Making Analytics Actionable for Financial Institutions

(Part II of III)

To identify meaningful use cases for analytics-driven banking and financial services solutions, organizations need a thorough understanding of how customer interactions align with context and anticipate needs, while simplifying the decision-making process.
Executive Summary

Many organizations in the banking and financial services sector (BFS) remain uncertain as to how they can most effectively use advanced analytics tools to drive growth and profitability by exploiting the convergence of social, mobile, analytics and cloud technologies (the SMAC Stack™). They frequently do not have the benefit of learning from peer experiences due to the limited number of proven use cases—especially those related to customer-centric outcomes. Success stories primarily focus on areas in which the problem scope is narrowly defined and training data is readily available. Unfortunately, these examples do not provide insights into potential approaches for addressing more complex situations in which drivers of human behavior are multi-dimensional and situation-sensitive.

Because of this situation, organizations that traditionally took fast-follower approaches to innovation, or waited for product vendors to develop solutions, need to take greater risks experimenting with potential uses of the technology. Failure to design these experiments to explicitly account for timing issues and feedback mechanisms can lead to misleading and disappointing results. Similarly, organizations must have a clear understanding of how experiments to better understand, predict and influence human behavior differ from those that were historically focused on optimizing transactional patterns and efficiencies. Finally, the level of insight pursued needs to be balanced against the number of product and service options that the financial institution is willing to offer.

This white paper, the second of a three-part series, presents a way to craft use cases that clearly communicate potential value, as well as the dependencies that must be addressed to achieve a meaningful result. Using the actionable analytics framework presented in Part One of the series, meaningful cases can be scaled to fit within an organization’s comfort zone relative to cost and execution risk constraints.
In Search of Usable Use Cases

Very simply stated, a common assumption drives investment in any type of analytics solution, be it descriptive, diagnostic, predictive or prescriptive: “If we better understood why something happens, we are better positioned to control outcomes.” In other words, the focus is on how analytics can be used to make better decisions and execute more effectively.

However, the definition of killer applications specific to banking and financial services organizations that maximize use of information assets and analytics tools is still elusive, due to the lack of clarity on how to create the required insight, execute upon that insight, or both. This challenge is exacerbated by the paucity of compelling, sector-specific use cases to apply and learn from.

This isn’t to say that there haven’t been successes. Fraud detection, algorithmic trading and (to a more limited degree) operational analytics for call centers and IT operations have all yielded significant business benefits. However, the success of these initiatives is tied to their ability to very tightly define the scope of the problem and establish closed-loop mechanisms that enable ongoing learning and validation. They also address a well-defined, primarily transactional context. The same cannot be said for the two major areas in which organizations seek to make analytics investments: customer-centric outcomes (55%) and risk/financial management (23%).

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Financial institutions have only recently acknowledged customer experience as a priority vs. their traditional focus on transactional speed and efficiency. Even today, many innovations in online and mobile banking that are positioned to improve customer experience are ultimately justified by the resulting operational cost savings. For example, the ability to deposit a check by taking a picture with a mobile phone makes life easier for the customer, but it also decreases the cost of check processing exponentially. The business case did not rely on the promise of increased revenues or market share. Conversely, although much is made of the potential for analytics-driven solutions to deliver a 360-degree customer view, next-best offers, information-based value-added offers or personalized services for retail and mass affluent customers in a wide array of industries, there are few compelling examples of this in the BFS sector.

Concerning risk and financial management, there is still significant room for improvement. Ongoing revisions in modern financial theory (e.g., the Capital Asset Pricing Model was augmented by Arbitrage Pricing Theory, which was extended by GARCH,\(^2\)) attempt to work around flaws rather than build from – and explain – contradictory evidence.\(^3\) One simple example of weaknesses in current analytics approaches is the degree to which actively managed mutual funds underperform their benchmark. Based on one study, the percentage of underperforming funds for a given asset class over a five-year period ranges anywhere from 40% (for large cap value funds) to 93%-plus (for long-term government bond funds).\(^4\)
Similarly, despite substantive investment in compliance technologies following 9/11, analytics-driven compliance solutions continue to incorporate models that yield a substantial number of false positives that must be manually addressed. Furthermore, there are instances when regulators are hesitant to accept algorithmic workarounds to address this issue due to an inability to assess their robustness.

