K-Means Clustering Segmentation Based on Consumer Interest Using SPSS Program at XYZ Indonesia Customers

Pontjo Utomo[1]*, Mia Tampi [2], Diny Claudia[3], Jerry Haikal[4]
[1]Bakrie University, Jakarta, Indonesia, utomopontjo@gmail.com
[2]Bakrie University, Jakarta, Indonesia, miatampi5@gmail.com
[3]Bakrie University, Jakarta, Indonesia, dinyclaudia1@gmail.com
[4]Bakrie University, Jakarta, Indonesia, jerry.heikal@bakrie.ac.id

*Corresponding Author: utomopontjo@gmail.com[1]

Abstract: This study aims to understand the preferences and behavior of PT XYZ Indonesia's customers through K-Means Clustering segmentation analysis using the SPSS program. PT XYZ Indonesia, a restaurant that combines Japanese and Indonesian cuisine, has adopted various digital marketing strategies to enhance their online brand presence and strengthen customer relationships. In this study, data was collected through questionnaires filled out by 102 respondents who are customers of PT XYZ Indonesia. The data includes demographic variables such as gender, age, marital status, occupation, monthly income, as well as consumer behavior variables such as ordering platforms, information sources, visit frequency, restaurant location distance, and menu preferences. Through K-Means Clustering analysis, customers were grouped into six different clusters based on their interests and behavior. One prominent cluster is Cluster 3, which consists of young customers who are active on social media and frequently order food through online platforms such as Shopee Food. This cluster has key characteristics such as being male, 27 years old, single, working as private employees with a monthly income between 5 to 10 million rupiah, and having a specific preference for the Enog Berger Mayo menu. This study provides significant business implications for PT XYZ Indonesia, including increasing promotional activities on social media, offering exclusive discounts through online platforms, optimizing restaurant locations, developing menus that are favored by customers, and improving delivery services. By implementing the right strategies based on these segmentation results, PT XYZ Indonesia can enhance customer satisfaction, strengthen loyalty, and improve their market position. This study also emphasizes the importance of using segmentation techniques to understand consumer preferences and behavior in directing more effective and efficient marketing strategies.

Keywords: Customer segmentation, K-Means Clustering, consumer behavior, digital marketing, marketing strategy, SPSS, PT XYZ Indonesia, food and beverage industry, social media promotion, customer loyalty.

INTRODUCTION

Indonesia boasts a rich diversity of culture and cuisine, creating a dynamic market in the food and beverage industry. Stable economic growth and increasing urbanization have driven this sector forward. In the ever-evolving digital era, marketing has become increasingly complex and focused on a deep understanding of consumer behavior. To enhance the effectiveness of marketing strategies, companies often employ customer segmentation techniques to identify different consumer groups and design strategies tailored to the needs and preferences of each segment. One popular segmentation technique is K-Means Clustering, which allows for the grouping of customers based on patterns found in data (Kodinariyah & Makwana, 2013).

PT XYZ Indonesia has several branches across Indonesia and stands out as a unique restaurant, distinct from others. This restaurant, which blends Japanese and Indonesian cuisine, is located at Jl. Cemp. Putih Tengah No.26 B/71-A, RT.7/RW.6, East Cempaka Putih, Cempaka Putih, Central Jakarta City, Jakarta 10510. With a rich and authentic menu, coupled with a focus on quality and customer satisfaction, PT XYZ Indonesia has several strengths that make it an attractive choice for Indonesian food enthusiasts seeking a special culinary experience. PT XYZ Indonesia has adopted various digital marketing strategies to enhance its online brand presence, increase customer engagement, and drive sales. One of the main strategies frequently used by PT XYZ and other restaurants in the food industry is leveraging social media. By utilizing platforms such as Instagram, TikTok, and Twitter, PT XYZ can interact directly with potential customers, expand its brand reach, and build closer relationships with its followers. Through engaging visual content, exclusive promotions, and active interaction, PT XYZ can create a strong online community around its brand and enhance customer engagement. By paying attention to consumer trends and preferences on social media, they can design relevant and effective content strategies to capture attention and influence customer purchasing behavior.

