Executive UPDATE
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BDFAB: A Roadmap for Strategic Adoption of Big Data

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This *Executive Update* outlines a roadmap for big data adoption based on the Big Data Framework for Agile Business (BDFAB). My last two *Updates* on big data strategies addressed overcoming the big data strategy lacuna and the importance of extracting the 5th "V" for value from big data. This *Update* builds on my previous two by demonstrating how organizations can adopt big data.

There are many different practical ways organizations use big data. Some set up a "cell" for experimenting with analytics. Others purchase and implement analytical tools to analyze *some* data, while some simply install Hadoop on servers (or a private cloud) and store large amounts of data. My perspective on big data adoption is that it is a strategic business decision. This decision transcends the analytics and technology domains of big data to focus on business value. This value is primarily understood through business agility, which, in turn, is defined by the speed and accuracy of decision making.

As discussed in my previous *Updates*, BDFAB comprises five distinct but interrelated modules. This framework also contains roles, deliverables, and business parameters that provide a sound basis for big data adoption. For example, the very first module of BDFAB — business investment decision — focuses on the importance of big data to business, associated costs, and returns. Other modules (or building blocks) in BDFAB deal with data science, business processes, enterprise architecture (EA), and people/quality. These building blocks provide important mechanisms for successful big data adoption. Yet the person in charge of big data adoption may still have an important question: "How do I structure a roadmap for strategic adoption of big data, and how can that transformation program utilize the BDFAB's modules?"

Practical application of big data requires a pathway that shows the activities and threads (or lanes) for actual implementation. Such a pathway, or roadmap, in BDFAB is based on iterations (repeating similar activities) and increments (gradually adding new activities to the output) that dramatically reduce business risks

associated with big data adoption. In this *Update*, we present such a roadmap comprising 12 lanes and four iterations and discuss the roadmap's practical applications.

An important aspect of this roadmap is *process*. In fact, processes provide the fundamentals for strategic adoption of big data. Therefore, we start with a discussion of processes as a basis for big data adoption, followed by an explanation of the adoption roadmap. This *Update* also argues for the importance of agility as a measure of success with big data adoption and outlines an example of the four iterations in practice.

Processes as Basis for Big Data Adoption

Figure 1 highlights two major types of processes. The first consists of business processes. Examples of such processes for a typical bank are: "customer withdraws amount"; "teller promotes car loans" (external); "manager reports totals"; and "staff rostering" (internal). These business processes are typically modeled and optimized using standardized notations (e.g., UML or BPMN). BDFAB enables the systematic embedding of big data analytics within these business processes to enhance business agility. These business processes are represented by the green and orange arrows of Figure 1.

Figure 1 further shows a time period of -1 to +1 year. While the adoption process itself is shown for one year, an understanding of how the business processes performed in the past is important in ascertaining the current state of process maturity of an organization. This maturity is ascertained by going back a year and examining the technical capabilities, economic strength, people, skills, and attitude, and the business