Obviously, these facts suggest there is still significant room for improvement to apply analytics to solving business problems. Careful review of lessons learned suggest two primary success factors that determine the effectiveness of any analytics-driven solution:

- **Adequacy of perspective**: Establishing a clear understanding of possibilities and limitations that can be derived based on “enough” information.
- **Requisite variety**: The capacity to respond to the complexity of a situation by maintaining a proper balance between variety of insight provided vs. variety of actions that can be taken.

By focusing on these two factors, organizations can significantly increase the effectiveness of analytics-driven solutions. Before demonstrating this point, however, we will elaborate on them a bit further.

**Adequacy of Perspective: What’s Really Going On?**

Perspective is derived from understanding contextual factors that drive behavior — whether the focus is on an individual, a group or a market. Deciding on the ideal combination of factors can be a daunting task for more complex types of problems (see sidebar). The most pragmatic response is for institutions to select one of three approaches to assess the adequacy of their perspective:

1. **Limit the number of actions/responses that can be executed based on available information.** As noted above, successful analytics solutions narrowly define their scope so that the information delivered provides sufficient insight to make reliable decisions.

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**Quick Take**

**Providing Some Context on the Idea of Context**

For purposes of this discussion, context can be defined as “any information about the circumstances, objects or conditions surrounding a user that are considered relevant to the interaction between the user and the ubiquitous computing environment.” This definition includes not only traditional demographics but also:

- Physical contexts (e.g., location, time).
- Environmental contexts (e.g., comfort, safety).
- Informational contexts (e.g., accessibility of relevant data, stock quotes, comparative analysis).
- Personal context (e.g., mood, habits, health, schedule, activity).
- Social context (e.g., group activities, social activities, physical proximity).
- Resource context (e.g., capital, talent, applications, infrastructure).

Another factor to be considered is interest duration (ephemeral, short term, long term, etc.).

Based on the list above, there are over a million possible combinations of context categories. If only .01% of these combinations are potentially significant from a business perspective for a given scenario, that still leaves about 100 combinations to be considered.
2. **Determine the range of options to be offered in terms of actions/responses** and hypothesize about the minimum amount of additional information needed to achieve the perspective for meaningful decisions.

3. **Launch a product/service/offer with a clear set of goals** regarding what information can be generated (i.e., what can be learned) as a result.

Many executives lack the willingness to experiment that is required by the latter two approaches. However, “playing it safe” is increasingly the higher risk option in the long term. Downward pressure on fees due to increased transparency and commoditization of services, coupled with upward pressures on cost due to increased regulatory requirements, suggest that new thinking is required.

This is not to say that organizations shouldn’t be thoughtful about the nature of the experiments selected. For example, it is likely that the addition of location information alone could significantly enhance the accuracy of credit card fraud detection mechanisms; however, it is much less obvious that it would yield a substantive increase in brokerage fee business, unless it is accompanied by several other pieces of information regarding drivers, needs and proclivities. Leaders need to get comfortable with the idea that success comes from speed of iteration and learning as opposed to “hitting the bull’s-eye” on the first shot.

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An initiative conducted by Bank of America to account for differences in performance metrics between call centers demonstrates the potential benefits of this type of experimentation. The bank’s intuition was that the culture at each center had a direct impact on its effectiveness. While “culture” is an emergent property that cannot be measured, there are some indicative elements that can be, such as employee collaboration. Rather than limit itself to traditional approaches for assessing collaboration levels, the bank experimented with socio-metric badges that could gather information regarding individual communication behaviors, including tone of voice, body language and the recipient of the communications. The biggest predictor of performance, it turned out, was with whom people interacted, which was six times more indicative than any other metric measured.

When the bank realized that the majority of these interactions occurred during overlapping lunch breaks, decision-makers were able to increase staff interaction levels through a simple policy change that allowed teams to take their breaks at the same time rather than on a staggered basis. Three months later, cohesion was up 18%, and the call center staff was completing calls 23% faster – equaling $15 million in annual savings from the policy change.