Given the variety of menu items favored by customers based on food quality, menu variety, service, price, and platforms used, the number of stars and reviews provided by users can indicate the popularity and reputation of the restaurant among customers. PT XYZ Indonesia can build trust and attract consumer interest online. This is an essential part of their digital marketing strategy to increase brand visibility and influence consumer purchasing decisions. In the case of PT XYZ Indonesia's marketing, relying on menu variety, product quality, and ordering platforms, the Segmentation, Targeting, and Positioning (STP) concept can also be applied. Here is how it relates to the STP concept:

PT XYZ Indonesia segments its customers using a customer database. This data can identify various customer segments based on preferences, behavior, and needs. For example, segmentation can be done by dividing customers based on menu preferences, order frequency, and more. By understanding different customer segments, PT XYZ Indonesia can direct its marketing efforts more effectively and tailor promotions, offers, and services to meet the needs of each segment.

After segmentation, PT XYZ Indonesia can select the most promising or strategic customer segments to target. Using data from their questionnaires, they can identify customer segments that provide high ratings, frequent orders, and diverse menu preferences, which may become the primary target due to their higher satisfaction with PT XYZ Indonesia's services. Additionally, PT XYZ Indonesia can target potential customer segments who have not yet tried their services but show interest through online interactions such as reviews or ratings.

After selecting target segments, PT XYZ Indonesia needs to position its brand appropriately in the minds of consumers. This involves conveying the unique value and differentiation of PT XYZ Indonesia compared to competitors. By leveraging positive ratings and reviews from platforms like Shopee Food, Grab Food, and Go Food, PT XYZ Indonesia

can position itself as a reliable and high-quality choice in the restaurant market. They can emphasize food quality, fast delivery, and friendly customer service as their unique values. Through appropriate promotions and effective communication, PT XYZ Indonesia can strengthen its position as the preferred choice among the selected target segments. By fully applying the STP concept, PT XYZ Indonesia can optimize its marketing strategies and enhance its competitiveness in the competitive restaurant market.
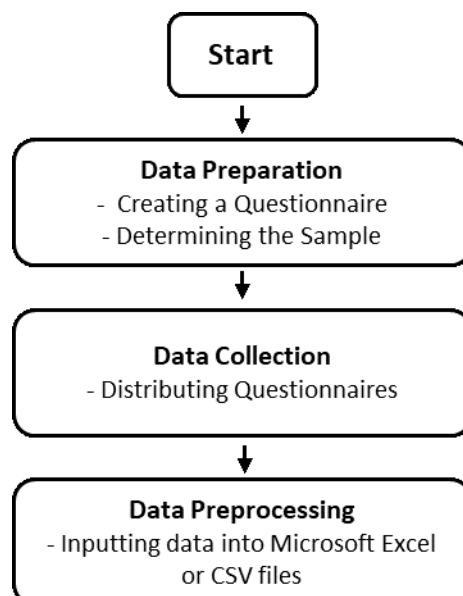
In this study, the author uses K-Means Clustering segmentation analysis with SPSS software. The research employs a questionnaire containing information about respondents' backgrounds. The questionnaire also includes questions related to various variables that help create respondent personas. These variables include aspects such as gender, age, marital status, employment status, monthly income, ordering platforms, sources of information, visit frequency, and distance. The author uses the K-Means Clustering segmentation analysis method with SPSS to group PT XYZ Indonesia's customers based on their interest in the menu varieties offered. This approach aims to gain a deeper understanding of customer preferences and identify relevant market segments. The process involves several key steps, from data collection to data analysis using K-Means Clustering.
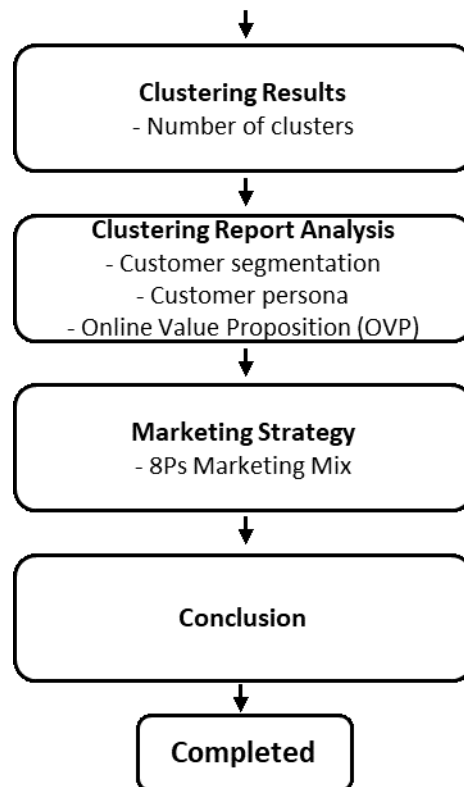
This study uses K-Means Clustering segmentation analysis to gain deeper insights into the preferences and behaviors of PT XYZ Indonesia's customers. By using data from structured questionnaires, the study successfully identifies different customer segments, which can help PT XYZ Indonesia design more effective and efficient marketing strategies. The application of the STP (Segmentation, Targeting, Positioning) concept helps PT XYZ Indonesia position its brand appropriately in the minds of consumers and direct its marketing efforts according to the needs and preferences of each customer segment. Thus, this study not only provides valuable insights for PT XYZ Indonesia but also contributes to a better understanding of segmentation techniques in the food and beverage industry in Indonesia.

