Determining, Integrating, and Displaying Your Metrics and Data

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Introduction

From business to education and from manufacturing to marketing; for better or for worse, metrics are the lever with which one moves the modern business world. Whether its kaizen, six-sigma or even the agile development process, determining and improving the effectiveness and efficiency of your processes requires metrics, particularly as they pertain to goals and objectives.

What Kind of Metrics Should I Use?

While there as many types of measurements as there are business cultures, let us focus on the key performance indicator, or KPI. Remember that the terms "KPI" and "metrics" are not synonymous. Metrics can apply to any activity that can be measured, including the number of steps from the parking lot to the front door. A KPI, on the other hand, reflects strategic value; hence the term key performance indicator.

When deciding on your KPI's, remember that they *need to actually be measurable*. The number of widgets produced per week is something easily measured. But what about measuring your efficiency when preparing your regulatory submissions? How much regulatory effort is necessary when changing the source of supply for a product being sold in Australia, and how do you know? To truly measure the efficiency of a process, you need to determine what is quantifiable and pertinent, so that you can ultimately answer the basic question "are we on or off track?"

Fortunately, most businesses hoard data. Record Retention policies are another subject altogether! Even if no specific database exists, most electronic processes create records of one sort or another, which can help track or diagnose performance. Third-party software is also available which can monitor, collect and display everything from system usage to patient enrollment.

Nonetheless, the challenge remains how to gather together the data you need to present a meaningful and useful picture of your work and your processes, so that you can make decisions that will best benefit the business.

Data Integration

Chances are that your statistical team has the data analysis of clinical trial information under control, but what about other areas? How is your site enrollment moving along? How many times does a customer prescribe the competitor's products? Where does your safety reporting get its information?

Your systems and processes will undoubtedly span multiple technologies. Electronic publishing, for example, often comprises printing software with document management software residing in a completely separate system. Patient accounting may involve collecting data from workstations found in clinics all over the country.

When we talk about data integration, we are talking about the process of collecting data from disparate locations and systems, and presenting them in a meaningful and useful way. In order to do this, the data usually has to be collected, transformed, and normalized before it can be aggregated into meaningful information.

Effective data integration is crucial to monitor and report on important aspects of the drug development life-cycle, as well as post-marketing activities. This can allow trial information from studies being conducted in far-ranging sites and countries to be easily collected and aggregated. Timely access to this data can be critical to ensure the maximum adherence to regulatory requirements and to provide up-to-date information for management.

Customer analytics also benefit from the collection and aggregation of information tracked by various systems. This information can have an effect on marketing efforts and decisions as fundamental as the design of a website. Analysis of purchasing information from various sources can benefit the marketing department and, ultimately, the customer.

Data can be found in as many forms as there are countries where your product is being marketed. Oracle tables, often staunchly monitored, can be found storing official pricing information. Less stringent SharePoint lists frequently host lower-level information that can be invaluable when interpreting the big picture. All of this data needs to be readily accessible and easily understood so that regulatory submissions and shareholder reports can be produced on schedule and with the minimum of effort or manipulation. For this to happen efficiently and accurately you need to be able to collect and review it easily, regardless of its source.

With the demands and speed with which business today is run, there is less time to develop complex, Rube Goldberg queries to gather the important information quickly. Fortunately, with some reasonably defined processes and modern software, solutions are available that can allow you to collect up-to-the-minute data from sources as disparate as Excel spreadsheets, Oracle tables, and SharePoint lists. This software can be easily configured to roll up and stratify the data in real time, making it extremely useful for business intelligence.

Reporting

Data this valuable can be consumed and presented in reports generated for a specific event, or even run periodically. It can also be distilled and presented at a higher level, often graphically, in the form of a dashboard, which present crucial and pertinent data understood at a glance.

Reports

Like the mail-merge of old, modern systems can automate the periodic creation of reports by maintaining a link to the source of the data. Current software allows even those outside of IT to create a re-usable report that can be linked to specific ranges, tables or lists (as long as they have the appropriate permissions, of course) and updated on demand, or even automatically.

A Word document can include embedded graphs linked to an Excel spreadsheet that is linked to an XML file that is updated periodically. Project managers appreciate the ability to begin authoring a Clinical Study Report containing data analysis tables that aren't even yet finalized, knowing that they can be configured to update the data every time they are printed or rendered in a PDF.

Even PowerPoint allows "linked data" to be included on a slide which can then be updated with the press of a single function key, ensuring the most current data.

Such dynamic reports don't have to be limited to document format. Webpages can be developed that collect and display historic data as it becomes available, or display the latest marketing information recorded by a handheld device and stored in a SQL table. This can even be filtered dynamically by the user so they can hone in on what is important to them.

Don't forget the ubiquitous Window's Clipboard (CTRL+C, anyone?) that will allow this amalgamated data to be copied and pasted *ad hoc* into documents or emails.

Dashboards

In a similar fashion, business has discovered the dashboard. According to Victoria Hetherington, Dashboard Demystified: What is a Dashboard? (Hetherington, 2009), a good dashboard adheres to the following four principles:

1. Simple, communicates easily

2. Minimum distractions…it could cause confusion

3. Supports organized business with meaning and useful data

4. Applies human visual perception to visual presentation of information

Fundamentally, this differs from a report in that it is not intended to contain detail. Like the automobile dashboard, this special kind of web page utilizes data visualization to allow one to answer the question, "Am I doing alright?" Often utilizing the universal signal-colors of red, yellow, and green, it is optimally designed to allow someone to quickly determine what, if anything, needs immediate attention. If metrics are accurate and current, you can quickly check the completion status of components of the current submission; marketing milestones that are "on-track" will show in a healthy green, while missed deadlines appear in red; and sales figures that exceed expectations can be reflected in the upward curve of a line-chart.

Of course, dashboards can also display additional information that might be useful. Bar- and line-charts give a quick visual indication of "good" or "bad" (or "getting better" or "getting worse"); bold, color-keyed numbers allow you to quickly notice important metrics; and pictures of gauges can convey the current state against thresholds of "not good" and "ideal."

As my history teacher was fond of saying, "Those are the facts, but the facts by themselves don't tell the whole story." Just as the red engine light in your car only tells you that you need to take it to the shop, the information in a dashboard is designed to prompt action by those who know how to do it. Still, the ability to quickly and easily see key information that is culled and distilled from the depths of your data warehouse can be a valuable tool when it comes to keeping your particular business running.

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