Understandably, many organizations may lack either the finances or cultural risk tolerance to pursue this level of experimentation. However, this example shows how a shift in perspective can lead to unexpected discoveries that create value. It also provides a solid example of the second critical success factor for analytics solutions.
Requisite Variety: Bridging the Gap Between Knowing and Doing

In the above example, the bank was able to take the necessary action (a policy change) to benefit from the insights gained through additional context. Although one might initially respond that it was a “no-brainer” to change the policy, situations frequently occur in large organizations in which there is a pronounced “knowing-doing gap.” What if the policy change was blocked due to union work rules, or the decision was continually deferred in a governance committee? Developing insights that are difficult or impossible to respond to simply lead to frustrations that ultimately undermine confidence in the value that can be derived from analytics investments.

Similarly, it can be just as disastrous to have the ability to do something but not have the means to maintain the appropriate level of insight. For example, prior to the 2007-2009 subprime mortgage crisis, institutions could sell collateralized debt obligations, but they were unable to maintain visibility into, or manage, the associated risk. This was particularly true as these products increasingly incorporated lower rated tranches recycled from other asset-backed securities. In this instance, the lack of requisite variety directly impacted the overall viability of many institutions.

To increase the likelihood of success, this balance between what can be known and what can be done or offered should be consciously engineered into any service or product offering that a financial institution considers. Interestingly, this is not always the case. For example, pricing has clearly been recognized as one of the most effective ways to improve revenue and profitability, yet many retail institutions have a very limited range of pricing options despite the socio-economic diversity of their clientele. There are already signs that some organizations that understand the potential opportunity in this area have seen this gap and are actively moving to capture it.

Using these concepts, organizations can identify and assess potential opportunities to create analytics-driven solutions that can make a substantive impact.

Transforming Followers into Leaders: Discovering Useful BFS Use Cases

As noted, the lion’s share of new investment in analytics-driven solutions in the BFS sector is focused on customer-centric outcomes. To date, the majority of the successful customer-centric use case examples either focus on loss avoidance (via fraud detection) or service efficiency (via call center analytics). In both cases, business cases for the associated investments are justified by the promised reduction in operating expenses and provisions. Examples of financial institutions using analytics to actually increase their client base or wallet share of existing clients are difficult to find.

Consequently, unless an institution is willing to wait and let “someone else figure it out,” it must transcend fast-follower status. We propose an approach, described in Figure 1 (next page), that identifies and validates a potential use case for an actionable, analytics-driven solution in the absence of industry-specific best practices and implementation examples.
Rather than creating something novel or avant garde, the approach described in this paper is simply a structured view of the activities – both planned and ad hoc – that make up an effective actionable analytics solution. It is, in effect, the de facto approach.

To be clear, this is not a design methodology; instead, it is a strategy for rapidly identifying, assessing and scoping initiatives in a way that will expedite decision-making, minimize upfront investment and reduce implementation risk. It enables business owners, operations specialists and technologists to assess the potential value and execution challenges of a given idea without getting bogged down in details prematurely. The required skill sets of attendees will vary for each of these steps.

After describing each of these six steps, we will then show how the first three can be used as the basis for a workshop to jumpstart analytics-driven initiatives.

**Step One: Identifying Actions to be Supported**

The most important decision to be made during this step is related to the proper scoping of the objective or ambition. The objective of this analysis needs to be precise in terms of who is engaged in the proposed actions and how those actions are tied to business objectives. To achieve this type of precision, it is important to go beyond aspirational objectives, such as “improve customer experience” or “increase customer loyalty.” Figure 2 (next page) illustrates a relatively simple decomposition of the “improve customer experience” mandate into a set of finely scoped goals that contribute to achieving the overarching objective.
Protection against theft and fraud
Recurring confirmation of service quality
Recurring validation of best price

Create peace of mind

Clients want to know they will be taken care of when things go wrong.

Competitive intelligence should be proactively integrated into pricing strategies.