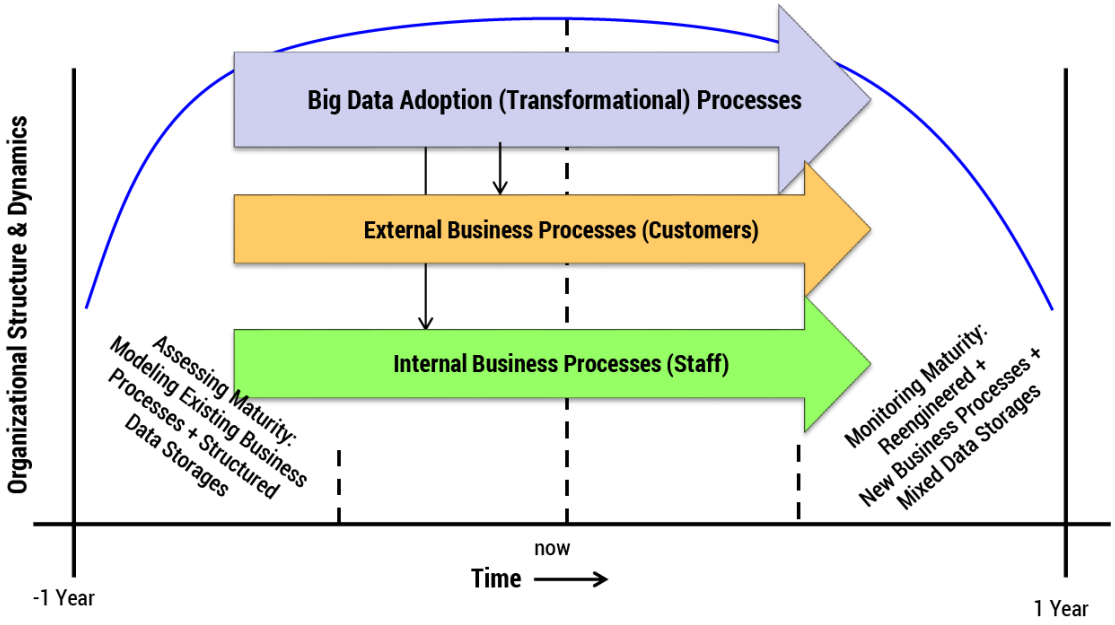

Figure 1 — Processes as the basis of big data adoption for Agile business.
(Source: Unhelkar, Bhuvan. *Big Data Strategies for Agile Business*. CRC Press, 2017.)

processes of the organization. Accordingly, Figure 1 shows the assessment of maturity by going back a year. Monitoring of the new maturity level is shown in the +1 year as big data adoption occurs.

A Roadmap for Big Data Adoption

The second type of processes is the roadmap to big data adoption. This roadmap has its own activities, tools, and techniques, which form a separate category of processes — shown earlier in Figure 1 (blue arrow) — that enable, aid, and support the adoption of big data. These big data adoption processes provide the necessary guidance and risk reduction in enabling the strategic use of big data by an organization. Note, therefore, that the adoption process is not a business process but rather a business transformational process. It helps the organization adopt big data and become Agile. These big data adoption processes in BDFAB comprise 12 lanes and four quarterly iterations over a one-year period. First, let's examine the 12 lanes. We will look at the four iterations in practice in a later section.

The 12x4 Lane Roadmap

The roadmap for big data adoption is an iterative and incremental pathway to transition. This adoption roadmap also helps in selecting the right elements from BDFAB and suggests how to customize each element. The use of the roadmap is governed by the following precepts that hold true in all business transformation programs:

- Engage leadership and stakeholders in explaining why big data is important to the enterprise. This creates buy-in from multiple cross-functional stakeholders.
- Evolve business strategy to adapt to and exploit big data. This strategy ensures a balance between the technical, economic, social, and process dimensions of a business.
- Develop new business models that enable utilization of big data technologies to generate business value (agility).
- Ensure governance and control processes are in place during the adoption process that both foster excellence in reporting to senior executives on progress and enable compliance with myriad regulatory requirements.
- Use short, sharp iterations with incremental efforts that reduce risks and generate business value.

Table 1 shows the 12 lanes of the roadmap with each lane representing an area of activities (or a thread within overall big data adoption). The table briefly describes each lane and its associated adoption activities. These lanes provide the starting point to create iterations in big data adoption. A later section discussing iterations in more detail expands on the adoption activities. Different activities can occur during different iterations within the same lane. Furthermore, not every lane is active in each iteration.

Table 1 —Transforming to big data–driven Agile business: 12 lanes of the BDFAB adoption roadmap.

