



EBM

EVIDENCE-BASED MANAGEMENT GUIDE

Scrum.org

September 2018

How to continuously improve business results by measuring business value and using empirical management

OVERVIEW

Organizations adopting agile product delivery practices can easily lose sight of their real goal of improving the value they deliver, by focusing on improving activities and outputs instead of on business outcomes.

Agile is a means to an end, not the end itself; the whole point of adopting agile practices is to improve business performance. When organizations lose sight of this, managers ask questions that seem sensible, but might create unintended and undesirable consequences. Some examples of such questions are...



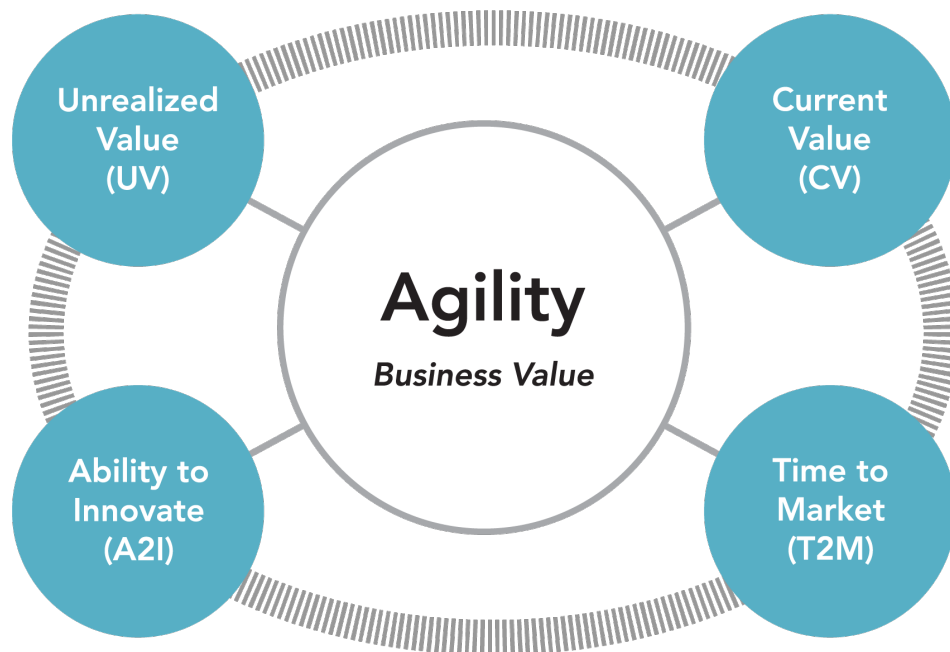
While the answers to these questions are interesting, they do not help an organization improve the value it delivers, or its ability to deliver value. Monitoring only the direct use of practices does not provide the best evidence of their effectiveness; for example, tracking a Development Team's velocity says nothing about whether that team is actually delivering something that is useful to customers or users.

Without measuring value, the success of any agile initiative is based on nothing more than intuition and assumption. In contrast, the Evidence-Based Management (EBM) approach measures value delivered as evidence of organizational agility, and provides ways to measure and improve the ability to deliver value. This approach enables organizations to make rational, fact-based decisions, elevating conversations from preferences and opinions to empirical evidence, logic, and insight.

EVIDENCE-BASED MANAGEMENT

Evidence-Based Management (EBM) is an empirical approach that provides organizations with the ability to measure the value they deliver to customers and the means by which they deliver that value, and to use those measures to guide improvements in both.

Figure 1: EBM consists of four Key Value Areas (KVAs).



Each KVA focuses on a different aspect of either value, or the ability of the organization to deliver value. Organizations without strength in all four KVAs may deliver short-term value, but will not be able to sustain it. Delivering value, happy stakeholders, and satisfied employees (*Current Value*) are important, but organizations must also show that they can meet market demand with timely delivery (*Time-to-Market*) while being able to sustain innovation over time (*Ability to Innovate*). Continued investment in the product is justified based on measures of as-yet (*Unrealized Value*) that could be realized if the product possessed the right capabilities.