Pricing

Provide best value for money

Quality of advice

Service integration

Obvious synergies between services should be implemented for client benefit.

Decision-making becomes simpler when client doesn't feel they have to second-guess the advice provided.

"Quality" can be measured in terms of financial performance (absolute and relative), timeliness, relevance, accuracy, actionability and understandability.

Maximize convenience

Simplify issue resolution

Simplify transactions

Simplify onboarding

Figure 2

Improved Customer Experience

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Translating Objectives into Actions

<table>
<thead>
<tr>
<th>Actionable Objective</th>
<th>Target</th>
<th>To-do (actions)</th>
<th>Outputs Generated</th>
<th>User Benefits (quantifiable)</th>
<th>Business Benefits (quantifiable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simplify decision-making</td>
<td>Mass affluent bank client</td>
<td>Define objectives, Identify options, Review research, Perform analysis, Gather opinions, Record decision</td>
<td>Validation/update of objectives and profile, Customized recommendations, Customized research summaries, Guided investigation</td>
<td>Time savings, Reduced anxiety about making portfolio changes, Improved portfolio results, Enhanced investing skills</td>
<td>Increased quality of client interaction, Opportunity to gain access to additional client information, Quicker time to decision, Increased assets under management, Increased client profitability, Improved brand perception</td>
</tr>
</tbody>
</table>

Using this approach, the statement of objectives could then be captured in the format detailed in Figure 3. For the sake of this example, we will focus on the goal of simplifying decision-making from the perspective of one type of stakeholder, a mass affluent bank client.

**Step Two: Assess Current Adequacy of Perspective**

We all work to make the best decisions possible based on the information available. The rapid growth and accessibility of Code Halos – the digital data that surrounds customers, employees, partners and enterprises – is drastically changing the breadth, depth and quality of “available” information. This fact, coupled with substantial advances in the affordability and speed with which these large volumes of data can be processed and analyzed, requires us to reconsider what it is about an entity that is “knowable.” However, we need to get more specific about how context can be understood by what we know, which leads to the ability to execute on the actions in Step 1 (see Figure 4). It is also important to reflect on what is already known to determine whether it is really being used to its greatest effect.

The last category, “what we would like to know,” highlights potential areas of experimentation that can be addressed in Steps 3 and 4 of this process.

**Context Inventory**

<table>
<thead>
<tr>
<th>Entity</th>
<th>What Is Known</th>
<th>What Is Being Inferred/Derived</th>
<th>What Is Being Assumed</th>
<th>What We Would Like to Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>Source</td>
<td>Insight</td>
<td>Assumption, Validation</td>
<td>Insight, Reason, Ease of acquisition</td>
</tr>
</tbody>
</table>

Figure 3

Figure 4
Given that this example is not specific to a particular institution’s environment, information regarding source, assumption validation and ease of acquisition cannot be precisely defined. However, we can speak to the other areas, as follows:

- **What is known:**
  - Information provided at the time of application.
  - Information recorded by the relationship manager during the course of conversation.
  - Credit scores.
  - Self-reported risk tolerance.

- **What is being inferred/derived:**
  - Risk behavior.
  - Lifestyle.

- **What is being assumed:**
  - Information available to the relationship manager is sufficient to create groupings of individuals who are “similar” in a way that matters to providing banking services.
  - Metrics used for assessing accuracy of categorizations can be empirically validated.
  - Patterns that can be observed inside the portfolio accessible to the relationship manager are indicative of the client’s behaviors elsewhere (a big assumption in this context).

- **What we would like to know** (data or facts that can then be used to better predict behavior):
  - Percentage of total assets held in other accounts.
  - Transaction histories in other accounts (the client may be taking risks somewhere that is invisible to the relationship manager).
  - Employment history (e.g., could be taken from LinkedIn).
  - Affinities (social, political, philanthropic).
  - Interest (potentially from social media).
  - Interests of those close to the client (spouse, children, etc.)

The selection of the source data used is ultra-critical. Any data can be made to fit any model. Once the obvious is identified, the selection of potential extensions requires thought and openness to experimentation that cannot be avoided.

