Insights

Build vs. Buy a Healthcare Enterprise Data Warehouse: Which is Best for You?
By Mike Doyle

Chances are, if you are reading this blog, you have heard some flavor of the “build vs. buy” question in the context of data warehousing. For example, here are two conflicting ways that I’ve personally heard this question posed:

- “Do we need to buy [a data warehouse], or can we build it?”
- “Are there any vendors we can buy this from, or will we have to build this?”

As you can imagine, both approaches resonate differently with different people, cultures, and strategies, and the same basic questions sound very different depending on who is asking it.

Context

When we consider a simplified version of the software development life cycle (see figure below), an organization will likely assess their current state, and ask “do we have the tools to use data to help transform care delivery and streamline operations?” If this organization finds they lack that capability — if it’s harder than expected to be able to use the data in the medical record systems, patient experience systems, surveys, and financial-decisions support systems — they may decide to move to the next step and start the design process. Of course, not all processes are going to be as formalized as shown in the figure, but, like the organization in this example, you might end up going through these stages as you think about what your organization’s future state should look like. Between the design and implementation stages, you’ll select an approach. For the purposes of this paper, we’re going to assume you’ve selected an enterprise data warehouse or a data warehousing approach to integrating your data and creating that single source of truth from your disparate systems. You’re likely interested in facilitating Triple Aim reporting, and you’ll proceed either to implement a vendor
solution or to build from scratch a data warehouse.

The topic for this paper is really that inflection point/decision point between the design and implement phases. Where you and your organization evaluate the options and ask: should we try to build it from scratch? Should we look toward a vendor to partner with us and buy that solution? Are those our only options? Is there a third option where we can do a little bit of both?

Ultimately, the decision is up to you. We want to provide some of the things that can help factor into your decision-making process.

**Context for this topic**

[Diagram showing the stages of decision-making: Assess, Design, Implement, Test, Deploy]

**Historically, Why Were Healthcare Data Warehouses Built, Not Bought?**

To give some context to this question, it may help to draw a parallel with the evolution of the EMR. Early adopters of EMRs had to build their own, as there were few commercial vendor options. Then, the first generation of rudimentary commercial EMRs came along. Companies like Siemens, Cerner, and Epic evolved early concepts into second and third generation systems, prompted by the
EMR adoption model from HIMSS that gave vendors and customers a benchmark — a roadmap — for product development and acquisition.

Similarly, until recently no single vendor offered an enterprise data warehouse (EDW) solution for healthcare that could deliver quantifiable results and return on investment. Innovative organizations with the resources to support an extensive internal development effort really had only one potential path: build it themselves.

Health systems without the staff, budget, or experience to build a centralized EDW themselves were left with two main options:

1. “Data analyst heroism” — where a small number of savvy analysts used whatever reporting or analysis tools they had at their disposal. Great people in these roles achieved excellent results, but their potential value was often underutilized because they needed to spend too much time extracting data instead of analyzing it.

2. Implemented best-of-breed analytics solutions to help address specific, siloed, reporting, and analytic needs.

The Case for Building a Healthcare Data Warehouse

As of today, the healthcare analytics market has matured to the point where there is now a compelling buy-option for companies who aren’t interested or able to develop an EDW internally.

But the reality is, there will always exist a small number of healthcare organizations that prefer to leverage internal software developers wherever and whenever possible. These organizations may perceive functionality shortcomings in the commercial offerings and have some great ideas about how they could close those gaps through internal software development.

For some organizations, however, the Build vs. Buy question can become a heated, political battle; dividing parts of the organization (typically IT vs. everyone else) in unhealthy ways, often leading to byzantine system-selection processes, where the internal staff are asked to represent themselves as a vendor, and present themselves as being in competition with external offerings.
But it doesn’t have to be this way. Let’s look a little more closely at some of the pros and cons of building an enterprise data warehouse from scratch:

**Pros of Building Your Own EDW:**

- The possibility of a “perfect fit” — custom development, in the hands of skilled software engineers, can yield excellent, tailored solutions.

- Potentially lower initial cost — organizations with a few cycles to spare can often get “something” in the way of healthcare analytics stood up very rapidly. In a small number of very specific cases, “something” is often “good enough for now.”

