**HBR - Dow Chemical Co.: Big Data in Manufacturing**

**Assignment 1.1**

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[1.1.1 What is big data? 4](#_Toc167655148)

[According to the case study, big data is defined as “data sets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze.” This essentially means that the data sets exist in a warehouse that is too large for typical database software, to be able to retrieve these datasets efficiently for analysis. For instance, we often look at DynamoDB or SQL to be able to retrieve data but with “big data”, this process is not possible, or mostly like really difficult to use due to the nature of the data. 4](#_Toc167655149)

[1.1.2 What is big data in the context of manufacturing? 4](#_Toc167655150)

[In the context of manufacturing, big data refers to the various data generated from sensors, monitors, and meters from different pieces of machinery on the shop floor daily. These data includes both technical and non-technical data. 4](#_Toc167655151)

[1.1.3 What are the opportunities that big data provides in manufacturing? 4](#_Toc167655152)

[Big data in manufacturing allows plants such as Dow’s, to listen to business process from the technologies they were using. 4](#_Toc167655153)

[1.1.4 Is the chemical industry amenable to the deployment of EMI? 4](#_Toc167655154)

[The chemical industry is amenable to the deployment of EMI. This is because the chemical plants are great at storing large volume of data from various systems such as sensors, monitors, and meters from the shop floor. Furthermore, having these process allows EMI to provide comprehensive analysis of the operations, which enables better decision making and optimization. 4](#_Toc167655155)

[1.1.5 What is EMI? 4](#_Toc167655156)

[Enterprise Manufacturing Intelligence, or EMI, is a subset of big data. The EMI system allows collection, analysis from both structured and unstructured from differences sources from the manufacturing chain. This is all done in real time. 4](#_Toc167655157)

[1.1.6 How does EMI help a company such as Dow? 4](#_Toc167655158)

[EMI helps DOW by allowing the company to enhance the overall experience of the company’s shop floor. For instance, the EMI software that they were testing integrated to the Laboratory information Management System (LIMS) allows the R&D lab to deliver test results in real time to engineers to support the customization efforts. The polymer division also benefited from EMI as this system allowed monitoring over the complex changeovers of the equipment and processes which helped produce data on the product quality and utilization inputs. Another benefit of the EMI system is that it helps maintain consistency when dealing with certain issues. For instance, based on the document, plant supervisors at Dow interprets data differently due to “different experiences, education backgrounds, and even personal beliefs, Which often bordered on biases” (Ryan). EMI however ensures that plant supervisors would be able to reach the same conclusion given the data. 5](#_Toc167655159)

[1.1.7 What are the skills required of a big data professional? 5](#_Toc167655160)

[Based on the document, it appears that the skills required by Dow of a big data professional revolved around core engineering skills as well as general data management skills. 5](#_Toc167655161)

[1.1.8 Why should Dow access data at the points of origin in real-time? Accessing data at points of origin in real time allows Dow to prevents the creation of data silos by ensuring data is not passed to redundant parallel spaces, which can create isolated data stores and hinder operational efficiency as well as reducing the complexity of the data and its associated costs. 5](#_Toc167655162)

[1.1.9 How should Dow gain user acceptance and scale up usage of data company-wide? 5](#_Toc167655163)

[In order for Dow to gain user acceptance and scale up the data usage of the data company-wide, they developed a series of approach to simplify the systems to make it easier. For instance, Dow broke down the EMI systems into modules to make it easy to install on individual workstations. This made it easy for users to get packages installed quickly and getting them onboarded quickly. Furthermore, because it was in modules, this meant that combability was easy to managed and so tools that was used to integrate with EMI was easily integrated. 5](#_Toc167655164)

[1.1.10 What are the metrics by which Dow could measure the return on investment of EMI? Based on the text, Dow could measure ROI of EMI by measuring the operational reliability. This means that they can measure the 5](#_Toc167655165)

[1.1.11 What are the alternative paths you would suggest for implementing EMI at Dow? An alternative path in implementing EMI at Dow would to create interactive trainings to ensure quicker onboarding, quick adoption, and facility integration easier. It can be taken one step further as well by monitoring the progress on the training, as well as the completion time of the training to further enhance it and address any potential challenges. 6](#_Toc167655166)

