

Case Study #5 – Text and Web Analytics in your Company/Org

Husky Trio: Billy, Vicky, Shouyang

What is text analytics?

Information retrieval + Information Extraction + Data mining + Web mining

For Smithfield, text analytics is the process of extracting meaningful information using natural language processing from text, structure or unstructured data, and written communications to understand farm trends and customer preferences. Especially things like customer opinions on livestock products and farm experiences. As we learned that *85 - 90 percent of all corporate data is in some kind of unstructured form, and unstructured corporate data is doubling in size every 18 months.*(per lecture)



Text Analytics Regarding Strategic Opportunities

- **Unlock hidden information & Develop new strategy**

There is lots of information on the internet about farms and livestock that we can use to improve and unlock hidden business information. When customers are looking for the best farm to visit or purchase products, various information pop up. How can they notice Smithfield then? How can Smithfield gain competitive advantage? However, by applying text mining strategy, Smithfield can uncover the secret of popular farms by extracting all the potential relevant information that is associated with farms searching, such as livestock, crops, land, cows, etc and run a detailed analysis to find out what customers like. For example, Smithfield can use *lexical analysis (aided by domain-specific dictionaries), into a form that allows a computer to extract structured data (information) from the original unstructured text.* (McDonald, 2012) Then whatever keyword information that Smithfield identifies can be potentially used to improve their business operation model. For instance, by using text analytics, Smithfield finds that customers are interested in farms that sell organic cattle meat. However, Smithfield sells lambs as the major product, then we know that there is an insufficient in product variety that needs to be fixed.



(“Cattle word cloud,” n.d.)

More importantly, Smithfield can use text analytics to develop new knowledge about farming and rearing. Instead of reading through books about farming techniques and rearing tricks, text analytics helps Smithfield extract all the relevant information and provide access to various collections of abstracts through a peer-reviewed or indexing service. This sophisticated information retrieval technique can help Smithfield staff save reading time and learn more comprehensively and efficiently. Text analytics helps Smithfield better understand the market trends, customer preferences and develop new knowledge, so Smithfield can always adjust their marketing strategy and product variety to be competitive in the marketplace.

Text Analytics Regarding Operational Problems

- **Improve management efficiency**

The best part of text mining is that it can analyze existing data more efficiently. The most important operational problem that Smithfield needs to improve is livestock management efficiency, especially in feeding & health management. Per research, *high producing dairy cows will eat 110 to 120 pounds of wet feed a day or 50 to 55 pounds of dry matter (DM) a day.* (“How many pounds of feed does a cow eat in a day? – DAIRExNET,” 2019) On average, farms normally have 500 - 1000 cows, though we don’t have an accurate number for Smithfield, we assume it falls under the range. Therefore, the Smithfield staff spends hours every day to feed all the livestock and record their feeding memos. However, when things come up, such as emergency health issues for the livestock, these records are long, wordy and hard to relocate the right information. Then text analytics is here to solve the problem. Text analytics is able to extract information automatically which reduces the time it takes to ensure that staff is looking at the right file. For instance, given the large number of daily records that have been here since 1824, it may take days or months for staff to find the right documents and analyze them to solve the issue. In contrast, using text analytics, Smithfield can identify the information needed and extract other information that is relevant to the issue to provide extra help. More importantly, this

feature can be applied to extract any information/data that Smithfield has, including but not limited to, financial information, human resources information, legal documents, sales records, and etc. Having the ability to extract useful information accurately and quickly ensures that Smithfield can always respond quickly to emergencies and solve it promptly, have less chance of making mistakes and eventually, improve the farm overall management efficiency.

Text Analytics Bold Predictions

- **Animal Diseases Detection**

A recent case study by Elder Research (2021) suggested a possibility of animal disease detection through text analytics. In the case study, both the natural language processing (NLP) algorithm and web crawler technology were used to discover patterns within the text and among different documents. As a result, researchers were able to sift through huge databases and incoming information streams, validate incidents of animal disease and make recommendations for dealing with them at the earliest stage possible (Elder Research, 2021).

For Smithfield, similar methods and insights can be applied to monitor its livestock's health condition and prevent infectious diseases from spreading. By engaging in text mining within the farm, it can find out insightful patterns from different resources such as daily logs, machine reports, and data from smart devices. In addition, Smithfield can also constantly get text analytics from outside sources that may share concerns about animal diseases. Therefore, the effective use of text analytics can be another significant tool for Smithfield to ensure product quality and be profitable. We predict that NLP algorithms will be widely used in the farming industry in the next 50 years. It will be more efficient for animal disease detection as the technology matures.

