

Case Analysis #6 –Decision Intelligence

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According to the Hype Cycle for Analytics and Business Intelligence in 2020, Decision Intelligence(DI) is listed as one of the current trends with a market penetration of “5% to 20% of the target audience” (Kronz et al., 2020). As a newly emerging academic discipline concerned with the intricate network of problems between decisions and outcomes, DI is still an open abstract concept. The head of the Decision Intelligence division at Google, a recognized leader within the field, defines DI as “a new discipline that brings together the best of applied data science, social science, and managerial science to use data to improve the lives of business and lead AI projects.” (Kozyrkov, 2020). The definition given is rather vague, and it does not differentiate the nuances between DI and other information fields such as predictive and prescriptive analytics. We prefer the explanation given by a VP analyst at Gartner:

A framework that brings multiple traditional and advanced techniques together to design, model, align, execute, monitor, and tune decision models and processes.
(Brethenoux & Sicular, 2018)

At its very core, Decision Intelligence is powered by big data and artificial intelligence. In layman’s terms, big data is a large volume of data pulled from different sources. Such datasets are often complex by default simply because of the sheer volume. Furthermore, both structured and unstructured data are often used to complicate the analysis process further. Thus, humans can’t analyze the data using traditional data-processing methods without the help of artificial intelligence. At the core of artificial intelligence is deep learning, which is a subset of machine learning. In other words, machine learning enables data professionals to extract useful information from big data. Such valuable information can then be used to support the decision-making process in a Decision Intelligence system.

As illustrated above, Decision Intelligence can not be separated from traditional machine learning, predictive/prescriptive analytics, and standard Business Intelligence dashboards. However, none of the aforementioned terms alone wholly cover all aspects of a Decision Intelligence software. One can think of a Decision Intelligence solution as a decision-centered technology that *effectively integrates* all of the related fields - including applied mathematics/statistical modeling, applied data science, and descriptive, predictive, and prescriptive analytics – for finding multiple relationships between decisions and outcomes. By finding such stochastic solutions, business executives and managers have the ability to make not

just data-driven but accurate and precise decisions knowing the results before an event even happens.

It is a lot easier than done, and we are still at the beginning of the journey. Implementing a data warehouse is challenging because we have to extract, transform and load data from different sources. Now imagine we want not just to simply combine but integrate all of the different technologies from different fields into one solution that enables a comprehensive result that takes all of the sub-results from different tools. Such an algorithm is not black magic or supernatural of any kind. It is based on the principle of causation. It exploits the interrelationships and interdependency between cause and effect. While it is debatable among the science community if we can ever precisely predict the future such that an observer can control and monitor all of the variables – both known and unknown. However, theoretically and practically, we can enable Decision Intelligence with a probabilistic and stochastic approach. In plain English, for example, you have a higher chance of making more money if you choose to attend graduate school to educate yourself. However, attending graduate school does not necessarily guarantee you to make more money. The higher the probability, the stronger the relationship between an action/decision and an outcome. To make more money, you don't necessarily need to go to graduate schools. The simple example illustrates that the relationship between a decision and an outcome is rather complicated and multi-linked. A decision can have many consequences, and a result can be associated with many choices. To further complicate the issue, a decision can have an impact on the outcome. In return, the outcome can positively or negatively impact the next decision you make. The chained ripple effect needs to be taken into consideration when doing the analysis. Such a relationship is a lot more complicated in the business world and not as apparent as the example above.

By finding multiple links between an action and an outcome, we believe Decision Intelligence will enable the next information renaissance. The ultimate goal of Decision Intelligence is to find the mysterious unknown between the present and the future based on big data analysis. The application can be used not just in business but in personal relationships, agriculture, politics, military, and practically any field one can think of. It is not a surprise that many regard Decision Intelligence as the next form of artificial intelligence or ML++.

Understanding Decision and its Relevance to Decision Intelligence

The author Lorien Pratt explains Decision Intelligence by first discussing what a decision is. She claims that a decision is a thought process by which people think through the downstream consequences of their actions on the future. In this process, it is critical to understand the cause-and-effect pattern, which is how each action may lead to a different outcome so that people can make decisions that can lead to desirable outcomes and avoid unintended ones.

In order to better understand a cause-and-effect pattern, Pratt suggests drawing a diagram of a decision that presents the stream of consequences of an action. With the diagram that explicitly

illustrates the thought process, people can potentially see the positive and negative outcomes of the decision. In addition, Pratt claims that a group of people with diverse backgrounds tend to make better decisions than an individual does. It is because when there are more people brainstorming all the actions and the associated outcome, the thought process can be more comprehensive, and more possibilities can be considered.

With all the fundamentals of decisions in mind, it is clear to understand the significance of Decision Intelligence. As we discussed, a huge number of cause-and-effect patterns can be involved in the process of a decision. Therefore, DI can help people analyze all those patterns more efficiently to avoid unintended consequences and find better outcomes. In addition, DI can help people go beyond human-like ways of thinking to better understand the interdependencies of events. Therefore, for modern organizations that operate and compete in complex environments, DI is a strong tool for them to make better decisions and be competitive.

In this article, Pratt claims that Decision Intelligence is the new technology and scientific discipline that takes AI to the next level. This indicates DI will be closely assisting AI in terms of understanding the decision-making process such as the chain of events and avoiding unintended consequences. In fact, as compared to AI, which was mainly developed from academic and scientific research, DI was first developed and applied in commercial settings. Recently, large companies such as Google, Alibaba, and Xylem Inc. have been actively experimenting with DI to reach strategic goals and many of them have made considerable achievements. This is a solid indication that DI will be broadly used by many organizations and companies in the future to help with the decision-making process and build strategic competencies.