Current Value (CV)

Reveals the value that the product delivers to customers, today

The *goal* of looking at CV is to maximize the value that an organization delivers to customers and stakeholders at the present time; it considers only what exists right now, not the value that might exist in the future. Questions that organizations need to continually re-evaluate for current value are:

1. **How happy are users and customers today? Is their happiness improving or declining?**
2. **How happy are your employees? Is their happiness improving or declining?**
3. **How happy are your investors and other stakeholders? Is their happiness improving or declining?**

A variety of things can improve CV: improving usability, improving customer or user outcomes, even creating a happier workplace. Looking at CV from the perspectives of customers or users, as well as investors, is obvious, but considering employee attitudes recognizes that employees are ultimately the producers of value. Engaged employees that know how to maintain, sustain and enhance are one of the most significant assets of an organization, and happy employees are more productive.

Example Key Value Measures (KVMs) for each KVA are described in the Appendix.

Time-to-Market (T2M)

Expresses the organization's ability to quickly deliver new capabilities, services, or products

The *goal* of looking at Time-to-Market is to minimize the amount of time it takes for the organization to deliver value. Without actively managing Time-to-Market, the ability to sustainably deliver value in the future is unknown. Questions that organizations need to continually re-evaluate for time to market are:

1. **How fast can the organization learn from new experiments?**
2. **How fast can you learn from new information and adapt?**
3. **How fast can you deliver new value to customers?**

A variety of things can reduce the Time-to-Market: everything from removing internal communication bottlenecks to improving delivery pipeline automation to improving application maintainability and removing technical debt; anything that reduces time spent waiting or time spent performing work.

Ability to Innovate (A2I)

Expresses the ability of a product development organization to deliver new capabilities that might better meet customer needs

The *goal* of looking at the A2I is to maximize the organization's ability to deliver new capabilities and innovative solutions. Organizations should continually re-evaluate their A2I by asking:

1. **What prevents the organization from delivering new value?**
2. **What prevents customers or users from benefiting from that innovation?**

A variety of things can impede a team from being able to deliver new capabilities and value: spending too much time fixing defects or reducing technical debt, having to maintain multiple code branches or product versions, a complex or monolithic application architecture, insufficient product-like environments to test on, lack of operational excellence, poor code management practices, lack of decentralized decision-making, inability to hire and inspire talented, passionate team-members, and so on. As low-value features and systemic impediments accumulate, more budget and time is consumed maintaining the product or overcoming impediments, reducing its available capacity to innovate. In addition, anything that prevents users or customers from benefitting from innovation, such as hard to install software or lack of capabilities that would be compelling enough to warrant installing the software, will also reduce A2I.

Unrealized Value (UV)

Suggests the potential future value that *could be realized* if the organization could perfectly meet the needs of all potential customers

The *goal* of looking at Unrealized Value is for the organization to maximize the value that it realizes from the product over time. Questions that organizations need to continually re-evaluate for unrealized value are:

1. **Can any additional value be created for our organization in this market or other markets?**
2. **Is it worth the effort and risk to pursue these untapped opportunities?**
3. **Should further investments be made to capture additional Unrealized Value?**

These questions can't be completely answered in isolation from the UV of other products; the decision to invest in one product means not investing in others. Considering both CV and UV provides organizations with a way to balance present and possible future benefits.

For example, a product may have low CV, because it is an early version being used to test the market, but very high UV, indicating that there is great market potential. Investing in the product to try to boost CV is probably warranted, given the potential returns, even though the product is not currently producing high CV.

Conversely, a product with very high CV, large market share, no near competitors, and very satisfied customers may not warrant much new investment; this is the classic *cash cow* product that is very profitable but nearing the end of its product investment cycle.

