Teaching Note:

**Big Data Strategy of Procter & Gamble: Turning Big Data into Big Value**

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Big Data Strategy of Procter & Gamble: Turning Big Data into Big Value

ABSTRACT

This case is about the challenges faced by the new CIO of P&G, Linda W. Clement-Holmes (Linda), in taking the big data strategy of the leading consumer packaged goods company forward. Under her predecessor, Filippo Passerini (Passerini), P&G had leveraged big data successfully in all its business decisions – marketing, product development, supply chain, etc. The company collected consumer data and other data from multiple touch points as part of its digitization drive. The case elucidates the benefits that the company had derived from big data, including cost savings and the speedier roll-out of new products. The case also explores the potential downside of an excessive focus on big data and digitization, including diluting the human touch in the company’s interactions with its customers, and other potential risks of employing big data. Linda faced a challenging situation as she tried to take the company’s big data strategy forward at a time when P&G was facing difficult times.

TEACHING OBJECTIVES AND TARGET AUDIENCE

This case is designed to enable students to:

- Understand the opportunities and challenges in implementing a big data strategy.
- Understand the significance of accessibility to information in an organization and how its functioning can be transformed through the availability of real-time data.
- Discuss the ways in which big data could be productively employed in an organization.
- Understand how big data can be effectively exploited in some of the key business functions.
- Understand the limitations of employing big data.

This case is meant for MBA students as a part of the Information Technology & Systems. It can also be used in a core Strategy curriculum.

IMMEDIATE ISSUES

- How should Linda take the big data strategy forward — continue what was already operational or chart her own course at P&G?
- How is the potential of big data to be tapped to create value for P&G? How can the potential risks be mitigated?
- How can the top management be kept invested in the potential of big data at a time when the company’s revenues are shrinking?
BASIC ISSUES

- Big data strategy; Adapting data analytics for innovations and decision making; Big data and its applications in the retail sector; Business strategy to restructure the organization according to the changes in the technology.
- Strategic capabilities; Competitive advantage

TEACHING THE CASE

This case can be used effectively in classroom discussions as well as in distance learning programs. In the classroom mode, the case instructor may initiate the discussion by giving a brief introduction about how the big data initiative had helped in changing the thought processes of P&G’s employees. The instructor can start by asking students if they are familiar with how companies are using big data. The students may then be asked to list the avenues from which P&G was collecting big data, how it was processing the data, and the tools it was using to make real time data available to the decision makers. This can be followed up with a discussion on the different organizational domains where P&G had deployed big data. The moderator can take the discussion further with the help of the following questions:

1. Critically analyze the big data strategy of P&G.
2. How did P&G benefit by employing big data?
3. Going forward, what are the challenges for P&G on the big data front? What should the company do?

SUGGESTED SESSION PLAN

<table>
<thead>
<tr>
<th>Discussion Pastures</th>
<th>Time</th>
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<tbody>
<tr>
<td>Introduction</td>
<td>10 min</td>
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<td>Discussion on Q1</td>
<td>15 min</td>
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<tr>
<td>Discussion on Q2</td>
<td>20 min</td>
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<td>Discussion on Q3</td>
<td>25 min</td>
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<td>Summary</td>
<td>10 min</td>
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<td><strong>Total</strong></td>
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ANALYSIS

1. Critically analyze the big data strategy of P&G.

Over the years, consumer attention had shifted from radio, print, and television to the digital media as it facilitated real-time engagement of consumers. Brands competed for consumer attention through such media and relied on them for data and analytics for customer acquisition and retention and to offer tailor-made products and services to them. However, the real challenge with such a vast amount of data was that it was mostly unstructured and difficult to structure. Moreover, filtering the genuine data was a big challenge for the companies, especially retailers.

P&G wanted to grow into the most technologically superior business in the world. For that, it wanted to be digitally linked to all of its retailers, consumers, and other members of the supply chain; to see the movement of any product as it moved through a manufacturing line anywhere
in the world, and to be able to track those products while in transit. As this scenario required huge amounts of data and refined procedures and models to realize, big data had intruded into every phase and department within P&G.