Will Decision Intelligence apply to Smithfield?

Yes.

How will Decision Intelligence benefit Smithfield?

Decision intelligence connects technology and decision making and is the breakthrough tech of the decade.

Simply put, DI is the science and technology of understanding how actions lead to outcomes. For this reason, DI could have just as easily been called “action intelligence”. With roots in many fields, including Cybernetics, Systems Dynamics, Complex Systems, Behavioural Economics, Strategic Foresight, and more, DI was recognised recently by Gartner and Forbes. (Pratt, 2021)

Like Xylem, which uses decision intelligence to achieve a 23% decrease in water consumption, Smithfield can also apply decision intelligence to their farming operations by maximizing sales profits and minimizing operating costs.

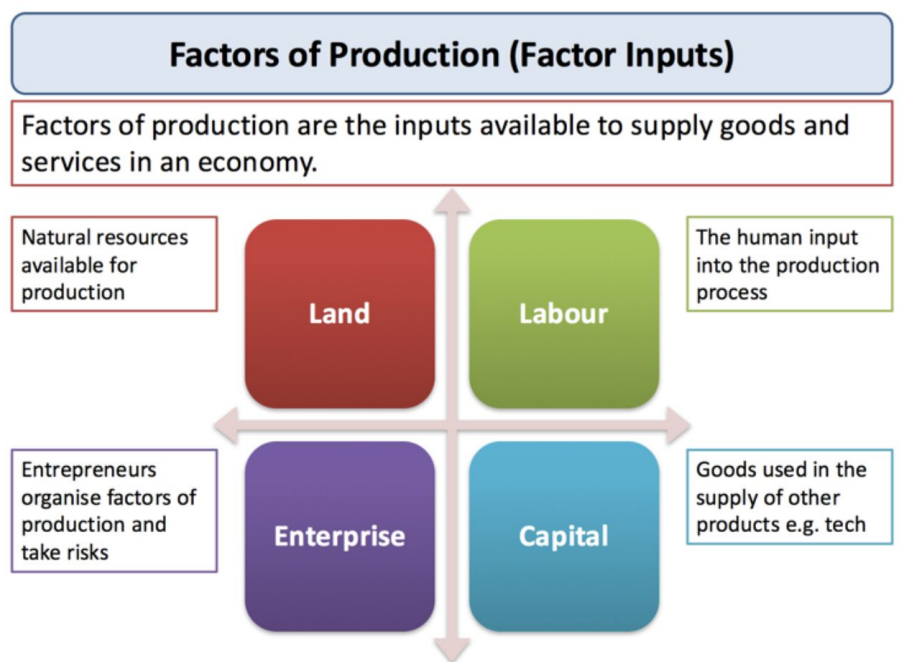
Apply Decision Intelligence for Smithfield

1. Understand the decision

Having a productive farm is the main goal of every farmer, regardless of the size of the farm. For a family own farm like Smithfield, the very first goal is to increase the farming productivity. By achieving this, Smithfield is able to earn more profits to provide better pay for its employees (obtain the best human capital), invest in research and development to gain more competitive advantage in farming and breeding, and etc.

2. Identify the factors that affect the decisions

However, to achieve that higher productivity, Smithfield faces a lot of factors that limit its productivity, including but not limited to, land, weather conditions, labour, capital, crops, market access, lack of new technology and etc. For instance, when we talk about land, we refer to the natural physical resources of the land. For Smithfield, short of land will lead to limitation on the number of livestock they can rear. Bad land such as, hazard soil conditions and barren land will have great negative impact on the land productivities. And these factors sometimes can't be easily detected by humans, we rely on new technologies to identify these limitations and provide feasible solutions. On the other hand, we know that if we have experienced labour that takes good care of the farm and high technology that can monitor and manage livestock, we know this will lead to higher productivity. And for positive factors like these, Smithfield needs to hold tight to it and improve even better. Thus, it is really important for Smithfield to find out the factors/cost drivers that help us to lead to the optimal decision, which is a higher productivity for Smithfield.



tutor2u

Factors of production are the inputs available to supply goods and services in an economy.

("tutor2u," 2016)

By applying decision intelligence, Smithfield can use cutting edge technology such as machine learning and optimization methods to build a smart decision making system. (Zhang, n.d.) And this smart decision making system relies little on human monitoring and effectively can find the cause - effect links between all the factors, livestock management, market trends, employee status and etc, that affect the final outcome, to help Smithfield improve operational efficiency and reduce operating costs.

3. Conclusion



(“How Decision Intelligence Could Change The World,” 2020)

As Pratt mentioned, the best part of decision intelligence is it connects so well to how humans think naturally to the cognitive tools that we use. Decision intelligence provides a tool to Smithfield to leverage machine learning and statistics in automated decision making. For example, if Smithfield finds out the cause - effect link between level of automation and productivity, it can apply more new technologies to improve the high productivity of the farm to maximize revenue. It can help Smithfield solve problems in farming operations and deliver solver capabilities. Ideally speaking, with the optimal model, the decision intelligence system helps us go beyond the current thinking to better understand the relationship between the factors such as land, weather, capitals that are essential, deliver the right information and return Smithfield with the optimized results which is a higher farming productivity.

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