MIS Quarterly Executive

How Lufthansa Capitalized on Big Data for Business Model Renovation[1]

Hong-Mei Chen, University of Hawaii at Manoa (U.S.)
Roland Schütz, Deutsche Lufthansa AG (Germany)
Rick Kazman, University of Hawaii at Manoa (U.S.)
Florian Matthes, Technische Universität München (Germany)

Executive Summary

Enterprises have begun to derive value from big data, but many challenges remain. The full article reports how Lufthansa successfully discovered big data value and addressed the technical complexities, and used big data as the basis for renovating its traditional business model to one that embraces customers as value co-creators. From Lufthansa's experience, we identify the challenges and critical success factors for innovating with big data and navigating through uncharted waters. The key is to shift the focus from technology to business values.

Big Data is Enabling Lufthansa's New Business Model

By using Value Discovery to develop use cases, Lufthansa identified big data value and innovation in four major areas: (1) Personalizing the customer experience; (2) Handling irregular (IRREG) situations; (3) Predicting departure delays and being proactive in IRREG recovery; (4) Implementing predictive and preventive aircraft maintenance. The primary use cases in these four areas were then used as the basis for big data requirements, or as the blueprint for strategic development planning and the subsequent system design and implementation for realizing the business value discovered.

Big data capabilities in these areas provide the foundation for renovating Lufthansa's business model to one that centers on customer experience and service innovation. Big data enables the design of an end-to-end customer experience and is being mined to discover innovative service offerings and operational efficiencies that were not possible before.

The renovated business model reframes Lufthansa's relationship with its customers, and fully transitions the airline from goods-dominant logic to service-dominant logic (the differences between these two logics are explained in the full article). This shift has subtle but profound implications for how Lufthansa conceptualizes IT-enabled service initiatives and how it approaches service innovation.

The combination of service-dominant logic principles and the big data paradigm is the driving force behind Lufthansa's renovated business model. The big data paradigm means collecting data from everywhere (weblogs, social media, mobile apps, etc.), and is an open world system concept that is critical for CRM from the service-dominant logic perspective. This paradigm requires the integration of internal, external, real-time and batch-processed data, whether structured or unstructured, to provide the base for big data analytics.

The potential of big data comes from the variety of data from multiple sources that can be explored to provide insights. Previous "small" (structured, relational) data systems could not support this wide variety. Before big data deployment, Lufthansa relied on "small" database/data warehouse systems to perform analytics on only internal, structured, mostly transactional data, which was very limiting.

Critical Success Factors for Innovating with Big Data

1. A Formal Top-Down Value Discovery Process. Lufthansa used the Value Discovery process before adopting big data. This process has three phases: innovation process, use case development and strategic development planning, which includes cost-benefit analysis, sourcing decisions, talent management, etc.

1 The full article is published in the March 2017 issue of *MIS Quarterly Executive*, available online at www.misqe.org.

2. Direct Involvement by the CEO. The direct communication between Lufthansa's CEO and CIO reflects the strategic role of IT at Lufthansa. IT innovation, especially big data, is now front and center.

3. Service-Dominant Guidelines for Deploying Big Data. To make the full shift to service-dominant logic, service-dominant system design principles must be applied to govern big data requirements and guide big data system design and business process management. These principles will ensure that the resulting systems will help the organization to develop genuine relationships with its customers.

Service-Dominant System Design Principles

Service-Dominant Logic Foundational Premises	Service-Dominant System Design
The customer is always a co-creator of value	Include customer competencies and networks for IDIC (Identify, Differentiate, Interact, Customize) CRM design; shared information among customers, firms and networks; dynamic interaction design with customers; focus on both the firm's and customers' processes; analysis of the entire customer interaction chain; many-to-many design; customer involvement in design
The enterprise cannot deliver value, but can only offer value propositions	Internal and external process integration; dynamic value configuration with customers' network and supplier chains
A service-centered view is inherently customer-oriented and relational	Longer-term customer value; design for trust and loyalty in a network
All social and economic actors are resource integrators	Including both the firm's and customers' competencies and resources; dynamic integration for personalization; end-to-end process integration
Value, determined by the beneficiary, is idiosyncratic, experiential, contextual and meaning-laden	Value measurement needs to capture intangible, experiential quality of services (dynamic); customer-focused balanced scorecard

4. Business-Case-Driven Decision Making with Creativity. Enterprises must cultivate effective innovation processes and creative system designers for devising innovative big data use cases where business value can be derived. At Lufthansa, use case development was critical to big data value discovery and subsequent deployment.

5. An IT Architectural Foundation for Growth and Integration. Lufthansa has implemented SOA technology as the means for cost-effectively obtaining organizational agility and aligning the business and IT. The SOA infrastructure provides the foundation for growth and integration.

6. Effective Outsourcing and Vendor Management. Lufthansa's main strategy for big data deployment is outsourcing. This strategy mitigates some of the big data development complexity but creates new complexities, such as managing hundreds of providers and ensuring that all system components interoperate.

7. Data Governance and Talent Planning Processes. Lufthansa has many data specialists in command-and-control centers who are continuously working to improve data analytics. However, data scientists might be in short supply and recruiting them might be tricky and expensive. Having plans in place to recruit suitably qualified data specialists is a crucial aspect of the strategic deployment of big data.

In summary, the Lufthansa case demonstrates how business value deriving from big data can enable an innovative business model. Lufthansa's renovated business model is helping it survive and thrive in a fiercely competitive business environment.

There are two practical implications from the Lufthansa case. First, although it is important to incorporate new semi-structured or unstructured data driven by use cases, integrating existing data is crucial for big data innovation. Blending the old with the new is a challenge in big data and requires a thoughtful IT architectural approach and data governance processes. Second, to use analytics for competitive advantage it is necessary to build a culture that fosters analysis. We also caution against enterprises just collecting big data but not using it for analytics.