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What Are the Beneficial Effects of Big Data on the Front-End Information and Efficiency, Performance of the Company in the CPG Industry?

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Abstract: This research paper is to find out the benefits of data analysis on the front-end information and internal efficiency of the consumer-packaged goods (CPG) industry. Combining various scholarly types of sources, our research first figures out the steps before analyzing the data, then discusses the advantages of extensive data analysis on both external and internal performance of a CPG company, and finally points out some potential limitations to extensive data analysis on economic grounds.

Keywords: consumer packaged goods, data analysis, financial performance

1. Introduction

Consumer packaged goods (CPG) are products that consumers consume quickly and need to buy repeatedly. CPG is a product that meets the most basic needs of people's lives, and it has the characteristics of high-frequency, daily repeated use, and frequent consumption by consumers. The CPG industry generally obtains profit and value by scaling up the market.

With the fierce competition in the industry market and the acceleration of people's consumption upgrades, some traditional brands face a transformation crisis. Therefore, changing the brand's tone and products to adapt to current consumer needs and providing more personalized services according to consumer preferences and habits have become the focus of every CPG company's research.

In such an industry environment, extensive data analysis is becoming more critical in the CPG industry. The competition in the CPG industry has shifted from the competition of brands, channels, and products to the competition of companies' data usage capabilities. Analysts from McKinsey said that companies in the CPG industry “either fully tap into the power of digital and analytics or get left behind" [1]. In other words, they believed that companies with high data analytics maturity in the CPG industry are creating tremendous value. The following part of the paper discusses how data analytics has led to more benefits and value for CPG companies.

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2. Before the Big Data Analytics

2.1. Collecting Data

The CPG industry should now exclusively depend on data analytics to find trends and opportunities in consumer behaviour due to Covid-19. During these unstable times, the pandemic caused people to shift their consumer activity from offline to online, which benefits companies by gathering more data to be analyzed. The most fundamental method of data acquisition for businesses is through the Internet. Of course, the authenticity of Internet data is an issue, but from a large-scale perspective, Internet data is crucial for predicting industry trends. As a result, many CPG companies focus more on gathering and analyzing Internet data, and some analysis reports will also rely on the analysis findings of Internet information.

At the same time, third-party companies also have more occurrences that process data, which allows CPG companies to cooperate with them. This is an essential means to obtain high-value-added information and a more effective means. For example, CPG companies want to carry out significant data transformation, but their technical capacity does not allow them to do so. Additionally, they hope to lower the price of significant data transformation. Hence, cooperating with third-party data providers is a good choice.

3. Effects of Big Data on Companies' Overall Performance

3.1. Ways to Effectively Store and Analyze the Data

Some CPG companies have settled on their framework to process the collected data better. Under the framework, employees will become more disciplined in analyzing and processing data. Take Nestle as an example: it created a framework called FAIR, which is "Findable", "Accessible", "Interoperable", and "Reusable". Nestle's FAIR framework guarantees that the appropriate individuals can access the appropriate data and utilize these insights to make more intelligent, strategic choices [2]. According to Nestle's official summary for the 2021 annual result, the FAIR framework has helped accelerate Nestle's digital transformation and fueled Nestle's real internal growth of 5.5% in 2021 [3]. This helps illustrate how to improve a company's financial performance by creating a framework for analyzing data.

CPG companies could also conduct consumer profiling based on big data. With user portraits, consumer behaviour, and preference data combined with personalized recommendation algorithms, CPG companies could recommend different goods or products according to users' various interests and needs, which achieves truly "customizing" and maximizing the efficiency and effectiveness of promotional resources. First, companies need to collect consumers' primary data in the background, such as consumers' gender, region, age, and general consumption preferences. It is also necessary to collect consumers' behavioural and transactional data, such as what, where, when, and how often the goods were purchased.

After the companies have all the information about consumers, they may understand the intrinsic needs of consumers, which could better create benefits for the companies.

7-Eleven, the first chain store to start providing convenience services in the CPG industry, caters to customer preferences after analysing customer data. 7-Eleven creates labels to describe and categorize its customers. Following two primary and behavioural data criteria, consumers are organized by different labels [4].

Promotions on products could then be tailored to individual clients and circumstances. By this, customers are attracted by the goods from 7-Eleven since the promotions are exactly what they acquire. In 2020, 7-Eleven's system-wide sales were 3.1 per cent higher than in 2019, reaching $91.8 billion. As a result, sales increased by $2.8 billion [5]. Therefore, extensive data analysis not only

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helps improve the accuracy and efficiency of satisfying consumers' needs but also enhances the financial performance of the whole company.