- Pride of ownership — several healthcare organizations, including members of the Healthcare Data Warehousing Association have built successful data warehousing programs from scratch, starting in the late 1990’s. Many of those organizations are now among a short list of organizations that are well-positioned to address the needs of healthcare reform. Viewed by other systems nationwide as now possessing a vital knowledge asset, they are justifiably proud of their accomplishments, vision, and forethought. However, several of those early pioneers now realize that their home-grown solutions are neither sustainable nor adaptable to new analytic use cases in the industry … and the perceived value of these first generation EDWs is in decline.

**Cons of Building Your Own EDW:**

- Staffing: plan to ramp up significantly, or at the very least, be prepared to dedicate existing software engineering professionals to the data warehouse build for many months if not years. Internal data warehouse projects are notoriously under-scoped, under-resourced, and delivered much later than planned. Only a small number of healthcare organizations with very agile IT governance can make this happen smoothly.

- There is an enormous shortage of experienced data and software engineers in healthcare — in fact, across all industries. There simply aren’t enough skilled people available in the labor market to sufficiently lower the risk of building your own EDW. Across all industries, 60 percent of internally developed EDW projects fail to meet expectations. The number...
will be higher in healthcare if we make the mistake of believing we can build and sustain these systems with internal resources alone.

- From a technical perspective, one of the most significant “cons” to building your own EDW is you will be learning lessons (i.e., making mistakes) that have previously been addressed by an experienced vendor. Without a starting point, including coding standards, naming conventions, and a proven approach to data architecture, your developers will soon find themselves refactoring or re-engineering key parts of their data warehousing solution.

- Many of these projects often start “under the radar” and in response to a lack of agility in IT to meet the reporting and analytic needs of the organization. As such, their success can be culturally divisive, and create silos of data that need to eventually be re-incorporated into an enterprise-wise strategy for data management.

- IT teams accustomed to strict waterfall project management approaches may also lack the agility necessary to adapt to rapidly changing vocabularies, standards, and new healthcare analytics use cases. Inability to deliver continuing value can lead to project delays, unmet expectations, and overall frustration with the costs that have gone in to an internal development effort.

The Case for Buying a Healthcare Data Warehouse

On the other hand, buying a data warehouse solution for healthcare is now a viable option. For many organizations without a deep bench of software developers, the possibility of rapidly implementing a robust analytic resource is now a reality. However, there are some important things to consider before choosing this option:

Pros of Buying an EDW:

- Shortest time to greatest value — with the right technology, including adapters and accelerators for common source systems, the implementation of a healthcare data warehouse can now be accomplished in as little as 90 days.

There is an enormous shortage of experienced data and software engineers in healthcare — in fact, across all industries. There simply aren’t enough skilled people available in the labor market to sufficiently lower the risk of building your own EDW.
The right vendor will have seen many different design approaches in practice, and they will know what works and what doesn’t. Savvy health systems realize that they benefit from a top-notch vendor’s real-world experience and prior investments in product development.

An infusion of help — most IT departments today work hard to deliver on existing project commitments. New software development projects have to compete with prior commitments, such as ICD-10 or Meaningful Use, and may struggle to even get launched. Starting a project with an experienced vendor brings with it an infusion of resources to help get the work done when you can’t spare anyone else.

As some of the best health systems in the country have found, working with a vendor helps to mitigate a lot of the risks associated with custom development and deliver success early.

Lower total cost of ownership — even though the initial cost of any vended software solution may seem high, the three- to five-year total cost of ownership can be much less.

Cons of Buying an EDW:

Knowledge transfer — in a truly “hands off” data warehouse implementation, there is a risk that when the vendors leaves, insufficient knowledge has been transferred to the team providing operational support.

As with any enterprise software purchase, expect to encounter some tradeoffs between the perfect solution for your environment, and one that is very good. Health systems are already making these types of tradeoffs, choosing to configure off-the-shelf EMRs and adapt their processes, rather than build an EMR outright from scratch to their exact specifications.