Big data is frequently depicted as a potential opportunity for business firms and other types of organizations. Firms skilled in the use of big data like P&G are using their analytics capability to create strong competitive advantages. Those firms are making many important decisions in real time and are able to keep pace with the rapidly changing environments of the digital age.

P&G used simulation analytics to design new products. Simulation analytics helps to confirm optimum product performance by taking many different variables into account and creating and changing different models or designs effectively. P&G leveraged big data for new product development also and reaped many benefits. It created products that connected with the consumer, provided increased consumer value, minimized the risks related to a new product’s launch, and coordinated the use of internal R&D resources efficiently. Through data mining, P&G identified consumer needs it might not otherwise have seized. For example, instead of manually creating a new design for a disposable diaper by spending a lot of time, P&G used modeling and simulation to create thousands of duplications in seconds in order to find the best design for a disposable diaper.

By continuously developing products that fulfilled consumer needs, P&G was able to achieve customer brand engagement and increased customer lifetime value. Through modeling and predictive analytics, P&G predicted the performance of the products in the market both pre- and post-launch. It determined the optimal distribution chains, and augmented marketing strategies to get more customers at the lowest cost. By removing the delay of manually collecting and accumulating data, P&G’s big data systems improved output and teamwork, streamlined work processes, and condensed the decision-making cycle time. This gave the company the time to focus on innovating for the consumer (See TN Exhibit I).

TN Exhibit I

P&G Conceptual Framework of Big Data

<table>
<thead>
<tr>
<th>Master Data</th>
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<tbody>
<tr>
<td>Application Sources</td>
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<tr>
<td>Data Factory</td>
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<tr>
<td>Inputs</td>
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<tr>
<td>• Structured Data</td>
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<td>• Semi-structured Data</td>
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<td>• Unstructured Data</td>
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<tr>
<td>Outputs</td>
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<tr>
<td>• Cleansed Data</td>
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<td>• Transformed Data</td>
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<tr>
<td>• Augmented Data</td>
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<tr>
<td>• New Data</td>
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<tr>
<td>• Combinations</td>
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<tr>
<td>• Analytic Models</td>
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<tr>
<td>• New Data Results</td>
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<tr>
<td>• New Metrics</td>
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<tr>
<td>• Experimental Analytics</td>
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<tr>
<td>• Text Analytics</td>
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<tr>
<td>• Some Direct BI</td>
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<tr>
<td>• Long Historical Data sets</td>
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</table>

| Inputs |
| • Cleansed Data |
| • Transformed Data |
| • Augmented Data |
| • New Data |
| • Combinations |
| • Analytic Models |
| • New Data Results |
| • New Metrics |
| • Experimental Analytics |
| • Text Analytics |
| • Main Stream BI |
| Outputs |
| • Specific Analytical Results |

Source: www.practicalanalytics.co
Big data involves the following categories of data to be processed:

- **Unstructured data** includes text, videos, audio, and images.
- **Semi-structured data** includes email, earnings reports, spreadsheets, and software modules.
- **Structured data** includes sensor data, machine data, actuarial models, financial models, risk models, and other mathematical model outputs.

Understanding the relevance of each of these data sets to business needs is a key aspect in succeeding with big data initiatives. GBS at P&G worked with Oracle in the implementation of big data. P&G capitalized on its analytics talent to speed up business decision making. The experts developed the capabilities required for making good and timely decisions in unpredictable and stressful environments. The P&G analytics platform was a part of a wider strategic initiative which aimed to support, provide, and deliver insights to meet the needs of P&G.

P&G had built digital competence to make better and faster decisions, and to improve existing products. It used data and analytics to create insights and custom reports and become a new profit center. In order to implement these strategies, P&G modified its organizations. First, the company needed a competent leader. The former CIO of P&G Passerini executed this role efficiently by promoting data as a strategic asset that could help grow the company and make it more successful.

At P&G, the supply chain function met in the control tower. Within the control tower, a cross-functional team met in a special room called a business sphere to analyze the sales data. For instance, the analytics competencies were used to determine and see the best way to redirect trucks and still meet other delivery commitments to customers. The complex data was presented visually in business processes, allowing decision makers to view the data more easily, process the information faster, and quickly turn insights into actions.

