



# Towards a Conceptual Framework for Customer Intelligence in the Era of Big Data


Nguyen Anh Khoa Dam, Université du Québec à Trois-Rivières, Canada

 <https://orcid.org/0000-0003-0928-8402>

Thang Le Dinh, Université du Québec à Trois-Rivières, Canada

 <https://orcid.org/0000-0002-5324-2746>

William Menvielle, Université du Québec à Trois-Rivières, Canada

 <https://orcid.org/0000-0002-3363-0362>

## ABSTRACT

The dominance of services and service-based products in today's economy highlights the significance of customer intelligence for service offerings. Furthermore, the revolution of big data has generated a vast amount of customer data and reshaped the dimensions of organization, management, and technology within enterprises. The big data era also acknowledges the role of customers for value co-creation. Therefore, the objective of this paper is to propose a service-based framework for customer intelligence in the age of big data, hereafter called the SBCI framework, from the design science and service science approach. It laid the groundwork upon design science; the SBCI framework is proposed with the detailed artefacts, including construct, model, method, and instantiation. The framework also reflects service science through the three levels: 1) the network of service systems level for service proposal, 2) the service system level for service creation, and 3) the service level for service operation.

## KEYWORDS

Big Data, Conceptual Framework, Customer Co-Creation, Customer Insights, Customer Intelligence, Design Science, Digital Transformation, Service Science

## INTRODUCTION

The dominance of the service sector in today's economy gives prominence to customer intelligence as a means for enterprises to provide optimal services and service-based products (France & Ghose, 2019; Ramaswamy & Ozcan, 2019). The age of big data defines customer intelligence as knowledge or insights on customers extracted from the data mining process by integrating, analyzing, and interpreting various sources of customer data (Dam et al., 2020b; Davenport & Spanyi, 2019). Accordingly, customer intelligence enables enterprises to develop service offerings, understanding customer behaviors, and improving marketing strategies in the service-based economy (Anshari et al., 2019; Yan et al., 2020; Zerbino et al., 2018). Nowadays, the service sector occupies the majority of the Gross Domestic Product (GDP), particularly in developed countries with over two-thirds (Szirmai & Verspagen, 2015). The proliferation of the service sector in the age of big data highlights the role of customers as co-creators for business value. Customer interactions on various digital platforms

DOI: 10.4018/IJIT.289968

have created a vast amount of customer data, which is considered as a great source for customer intelligence (Cooke & Zubcsek, 2017; Crandell, 2016).

However, most enterprises find it challenging to overcome the three major obstacles related to customer intelligence. The first challenge arises from customer co-creation concerning engagement forms (Crandell, 2016; Frow et al., 2016; Xie et al., 2016), which leads to a burdensome task to figure out the roles of customers in the process of co-creating with enterprises for customer intelligence. The second challenge happens within the organizational, management, and technological dimensions of enterprises (Davenport & Spanyi, 2019; Tabrizi et al., 2019). As a matter of fact, the majority of enterprises tend to overemphasize the importance of technological changes while lacking the mindset of restructuring the organizational and management viewpoints to better offer service for customers (Anshari et al., 2019; Tabrizi et al., 2019; Yohn, 2018). The last challenge involves how enterprises apply customer intelligence for service development and innovation (Amado et al., 2018; Anshari et al., 2019). Accordingly, optimal service offerings require the congruence in the dimensions of organization, management, and technology which enables enterprises to acquire customer intelligence and turns it into optimal applications for service (Lafrenière, 2020; McGrath & McManus, 2020).

To address this challenge, the objective of the paper is to propose a *service-based framework for customer intelligence* in the age of big data - hereafter called the **SBCI** framework. Considering the significance of service in the era of big data, the framework is developed through the lens of design science and service science. On the one hand, the design science approach deals with the development and validation of designed artefacts or concepts related to customer intelligence (Hevner et al., 2004; Peffers et al., 2007). On the other hand, the service science approach focuses on science, management, and engineering dimensions in the transformation to the service-based economy (Maglio & Spohrer, 2013; Spohrer et al., 2007). The science dimension focuses on the organizational viewpoint, the management dimension covers the strategic viewpoint, and the engineering dimension touches upon the technological viewpoint.

The remaining structure of the paper continues with the theoretical background relevant to the service science approach. Then this paper applies the design science approach to examine the research objectives. Based on the design science, different artefacts are constructed. The SBCI framework is further discussed with validation. The last section of this paper indicates an in-depth discussion of contributions and future directions as a conclusion.

