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Introduction

During our nation’s recent history when the financial hurdles of the economic downturn challenged many sectors of the economy, the U.S. healthcare information technology (HIT) industry emerged as one of the few bright spots in the U.S. economy. Notwithstanding the market gains achieved via the progressive uncovering of evidence corroborating the transformative promises HIT vendors dangled in front of healthcare leaders, the gains in HIT's recent past have been propelled by at least two related factors.

The most significant variable is the Federal government’s Meaningful Use incentive program. Money is a powerful motivator and the American Recovery and Reinvestment Act of 2009 (ARRA) stimulus monies have helped accelerate the adoption of select healthcare information technologies. The other factor surrounds the emergence of prescriptive HIT adoption roadmaps. It started with the HIMSS Analytics Electronic Medical Record Adoption Model (EMRAM)3, followed by the Federal government’s meaningful use criteria. Healthcare has benefited from these high profile efforts to help providers implement an HIT infrastructure which would move them from simple (perhaps even chaotic) information management functionalities to a more mature state.

How have healthcare providers responded to these market influences? In this white paper, we will highlight seven key findings discovered while exploring the HIT buying patterns of U.S. hospitals. We will discuss the implications of each finding, which we believe can help inform healthcare executives working in both acute care and ambulatory settings as they consider the effectiveness of their HIT buying strategies.

Study Design

The information reflected in this report draws upon data from the HIMSS Analytics® Database for the years 2008 to 2012. Limiting the focus to U.S. hospitals, HIMSS Analytics staff queried each year’s year-end database and profiled the HIT buying behaviors of hospitals in terms of the number of applications acquired, the most commonly acquired applications, and the types of applications frequently acquired at the same time.
Key Findings

1. The vast majority of U.S. hospitals (90.6 percent) have some type of recent experience in acquiring/installing an HIT application.

Acquiring and/or installing HIT applications are not foreign concepts to most U.S. hospital providers. Indeed, the U.S. hospital market can be characterized as an experienced HIT buyer market as roughly 90 percent of hospitals at the end of 2012 had either contracted to install or had installed at least one HIT application during the previous five years.

Implications

With 90 percent of hospitals having some experience with an HIT vendor during the past five years, it’s safe to assume that the vast majority of hospital leaders have some type of opinion about HIT and HIT vendors. Is this a good or bad thing? The answer depends on the sales and implementation experience. A positive experience can certainly make things easier for the Chief Information Officers (CIOs) to internally “sell” their HIT strategy. A negative experience presents many more challenges. For one thing, it may require the CIO to start all over in selecting a different vendor. Even if the current vendor has the preferred products to meet the hospital’s needs, the internal pressure to select another partner can be so great that it delays the organization in moving forward in its IT strategy until the “right” partner is in place.

2. The last five years has seen a steady growth in the percentage of hospitals involved in the acquisition and/or installation of HIT applications.

When profiling the percentage of U.S. hospitals each year that have contracted to install or are installing at least one HIT application, the data reveals that more and more hospitals are becoming involved in some type of HIT transaction. In 2008 for example, roughly 55 percent of U.S. hospitals had acquired and/or reported to be installing at least one HIT application. By 2012, the percentage of hospitals in this category had jumped 10 percentage points to 65 percent. The percentage gains during this five-year period were fairly consistent each year (between three and four percent), with the 2011 to 2012 period suggesting a potential deceleration (Table 1).

Table 1: Percentage of U.S. hospitals having acquired/installed at least one HIT application (2008 – 2012)

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>54.7%</td>
<td>57.7%</td>
<td>61.4%</td>
<td>64.6%</td>
<td>65.4%</td>
</tr>
</tbody>
</table>
Implications

These findings provide the most comprehensive evidence quantifying the long held belief that HIT penetration in the hospital market is growing. While these findings should come as no surprise to those involved in the industry, it could be the evidence hospital executives might need to convince their boards that HIT investments are needed to remain competitive. The market is moving in one direction and hospitals need to decide if they will keep pace or fall behind. We will continue to monitor the growth trajectory to see if the deceleration between 2011 and 2012 was an anomaly, or the start of a slowdown in the industry.

The potential downside of this finding relates to the quality of the HIT products and services delivered to the market. The challenge for hospitals in a high demand market is to ensure that the vendor they select can deliver high quality products and services when resources are stretched thin and within the timelines expected. The old transportation adage that "speed can kill" applies to HIT implementations as well. Without strong quality assurance practices in place, the probability of inferior HIT products and services getting to market increases, and implementing in too much of a hurry can seriously impact the end result. It behooves HIT buyers to take the time to pay attention to details and place more emphasis on accuracy instead of speed when trying to meet Meaningful Use deadlines.

