to generate customer loyalty. Most applications are free and are used to help doctors with everyday decision-making or enable athletes to document their training (see figure 18 on page 23). More interesting and more promising, however, are applications that are directly linked to medical devices. In diabetes care, for example, it is already possible to support the entire process, from diagnosis to monitoring to treatment, using mobile solutions. This holds huge potential that is far from being fully exploited.

In the medium term, it is conceivable that further refinements to decision-making and monitoring technologies will allow for direct interventions and responses to the parameters they are
measuring. Drug-eluting stents, for example, have been used in Germany for the past 10 years to treat coronary artery disease and cancer, but it is impossible to vary the dosage of the drugs they release. Implanted probes that release drugs in a controlled manner could be adjusted via mobile devices, quickly adapting to changes in certain parameters. Another innovation under discussion is a battery-powered pacemaker that can be recharged via interfaces, eliminating the need for surgical replacement. Patients would be spared repeated serious operations and substantial inconvenience, and the financial burden on healthcare payers would likewise be reduced.

As intriguing as these approaches are, the medtech industry lacks some fundamental competencies needed to succeed in m-health. First and foremost, the industry offers only restricted access to users and has limited experience in the services sector. With technology-hungry younger people as the main target group for entering m-health, device design and style must be up to date. In general, a greater focus not just on patients but also on consumers will be vital for market success.

For individual medtech firms to obtain the expertise they lack, one relevant option would be forming strategic alliances, yet many have difficulty with the idea of partnerships. Feasible
alternatives include taking over small or medium-sized companies or acquiring specific technologies or competencies, which would require both flexibility in mobilizing capital and brave management decisions. In particular, small and medium-sized German medtech companies are renowned for their conservative attitude and aversion to risk. Given that the hardware segment is growing substantially thanks to the secondary health market, hardware-oriented medical technology companies are particularly well positioned to benefit from m-health. Companies such as Phillips, whose portfolio already consists of a combination of medical technology and home electronics, have notably good prospects of success.

At present there are also various consortia attempting to conquer the market with innovative solutions. One good example is the SmartSenior project, in which 28 partners from research and industry are working to create mobile solutions designed to enable elderly people to live as independently as possible. For example, within this group BMW is working on an emergency stop assistant that automatically takes over steering the car if a driver suffers a stroke, and then guides the car safely to the side of the road.

The German medical technology sector has a solid basis for success and growth in the m-health market. Much will depend on whether it musters the courage to invest in novel partnerships and ideas. Another decisive factor will be the extent to which the industry will be able to develop innovations with partners or in new ecosystems and refine them to create integrated solutions.

How Relevant Will Mobile Health Be to the Growth of the Health Industry over the Next Five Years?

Many expect m-health to bring massive growth and major positive changes to the healthcare system. That said, these high expectations have not materialized in Germany thus far. M-health remains in the trial phase. Although the technical foundations are essentially in place, the market is still showing restraint, largely because of legal ambiguity and inadequate provisions for payment and reimbursement.

We believe the fate of mobile health rests partly on improving the policy framework and partly on intensifying cooperation among companies and political decision-makers. Without a clear legal framework, m-health will not reach its potential, and its possibly huge benefits will remain untapped. The various stakeholders must adopt courageous strategies to augment their currently inadequate competencies. Fears of losses must be dispelled and individual interests understood and taken into account.

Over the next five years, m-health will struggle to make a true dent in sales, especially for the pharmaceutical industry, for many reasons.

- Consumers and startups are the true driving forces in m-health. For now at least, pharmaceutical and medical technology industries will watch this trend and respond cautiously. As long as m-health is not clearly represented in insurers’ reimbursement catalogs, doctors and other medical service providers will also hang back rather than risk losses or unnecessary costs (see figure 19 on page 25).

- Pharmaceutical companies in particular are reluctant to enter the market with end-to-end solutions. Under current conditions, they would indirectly cause a loss of income for doctors working outside of hospital settings and would become direct competitors for their existing customers.
Figure 19

Today, patients and consumers are the driving force behind m-health developments

- Pharmaceutical companies will remain cautious in social media and m-health activities because of the increase in online reports of adverse side effects between 2000 and 2010 (more than 11 percent per year).
- Compared to traditional payment flows, m-health’s impact will be small (see figure 20 on page 26). In spite of forecasted growth rates of more than 85 percent, m-health remains a tiny portion of the pharmaceutical business.

The signs point to no radical change in how services are provided, but rather selectively use of m-health—primarily on the secondary healthcare market. Despite the fact that the technical conditions for m-health in Germany are ideal as mobile penetration reaches 140 percent, the German healthcare system will struggle to make major gains in this field over the next five years.

Looking for the “Killer App”

People wonder whether, as has occurred for other technological innovations, one “killer app” for m-health will emerge. Given the variety of diseases, risk factors, and target groups, it is highly unlikely a single smartphone app will meet all such requirements, at least in the near future.

Instead, we expect that many applications will tackle specific problems in a targeted way. These apps will, however, be embedded at a level with other service models, following the few technology platforms that emerge in the future (see figure 21 on page 26). This means that the technology platforms will provide solutions for global as well as fundamental problems, whereas apps will target specific groups and conditions. It follows, then, that m-health must move away from small applications and toward large-scale platform solutions if it is to achieve
Figure 20
Comparing Europe’s healthcare market and its subsegments as of 2012

Europe’s healthcare market
>$1 trillion

Pharma
€270 billion

Med-tech
€110 billion

E-health
€15.6 billion

M-health
€3.9 billion

Note: M-health totals are based on the GSM Association’s estimate that Germany has 23 percent share of Europe’s total m-health market.
Sources: European Union, IMS, Eucomed, Capgemini, European Diagnostic Manufacturers Association, GSMA; A.T. Kearney analysis

Figure 21
Commercialization of m-health solutions varies depending on consumers’ level of health

Source: A.T. Kearney analysis
widespread use. The real “killer app” may not be an app at all, but rather the mere possibility of installing use powerful applications anytime, anywhere. This technological achievement will be a pivotal turning point for m-health and indeed for the health industry in general.

In Germany, m-health is no longer a technical issue but rather a socio-political one. An aging society, an increasing rate of multiple morbidities, cost concerns, and the roaring success of the mobile Internet amount to an excellent starting point for the next stage of development for the m-health market. Nevertheless, an m-health revolution will be thwarted early if m-health is not incorporated into the existing reimbursement system, with corresponding incentives for medical service providers. As a result, growth in the m-health market over the next five years will likely be limited to the secondary healthcare market and use by younger digital natives.

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The authors wish to thank their colleague Verena Luetschg for her valuable contributions to this paper.
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