3.2. External Performance

External performance directly reflects the performance relating to the market share, the critical project, profit, etc. Therefore, we need to study genuine cases from the CPG industry to understand how a company enhances its external performance by adopting big data analytics (BDA) and its technologies.

The first topic is about opportunity and dilemma. The reason to talk about these two words is that opportunities always come with a dilemma. The difficulty is inevitable when companies start working with BDA. Even the top-tier companies faced many problems initially, and it took a long process to adopt BDA as a crucial part of the company. However, for the majority, developing and utilising BDA by using limited resources becomes more meaningful. So, here is the case from the article "Searching for big data: How incumbents explore a possible adoption of big data technologies" by Caesarius & Hohenthal [6]. The incumbent in the study has a long history in the Scandinavian CPG industry. The marketing and sales department had found significant opportunities with BDA for the first time. Meanwhile, the incumbent struggled for years due to the continuous decrease in market share. Therefore, the incumbent was eager to seek more profitable segments to overcome the dilemma.

The initial cost and difficulty would be, in most cases, the most significant barrier for the company. It would require major investment to modernize the firm's neglected IT infrastructure [6]. Thus, they could not become modernized overnight. The incumbent realized they did not need to prioritize BDA; attracting and keeping customers was the most critical task. The incumbent decided to find a pilot case with a fast return on investment to bring BDA into the company's structure. After that, their first step was introducing BDA into the POS (Point of Sales) data from all the stores and keeping them within a new database. As a result, they could easily match up the most likely appealing products with the appropriate customers.

According to the study, the sales improvement by using BDA had been confirmed by the incumbent. The one practical experience that can be learned from their adoption process is to develop BDA-adjacent technology first rather than directly utilize BAD itself. Thus, based on the incumbent, their following project is to invest more profound in the BDA technologies and therefore enhance the analytic abilities step by step. To sum up, it is easy to generalize the situation that could happen in most CPG companies when adopting BDA for the first time.

Especially for those companies that may have troubles in their profits, market share, or products, the knowledge behind the incumbent is quite helpful. Moreover, this incumbent had poor behaviour in even both technical reserve and user competence. However, the incumbent's willingness is solid since they believe in the capabilities of BDA in seeking opportunities and turning over the dilemma. Therefore, even though the perspectives about BDA's role may differ in different companies to satisfy their unique demands, the improvements brought by BDA on the company's performance are incontestable.

3.3. Internal Performance

Even if the company had fantastic external performance, the archaic business process would ruin the entire company. Therefore, the first indicator to evaluate Internal Performance is efficiency. It is even more critical to the CPG industry since the fast-moving sector always requires the company to be more sensitive to the market. To investigate how BDA assists in the CPG industry's process management, we first need to talk about Business Process Management (BPM), which is designed to

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evaluate and control operational functions [7]. Applying BPM ensures the repeatability of successful operations and processes in the company. Also, a good BPM helps the company reduce costs and avoid previous errors, ultimately boosting the operational process's efficiency.

Mohammed quoted the report from McKinsey in his article. He stated, "In 2012, the McKinsey report suggested that a BPM system is generally fixated on support by modelling and automating business processes. By introducing BI, process execution is achieved in a timely and cost-efficient manner" [8]. The conclusion made by McKinsey is apparent. Business Intelligence plays a significant role in the operational process of the company. Again, CPG companies rely more on the BI because they usually need to make many complicated decisions.

As a result, an ideal BI system should be fed with more data from the market. After that, this system can reflect the results and optimize the entire process. It is a so-called BDA-capable Business Process Management System (BPMS) [9, 10]. With the promotion of this system, the company's leaders can make decisions more efficiently and find better solutions. By using BDA and other related technologies, CPG companies can better understand the patterns of customers' behaviours and better plan strategies for the future market. As we mentioned in the previous part, the size of data in the market has become larger and more prominent because of digitization and COVID-19. Hence, it is necessary to adopt BDA and apply it to the BPMS to enhance the efficiency of the business process, which in turn benefits Internal Performance.

Furthermore, to be more practical about BDA's beneficial effects on the Internal Performance of CPG companies, we can find many meaningful and accurate instances from Unilever Kenya and L'Oreal East Africa in Kenya, where the CPG industry has dramatically grown in the last several years. Besides, both Unilever and L'Oreal are well-known and top-tier CPG manufacturers worldwide. Thus, they can utilize plenty of resources to develop Industry 4.0 technologies, and BDA is one of the most fundamental parts of Industry 4.0.