This study aims to examine the interest of PT XYZ Indonesia's customers based on menu varieties using the K-Means Clustering segmentation model. PT XYZ Indonesia is a company operating in the food and beverage industry in Indonesia, known for its innovation in serving authentic Indonesian dishes with a modern twist. With the rapid growth of the restaurant industry and increasingly fierce competition, a deep understanding of customer preferences and behavior is key to maintaining a competitive edge. This study is expected to provide valuable insights for PT XYZ Indonesia in optimizing its marketing strategies.

METHOD

In this research, the author conducted several stages. Below is an outline of the research process flow based on the methodology employed by the author:

RESULTS AND DISCUSSION

In processing the data for this research, the author used Microsoft Excel and analyzed it using the SPSS application to determine the K-Means Clustering segmentation analysis for PT XYZ Indonesia, as shown in the following figure:

Table 1. The Output Results of Final Cluster Centers

Final Cluster Centers						
	Cluster					
	1	2	3	4	5	6
Age	22	33	27	50	41	57
Perempuan	0,59	0,35	0,32	0,58	0,50	0,33
laki_laki	0,41	0,65	0,68	0,42	0,50	0,67
Lajang	0,94	0,65	0,66	0,17	0,17	0,00
Menikah	0,06	0,35	0,34	0,83	0,83	1,00
pegawai_swasta	0,41	0,52	0,51	0,42	0,17	0,67
pegawai_negeri	0,18	0,22	0,15	0,25	0,33	0,00
other	0,41	0,26	0,34	0,33	0,50	0,33
@3000000	0,18	0,09	0,12	0,08	0,17	0,00
@3000000_5000000	0,12	0,09	0,10	0,00	0,00	0,00
@5000000_10000000	0,65	0,35	0,49	0,25	0,50	0,00
@10000000	0,06	0,48	0,29	0,67	0,33	1,00
Shoppe_food	0,65	0,35	0,34	0,58	0,17	0,00
Gofood	0,12	0,09	0,27	0,25	0,33	0,67
Grab_food	0,18	0,30	0,27	0,00	0,17	0,00
Dine_in_A	0,06	0,26	0,12	0,17	0,33	0,33
X	0,24	0,48	0,32	0,33	0,17	0,00
Tiktok	0,12	0,04	0,10	0,00	0,00	0,00
Instagram	0,65	0,30	0,46	0,17	0,50	0,00
others	0,00	0,17	0,12	0,50	0,33	1,00
@1_Km	0,18	0,17	0,24	0,17	0,50	0,33
@2Km_5Km	0,76	0,78	0,71	0,83	0,33	0,67
@5_Km	0,06	0,04	0,05	0,00	0,17	0,00
beef_onsen	0,00	0,43	0,15	0,17	0,50	0,00
beef_sambal_korek	0,18	0,09	0,20	0,17	0,00	0,67
edog_burger_mayo	0,47	0,17	0,41	0,25	0,33	0,00