Lane	Description	Adoption Activities
1: Develop agility as a business mindset	Focus on rapid and accurate decision making, utilizing big data analytics.	• Define business agility as value. • Ensure an Agile culture across organization. • Encourage a proactive Agile mindset. • Employ big data to achieve business agility. • Merge non-Agile areas of work with Agile.
2: Identify data inputs and outputs and SoMo (social media/mobile) interfaces	Undertake critical review of where and how data is currently being sourced as well as changes to data sources with the adoption of big data.	• Identify SoMo devices and interfaces for data (inputs) and displaying insights (outputs). • Review existing devices and explore new ideas with the Internet of Things (IoT). • Study machine-sensor inputs. • Study, document, and prototype contents, mechanisms, frequencies, and feedback of data sources.
3: Optimize business process models with big data (optimization)	Reengineer business processes; enhance business processes; eliminate redundant processes and introduce entirely new processes; embed big data analytics within these processes.	• Model business processes (UML, BPMN). • Establish maintenance of processes (including business rules). • Optimize processes embedded with big data analytics and improve their efficiency and effectiveness.
4: Generate fine granular big data analytics and insights	Ascertain the level at which analytics will be pitched (granularity implies the details of analytics and the time frame available before analytics lose currency).	• Formulate analytics and create prototypes to help business decision making. • Ensure the optimum granularity level based on business factors, available resources, and potential returns.
5: Develop collaborations (business partnerships) for data sourcing, analytics, and innovative decision making	Develop business strategies by considering collaborative arrangements globally between businesses in the same vertical to capitalize on opportunities (time-bound).	• Collaborate with partners for big data analytics to decide on products/services/support. • Establish interfaces for services in the cloud provided by third parties and partners. • Explore and establish interfaces with open data initiatives wherein government provides freely available data (usually metadata) that can be plugged into applications.
6: Establish big data center of excellence (people; knowledge sharing)	Enable pooling and sharing of knowledge and experience within the organization and across the industry (part of framework at industry level).	• Assess, enhance, and share tools, techniques, and capabilities. • Upskill/train staff through formal frameworks (e.g., Skills Framework for the Information Age). • Undertake new technologies (e.g., IoT) trials and share results. • Nominate champions to promote, help, and support big data adoption. • Put in place HR management activities.

Lane	Description	Adoption Activities
7: Use Hadoop (HDFS and MapReduce), NoSQL, and enterprise architecture (EA)	Examine strategically the technical capabilities of big data.	• Undertake technology inventory (e.g., relational and NoSQL databases, HDFS, mappers). • Develop technical prototypes. • Apply CAMS with DevOps (or equivalent) for Agile approach to solutions. • Map to EA of organization.
8: Present big data insights and enhance user experience	Develop strategies for appropriate presentation through visual and other means.	• Explore various visualization (presentation) formats for big data analytics results (e.g., heat maps, reports). • Make timely presentations keeping in mind outcomes desired by user. • Incorporate presentation of nonvisual outputs (e.g., audio, sensors).
9: Apply Composite Agile Method and Strategy (CAMS); manage governance, risk, and compliance (GRC)	Explore agility in describing business value and in developing solutions.	• Deploy CAMS, starting with job aids and formal process maps. • Manage GRC issues and their mapping to big data analytics.
10: Verify and validate big data quality (contents and processes)	Examine value of data before processing based on veracity (quality).	• Manage data quality by verifying inputs, testing algorithms, and useability. • Assure the syntax, semantics, and aesthetics of analytical models. • Provide ongoing testing/cleansing of data. • Apply preventive activities. • Use automated tools.
11: Measure big data maturity, KPI and ROI theory metrics, and ROI	Develop a mechanism to identify the existing maturity of the organization and create a pathway for enhancing the maturity of big data usage of business in a strategic manner.	• Measure and report on big data initiative. • Fine-tune big data adoption program (and BDFAB implementation) based on feedback. • Demonstrate ROI to all stakeholders by providing visible KPIs as the adoption progresses.
12: Embed sustainability and environmental considerations across big data	Explore the use of big data analytics to read and measure the carbon emissions associated with the business; improve sustainability of organization.	• Develop sustainable big data solutions. • Apply big data to reduce environmental footprint of organization. • Measure and report on carbon generation. • Use machine sensors to read and report on carbon performance of organization.