3. The percentage of hospitals involved in the acquisition and/or installation of multiple HIT applications at one time has been fairly stable over the last five years.

In the previous section, we noted that the percentage of all U.S. hospitals involved in some form of an HIT transaction has been increasing between 2008 and 2012. When we drill down further into this data and consider the number of HIT applications hospitals are implementing at any one time, we discover a fairly stable pattern. Roughly one-quarter of hospitals each year report they are acquiring and/or installing four or more HIT applications at once (Table 2). Additionally, there has been steady growth among the hospitals that are acquiring/installing a limited number of applications (one to three applications).

Table 2: Number of applications acquired/installed in U.S. hospitals (2008 – 2012)

<table>
<thead>
<tr>
<th>Number of Applications Acquired/Installed</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 3 Applications</td>
<td>27.2%</td>
<td>33.3%</td>
<td>36.0%</td>
<td>36.3%</td>
<td>39.1%</td>
</tr>
<tr>
<td>4 - 9 Applications</td>
<td>14.5%</td>
<td>14.4%</td>
<td>15.6%</td>
<td>16.0%</td>
<td>13.2%</td>
</tr>
<tr>
<td>10+ Applications</td>
<td>13.0%</td>
<td>10.0%</td>
<td>9.8%</td>
<td>12.3%</td>
<td>13.1%</td>
</tr>
</tbody>
</table>

Implications

The relative stability in the size of the market implementing multiple HIT applications at once suggests two things. First, it suggests that the market’s HIT needs are being satisfied via a steady progressive approach. Hospitals by and large are not endeavoring to change too
many HIT acquisitions at once. What is not known is if this limited progressive approach is a purposeful strategy by hospital leaders or just a resource bandwidth issue. If the resources were available (albeit on the hospital’s side or the vendor’s side), we might see more hospitals acquire/implement more applications at once.

The second implication suggests that the market for “large scale” projects (implementing four or more HIT applications at once) is fairly limited. While one-quarter of the market is still a sizeable market, the number of hospitals engaged in “large scale” projects seems consistent. We will continue to monitor the size of this segment of the market to see if it changes, and explore why hospital leaders initiate “large scale” HIT projects.

4. **Over the last five years, the HIT applications most frequently acquired/installed were clinical applications intimately tied to the Electronic Medical Record (EMR).**

We looked at the HIT applications most frequently acquired and/or installed by U.S. hospitals over the past five years. Of the 100 plus HIT applications monitored by HIMSS Analytics, the applications most frequently acquired and/or installed (in descending order) were:

1. Computerized Practitioner Order Entry (EMRAM Stage 4)
2. Physician Documentation (EMRAM Stage 6)
3. eMAR (EMRAM Stage 3)
4. Nursing Documentation (EMRAM Stage 3)
5. Classic Order Entry (EMRAM Stage 3)

These top five most frequently cited applications are not only all clinical in nature, but closely tied to the EMR. In fact, these applications reflect the solutions necessary to achieve EMRAM stages 3 through 6.

**Implications**

The findings suggest that clinical applications, and more specifically, the applications central to the EMR, are a priority for HIT buyers. If the Federal government’s intention via the ARRA and HITECH incentives was to focus the market’s attention on the EMR, the evidence from the HIMSS Analytics database suggests success.

While the findings are perhaps what one might have expected, the ‘flip-side” suggests that non-clinical applications (e.g. revenue cycle applications) are a lower priority for hospitals. This is not to say that the non-clinical applications are not needed by hospitals. It is just that the Meaningful Use incentive program instituted by the Federal government has created an “unnatural market”. Hospitals are favoring the applications of the EMR over their operational applications because they are incented to do so. The need for non-clinical applications still exists (and perhaps is being exacerbated), but is either being ignored as hospitals learn to live without the needed applications, or tolerated as they hobble along
with their current aged systems. If true, then these findings suggest that a non-clinical application market demand “bubble” may be on the horizon.

5. **Over the last five years, the top two HIT applications most frequently acquired and/or installed are targeted towards physicians.**

While the previous section considered the top five applications, it should be noted that the top two applications during the past five years have been applications specific to physicians:

1. Computerized Practitioner (Physician) Order Entry (EMRAM Stage 4)
2. Physician Documentation (EMRAM Stage 6)

As hospitals build out the basics of their EMR infrastructure, we are finding a growing number of hospitals fixing their attention to a stakeholder group critical to the organization's success.