[1.1.12 What are your recommendations to Colegrove for implementing EMI? My recommendation for Colegrove for implementing EMI would be making the EMI systems even more granular and more modular. This means that the EMI system would be targeting certain areas and aspects of the shop floor. By doing this, users and engineers can work faster and troubleshoot issues faster. 6](#_Toc167655167)

# HBR Case STUDY - Dow Chemical Co.: Big Data in Manufacturing

## UVA CASE STUDY QUESTIONS

### What is the landscape of the global automobile industry?

### The current landscape of the global automobile industry is much different from what it originally started from. From a wide adoption of diverse global markets, fierce competitions from all perspective of automobiles, and constant technological advancements makes the automobile industry significantly different and exciting. For instance, the automobile industry has shown consistent growth driven by increasing vehicle ownership, particularly in emerging markets. One of the largest and most reliable market of the automobile industry is from Asia. Europe is also notorious for developing “over-engineered” cars and North America has now become the main staple for fuel alternative vehicles. Automobiles are now built for different purposes, and customers have a wide variety of options from price range, size, and terrain, and even color. Furthermore, automobiles have slowly adopted new and alternative fuel, such as Electric Vehicles (EVs), with the focus on reducing carbon emission.

### How did VW Group's position evolve over the years?

### Volkswagen Group's (VW Group) journey from its inception in 1937 to its position as a leading global automaker by 2018 involves strategic expansion, acquisitions, and a focus on innovation and adaptability. In 1965, VW acquired Auto Union GmbH, and merged It with another manufacturer. This would ultimately create a firm called Audi. Over the next 20 years, VW introduced various models that would become some of its most successful. In 1984, they entered the Chinese market, increasing its reach across Asia and globally. In the 1990s, VW made moves expand into the high-end market by acquiring luxury brands such as Lamborghini and Bugatti.

### What is VW Group's strategy for 2018?

### VW Group strategy for 2018 was to first, deploying intelligent innovations and technologies to become a world leader in customer satisfaction and quality; second, increasing unit sales, in particular, by capturing an above-average share of the development of the major growth markets; third, increasing its return on sales before tax to at least 8 per cent to ensure that the group’s solid financial position and ability to act were guaranteed, even in difficult market periods; and fourth, becoming the top employer across all brands, companies and regions.

### Identify 4 business areas that big data can be used in Volkswagen. The four business areas that big data can be used in Volkswagen are improvements to the overall operations, improving the customer experience, increasing revenue across different divisions, and innovation to the cars themselves. Volkswagen can improve its overall operations simply by collecting data from operations. It use this data to analyze key factors that might be able to increase operation times, reduce costs, or even reduce workloads. In addition, Volkswagen can also use big data for their customer experience. For instance, the manufacturer can identify what features certain types of customers use the most and implement this features specifically to target those customers. Big data can also find what customers use least, and optimize/remove those features entirely. Another example of how big data can be used in Volkswagen is to help increase the revenue of Volkswagen. In the, Volkswagen can help optimize their operations. This can have affects with the overall operation costs and by using big data, the costs can lower, further increasing profits. There’s also many other ways Volkswagen can increase revenue via big data such as predictive manufacturing and production efficiency. Finally, Big data can help Volkswagen develop new technology. They can use this data to develop and train their own self driving AI to navigate the roads using machine learning. This is similar to Tesla’s Autopilot, where it “uses cameras, radar, and other cool sensors to know what’s happening around the car.” (Tales)

### What role could big data play in this strategy?

### Big data is expected to give Volkswagen not only a competitive advantage but also overall growth in the 2018 strategy. Volkswagen obtains large amounts of data that can help them increase customer satisfaction and quality, general sales/profits, innovation, and to achieve employee satisfaction. Similar to earlier, big data can give Volkswagen an edge when it comes to developing new machine learning features or use big data to achieve higher customer satisfaction.

### If you were the head of a business unit within VW Group, how would you leverage big data to help the company achieve this strategy? You can select any unit, such as any brand or function.?

### How would you assess and prioritize different big data-related initiatives so that you could select a winning proposal for investment? Please describe your methodology?

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