Impact of Agile on Big Data Adoption

BDFAB uses agility as a means to an end and, also, as an end in itself. Agile as a *method* is immensely helpful in producing a solution in an iterative and incremental manner. Agile as a *culture* enables the business processes of an organization to become Lean. This leanness is further enhanced by embedding big data analytics within the business processes. This is because analytics improve accuracy and reduce the time required in decision making. The following are ways in which a practical and Composite Agile Method and Strategy (CAMS) impacts big data adoption:

- **Visibility.** Agility makes the analytical models and the corresponding business processes immediately visible to multiple stakeholders, allowing for immediate user feedback and enabling the users to see value from development. Visibility also provides transparency in terms of the work undertaken to embed analytics within business processes.

- **Change management.** Agility is based on the premise of welcoming change rather than resisting it. This attitude inculcated by agility is most helpful in optimizing business processes using data analytics. With fine-granular data analytics, decision makers can make rapid changes to business processes. Change with agility is iterative, incremental, and transparent to all stakeholders.

- **Integrations and collaboration.** Most big data solutions are collaborative and complex; each solution deals with multiple other solutions, platforms, infrastructures, devices, and networks. Agility in developing solutions enables inclusion of external interfaces (APIs) in an “experimental” manner, thereby facilitating and enhancing collaboration and integration. Agile as a culture opens the doors for physical collaborations with partnering organizations. This results in innovative and collaborative business processes that provide greater value to users due to the availability of a wider range of data and creative ways of analyzing that data.

- **Continuous testing and showcasing.** Testing in its entirety must include not only functional accuracy, but also nonfunctional or operational quality (e.g., performance, security, and usability). Agile development of solutions supports comprehensive and continuous testing. Testing business processes in an "operational" environment is vital for a satisfying user experience; such testing happens incrementally through Agile.

- **Compliance and audit.** Complex regulatory requirements include security, compliance, audit, and risk management — and they consume substantial business resources. These requirements are not easily handled by pure Agile practices, but are by CAMS (a balanced approach to Agile). The artifact layer of BDFAB provides suggestions for the documentation required to enable a compliant and auditable adoption of processes.

Iterative Adoption of Big Data

The 12 lanes of the adoption roadmap are not all applied simultaneously. Keeping in line with agility, the lanes of the adoption process are implemented iteratively. Figure 2 shows an instance of the roadmap created, say, for a banking organization. A similar roadmap can be created for insurance, supply chain logistics, health, or any other industry. Nuances applicable to each industry come into play during the configuration and implementation of the adoption roadmap. The rectangles surrounding the activity groups in Figure 2 indicate that these activities are performed with greater intensity during that particular iteration.

The concentric circles on the left in Figure 2 suggest four iterations within the backdrop of the TESP (technology, economy, social, process) subframework, when adopting big data. While the subsequent iterations are not shown in this figure, the activities within those iterations are derived from the 12 lanes listed in Table 1. Iteration planning thus becomes an important and collaborative activity in BDFAB. While all four iterations can be planned up front (based on the knowledge and experience of staff and current maturity level of the organization in terms of big data analytics), each new iteration has its own iteration planning exercise. Such planning allows each iteration to be suitably modified based on the output of the previous iteration and the changing needs of the business context. Continuous modification of the iterations is an important part of the strategic adoption of the big data process within BDFAB.