Web Analytics Regarding Strategic Opportunities

- **Advertise Effectively by Understanding the Web Traffic**

As the Internet becoming a more commonly used platform for businesses, online advertising is now significant in many industries including livestock farming. For Smithfield, it is important to effectively advertise through a solid understanding of its web traffic. For example, while making the information of the organic meat product appear on a recipe website may attract a lot of customers, it is not a good idea to spam it on a political newsletter. Therefore, Smithfield must figure out the right place to advertise and the proper audience to target.

The recipe website example can be categorized as a referral website that contains links that send visitors directly to Smithfield's pages, and a deeper analysis can help determine which referrals

produce the greatest volume, the most new visitors, and so on (Sharda et al., 2018). Such referral websites are good opportunities for Smithfield to cooperate with since they typically provide great chances of getting new visitors while requiring minimal costs of advertising. In addition, those places are excellent to propagate the free-range and grass-fed organic meat products and make the brand distinct and recognizable.

Another fundamental aspect of the understanding of web traffic is identifying keywords from search engines. According to Sharda et al. (2018), for some businesses, it may need hundreds or thousands of keywords to draw potential customers and depending on how the individual phrases the search query there can be multiple variations. Therefore, it is essential for Smithfield to identify patterns from search engines so that it can effectively advertise by making its products appear at the appropriate place.

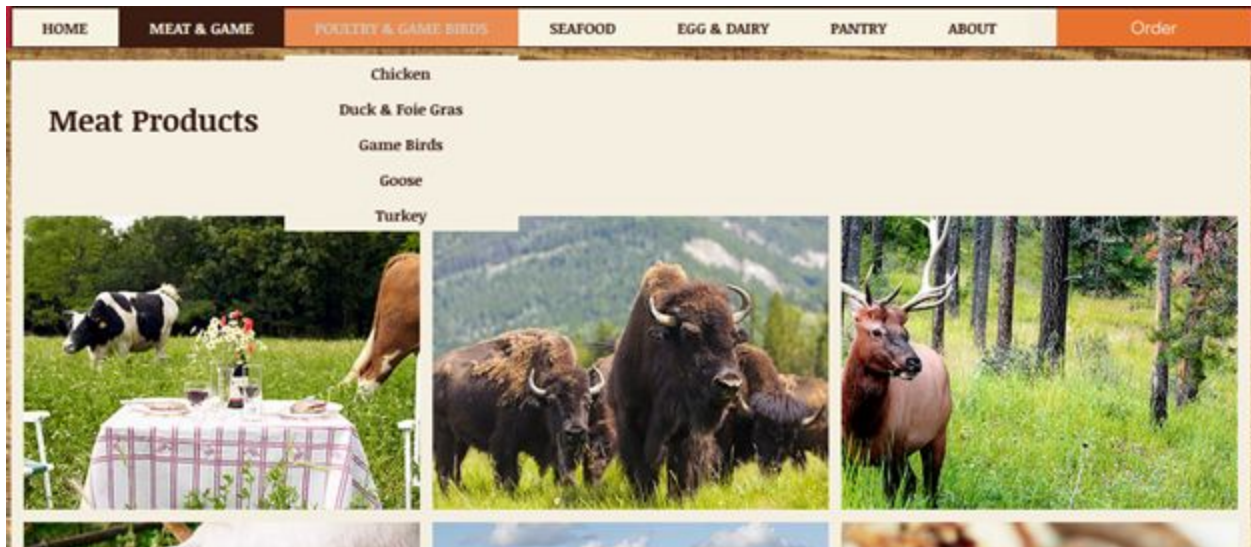
- **Optimize Web Page Design to Attract More Customer**

Smithfield can potentially attract more customers by making its web page more interactive and attractive. Currently, while having all the information about the farm, products, stores, etc. listed in detail, everything is parallelly listed without any focus or interaction. By analyzing the website usability, Smithfield can get to know visitor's time spent on each page in order to understand visitor's interests as well as identify potential improvements to each page. A click map serves a similar function by showing the percentage of clicks each item on the web page received so that Smithfield can recognize popular products and services. In addition, by analyzing the click path, which is the path that a visitor goes through the web site, many insights such as the purpose of visiting can be identified. With these analytics, Smithfield can then optimize the web page design in ways such as highlighting popular pages, decreasing the amount of text, and making critical information easily viewable. By doing so, Smithfield can make the best use of its online platform and possibly attract more customers.