**Step Three: Determine Requisite Variety**

This is the point at which the organization must get beyond a user view of desired functionality (the actions identified in Step 1) to identify what is happening behind the scenes to support key user interactions. This output is known as variety analysis. Its goal is not to design the underlying processes and infrastructure but to clarify expectations. For example, a simple request for a recommendation can become much more complex (i.e., require greater variety) if the requestor wants to drill down into the rationale or requires education to become better acquainted with the topic.

Debating the pros and cons of alternative modeling techniques is beyond the scope of this document. For the sake of simplicity, we suggest the use case modeling approach that is defined in the UML 2.0 standard. This approach lends itself to the
use of graphic facilitation and simulations techniques that can make the process more accessible for individuals who aren’t familiar with, or inclined toward, modeling activities.

Also, it is important to overcome the temptation to think more is better. At this stage, organizations are advised to employ a strategy known as minimum viable product, or MVP. An MVP has only those core features that allow the product to be deployed. The product is typically deployed to a subset of possible customers, such as early adopters that are thought to be more forgiving, more likely to give feedback and better able to grasp a product vision from an early prototype or marketing information. This strategy helps organizations avoid building products that customers do not want, and seeks to maximize the information learned about the customer per dollar spent.

Figure 5 provides a simple use case model related to the actionable objective of simplifying decision-making. The use cases shaded in green highlight opportunities for which the application of advanced analytics could potentially make a significant difference to the overall process.
Use cases with an “extend” relationship reflect opportunities to increase the variety of response that can be provided to the client and, as a result, further simplify the decision-making process. Consequently, they deserve special attention during the analysis phase.

Figure 6 proposes a format for capturing the implied capabilities and expectations that underlie each of the proposed actions. The “expand and clarify” use case illustrates the type of information that is sought as part of Step 3. The inputs to this table serve as the foundation for the sequence and activity diagrams that will need to be generated as part of the design process.

Regarding “readiness,” the intention is not to perform a detailed analysis of existing processes and platforms but to make a qualitative judgment about whether a given expectation can be met by:

- Using available resources/assets as-is.
- Using available resources/assets with some level of modification (specify a rough estimate of the anticipated time required).
- Using and extending available resources/assets with new features, functions and capabilities (specify a rough estimate of the anticipated time required).
- Conducting a radical overhaul or replacement of existing resources/assets.

The ultimate objective of Step 3 is to identify the types of variety that could be achieved so that it can be prioritized. In many cases, any one capability might be sufficiently “exciting” to serve as the basis for a minimum viable product. For example, based on a review of the use case model in Figure 5, an initial offer could be based solely on the concept of tailored presentation of research material derived from an analytics-driven assessment of persona and learning style. Rather than make a substantial upfront investment in automating a solution, this hypothesis could be tested quickly and inexpensively on a subset of clients.
More specifically, a group can be selected that has been determined to have a similar learning style and investing persona based on “traditional,” non-automated behavioral assessment techniques. A reporting and presentation format specific to that group could then be implemented to address its specific requests. Manual editing could even be performed by staff dedicated to supporting the experiment. By measuring this control group, the impact of a tailored presentation on client experience, revenue and profitability could be assessed. Based on these results, the basis would exist for making an investment decision.17

Step Four: Specify Learning Strategy

One of the foundational principles of both actionable analytics and MVP is closed-loop learning. Each client interaction is an opportunity to gain additional information about the client, operational capabilities and product competitiveness. All too often, this fact is overlooked during the design of a solution, and as a result, the opportunity is missed. To avoid this common pitfall during the design process, organizations should try to determine how they can leverage each interaction to gain some additional insight about the client. This information could be captured in the format proposed in Figure 7.

Feedback Requirements Summary

<table>
<thead>
<tr>
<th>Interaction</th>
<th>Feedback to be Collected</th>
<th>Collection Mechanism</th>
<th>Use</th>
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Clients may be more willing to provide additional personal and financial information if they perceive they will get a more immediate benefit for doing so. We call this the give-to-get equation.18 Even if they are unresponsive to explicit requests for detailed information, much can be learned from attributes such as:

- Source preferences.
- Activity sequencing (including repeats of an activity).
- Activity timing.
- Information preferences.
- Communication preferences.
- Presentation preferences.
- Channel-switching triggers.