**Implications**

These findings suggest HIT will have a greater impact on the physician’s role in the hospital than ever before. While the encroachment of HIT into the physician’s practice in the hospital has been expected, evidence from the HIMSS Analytics database suggests the interface between the IT department and physicians is “on”.

The best practice evidence suggests that HIT leaders should be engaged with their medical staff long before the first EMR application is installed. Understanding the HIT related needs, wants, and desires of physicians is critical for HIT leaders to harness if they want a successful EMR program. The lack of this dialog has proven disastrous in the past. Because administrator/medical staff relationships vary from organization to organization, executives should look internally for physician HIT champions and to their vendors and consultants for assistance in helping the hospital’s medical staff successfully adopt HIT.

6. **The HIT buyer market can be broken into four distinct segments.**

After identifying all of the HIT applications hospitals acquired each year, we used a statistical procedure called Cluster (or Segmentation) Analysis to determine if certain applications tend to be acquired and installed with other applications. This is an analytical tool frequently used in the retail industry to “bundle” or present certain products together because consumers tend to buy these products at the same time. The resulting “clusters” of applications should indicate distinctive HIT purchasing strategies.

The Cluster Analysis procedure yielded a pattern of four “segments” which tended to appear year over year. The largest segment of buyers (79 percent) showed no discernible pattern to the type of applications they acquire. The next two segments (approximately 17 percent of buyers) are clearly focused on acquiring/installing EMR applications. Of this group, 65 percent tended to focus on the basic elements of the EMR suite, with the remaining 35 percent of this group focused on acquiring/installing financial/operational applications.
along with the EMR suite. The smallest segment of the market (four percent) appears to be focused on acquiring/installing imaging (PACS) applications.

**Implications**

That the same buying cluster patterns emerged as the “best profile solution” in each of the separate HIMSS Analytics datasets suggests a consistency in the buying behaviors of U.S. hospitals over the past five years. For hospital leaders, this information provides some context as to how their specific purchasing strategy compares to other healthcare organizations.

With the vast majority of HIT buyers reflecting no discernible pattern in their buying behaviors, it raises questions as to what, if anything is guiding or influencing hospitals in their HIT adoption strategy. HIT roadmaps do exist but do not emerge as a deciding factor in the buying behaviors of a large segment of the market. This could be due to a lack of awareness of these models; the market has not totally bought into these models; or the market players view their individual situations as unique and, subsequently, minimize the value these roadmaps may bring to their particular environment.

But there is still a large enough segment (roughly 20 percent) of HIT buyers that have a fairly defined purchasing strategy that suggests a significant interest in a fairly defined, large-scale IT bundling strategy. Is this segment of HIT buyers influenced by HIT roadmaps like the HIMSS Analytics EMRAM model or the Meaningful Use incentive program? Our research suggests that the answer is a resounding “YES”. Approximately 24 percent of the hospitals in the U.S. market have achieved Stage 6 or Stage 7 of the EMRAM model meaning they have implemented full EMR functionality to include an integrated medical imaging capability.

7. **The Federal government’s involvement in clinical HIT applications via ARRA/HITECH initiatives is evident in the shift towards advanced EMR capabilities in U.S. hospitals.**

Finally, we evaluated the shifting distribution of U.S. hospitals in the HIMSS Analytics EMRAM framework between 2006 and 2012. As evidenced in Table 3, there is a notable shift in the distribution of hospitals in EMRAM stages 2 and 3 between 2008 and 2009, a time which coincides with the start of the Federal government’s ARRA/HITECH initiative. The findings suggest the policy of the Federal government has positively impacted the HIT buying behavior of U.S. hospitals. For instance, 4,477 hospitals have already registered for the CMS Medicare and Medicaid EHR Incentive programs®.
Table 3: EMRAM Profile of U.S. hospitals (2006 – 2012)