If your organization is fortunate enough to have some innovative in-house software developers, and you or your vendor doesn’t engage them in the data warehouse implementation, their talents could go under-utilized. Combined with the right knowledge transfer, these developers could be the ones who help deliver unexpected future successes with your EDW.
There is some risk associated with engaging any new vendor, or with engaging a new division or group within an existing vendor relationship. You are counting on the vendor to help your organization achieve its goals, but the fact that you haven’t seen that company succeed within your environment requires trust. Make sure you know what to ask your potential partner to ensure success.

Your Third Option: The Case for Buying AND Building a Healthcare Data Warehouse

More and more, organizations that have historically looked to internal IT resources to help them ascend the rungs of the Healthcare Analytics Adoption Model are looking for help from an experienced commercial partner:

1. This healthcare analytics market is at the same point as the market was for EMRs about 10 years ago, when viable commercial EMRs emerged and organizations no longer had to build their own.

2. Healthcare providers now have several commercial options for various types of healthcare analytics. For example, a 2013 report from Chilmark Research profiles several of these vendors, including Health Catalyst, which received the highest overall rating.

3. Organizations that have been able to nurture one or more teams of effective, internal software developers want to preserve this precious resource, and deploy them strategically for a competitive advantage. Where possible, they are looking to vendors to accelerate their implementation of analytics, not completely outsource or own that capability altogether.

These organizations recognize that they can get 80 to 100 percent of the analytic capability they need, quickly, and affordably. They are looking to deploy their internal developers to help them achieve even more, faster.
An example of the key driver behind this strategy is epitomized in a quote Dale Sanders recently heard:

“We are 15 years behind Intermountain. We need to close that in 2 years.”

- CEO, Leading Academic Medical Center

Here are some key points to consider when thinking about the Buy AND Build option:

**Pros of Buying **AND** Building an EDW:**

- All the pros of each buying and building — for example:
  - Rapid implementation time — the right vendor can help get a huge chunk of the data warehouse implemented quickly, allowing your IT leads to demonstrate early successes and keep project momentum high.
  - A tailored fit — your internal software developers know your systems inside and out. A savvy vendor knows this and will include and empower your top IT performers, ensuring a smooth implementation, and honing in on ways to meet immediate analytic needs.
  - Lower overall project risk — by choosing to leverage aspects of both the “buy” and the “build” strategies, you are positioning yourself for a successful project in the following ways:
    - You are engaging some of your most valuable IT employees early on.
    - Your vendor is contractually obligated to deliver on the agreed-upon terms and statement(s) of work.
    - Additional opportunity to innovate — a great EDW vendor will partner with you to empower your internal developers through access to integrated data and easily accessible metadata. With the “plumbing” taken care of by your vendor, your in-house engineers can focus on extracting even more value from your investment. Health Catalyst customers, for example, have begun developing their own predictive models, connecting to operational systems, and building bi-directional interfaces with other third party systems.

Many EMRs are now providing interfaces to consume relevant external data, such as patient-level risk scores, to drive best practice alerts at the point of care. With access to the data in an enterprise data warehouse, a talented internal software developer could deliver a prototype solution to a use case like that in days, rather than months or years.
Many EMRs are now providing interfaces to consume relevant external data, such as patient-level risk scores, to drive best practice alerts at the point of care. With access to the data in an enterprise data warehouse, a talented internal software developer could deliver a prototype solution to a use case like that in days, rather than months or years.

**Cons of Building and Buying an EDW:**

- Some of the same “cons” as both building and buying, but they tend to cancel each other out. For example: you will still need to be comfortable with your selection of vendor partner, but that is balanced by the internal developers you bring to the project team.

- This approach is best suited to a data-driven culture that values analytics as a business differentiator. Organizations with a commitment to a higher degree of data literacy and data management skills are very successful with a data warehouse.

- Slightly higher total cost of ownership than the purely “buy” option. However, this again is offset by the higher return on investment (ROI) which can be achieved through the optimal utilization of your EDW.