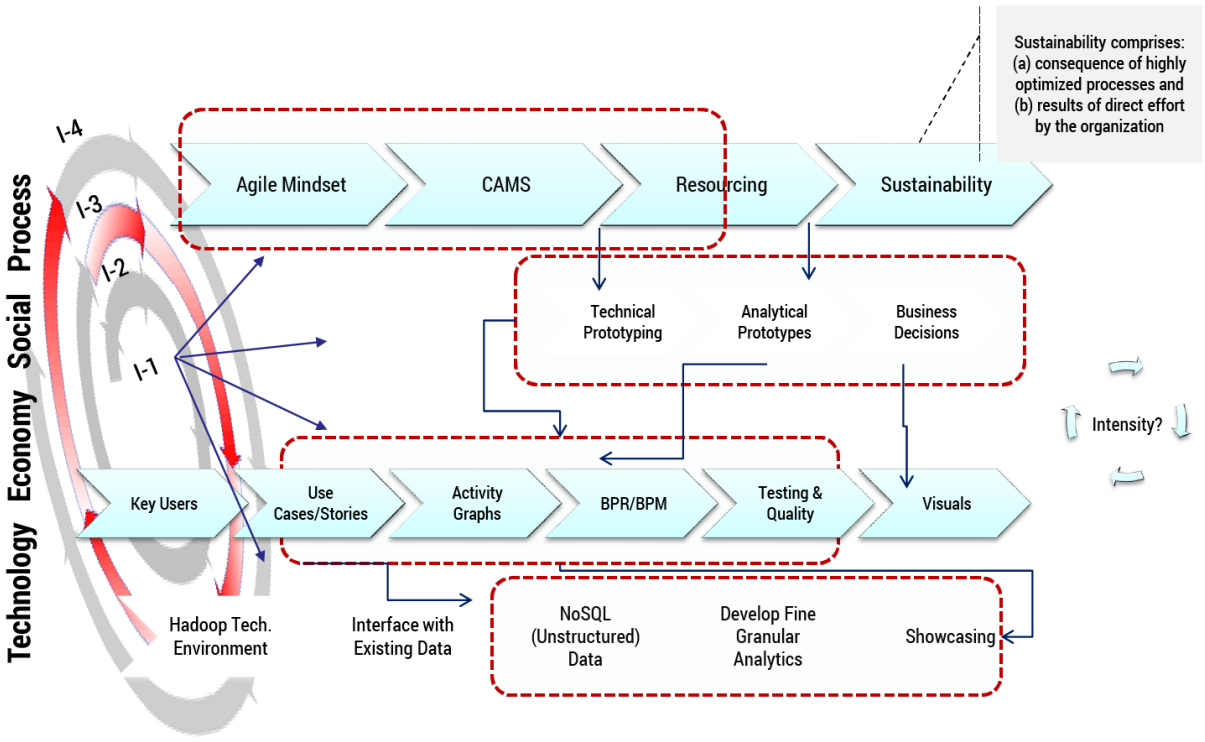

Figure 2 — Aligning the big data adoption process with the TESP (technology, economy, social, process) subframework to ensure smooth changes to organizational structures and dynamics and a smooth transition to Agile business processes. (Source: Unhelkar, Bhuvan. *Big Data Strategies for Agile Business*. CRC Press, 2017.)

Four Iterations of BDFAB in Practice

Strategic adoption of big data most often involves four iterations of BDFAB over a one-year period. To better explain this process, let's look at a fictitious example case study of a typical banking organization. ABC Bank is a large, multinational bank with substantial existing customer data and rapidly growing unstructured data acquired through its social media and mobile channels. The senior decision makers — who appreciate the technological and analytical aspects of big data and want a strategic approach to adopting it — make the investment decision for big data adoption. They set up specialist cross-functional adoption project teams comprising technical, analytical, financial, HR, and architectural skills to steer this strategic initiative.

These teams, also charged with the vital task of ensuring that the new initiative is in sync with the existing data and processes, study BDFAB carefully. In fact, the investment decision, made in the first module in BDFAB, provides the basis for further detailed SWOT analysis resulting in an adoption program budget. The teams then map out the four iterations based on the 12x4 lane roadmap within BDFAB. These iterations are created with an understanding that each will be modified and updated based on the results of what has been learned from the previous iteration.

The following is a description of what transpires within those iterations in a typical big data adoption process. (Note: there are several subtle nuances in creating an instance of the roadmap and not all are described below. For example, lanes have dependencies on each other, and a single lane, when executed more than one iteration, has a different focus and intensity for each iteration.)