## THEORETICAL BACKGROUND

This paper relies on the service science approach as it covers the three principal dimensions within an enterprise: science, management, and engineering (Maglio & Spohrer, 2013; Spohrer et al., 2007). It is argued that the service science approach can be used to fortify the significance of customer intelligence. In light of the *science dimension*, customer intelligence deals with the organizational structure and the process to create, communicate, and deliver values to customers, clients, partners, and society. Regarding the *management dimension*, customer intelligence is applied to marketing decisions and strategies. The final dimension of the service science approach: the *engineering dimension* clarifies how to transform customer data into information, knowledge, and wisdom to offer innovation and service (Le Dinh et al., 2014).

Laid the foundation upon the service science approach, customer intelligence may be implemented as services or service-based products. The study of Vargo and Lusch (2004) defined a *service* as the “application of competencies such as knowledge as skills to offer values to other entities and the entity itself”. Accordingly, customer intelligence is the application of knowledge and skills relative to customers and enterprises for mutual benefits. The science, management, and engineering dimensions set a robust foundation for the service system (Maglio & Spohrer, 2013). A *service system* is defined as the “value-co-creation configurations of people, technology, value propositions connecting internal

15 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the product's webpage:

[www.igi-global.com/article/towards-a-conceptual-framework-for-customer-intelligence-in-the-era-of-big-data/289968?camid=4v1](http://www.igi-global.com/article/towards-a-conceptual-framework-for-customer-intelligence-in-the-era-of-big-data/289968?camid=4v1)

This title is available in e-Journal Collection, Computer Science and IT Knowledge Solutions e-Journal Collection, Computer Science, Security, and Information Technology e-Journal Collection, Engineering, Natural, and Physical Science Discipline e-Journal Collection, Artificial Intelligence and Smart Computing Collection - e-Journals. Recommend this product to your librarian:

[www.igi-global.com/e-resources/library-recommendation/?id=2](http://www.igi-global.com/e-resources/library-recommendation/?id=2)

## Related Content

---

### Coordinative Optimization Control of Microgrid Based on Model Predictive Control

Changbin Hu, Lisong Bi, ZhengGuo Piao, ChunXue Wen and Lijun Hou (2018). *International Journal of Ambient Computing and Intelligence* (pp. 57-75).

[www.igi-global.com/article/coordinative-optimization-control-of-microgrid-based-on-model-predictive-control/204349?camid=4v1a](http://www.igi-global.com/article/coordinative-optimization-control-of-microgrid-based-on-model-predictive-control/204349?camid=4v1a)

### Hybrid System based on Rough Sets and Genetic Algorithms for Medical Data Classifications

Hanaa Ismail Elshazly, Ahmad Taher Azar, Aboul Ella Hassanien and Abeer Mohamed Elkorany (2013). *International Journal of Fuzzy System Applications* (pp. 31-46).

[www.igi-global.com/article/hybrid-system-based-rough-sets/101768?camid=4v1a](http://www.igi-global.com/article/hybrid-system-based-rough-sets/101768?camid=4v1a)

## Applying a Methodology in Data Transmission of Discrete Events From the Perspective of Cyber-Physical Systems Environments

Reinaldo Padilha França, Yuzo Iano, Ana Carolina Borges Monteiro and Rangel Arthur (2021). *Artificial Intelligence Paradigms for Smart Cyber-Physical Systems* (pp. 278-300).

[www.igi-global.com/chapter/applying-a-methodology-in-data-transmission-of-discrete-events-from-the-perspective-of-cyber-physical-systems-environments/266144?camid=4v1a](http://www.igi-global.com/chapter/applying-a-methodology-in-data-transmission-of-discrete-events-from-the-perspective-of-cyber-physical-systems-environments/266144?camid=4v1a)

## Unified Wavelet Transform Analysis Adapted to Different Biomedical Applications

Girisha Garg and Vijander Singh (2016). *Intelligent Techniques for Data Analysis in Diverse Settings* (pp. 1-21).

[www.igi-global.com/chapter/unified-wavelet-transform-analysis-adapted-to-different-biomedical-applications/150285?camid=4v1a](http://www.igi-global.com/chapter/unified-wavelet-transform-analysis-adapted-to-different-biomedical-applications/150285?camid=4v1a)