Leading and Lagging Indicators

Leading indicators detect changes in KVMs with relative rapidity, enabling faster response, while lagging indicators may only show changes after a long delay. Many indicators are neither intrinsically leading or lagging, but only become one or the other depending on how frequently they are measured. Thus, when revenue is measured every day, it is a leading indicator, but when it can only be measured monthly or less frequently it becomes a lagging indicator.

True leading indicators can be used to infer likely outcomes reported by lagging indicators, so that build and integration success is a fair predictor for the likely stability and predictability of the overall release.

Leading indicators of customer satisfaction are hard to obtain, but usage data can serve as a proxy. Transaction abandon rates can give insight into successful completion of an activity, and simple usage data can at least inform whether features are being used, and can give insight into how products are being used.

Measures of satisfaction may be leading or lagging indicators, depending on how long it takes to gather the information. For example, leading information about Employee Satisfaction can be gathered using something as simple as a “How was work today?” 😊😐😞 button that they can press as they leave for the day.

True lagging indicators like Revenue per Employee, or the Product Ratio, which measures the profitability of the product, are influenced by so many contributing factors that they provide mostly only general ideas of how well the product is creating value.

When inspecting indicators, a common challenge might be distinguishing between correlation and causality. It requires human judgment and bottom-up intelligence to have meaningful data-driven conversation to hypothesize about the root causes behind shifts in indicators. These conversations might trigger new actionable insights, hypotheses and experiments in service of creating the desired shift in the indicators.

How to Improve Empirically using EBM

“If you don’t know where you are going, any road will get you there.” – Lewis Carroll

Just starting to measure KVAs can drive some improvement, because it will show you immediately where you have improvement opportunities. Using a more systematic approach can provide even better results by enabling organizations to continuously learn and improve the value derived from software investments. To produce genuine and long lasting improvements, establish a learning loop as outlined below.

1. Quantify Value

The first step in the EBM learning loop is to quantify value in the form of KVM’s. The process of defining and aligning around KVM’s itself might be valuable to an organization, because it can create transparency around what is being optimized.

2. Measure KVMs

The next step in the EBM learning loop is to establish initial values or a baseline measure for the KVMs of interest. This step provides an initial view of the viability of the product and the ability of the organization to deliver the product. It creates transparency around relative strengths and weaknesses.

3. Select KVAs to improve

With a clear view of current organizational value and an understanding of the measures that reveal it, managers of software organizations can now make informed decisions about which KVAs would be most valuable to change.

Don’t try to affect too many KVAs within a single learning loop. Making small incremental changes and then quickly measuring the result is better than delaying improvement and measurement by changing too many factors at once. Changing many factors at the same time can also pose challenges when trying to establish causality between outcomes and activities. Short cycles with few changes are the most effective way to make sustainable improvements to an organization’s overall agility.

4. Conduct practice experiments to improve targeted KVAs

After choosing a desired KVA to improve, select, at most, a few practices that you think will improve the associated KVM(s), and run an experiment. For example, a software organization that wants to increase quality might choose to focus on reducing the Defects KVM. They may decide to try implementing test-first practices to increase the test coverage and the quality focus of the development teams.

5. Evaluate results

Once the results of the experiment are measured, they should be compared with the KVM values before the changes were made (see Figure 4). If the experiment produced improved measured, the change is kept, otherwise other improvements are tried. The learning loop continues until the KVA reflect the desired results.

Conclusion

“If you can't measure it, you can't improve it.” - Peter Drucker

EBM's Key Value Areas provide a holistic perspective on product delivery performance. Current Value is most important, as a product that offers no value to its customers or users won't survive long. Customer/user experience is only part of the picture; sustaining and improving value to customers is impossible without happy, engaged employees, and without happy investors, those employees will lack the capital they need to make improvements.

Rapidly improving the value a product delivers requires frequent delivery of new value, which means improving the Time-to-Market of the product. This means more than simply working faster; in fact, working harder to go faster is rarely sustainable. Instead, understanding and removing impediments to faster delivery is essential to delivering at faster cycles.