Tools like the Business Sphere and Decision Cockpit helped P&G save time and money by reapplying lessons learned across different categories, regions, and business units, and also put the actionable intelligence in the hands of the decision makers in real time.

**Virtual shopping replications:** Before launching a new product or modifying the product mix, P&G could work out whether vertical or horizontal stacking would be more convenient for customers. By garnering insights about potential users and prior customer suggestions, P&G could spot likely problems and prospects at the initial product design stage, suitably drive product drafting options, and launch products quickly.

With big data applications using virtual technology, designs were created much faster and at lower costs. Before implementing the big data strategy, the packaging design in P&G had been a costly and time-consuming process where physical mockups were made for consumer testing. Design and production of these prototypes took anywhere between six and 12 weeks. And it was tough to proficiently replicate changing consumer inclinations and needs using traditional, physical research methods. With big data applications using virtual technology, designs were created much faster and at less cost with more test-and-redesign cycles and more input from consumers and retailers. Consumers reacted to a virtual mockup of the new packaging. P&G had virtual stores and virtual shelves, which could be built in hours and days instead of weeks and months. Consumer perceptions were integrated more efficiently throughout the process, enabling P&G brands to deliver a delightful product and shopping experience.

A significant portion of any manufacturing company’s capital was locked up in its safety stocks\(^7\) inventory and this had been the case with P&G too. P&G had earlier made huge

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\(^7\) Safety stocks refer to the inventories that companies have to store, beyond that required in the near-term, to avoid running out of stocks in case actual customer demand exceeds the estimates.
investments in demand planning. But now it could curtail supply chain costs. Ecodesk’s know-how in cloud-based sustainable supply chain technology platforms, supplier engagement, and data collection analysis facilitated ease of use for suppliers and customers, speeding up the whole supplier valuation process.

Even in marketing, P&G was moving toward continuous measurement and scenario planning. It was driving faster insights and faster in-market action, reducing cycle times drastically, and making course correction based on real-time consumer and market response to its campaigns and promotions.

At the same time, P&G also faced significant challenges. Many of these were of a continuous nature and related to the nature of big data -- high volume, variety, and velocity -- and how to serve it to decision makers in a timely fashion. There were potent challenges related to privacy, security, intellectual property, and even liability that would have to be addressed.

2. How did P&G benefit by employing big data?

P&G leveraged big data in such a way that by using real time analytics, it was able to create a forward looking view based on a uniform version of the facts globally. This view helped P&G get the right tools and technology for the right people in the right places and the construction of a data driven information centric culture. Instead of debating about the sources of the data or the quality of the data, the decision makers at P&G knew that the data brought into a clear business context was correct and they could take quicker and better decisions in response to the fast changing environment (See TN Exhibit II).

TN Exhibit II

<table>
<thead>
<tr>
<th>Data Experts Leveraging Big Data</th>
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<tbody>
<tr>
<td>Ensure best in class models and algorithms support internal customers</td>
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<tr>
<td>Have solid understanding of statistics and analytics to improve business decisions</td>
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<tr>
<td>Drives the design and execution of the over all data and analytic strategy</td>
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<tr>
<td>Ensure future data requirements and delivery road map are robust and complete</td>
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Source: www.mckinsey.com

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Demand planning is the exercise of optimizing inventory by estimating customers’ requirement of the product.
In order to leverage big data, P&G had focused on hiring data experts like data scientists, analytic consultants, and data strategists who could bridge different functional areas.

P&G was able to create the visualization of customer sentiments, wish lists, and actual customer response data from different touch points to measure customer preferences. The results from such data were incorporated in product design and innovations. And through Business Spheres and Decision Cockpits, P&G was able to make quick decisions in key business areas.

P&G put visual displays of key information on the desktops of decision makers through Decision Cockpit. By establishing a common visual language for data, P&G was able to radically upgrade how the data was used to direct decision making and take action. Through Business Spheres P&G revolutionized the way meetings were held irrespective of the place. All Business Spheres had the same technology and data visualization protocols in place. The meetings were attended by analysts from P&G and the goal was to help everyone in the meeting to quickly understand the situations and make timely and smart decisions.

