

Aug 10th, 12:00 AM

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Recommended Citation

Kinnett, Seth J. and Abooleet, Saeed, "When Blockchain Meets CRM: An Evaluation of Enterprise CRM Vendor Blockchain Capabilities" (2022). *AMCIS 2022 Proceedings*. 1.
https://aisel.aisnet.org/amcis2022/sig_entsys/sig_entsys/1

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When Blockchain Meets CRM: An Evaluation of Enterprise CRM Vendor Blockchain Capabilities

Completed Research

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Abstract

The emergence of Blockchain technology has begun to manifest in various business and technical domains. Despite the transformative potential of Blockchain and other distributed ledger technologies, the distributed paradigm is markedly different than the relational database model underlying prototypical CRM systems, presenting a novel integration challenge. Resolving CRM-Blockchain integration challenges is a precondition to realizing the emergent paradigm known as *CRM 4.0*. The top 6 CRM vendors are identified, and their Blockchain capabilities are investigated. We conclude that while many of these vendors once implemented Blockchain capabilities, such capabilities have since largely been deprioritized, obfuscated, or outright abandoned. This paper extends the existing literature on CRM and Blockchain through the lens of industry.

Keywords

Customer relationship management, CRM, Blockchain, distributed ledger, enterprise systems.

Introduction

Blockchain and other emergent technologies (e.g., AI) have been highlighted as disruptive technologies that can change how current businesses operate (Nowiński and Kozma 2017; Zheng et al. 2018). Organizations like Walmart, IBM, TUI, NASDAQ, etc., have started experimenting with Blockchain to manage aspects of their business operations, like transactions, accounting, voting, supply chain management, tourism, marketing and brand loyalty programs (Kamath 2018; Varelas et al. 2019). A look at the current state of Blockchain *hype* as outlined by Gartner's Hype Cycle for Data Management (2021) places Blockchain at the bottom of the *Trough of Disillusionment* (see Figure 1), of *Adolescent*-level of maturity and 2-5 years from the beginning of mainstream adoption (Russom and Feinberg 2021). The *Trough of Disillusionment* describes a stage in the hype cycle where technology has failed to meet the overinflated expectations set for it by either media or industry, and a sizable number of vendors either consolidate or fail altogether (Linden and Fenn 2003). One explanation for the state of Blockchain and, indeed all distributed ledger technologies, is that such technologies are misclassified as disruptive and rather are *foundational* technologies like the TCP/IP protocol, unexciting by itself, but ultimately laying the foundation for what would become the World Wide Web (web) decades later (Iansiti and Lakhani 2017).

Whether Blockchain ultimately proves to be disruptive or foundational, achieving mainstream adoption for any innovation requires business use cases to be clearly defined and major integration challenges resolved. Integration considerations are a critical dimension of the enterprise systems (ES) domain, and customer relationship management (CRM) systems, the enterprise systems focused on the sales, service, marketing, and digital commerce functions (Thompson, 2021a), are no exception. Integration challenges have been shown to be significant in CRM systems in the emergent *CRM 3.0* paradigm. This includes the attempts to integrate the structured data characteristic of the relational database model underlying modern CRM systems, and the unstructured data mined from customer and prospect social media posts

Hype Cycle for Data Management, 2021

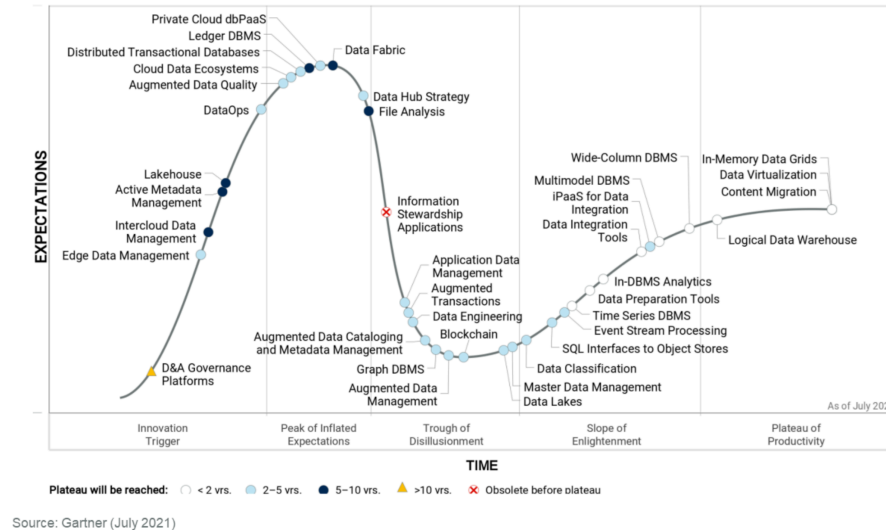


Figure 1. Gartner's Hype Cycle for Data Management, 2021
(Russom and Feinberg 2021) **pg. 5**

(Kinnett and Steinbach 2021; Taber 2011). Distributed ledger technology such as Blockchain raises similar challenges about the ability of systems sharing paradigmatically different database models to integrate elegantly. A recent paper (Kinnett and Steinbach 2021) characterizes the intersection of CRM and Blockchain as one manifestation of an emergent paradigm known as *CRM 4.0*. Still, we have yet to see a paper evaluating the sophistication of Blockchain solutions for the specific, major CRM enterprise systems. To address this gap, we propose the following research question:

RQ1: What solutions have the most prevalent CRM vendors developed to incorporate Blockchain into their product offerings?