Source: Research Data
Table 2. The Output Results of The Number of Cases in Each Cluster

edog_burger_mayo	0,47	0,17	0,41	0,25	0,33	0,00
tahu_bumbu_garlik	0,00	0,04	0,07	0,08	0,00	0,00
Nugget_Churncy_tartar	0,00	0,04	0,00	0,08	0,00	0,00
Nasi_campur_crispy	0,12	0,04	0,07	0,00	0,00	0,33
ayam_sesame	0,00	0,09	0,02	0,17	0,17	0,00
ayam_ala_hainan	0,24	0,09	0,07	0,08	0,00	0,00
@1_3kali	0,47	0,17	0,10	0,42	0,67	0,33
@3_5kali	0,29	0,52	0,29	0,25	0,00	0,00
@5_kali	0,24	0,30	0,61	0,33	0,33	0,67
Dine_in	0,06	0,26	0,12	0,17	0,33	0,33
Delivery_Online	0,94	0,74	0,88	0,83	0,67	0,67

Number of Cases in each Cluster

Cluster		
	1	17,000
	2	23,000
	3	41,000
	4	12,000
	5	6,000
	6	3,000
Valid		102,000
Missing		0,000

Source: Research Data

Based on the output results above, customer segmentation was conducted using the K-Means Clustering algorithm with the aim of grouping customers based on their interests and behaviors. The customer data of XYZ Indonesia was analyzed using the SPSS program, resulting in 6 distinct clusters and generating the following persona: male, 27 years old, single, working as a private sector employee, earning between 5 to 10 million per month, habitually purchasing food through the ShopeeFood delivery platform, sourcing restaurant-related information from Instagram, located within a 2-5 km radius from the restaurant, preferring menu items such as Enog Berger Mayo, and making online delivery purchases more than 5 times.

From the identified persona, it appears that this individual falls into Cluster 3, which represents young customers who are active on social media and frequently seek restaurant recommendations online. The further discussion of the characteristics of Cluster 3 are: Social Media Activity, this cluster is heavily influenced by trends and recommendations from social media platforms like Instagram. They often choose restaurants based on reviews and content they see online. Online Ordering, customers in this cluster prefer ordering food through apps like Shopee Food, which offer convenience and a variety of options. Proximity to Location, they tend to choose restaurants within a 2-5 km radius, likely to ensure fast and efficient delivery. Menu Preferences, this cluster shows a strong interest in specific menu items like Enog Berger Mayo, indicating a preference for unique and distinctive food choices. Purchase Frequency, they are frequent online food orderers, making more than 5 purchases within a certain period, demonstrating loyalty and consistent consumption habits.

By understanding the characteristics of each cluster, particularly Cluster 3 as described by the persona above, XYZ Indonesia can take the following strategic steps: Promotions on Social Media, increase promotional activities on Instagram and other social media platforms to attract the attention of this cluster. Special Offers on Shopee Food, provide special deals or exclusive discounts through the Shopee Food app to enhance customer loyalty. Location Optimization, ensure that restaurants partnering with XYZ Indonesia are located within an optimal radius from the population centers of this cluster. Menu Development, innovate the

menu by considering customer preferences, such as offering variations of the Enog Berger Mayo dish. Delivery Service, strengthen delivery services to ensure speed and the quality of food received by customers.

With the right strategies based on this segmentation, XYZ Indonesia can improve customer satisfaction and strengthen its position in the market.

CONCLUSION

This study aims to understand the preferences and behaviors of PT XYZ Indonesia's customers through K-Means Clustering segmentation analysis using the SPSS program. Based on the research conducted, six distinct customer clusters were identified, each with unique characteristics and consumption behaviors. One notable cluster is Cluster 3, which consists of young customers who are active on social media and frequently order food through online platforms like Shopee Food. This study successfully grouped PT XYZ Indonesia's customers into six clusters based on demographic and consumer behavior variables. Cluster 3 was identified as a group of young customers who often use social media to seek restaurant recommendations and tend to order food online. The majority of Cluster 3 comprises 27-year-old males, single, working as private sector employees with a monthly income of 5 to 10 million rupiah. Their consumption behavior can be observed through their primary source of restaurant information, which is Instagram, their preference for ordering food through Shopee Food, and their inclination toward restaurants located 2-5 km from their location. They favor specific menu items like Enog Berger Mayo and have a purchase frequency of more than five times through online delivery.