Iteration 1 (Focus on Business Investment Decisions)

The lanes the bank's adoption project teams selected for the first iteration of the big data adoption process are listed below. The teams identified five key business processes to address in the first iteration. These include four external customer-facing processes ("open an account"; "answer queries"; "change customer profile"; and "withdraw amounts in the branches") and one internal process ("post the control totals of the financial position of the branch to the central head office twice a day"). The teams describe the activities to be undertaken in each lane selected for this iteration:

- **Lane 1.** The big data transition team considers agility to be the base of the adoption process. Agility is a function of speed and accuracy in decision making at all levels of the business process. The team administers a short survey and conducts a set of interviews with decision makers and customer-facing roles to understand the level of agility within the five key processes previously identified.

- **Lane 2.** The activities in this lane start by identifying existing data input channels: the social media websites and blogs used by the bank and its customers and the mobile devices used by both customers and staff. Also studied are the areas where the new data (which is likely unstructured data) interacts with the existing structured data.

- **Lane 3.** The five business processes identified for the first iteration are modeled in detail using Business Process Model and Notation (BPMN), and the business rules associated with the business processes are documented. The modelers discover that some dated documentation of these processes exists and revisit that documentation to study and model the existing processes. These process models are later used to embed analytics for optimization.

- **Lane 7.** This lane starts focusing on the technical aspect of big data. The data inputs explored earlier in Lane 2 are now further studied from storage, access, and security viewpoints. The underlying technologies of Hadoop/HDFS are explored and prototypes are created.

- **Lane 9.** The senior decision makers, together with the specialist adoption teams, apply the principles of CAMS to team functions. They also explore the governance, risk, and compliance (GRC) issues related to embedding big data analytics.

- **Lane 11.** In this initial iteration, the work carried out in Lane 11 is to roughly determine the bank's maturity in terms of big data. Such ascertainment is carried out with a quick survey across the various cross-sections of staff and some volunteering customers. A suite of metrics to demonstrate the ROI of big data investment is outlined.

Iteration 2 (Focus on Business Processes, Granularity, and Context)

The selected lanes for the second iteration of the big data adoption process (including repeated lanes), and the activities within those lanes, are described below:

- **Lane 2.** In addition to the data sources identified in the previous iteration, this lane in the second iteration explores "fast data" sources (e.g., machine sensors and IoT devices) embedded in the bank's business processes. The interfaces for sourcing data (inputs) and presenting insights (outputs) are designed in this iteration while keeping the business context in mind. The data contents, input/output mechanisms, frequency of updates, and feedback to the users are studied and modeled in this lane.

- **Lane 3.** The business processes modeled in the previous iteration are revisited to enhance and/or replace activities with analytics. Thus, the effort in this lane is to start optimizing business processes to enable Agile decision making.

- **Lane 4.** The effort in this lane is dedicated to formulating context-based analytics using both structured and unstructured data. The level of granularity of the analytics is equally important as part of this focus. For example, the bank's external (customer-facing) business processes are studied to create an appropriate level of granularity of analytics (e.g., should a specific customer at a specific time be offered a lower-interest rate package for an auto loan?).

- **Lane 5.** The adoption team takes this strategic action to establish collaborative partnerships with organizations providing data. The focus here is to expand the data "base" beyond only the data available within the organization and tap into data sources either freely available through government initiatives or third-party data that can be purchased or leased. For example, ABC Bank establishes collaborative relationships with the Reserve Bank to source national interest rate data and patterns through Web services. ABC then incorporates that data in its analytics, predicting future interest rates.

- **Lane 7.** The effort in the initial iteration in terms of technologies is further intensified by exploring NoSQL databases. Injecting unstructured data in a NoSQL database (MongoDB being the choice for ABC Bank) and developing algorithms to analyze that data in real time is part of the activities in this lane. Third-party analytics tools (e.g., Excel, Power BI, Tableau, IBM Watson) are considered by ABC Bank. In this iteration, IBM Watson is selected.

- **Lane 8.** This lane focuses on exploring the various presentation styles (e.g., visuals, heat maps, and reports) that are part of the business processes. Additionally, presentation mechanisms other than visual (e.g., sensors, audio) are also explored in this lane in this iteration.