Web Analytics Regarding Operational Problems

Farming business is all about relationships. In other words, to attract and retain loyal customers, it is integral for farmers to cultivate and maintain a positive relationship by understanding consumer needs. One of the most significant problems that modern family farms face is a lack of information, potentially leading to performance issues. Lacking information is a generic problem that can be broken down into numerous subcategories, such as not knowing which items you sell are popular among consumers, customer demographics, and website usability. Web analytics can attack the problem from various angles by scrutinizing consumer behaviors online.

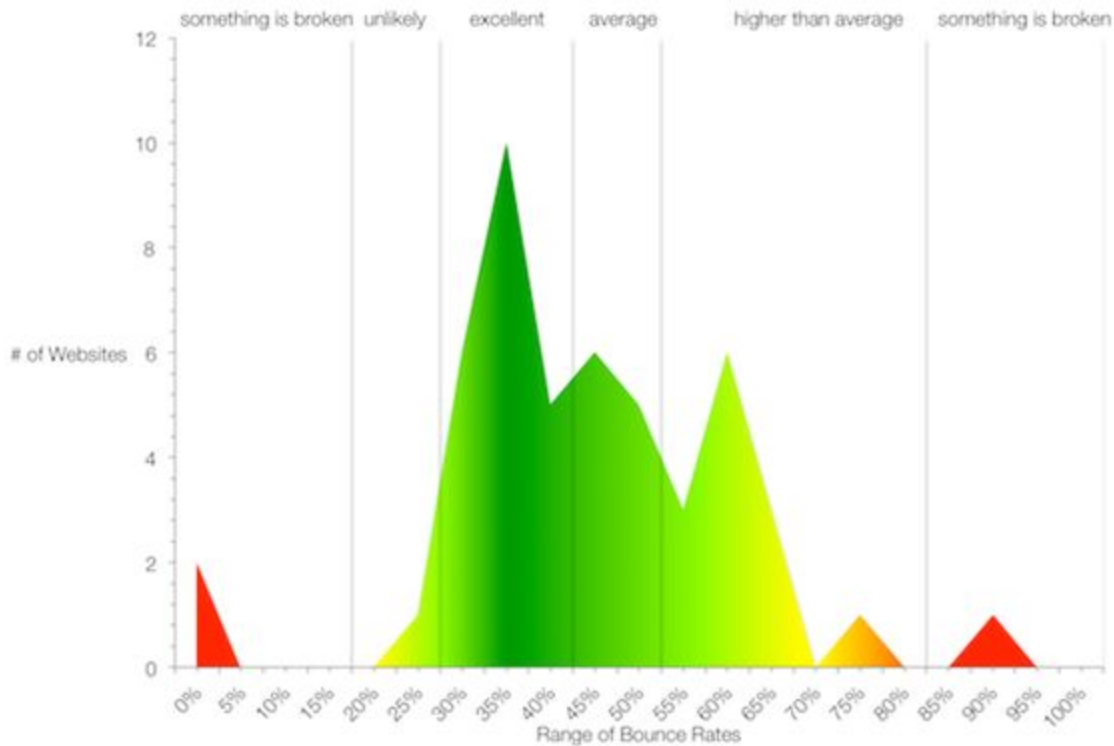
The following picture illustrates the basic design of a meat farm website where consumers can order various organic products online.



The navigation bar provides users with the convenience to quickly visit any product within site. For instance, by clicking on “Chicken”, it leads to a page showing the chicken’s price and other relevant information. However, one problem with traditional web engineering is that it doesn’t provide the owner any information about customer behaviors. Without an efficient web analytics system in place, the only process the owner can track is the final order customer placed.

While tracking final sales is essential, it doesn’t tell the farmer anything about Shopping Cart Abandonment Rate – *the percentage of online shoppers who add items to a virtual shopping cart but then abandon it before completing the purchase.* (Geckoboard, 2021) Shopping Cart Abandonment Rate is critical information when it comes to analyzing consumer behaviors. A high rate indicates many potential problems. A consumer may add an item and then abandon it for many reasons. It could be too pricey, or it could stem from the poor usability of your website. For instance, the information displayed on the checkout page may be different from what is expected by the consumers. The goal of the website is to simplify business transactions. A usability issue would no doubt affect your site’s ability to close sales.