The business implications of this research relate to social media promotions, as increasing promotional activities on Instagram can attract the attention of this cluster. Special offers on Shopee Food can also be leveraged by providing exclusive discounts through the app to enhance customer loyalty. Location optimization ensures that restaurants partnering with XYZ Indonesia are within an optimal radius from the population centers of this cluster. Menu development can focus on innovating based on customer preferences, such as offering variations of the Enog Berger Mayo dish. Additionally, delivery services can be strengthened to ensure speed and the quality of food received by customers. By implementing the right strategies based on this segmentation, PT XYZ Indonesia can improve customer satisfaction and strengthen its market position. This study also emphasizes the importance of using segmentation techniques to understand consumer preferences and behaviors, and how this can guide more effective and efficient marketing strategies.

Create engaging visual content on Instagram and other social media platforms that highlights specific menus and exclusive promotions. Leverage positive reviews and ratings from customers to build reputation and attract new customers. Special Offer Strategy, Provide exclusive discounts and promotions through Shopee Food to encourage repeat purchases.

Develop a loyalty program that offers additional benefits to loyal customers. Location and Service Optimization, ensure restaurants and delivery services are within a convenient radius for the target cluster. Enhance delivery service efficiency and quality to ensure customer satisfaction.

By implementing these recommendations, PT XYZ Indonesia can more effectively attract and retain customers, increase sales, and strengthen its position in the competitive food and beverage industry. This study provides valuable insights that the company can use to guide its strategic and operational decisions.

REFERENCES

Aggelis, V., & Christodoulakis. (2005). Customer Clustering using RFM Analysis. In *Proceedings of the 9th WSEAS International Conference on Computers* (ICCOMP '05).

Angelie, A. V. (2017). Segmentasi Pelanggan Menggunakan Clustering K-Means dan Model RFM (Studi Kasus: PT. Bina Adidaya Surabaya). *Institut Teknologi Sepuluh Nopember Surabaya*.

Bahar, A., Pramono, B., & Sagala, L. H. S. (2016). Penentuan strategi penjualan alat-alat tattoo di studio sonyxtattoo menggunakan metode. SemanTIK, 2(2), 75-86.

Bhatia, S. K. (2012). A Propound Method For The Improvement of Cluster Quality. *IJCSI International Journal of Computer Science Issues*. 9(4), 216-221.

Bholowalia, P., & Kumar, A. (2014). EBK-Means: A Clustering Technique based on Elbow Method and K-Means in WSN. *International Journal of Computer Application*, 105(9), 17-24.

Brock, G., Pihur, V., Datta, S., & Datta, S. (2011). clValid, an R package for cluster validation. *Journal of Statistical Software*.

Caliński, T., & Harabasz, J. (1974). A dendrite method for cluster analysis. *Communications in Statistics - Theory and Methods*, 3, 1-27.

Cheng, C.-H., & Chen, Y.-S. (2009). Classifying the segmentation of customer value via RFM model and RS Theory. *Expert Systems with Applications*, 36, 4176-4184.

Gaffar, V. (2007). CRM dan MPR Hotel. Bandung: Alfabeta.

Han, J., & Kamber, M. (2006). Data Mining: Concept and Techniques (2nd ed.). Morgan Kaufmann Publishers.

Herlinda, V., Darwis, D., & Dartono. (2021). Analisis Clustering Untuk Redesialing Fasilitas Kesehatan Menggunakan Metode Fuzzy C-Means. *Jurnal Teknologi Dan Sistem Informasi (JTSI)*, 2(2), 94-99.

Hughes, A. M. (1994). Strategic Database Marketing. Chicago: Probus Publishing.

Junaedi, H., Budianto, H., Maryati, I., & Melani, Y. (2011). Data Transformation Pada Data Mining. In Prosiding Konferensi Nasional "Inovasi dalam Desain dan Teknologi". (93-99).

Kamila, I., Khairunnisa, U., & Mustakim. (2019). Perbandingan Algoritma K-Means dan K-Medoids untuk Pengelompokan Data Transaksi Bongkar Muat di Provinsi Riau. *Jurnal Ilmiah Rekayasa dan Manajemen Sistem Informasi*, 5(1), 119-125.

Khajvand, M., & Tarokh, M. J. (2011). Estimating Customer Future Value of Different Customer Segments Based on Adapted RFM Model in Retail Banking Context. Procedia Computer Science, 3, 1327-1332.