- **Lane 9.** CAMS enables the adoption team to practice the techniques outlined in BDFAB. Here, the team ensures that Agile practices are followed by the adoption team. Also, given the possibility of method friction due to existing methods within the organization, CAMS also works to avoid that friction.

- **Lane 10.** This lane in this iteration focuses on data quality. A subprocess is established to systematically cleanse data for analytics, while a strategy for quality of open source data (externally sourced) is also established.

- **Lane 12.** This lane in this second iteration starts the activities of the organization to utilize big data to impact the sustainability of the organization. While the activities here are optional, in the case of ABC Bank, there is a specific goal to improve sustainability in its business processes, especially the internal business processes, by optimizing processes.

Iteration 3 (Focus on Knowledge Sharing, Quality)

Activities in some lanes selected for the third Iteration of big data adoption by ABC Bank are carried out with greater intensity, whereas in other lanes, a new suite of activities appropriate to the iteration are executed. The following is a brief description of the lanes:

- **Lane 1.** In this third iteration, the adoption team merges existing non-Agile business processes (e.g., "teller seeking permission from branch manager before making loan offers to customers") with agility (e.g., "teller making use of big data–driven analytics to offer a reduced interest loan 'on the spot' to the customer").

- **Lane 2.** This iteration focuses on finessing the presentations and visualization aspect of analytical outputs. By the time the big data adoption reaches this third iteration, there is substantial development of algorithms and code to enable focus on the display of results — right amount, to the right person, at the right time, and in the right way. For example, to ABC Bank's teller, the visualization can be a holistic, single-screen display to offer a reduced-interest car loan for the customer standing across the counter.

- **Lane 4.** While the decision on the level of granularity is taken in the previous iteration and is context-dependent, in this iteration additional prototypes are built in order to fine-tune the level of granularity for the analytics.

- **Lane 6.** Strategic big data adoption ensures that the newly gained knowledge and experience by the organization is shared across the entire organization. For example, experimentation with the levels of granularity and the understanding of the context for decision making are activities that need to be stored and shared to all staff. This lane also nominates one or more champions entrusted with storing and sharing knowledge on big data tools, technologies, techniques, and risks across the organization.

- **Lane 8.** The activities in this iteration focus on user experience through presentation — in particular, the visualization of analytical results. User experience goes further than the design of good user interfaces and visual charts; it focuses on the overall experience when interacting with the analytical solution. Operational parameters (such as speed of response) are applied in testing user experience in this iteration. Creative ways of presenting visuals (right time, place, person, method) resulting from analytics are also explored.

- **Lane 9.** This lane supports the CAMS-based Agile practices used by the adoption team. The roles within the business processes are also provided skills training in using Agile techniques. CAMS is valuable in terms of its balanced approach, as it provides planning, documentation, and reporting.

- **Lane 10.** This lane focuses on verifying and validating user experience based on volume, velocity, and variety of data. Additionally, the activities in this lane strategize for ongoing testing and cleansing of data (especially streaming and machine data that is not static).

- **Lane 12.** Depending on the priorities of the organization, this lane continues to focus on the environmental footprint of the organization and reduction efforts based on big data analytics.

Iteration 4 (Focus on Metrics, ROI)

The activities within the lanes selected for the last iteration of the bank's big data adoption process are outlined next:

- **Lane 1.** This focus of this lane is to continue to build business agility through rapid and accurate decision making at all levels within the organization. This ongoing enhancement is achieved by

promoting Agile as a culture throughout the business. It includes the use of metrics to determine improvement in agility based on big data analytics.