A second closely-related crucial area web analytics focuses on is the bounce rate – *the percentage of visitors that leave a webpage without taking action, such as clicking on a link, filling out a form, or making a purchase.* (Backlinko, 2019) Studies show that a bounce rate of around 30% is excellent based on the following plot.



(Rounce Rates Range, Peyton, 2017)

A high bounce rate indicates many potential problems, such as poor usability, UX/UI, or lousy content. For instance, a customer might try to access your website from a smartphone. If your website is designed for laptops only, it might cause a layout issue that stops the customers from accessing the content. On top of that, by tracking how much time a customer spends on a specific page, the owner can better understand customer needs for marketing purposes.

As we can observe here, farmers can leverage web analytics to gain valuable insights into web usability by collecting user data and analyzing user behaviors online.

Web Analytics Bold Predictions

Farmers will see a boost in the number of customers in the short run if they could leverage web analytics effectively. The growth will be more significant in the long run. In other words, more visitors will convert into returning customers.

The global pandemic forces small business owners to suspend many of their in-person operations. The ban and restrictions on travel would no doubt affect the farming business as well. As a result, many small businesses are moving online by providing their customers an opportunity to order products via their websites. Studies show that in the age of the pandemic, *websites are becoming increasingly valuable business tools, especially for business development. In other words, the coronavirus has just turned your website into your rainmaker.* (Frederiksen, 2020)

While your website's overall appearance is crucial to attracting more customers, usability is just as critical. Web analytics is a powerful tool to be leveraged to increase web usability. The issue with many web owners is that they don't know how to test their website usability. Most farmers are not programmers or web designers, resulting in a poorly designed website. Tracking and analyzing metrics such as the bounce rate, the time people spend on a page, and the shopping cart abandonment rate enable web owners to leverage a quantitative approach to website usability. Instead of blindly changing designs and spending thousands of dollars on marketing the false or irrelevant area, farms can strategically improve web usability by gauging the metrics mentioned above. A significant drop in the bounce rate and the cart abandonment rate indicates a higher conversion rate to turn visitors into customers.

By improving usability via web analytics, it is very likely the SEO (Search Engine Optimization) rating will increase as well, resulting in an increase in the quantity and quality of the traffic to your website. The domino effect will lead to more and more customers in the long run. One crucial thing to note here is that web analytics is not enough to gain you more customers, just like having a website doesn't mean you can profit from it. The quality and accuracy of the data collected and analyzed directly impact the final business result. In other words, web analytics is just a tool. A desirable result requires leveraging the right tool to make the most appropriate data-driven decisions.

References

- Elder Research. (2021, January 12). Using Text Analytics To Detect Animal Diseases.
<https://www.elderresearch.com/resource/case-studies/using-text-analytics-to-detect-animal-diseases/>
- Sharda, R., Delen, Dursun, Turban, Efraim, Aronson, Janine E, Liang, Ting-Peng, & King, David. (2018). Business intelligence, analytics, and data science : A managerial perspective (Fourth ed.). New York: Pearson.
- Cattle word cloud. (n.d.). Retrieved February 12, 2021, from 123RF website:
https://www.123rf.com/photo_42383864_cattle-word-cloud.html
- How many pounds of feed does a cow eat in a day?
 Retrieved from Extension.org website:
<https://dairy-cattle.extension.org/how-many-pounds-of-feed-does-a-cow-eat-in-a-day/>
- McDonald, D. (2012, March 14). Value and benefits of text mining. Retrieved from Jisc website:
<https://www.jisc.ac.uk/reports/value-and-benefits-of-text-mining>
- Geckoboard. (2021). *Shopping Cart Abandonment Rate*. Geckoboard.
<https://www.geckoboard.com/best-practice/kpi-examples/shopping-cart-abandonment-rate/>
- Backlinko. (2019). *What Is Bounce Rate? And How to Quickly Improve It*. Backlinko.
<https://backlinko.com/hub/seo/bounce-rate>
- Frederiksen. (2020, September 30). *COVID-19 has just turned your website into a rainmaker*.
 Accounting Today.
<https://www.accountingtoday.com/list/covid-19-has-just-turned-your-website-into-your-rainmaker>
- Peyton, J. (2017). *What's the Average Bounce Rate for a Website?* Rocketfuel2014.

<https://www.gorocketfuel.com/the-rocket-blog/whats-the-average-bounce-rate-in-google-analytics/>