Kodinariya, T. M., & Makwana, D. P. R. (2013, November). Review penentuan jumlah Cluster di Pengelompokan K-Means. *Jurnal Internasional Penelitian Lanjutan di Ilmu Komputer dan Studi Manajemen*, *1*(6), 90-95. : https://www.researchgate.net/publication/313554124

Kotler, P., & Keller, K. (2007). Manajemen Pemasaran (Jilid I, Edisi Kedua belas). Jakarta: PT. Indeks.

Kusrini, & Luthfi, E. T. (2009). Algoritma Data Mining. Yogyakarta: Andi.

Larose, D. T. (2005). Discovering Knowledge In Data: An Introduction To Data Mining. John Wiley & Sons, Inc.

Lestarini, A. H. (2017). 2020, Industri Kecantikan RI Siap Libas Asia Tenggara. Metrotvnews. Retrieved from http://ekonomi.metrotvnews.com/mikro/8N0eqoEb-2020-industri-kecantikan-ri-siap-libas-asia-tenggara

Luthfi, M. A., & Nilogiri, A. (2019). Implementasi Algoritma K-Means Clustering Untuk Pengelompokan Minat Konsumen Pada Produk Online Shop. Universitas Muhammadiyah Jember, 1-5.

Mulyati, S. (2015). Penerapan Data Mining dengan Metode Clustering untuk Pengelompokan Data Pengiriman Burung. *Seminar Ilmiah Nasional Teknologi Komputer*, 30-35.

Mulyono, R., Ndini, A. S., Kharisma, G., & Heikal, J. (2023). Segmentation K-Means Clustering Model With SPSS Program Case Study Customer The Park Mall Sawangan. *Syntax Literate:Jurnal Ilmiah Indonesia*, 8(2). http://dx.doi.org/10.36418/syntax-literate.v8i2.11429

Nasari, F., & Darma, S. (2015). Penerapan K-Means Clustering pada Data Penerimaan Mahasiswa Baru (Studi Kasus: Universitas Potensi Utama). *Seminar Teknologi Informasi dan Multi Media 2015* (pp. 73-78). Yogyakarta: STMIK AMIKOM.

Nasution, S. A., Poningsih, & Okprana, H. (2021). Penerapan Algoritma K-Means Pada Penjualan Frozen Food Pada UD Soise Sosis Pematangsiantar. *Jurnal Sistem Komputer dan Informatika (JSON)*, 2(2), 171-177.

Normah, N., Rifai, B., & Sari, P. (2020). Algoritma Apriori Sebagai Solusi Kontrol Persediaan Suku Cadang Mobil PT. Buanasakti Aneka Motor Jakarta. *Paradigma - Jurnal Komputer Dan Informatika*, 22(2), 161-168. https://doi.org/10.31294/p.v22i2.6530

Nurajizah, S. (2019). Analisa Transaksi Penjualan Obat menggunakan Algoritma Apriori. INOVTEK, 4(1), 35-44.

Piatetsky, G., & Shapiro. (2006). An Introduction Machine Learning, data mining, and Knowledge discovery, Course in data mining Kdnuggets.

Piatetsky, G., & Shapiro. (2006). An Introduction to Machine Learning, Data Mining, and Knowledge Discovery. Kdnuggets.

Rainer, R. K., & Cegielski, C. G. (2011). Introduction to Information Systems (3rd ed.). USA: Wiley.

Rohmawati, N., Defiyanti, S., & Jajuli, M. (2015). Implementasi Algoritma K-MEANS dalam Pengklasteran Mahasiswa Pelamar Beasiswa. *Jurnal Ilmiah Teknologi Informasi Terapan*, 1(2), 62-67.

Sauro, J. (2011). Measuring Usability With The System Usability Scale (SUS). Retrieved from http://www.measuringu.com/sus.php.

Sauro, J. (2013). A Single-Item Measure of Website Usability: Comments on Christophersen and Konradt (2011). *Interacting with Computers*. 25(4), 302-303.

Silahi, M. (2018). Analisis Clustering Menggunakan Algoritma K-Means Terhadap Penjualan Produk Pada Batamas Niaga Jaya. *Computer Based Information System Journal*, 6(2), 20-34.

Tan, P.-N., Steinbach, M., & Kumar, V. (2005). Introduction to Data Mining. Boston: Addison-Wesley Longman Publishing Co.

Tsiptsis, K., & Chorianopoulos, A. (2009). Data Mining Techniques in CRM: Inside Customer Segmentation. Chichester, West Sussex, U.K: Wiley.