In most cases, this information is, or can be, captured. However, it is frequently underutilized or ignored because it is not viewed as a core input or output of the functions being implemented. This change in perspective can yield significant value.
Step Five: Assess Implementation Readiness

Having passed the preceding gates, it is now time to perform a more detailed assessment of the resources available to implement the proposed solution. The categorization of capabilities to be assessed is provided by our actionable analytics checklist (see Figure 8).

In addition, the quality of access to the various information sources identified in Step 2 should be documented, as it may substantively impact the time and cost of implementation.

Step Six: Develop Execution Plan

Understandably, execution plans will be relatively unique based on the scope of the MVP and the idiosyncrasies of the environment. The most unique aspect of this type of plan is the need to consciously identify which outputs can be re-scoped or modified in flight and which must remain fixed to satisfy the definition of an acceptable MVP. For example, certain assumptions might have been made in the original plan that information should be provided in real time. However, if the intent is to understand information that is currently not made available until the next day, then bundled intra-day alerts might be sufficient.

Steps 5 and 6 are heavily driven by the specific environment in which a project is being implemented. However, we have provided a simple demonstration of how the first four steps can be used to define a well-bounded and meaningful use case that can serve as the basis for an MVP.
Looking Forward
The preceding discussion introduced a new way of approaching the discovery and specification of potential use cases for the implementation of actionable analytics that embody five critical solution characteristics: contextual awareness, immediacy, closed-loop decision-making, balanced information exchange and trustworthiness. This approach leverages well-established and proven engineering practices for dynamic, closed-loop systems to accelerate the ability of business leaders and solution architects to identify potential opportunities for creating value that can be scaled to fit within an organization’s resource constraints and risk appetite.

However, it is important to note that this is only one element of a larger hyper-cycle that must become an integral part of an institution’s operating model and culture in order to drive continuous discovery and innovation based on analytics-generated insights.

The next and final part of this series will discuss how analytics capabilities can be leveraged to initiate and sustain innovation hyper-cycles capable of overcoming traditional barriers to performance improvement and organizational change.

Footnotes
2 These are pricing models used to valuate risky assets.
5 The concept of requisite variety was originally introduced in the 1950s in *An Introduction to Cybernetics* by William Ross Ashby (John Wiley & Sons, 1956). Cybernetics focuses on the study of closed-loop systems. It is relevant to the study of all types of systems, including mechanical, physical, biological, cognitive and social.
9 The nature and prevalence of this gap was the subject of a research project by Jeffrey Pfeffer and Robert Sutton in the late 90’s. The findings were published in their book *The Knowing-Doing Gap, How Smart Companies Turn Knowledge Into Action*, Harvard Business School Press, 1999. Over 15 years later, many of the behaviors and issues persist despite advances in technology.
12 The same is not necessarily true for the insurance industry. Although a detailed analysis is beyond the scope of this discussion, it is safe to say that it is most likely attributable to the fact that the industry’s product value propositions focus on risk transfer vs. risk management and money movement.
About the Author

Edward Merchant is the Chief Technology Officer within Cognizant’s Banking & Financial Services Business Unit. He is responsible for advising and coaching BFS clients seeking effective and affordable ways to address chronic business and operational challenges through the creative use of both mature and emerging technologies. As the global co-lead for the BFS Technology & Architecture Office, he manages a team of solution architects and engineers responsible for converting concepts into implementable software designs. Over the course of his 30-plus year career, Ed has held a variety of systems engineering, architectural design and IT operations leadership roles within financial institutions (regional and divisional CIO positions, Global Head of IT Strategy and Architecture, and Global Head of Vendor Management) and IT services providers (sector and country BU head positions). He holds an M.S. in mechanical engineering, Fairleigh Dickinson University, and a B.S. in industrial education and technology from Montclair State University. Ed can be reached at Edward.Merchant@Cognizant.com.
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