**Selecting Your Healthcare Data Warehouse Approach: You Have Options**

As you can see, you have options when it comes to selecting your approach to a healthcare data warehouse. If you choose to develop an enterprise data warehouse purely from scratch, you face many of the same hurdles organizations overcame through the last decade of expensive, in-house software development. There are now vendors who can leverage their experience to help you achieve a similar level of analytic maturity in a much shorter time and at a lower total cost. Thanks to the early pioneers of our industry, we now know enough about the characteristics of a high-value EDW to make informed decisions when choosing a vendor. This blog, “How to Evaluate a Clinical Analytics Vendor” outlines the issues to consider, and criteria for evaluation.
When choosing either of the “buy” options described above, it’s important to consider not only total cost, but also how you want to engage your internal resources. Think about not only how fast you want to realize value in the short term, but also how you envision developing your own analytic applications in the future.

The early adopters of EMRs mentioned above were also some of the first to build their own EDWs. Several of those early pioneers are now applying their experience with home-grown EDWs to the purchase and installation of hybrid solutions — commercial vendor EDWs that come pre-configured for rapid deployment and quick value, but that can also be evolved and maintained by local IT organizations if they choose to do so.

For many organizations, the “hybrid” option of buy AND build provides a way to achieve the most value, while also mitigating many of the risks associated with large in-house software development efforts. This hybrid strategy is the best of both worlds. You get the flexibility and empowerment of building a system on your own, but without the risks, and you get the benefits of a commercially supportable solution. No one would think of developing their own EMR now. Likewise, we are at a point in the evolution of the EDW where building your own simply doesn’t make sense from the perspective of risk, time to value, and long-term evolution of organizations’ analytics strategies.

Resources

- Late-Binding™ Data Warehouse Platform  http://www.healthcatalyst.com/late-binding-data-warehouse-platform
- Advanced Analytics Holds the Key to Achieve the Triple Aim and Survive Value-based Purchasing  http://www.healthcatalyst.com/advanced-analytics-survive-healthcare-reform
- EMR Adoption Model from HIMSS  http://www.himssanalytics.org/docs/HA_EMRAM_Overview_ENG.pdf
- The Healthcare Data Warehousing Association (HDWA)  http://www.hdwa.org/
About the Author

Mike Doyle joined Health Catalyst in May of 2013 as a Vice President. He has been connected with the Health Catalyst senior leadership team since 2006. Prior to Health Catalyst, Mike led the Enterprise Data Warehouse (EDW) program at Allina Health as Director of Healthcare Intelligence. He helped Allina grow its EDW program from a nascent clinical improvement initiative to an enterprise-wide strategic asset, in heavy demand by thousands of users across all of Allina's 11 hospitals and 100+ clinics. Prior to his work with Allina, Mike was employed on the Northwestern Medicine campus in Chicago, beginning as a Systems Administrator at the Medical School and eventually leading the Analytics and Systems Integration team at Northwestern Medical Faculty Foundation. In addition to his experience building strong technology teams, Mike has experience in technical roles such as database administrator, web programmer, data architect, and business intelligence developer. Mike holds a Master of Music degree from Northwestern University and a Bachelor of Fine Arts degree from Carnegie Mellon University.

About Health Catalyst

Based in Salt Lake City, Health Catalyst delivers a proven, Late-Binding™ Data Warehouse platform and analytic applications that actually work in today's transforming healthcare environment. Health Catalyst data warehouse platforms aggregate and harness more than 3 trillion data points utilized in population health and ACO projects in support of over 22 million unique patients. Health Catalyst platform clients operate 96 hospitals and 1,095 clinics that account for over $77 billion in care delivered annually. Health Catalyst maintains a current KLAS customer satisfaction score of 90/100, received the highest vendor rating in Chilmark’s 2013 Clinical Analytics Market Trends Report, and was selected as a 2013 Gartner Cool Vendor. Health Catalyst was also recognized in 2013 as one of the best places to work by both Modern Healthcare magazine and Utah Business magazine.

Health Catalyst’s platform and applications are being utilized at leading health systems including Allina Health, Indiana University Health, Memorial Hospital at Gulfport, MultiCare Health System, North Memorial Health Care, Providence Health & Services, Stanford Hospital & Clinics, and Texas Children’s Hospital. Health Catalyst investors include CHV Capital (an Indiana University Health Company), HB Ventures, Kaiser Permanente Ventures, Norwest Venture Partners, Partners HealthCare, Sequoia Capital, and Sorenson Capital.

Visit www.healthcatalyst.com, and follow us on Twitter, LinkedIn, Google+ and Facebook.