<table>
<thead>
<tr>
<th>EMRAM Stage</th>
<th>YEAR</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 7</td>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.3%</td>
<td>0.7%</td>
<td>1.0%</td>
<td>1.2%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Stage 6</td>
<td></td>
<td>0.1%</td>
<td>0.8%</td>
<td>0.5%</td>
<td>1.6%</td>
<td>3.2%</td>
<td>5.2%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Stage 5</td>
<td></td>
<td>0.5%</td>
<td>1.4%</td>
<td>2.5%</td>
<td>3.8%</td>
<td>4.5%</td>
<td>8.4%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Stage 4</td>
<td></td>
<td>3.1%</td>
<td>2.2%</td>
<td>2.5%</td>
<td>7.4%</td>
<td>10.5%</td>
<td>13.2%</td>
<td>14.2%</td>
</tr>
<tr>
<td>Stage 3</td>
<td></td>
<td>18.7%</td>
<td>25.1%</td>
<td>35.7%</td>
<td>50.9%</td>
<td>49.0%</td>
<td>44.9%</td>
<td>38.3%</td>
</tr>
<tr>
<td>Stage 2</td>
<td></td>
<td>40.0%</td>
<td>37.2%</td>
<td>31.4%</td>
<td>16.9%</td>
<td>14.6%</td>
<td>12.4%</td>
<td>10.7%</td>
</tr>
<tr>
<td>Stage 1</td>
<td></td>
<td>17.4%</td>
<td>14.0%</td>
<td>11.5%</td>
<td>7.2%</td>
<td>7.1%</td>
<td>5.7%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Stage 0</td>
<td></td>
<td>20.4%</td>
<td>19.3%</td>
<td>15.6%</td>
<td>11.5%</td>
<td>10.1%</td>
<td>9.0%</td>
<td>8.4%</td>
</tr>
</tbody>
</table>

**Implications**

This finding implies that the HIT market benefited from the Federal government “kick-starting” the adoption of select clinical HIT applications. Moreover, the continued shifting of hospitals into higher stages of EMR capabilities is yielding the intended benefit of strengthening the nation’s management of clinical patient information.

While the above findings do suggest there is some momentum in the market towards advanced EMR capabilities, it is unknown if the momentum is sustainable. Stated differently, what impact will past governmental involvement have on the evolution of the HIT market? Once Federal incentive dollars “dry up”, will we continue to see hospitals progress through the EMRAM stages towards a virtually paper-free healthcare delivery environment? Or have we trained the market to expect financial support from the governmental in the HIT buying process which will cause providers to defer purchasing additional HIT applications (e.g. revenue cycle related applications) in order to “wait and see” if more Federal monies will be made available?

**Conclusion**

The HIT industry has been a promising sector of the U.S. economy. The recent growth in this industry is attributable in no small part to the Federal government’s efforts to stimulate the economy through ARRA and the Meaningful Use incentive program. The evidence presented in this report suggests the Federal government’s policy initiatives have influenced the HIT acquisition behaviors of U.S. hospitals such that providers have focused their acquisition/installation efforts on clinical applications. While this may be touted as a successful outcome of the government’s initiatives, the downside may be the creation of an unnatural market. The winners in this equation beyond hospital leaders have been EMR and EMR-related vendors while non-EMR vendors have arguably struggled.

While the Federal government may have clearly influenced the hospital HIT market, the influence has not been all pervasive. Hospitals by and large appear to be adopting a
progressive HIT acquisition/installation strategy with a large segment of the market displaying no distinctive pattern to their HIT buying behavior. However, there are discrete segments of the market which do acquire/install a distinctive suite of applications. Healthcare leaders will want to know and understand this market as they benchmark their HIT efforts to their peers.

Finally, the information in this report reveals that the Federal government has successfully helped propel the HIT industry forward. What is unknown is to what extent past governmental involvement will have on future HIT buying behaviors.

Appendix – HIMSS Resources

HIMSS is a cause-based, not-for-profit organization exclusively focused on providing global leadership for the optimal use of information technology (IT) and management systems for the betterment of healthcare. Some of the resources below are available to all HIT professionals, some are restricted to HIMSS members. Listed below are some key resources that HIMSS has produced regarding this topic.

HIMSS Meaningful Use OneSource
http://www.himss.org/meaningfuluse?navItemNumber=17793

HIMSS Electronic Health Record Home Page
http://www.himss.org/library/ehr/?navItemNumber=17633

Healthcare Transformation Project Program Website
www.himss.org/transformation

End Notes

1 Employment outlook: 2008 – 2018 Occupational employment projections to 2018
2 HIMSS Analytics: Data Show that Meaningful Use is Affecting EHR Adoption http://www.himssanalytics.org/about/NewsDetail.aspx?nid=81801
3 HIMSS Analytics EMRAM Model™ http://www.himssanalytics.org/emram/emram.aspx
5 HIMSS Analytics® Database http://www.himssanalytics.org/data/index.aspx
6 Historical Data courtesy of the Dorenfest Institute for Health Information http://apps.himss.org/foundation/histdata.asp
7 HIMSS Analytics www.himssanalytics.org