- **Lane 2.** By this fourth iteration, the big data adoption team has a full understanding of the unstructured data. The effort in this iteration fully utilizes existing structured data with unstructured data.
- **Lane 3.** While big data analytics is not necessarily used for automation, they are most certainly employed for optimization. In this iteration, the business processes modeled and embedded with analytics are further studied, measured, and improved from a performance viewpoint. The ability of business processes to utilize other unrelated data sets is an important activity in this lane.
- **Lane 5.** Once the external data sources are understood and collaborative partnerships with external organizations are set up, there is a greater opportunity for innovation in decision making within the business processes.
- **Lane 6.** Activities in this lane focus on upskilling users, technologists, and analysts. The tools selected (e.g., IBM Watson in the case of ABC Bank) and its experience by the adoption team are disseminated across the organization.
- **Lane 7.** The ABC Bank's EA (based on the Zachman Framework) is used to introduce big data–enabled solutions within the organization.
- **Lane 8.** The activities in this lane use feedback from users of the enhanced and optimized business processes to improve visuals and reports.
- **Lane 10.** In addition to the quality of the data being analyzed, the focus here is on quality of interfaces between various sources of data and the analytical solutions.
- **Lane 11.** This lane focuses on demonstrating the ROI to the stakeholders who initially undertook the investment decision for big data adoption.

Due to this iterative approach to big data adoption, ABC Bank finds its business processes are more Agile than before. This agility of processes translates into: (1) quicker decision making, (2) more accurate decision making, and (3) decentralized decision making. Effectively, the analytics and technologies of big data are utilized in a strategic manner to optimize and improve both external (customer-facing) and internal (staff-related) business processes.

Conclusion and Future Direction

This *Update* described an adoption process suitable for big data. BDFAB elevates the technologies and analytics of big data to a strategic business level. However, implementing this framework requires a process of its own. The iterative and incremental nature of big data adoption, especially for large and complex

organizations, reflects underlying agility, with the end value from big data adoption being a function of business agility. Four iterations of three months each are a suggested starting point. In many organizations, depending on the level of big data maturity, there are additional iterations performed in greater detail (or greater intensity). Having a roadmap for implementing big data, such as the one presented in this *Update,* is one way of improving the success of big data adoption and reducing the associated risks.

About the Author

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Dr. Unhelkar has designed, developed, and customized a suite of industrial courses, which have been regularly delivered to business executives and IT professionals globally, including those in Australia, US, UK, China, India, Sri Lanka, New Zealand, Singapore, and Malaysia. He is also a specialist distance tutor for the Australian Computer Society and Australian Catholic University. Dr. Unhelkar's thought leadership is reflected through multiple Cutter Executive Reports, *various journals, and 20 books, including* Big Data Strategies for Agile Business *and* The Art of Agile Practice: A Composite Approach for Projects and Organizations. *He is passionate about coaching senior executives; training, reskilling, and mentoring professionals (i.e., business analysts, Agile practitioners, testers); forming centers of excellence; and creating SFIA-based assessment frameworks to support these initiatives. Dr. Unhelkar was the recipient of* Computerworld's *Object Developer Award (1995), the Consensus IT Professional Award (2006), and the IT Writer Award (2010).*

Dr. Unhelkar earned his PhD in the area of object orientation from the University of Technology, Sydney. Subsequently, he designed multiple industrial and master's degree courses in such areas as global information systems, Agile method engineering, object-oriented analysis and design, and business process reengineering and new technology alignment, which he has delivered to universities in Australia, US, China, and India. Dr. Unhelkar has also supervised PhD research and presented/published numerous papers and case studies. His current industrial research interests include Agile business analysis (CAMS and avoiding method friction), big data, and environmentally responsible business strategies. Dr. Unhelkar holds a Certificate-IV in TAA and TAE and is a Certified Business Analysis Professional (CBAP of the IIBA). He is an engaging and sought-after speaker; a Fellow of the Australian Computer Society (for distinguished contribution to the field of ICT); a life member of the Computer Society of India; President of Rotary Club of Sarasota Sunrise (Florida) — Multiple Paul Harris Fellow, AG; a Discovery volunteer at NSW parks and wildlife; a member of the Society for Design and Process Science; and a former TiE Mentor. Dr. Unhelkar can be reached at bunhelkar@cutter.com.