Faster Time-to-Market is not the whole story. Fast release cycles that deliver only very small improvements do little to rapidly improve the value delivered by a product. The ability for the organization to innovate is also determined by its ability to deliver significant innovation in each release. Measuring this ability gives organizations the insights they need to be able to remove barriers that keep them stuck in the past.

Improving organizational performance is also a cyclic, iterative process: measuring current conditions, setting performance goals, forming small improvement experiments that can be quickly run, and then measuring again to gauge the effect, then repeating, continuously.

End Note

Evidence-Based Management is free and offered in this Guide. Although implementing only parts of EBM is possible, the result is not Evidence-Based Management.

Acknowledgement

Evidence-Based Management was collaboratively developed by Scrum.org, the Professional Scrum Trainer Community, the Engagement Manager community and Ken Schwaber and Christina Schwaber.

Appendix – Example Key Value Measures

Current Value (CV)

KVM	Measuring:
Revenue per Employee	The ratio (gross revenue / # of employees) is a key competitive indicator within an industry. This varies significantly by industry.
Product Cost Ratio	Total expenses and costs for the product(s)/system(s) being measured, including operational costs compared to revenue.
Employee Satisfaction	Some form of sentiment analysis to help gauge employee engagement, energy, and enthusiasm.
Customer Satisfaction	Some form of sentiment analysis to help gauge customer engagement and happiness with the product.
Usage Index	Measurement of usage, by feature, to help infer the degree to which customers find the product useful and whether actual usage meets expectations on how long users should be taking with a feature.

Time-to-Market (T2M)

KVM	Measuring:
Build and integration frequency	The number of integrated and tested builds per time period. For a team that is releasing frequently or continuously, this measure is superseded by actual release measures.
Release Frequency	The number of releases per time period, e.g. continuously, daily, weekly, monthly, quarterly, etc. This helps reflect the time needed to satisfy the customer with new and competitive products.
Release Stabilization Period	The time spent correcting product problems between the point the developers say it is ready to release and the point where it is actually released to customers. This helps represent the impact of poor development practices and underlying design and code base.
Mean Time to Repair	The average amount of time it takes from when an error is detected and when it is fixed. This helps reveal the efficiency of an organization to fix an error.
Cycle Time	The amount of time from when work starts on a release until the point where it is actually released. This measure helps reflect an organization's ability to reach its customer.
Lead Time	The amount of time from when an idea is proposed or a hypothesis is formed until a customer can benefit from that idea. This measure may vary based on customer and product. It is a contributing factor for customer satisfaction.
Time-to-Learn	The total time needed to sketch an idea or improvement, build it, deliver it to users, and learn from their usage.

Ability to Innovate (A2I)

KVM	Measuring:
Usage Index	Measurement of features in the product that are frequently used. This helps capture features that are rarely or never used.
Innovation Rate	The percentage of effort or cost spent on new product capabilities, divided by total product effort or cost. This provides insight into the capacity of the organization to deliver new product capabilities.
Defect trends	Measurement of change in defects since last measurement. A defect is anything that reduces the value of the product to a customer, user, or to the organization itself. Defects are generally things that don't work as intended.
On-Product Index	The percentage of the total user base that is using the current version of the product.
Installed Version Index	The number of versions of a product that are currently being supported. This reflects the effort the organization spends supporting and maintaining older versions of software.
Technical Debt	A concept in programming that reflects the extra development and testing work that arises when "quick and dirty" solutions result in later remediation.
Production Incident Trends	The number of times the Development Team was interrupted to fix a problem in an installed product. The number and frequency of Production Incidents can help indicate the stability of the product.
Active code branches, time spent merging code between branches	These measures are similar to the Installed Version Index, since different deployed versions usually have separate code branches.
Time spent context-switching	Number of meetings per day per person, and the number of times a day team members are interrupted to help people outside the team can give simple insight into the magnitude of the problem.

Unrealized Value (UV)

KVM	Measuring:
Market Share	The relative percentage of the market controlled by the product.
Customer or user satisfaction gap	The difference between a customer or user's desired experience and their current experience.