P&G was able to significantly reduce its R&D costs by employing big data. Through computer modeling and simulation, it was able to launch new products at a faster pace. By leveraging big data, P&G was able to save over US$1 billion in terms of inventory costs. Even the costs associated with packaging had come down due to virtual technology associated with big data. Big data analytics software was used to forecast the best exchange rates, and accordingly shuffle production and component quantity procurement between nations. In this way, P&G extensively leveraged big data in product development and innovations, managing the supply chain, decision making in key areas, human resource practices, and inventory management (See TN Exhibit III).

### TN Exhibit III

<table>
<thead>
<tr>
<th>Key Benefits of Big Data for P&amp;G</th>
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<tbody>
<tr>
<td><strong>Understand customer needs better</strong></td>
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<tr>
<td>- P&amp;G virtual replicas through simulation in product development to deliver better products</td>
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<tr>
<td>- P&amp;G deploying predictive analytics for consumer research and to improve brand performance</td>
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<tr>
<td><strong>Reduce Costs</strong></td>
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<tr>
<td>- P&amp;G was able to save inventory costs of over US$1 billion</td>
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<tr>
<td>- By using virtual technology, designs were created much faster and at a lower cost</td>
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<tr>
<td><strong>Detect Risks</strong></td>
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<tr>
<td>- Big Data enabled P&amp;G to detect risks in real time markets through analysis of data</td>
</tr>
<tr>
<td><strong>Understand customer needs better</strong></td>
</tr>
<tr>
<td>- P&amp;G virtual replicas through simulation in product development to deliver better products</td>
</tr>
<tr>
<td>- P&amp;G deploying predictive analytics for consumer research and to improve brand performance</td>
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Source: www.promptcloud.com
P&G demonstrated that big data capabilities could be a major source of competitive advantage for a firm. It showed how data had swept into every industry and business function and was now an important factor of production, alongside labor and capital. Some of the broad ways in which P&G used big data to create value are:

- To unlock significant value by making information transparent and usable at much higher frequency.
- To create and store more transactional data in digital form. P&G could collect more accurate and detailed performance information on everything from product inventories to reactions to marketing campaigns, and thereby expose variability and boost performance. The company was leveraging big data to make better management decisions, basic low-frequency forecasting to high-frequency nowcasting to adjust its business levers just in time.
- To enable ever-narrower segmentation of customers and therefore much more precisely tailored products or services.
- To use sophisticated analytics to substantially improve decision-making.
- To develop the next generation of products and services.

3. **Going forward, what are the challenges for P&G on the big data front? What should the company do?**

The following are the some of the challenges faced by companies implementing big data.

- Scattered data lying in silos across various teams
- Absence of a clear business case for funding and implementation
- Ineffective coordination of big data and analytics teams across the organization
- Dependency on legacy systems for data processing and management
- Ineffective governance models for big data and analytics
- Lack of sponsorship from top management
- Lack of big data and analytics skills
- Lack of clarity on big data tools and technology
- Cost of specific tools and infrastructure for big data and analytics
- Data security and privacy concerns
- Resistance to change within the organization

Being a pioneer in employing big data and digitization, P&G has already navigated many of these challenges. It has benefited from top management’s sponsorship and its deep pockets have helped it acquire the tools and infrastructure for big data analytics. The company seems to be very clear about the importance of big data in its digitization drive and as part of its overall strategy. However, many of these challenges are of a continuous nature with the digital age witnessing changes at breakneck speed. This means that efficiently capturing the relevant data, curation of the data, secured storage of the data, searching the data, sharing the data for analysis, and transferring the data to relevant place, analysis and presentation of data, will be a continuous challenge.

Analyzing the information to derive added value for the business is the major challenge for P&G. Apart from the volume of information, the time taken to process the information also play a vital role. Another challenge lies in the need for system scalability. Big data systems have to duplicate information to multiple servers and perform automatic backup to survive any breakdown or shut-down.
An organization involved in big data receives more information than all of the information in a major library. The key to approaching information in a big data project is planning ahead. P&G has made sure that even the simplest action are planned in advance and carried out according to the plan due to the large volume of information. Most organizations have not fully integrated their data sources across the organization. This means decision-makers lack a combined view of data, which prevents them from taking accurate and timely decisions.