Based on the results of the research article from Anitah, Nyamwange, Magutu, Chirchir, and Mose, we have six aspects of effects on the operational performance of the two companies in Kenya [11]. The six aspects are Product Quality, Delivery Lead-Time, Volume Flexibility, Production Lead Time, and Productivity Levels. The BDA is such a powerful tool and has a decisive function, especially for Product Quality and Volume Flexibility.

For Product Quality, 90% of the respondents agreed that technologies help improve product quality. During the manufacturing process, collecting Big Data and the analyzed information from BDA becomes the basis of the decision-making. The benefits of BDA are way more than that. One of the respondents illustrated that real-time data benefits the supply chain's responsiveness, which means they can suddenly change it to satisfy the new customer demands. In both companies, BDA helps them effectively forecast product demand. Much time can be saved for adjusting the production, which ensures high flexibility. The conclusion is clear and convincing that BDA technologies under industry 4.0 promote the operational process efficiency in both Unilever and L'Oreal.

To summarise, we have reviewed several case studies and ideas from previous parts. There is considerable evidence supporting the beneficial effects of BDA on CPG companies' overall performance from both external and internal angles that are significant and profound. Moreover, their instances and feedback are believed to be general enough to conclude that overall salutary gains of BDA are vital to the development of the CPG industry.

4. Limitation

There are two points that we believe can become limitations for some companies. First, the cost is very high for small CPG companies, and it is challenging to count data and link it to decision-making.

Firstly, big data is expensive. An example to explain this: Amazon has studied the costs related to the establishment and maintenance of data warehouses and found that the annual cost may be between

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$19,000 and $25,000 per year. Managing big data platforms is high for ordinary enterprises, but there are several ways to reduce the cost significantly. The most important is to use open source and hosted big data platforms. With the help of correct technology, data analysis can play its functions. As a result, small businesses can reduce operating costs, improve their business models, increase revenue, and stand out from the competition.

Secondly, there are some key challenges that the company will face when they try to use that data to make decisions. We briefly choose three points: Process large amounts of data in a shorter time; Visual representation of data; Applications should be scalable. For processing data, batch processing allows companies to process large amounts of data quickly. Because many records can be processed at once, batch processing speeds up processing time and provides data so companies can take timely action. Business intelligence has become faster than ever because it can handle multiple jobs simultaneously. Data visualization refers to a graphical representation of information and data. Using visual elements such as charts, graphs, and maps, data visualization tools provide an accessible way to view and understand trends, outliers, and patterns in data. In the big data world, the applications of data visualization tools and technologies are crucial for analyzing a large amount of information and making decisions. Application scalability refers to an application's ability to handle more and more users and loads without affecting performance and interrupting the user experience. In other words, scalability reflects the ability of software to grow or change with user needs.

5. Conclusion

The application of data can bring significant breakthroughs to CPG companies. Providing better services, the integration of research suggests that the method of data collecting has evolved because of big data analytics. Also, as the front end of extensive data analysis, it is for sure that developing more in data collecting and storing can benefit the CPG industry. By studying a practical case and conclusions from incumbents in Scandinavia, the research also suggests that outdated IT infrastructures will affect the adoption of BDA to some degree. However, complete evaluations and actual demands for BDA's benefits are more influential to the company's external performance. The research of BDA-capable BPMS sufficiently illustrates the fundamental ideas behind improving internal efficiency. Well-known international companies usually have strong resource support and powerful technical reserves. Thus, they could quickly adapt to the BDA technologies and take advantage of them. The industry 4.0 development of Unilever and L'Oreal in Kenya is the most persuasive.

Finally, the company's future is to make better use of data to make the company gain profits. In addition to the three limitations outlined above, there are other challenges, such as planning a company's strategy, that the company must overcome. Because companies need to find targets for improvement and analyze the data to determine whether they want to continue with the new strategy. To make the company have better development, making the right decision is a critical link. Companies that put data at the heart of decision-making can also reduce costs and increase profits.

Moreover, to accurately reflect the whole status quo of the objective situation, process and analyze crucial statistical data and some data that makes a scientific judgment and write a data analysis report. The data analysis department has much statistical data and materials, which can comprehensively and correctly grasp and understand the situation and development changes of society and the company's economic operation so that it can more effectively discover future risks and better develop and plan the company's future market strategy. Companies that rely on data analytics can make significant breakthroughs. The company can formulate the notarized business strategy; rely on technological progress, scientific management, and other means to form their competitive advantages to have a more favourable competitive position in the future market; use data analysis to meet user needs, and establish a good reputation and corporate image.

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In general, the function of data analysis is to show the current situation, clarify the gap with the goal, and then use it as a guide for subsequent improvement programs and action plans. The significant data analysis function can collect, sort out and statistically analyze the big data of enterprises, which has high application value.

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