P&G has added to its existing analytical staff data scientists who have a higher level of technical capabilities, as well as the ability to operate big data technologies. These competencies include natural language processing and text mining skills; video, image, and visual analytics experience. A data scientist typically needs skills in three core areas: 1. business intelligence related skills 2. Statistics and analytical techniques 3. Business skills to interpret analysis results in business terms.

A major indeterminate block for big data implementation is lack of adequate coordination among analytics teams. A significant number of organizations operate with decentralized teams that function without central planning and oversight. The success of implementation of big data and analytics is associated with the team that owns and drives the program. The understanding of the team in terms of both domain knowledge and data knowledge to leverage the outcomes from the big data initiative would impact the success.

Big data involves a steep learning curve for the people in the organization. And it requires organizational changes for implementation where there is resistance to change from the employees. Apart from this, the nature of big data — high volume, variety, and velocity — makes it challenging to ensure data veracity.

A shortage of the analytical and managerial talent necessary to make the most of big data is also a significant challenge for P&G.

Policies related to privacy, security, intellectual property, and even liability will need to be addressed in a big data world.

In addition, Bob McDonald who was credited with the digital drive at P&G has exited, as has Passerini. For the new CIO, Linda, the challenges are many as it is not always easy to succeed a highly successful and long-tenured CIO. While she was very much in the scheme of things working as P&G’s Global Information & Decision Solutions Officer and has inherited a robust infrastructure and stable team, she may still find it difficult to chart her own path. Also, while the shrinking of the company is not a result of its digitization initiatives, it still makes the situation for Linda as the new CIO, a challenging one. In these tougher times, management teams frequently don’t see enough immediate financial impact to justify additional investments. Then, existing organizational processes are unable to accommodate advancements in analytics and automation, often because protocols for decision making require multiple levels of approval. Redesigning jobs is an important issue in leveraging big data, but there may be resistance from existing structures.

On the brighter side, the new CEO, Taylor, also seems to be bullish on big data, and there is an inherent belief in the company that big data is a source of competitive advantage at P&G and will eventually help it in turning around. Nevertheless, Linda has her task cut out for her, and she will have to focus on change management and embed the data-driven culture more deeply into the company. She will have to work closely with Guy Peri, P&G’s Chief Data Officer, to ensure that P&G leverages data in the best and most secure way:

- As data volumes continue to grow, larger volumes of data will be generated particularly because the number of handheld devices and internet connected devices is expected to grow exceptionally. P&G should be future ready to handle the growing data analysis requirements by updating its big data infrastructure as well as talent pool.
- P&G should update its software programs to analyze data. Big data has multiple layers of hidden complexity that are not visible by a simple inspection it from an end-user perspective. The complexities are present in the data itself because of its structure and formats, content, and metadata. Without understanding the complexity, modeling a solution for the data set whether statistical, mathematical, or text mining can create erroneous results. P&G should make sure that these hidden complications of data format and language are key areas to understand when processing textual, semi structured, and semantic layer are dependent big data.

- More tools for data analysis without the intervention of analysts will emerge and P&G should grab them as soon as they released.

- Big data will face huge challenges around privacy, especially with the new privacy regulation by the European Union. According to experts, by 2018, 50% of business ethics violations will be related to data. P&G should set up a strong network to avoid privacy breaches and hacking of data.

- As the growing volume of data sources and their complexity of information make manual analysis uneconomic and infeasible, autonomous agents and things like robots, autonomous vehicles, virtual personal assistants, and smart advisers will emerge and P&G should draw up an action plan to leverage this scenario in future.

- Recruiting key talent is an important priority. Organizations need to not only put the right talent and technology in place but also to structure workflows and incentives to optimize the use of big data. P&G’s organizational structures as well as the governance structures will also need to evolve with time.

- Maintaining data privacy is a big task for P&G in the implementation of big data. For this, it should opt for technologies like ‘InfoSphere Data Privacy for Hadoop’ and make the data privacy and security a priority.

- According to some experts, “Fast data” and “actionable data” will replace big data in future. P&G should be future ready to deploy these new technologies.
Suggested Readings:


References:

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