The contribution of this paper is threefold: First, this paper provides a complete assessment of leading CRM vendors' initiatives on Blockchain, which can guide practitioners and policymakers' future decisions related to the adoption of Blockchain in CRM. Second, it can be used as a template by other scholars attempting to evaluate certain technology vendors utilizing industry reports, such as Gartner Magic Quadrants. Third, this research attempts to bridge the gap between academia and industry by considering both views while assessing CRM-Blockchain potentials. The remainder of our paper outlines a brief background on CRM systems and Blockchain technology, defines a research methodology, presents the results of our investigation, and closes with a discussion, conclusions, and planned future work.

Background

Customer Relationship Management (CRM)

Academic papers have conceptualized CRM as an embodiment of the innovative marketing practice known as *relationship marketing (RM)* (Ryals and Payne 2001), also known as *one-to-one marketing* (Peppers et al. 1999). Although improved revenue via the repeat sales potentially resulting from successful cultivation of customer relationships is one of CRM's purported benefits, a CRM benefits framework has proposed that organizations may realize benefits across the operational, tactical, and strategic levels, including improved customer data, process, & service management, improved productivity, improved market segmentation, key account management, channel management, and customer satisfaction, among others (Shanks et al. 2009). Various dimensions for CRM have been proposed, such as the operational-analytical-collaborative lens, which suggests CRM systems are oriented toward automation and efficiency, data analysis, and interactions, respectively (Soltani and Navimipour 2016). The industry research group, *Gartner, Inc.*, conceptualizes CRM as a strategy aimed at revenue optimization and profitability while simultaneously

improving customer satisfaction and cultivating customer loyalty. Constituted against this remit, Gartner further places CRM software products as spanning the five dimensions of sales, marketing, customer service, digital commerce, and cross-CRM (Zijadic, Blood, Shen, & Elkin, 2021). The nature of this dispersion results in the potential for many niche vendors to provide targeted solutions, which technically fall into the realm of CRM, even if they do not resemble legacy conceptualizations of CRM systems, which began as simple contact databases (Kennedy 1984) and evolved to automate aspects of the sales process such as lead management (Collins 1985; Taylor 1983).

Blockchain

Blockchain is a tamper-evident and tamper-resistant distributed ledger that is usually decentralized (Yaga et al. 2019). Nakamoto (2008) introduced the first and the most popular Blockchain application by creating a peer-to-peer payment system (Bitcoin). Blockchain is defined as a digital, distributed transaction ledger, with identical copies maintained on multiple computer systems controlled by different entities” (Schatsky and Muraskin 2015). Each block has a block header containing metadata and block data comprising a set of transactions. The header of each block except for the very first one (i.e., the genesis block) contains a *hash* that links it to the previous block (Yada et al., 2019). Cryptographic techniques enforce the rules of the network that prevent tampering and equivocation of data (Narayanan et al. 2016). As new blocks are added, the previous blocks become near impossible to alter. New blocks are replicated across copies of the ledger within the network, and any conflicts are resolved automatically using established rules (i.e., consensus mechanism). Nodes in the network aim to reach a consensus regarding the following block to append utilizing a consensus protocol, which ensures decentralized governance, quorum, performance, authentication, integrity, nonrepudiation, and byzantine fault tolerance (Garriga et al. 2021). There are several consensus mechanisms such as proof of work (PoW) where a user publishes the next block by being the first to solve a computationally intensive puzzle, proof of stake (PoS) where selected validators based on their holdings in the Blockchain are responsible for the validation, delegated proof of stake (DPOS) where participants vote to elect and revoke the rights of delegates to validate blocks, proof of authority (PoA) that leverages the value of identities where validators stake their own reputation instead of coins etc. Blockchain systems are categorized into three types: public, consortium and private. All records are visible to the public in a public Blockchain, and everyone can participate in the consensus process (permissionless). A private Blockchain is a centralized network controlled mainly by one entity while several entities maintain the consortium Blockchain. Records of the private and consortium Blockchain systems can be public or private; however, only approved nodes are able to be part of the consensus process (permissioned) (Zheng et al. 2017).

Blockchain & CRM

Integrating Blockchain and CRM can create new customer experiences and drive a worthy customer value, improve data confidentiality, and streamline data sharing (Ghazaleh and Zabadi 2021). Its enhanced security features make Blockchain an ideal solution to mitigate the impact of malicious attacks by either preventing data loss or improving recovery efforts (Sharma et al. 2018). Blockchain offers auditable transactions that enable end-to-end transparency (Collomb et al. 2019). Transparency has been shown to significantly influence customer trust, which consequently impacts customer relationships and loyalty (Kim and Kim 2016). Blockchain’s ability to facilitate trust without human interactions may, paradoxically, result in a trust gap in B2B buyer-seller relationships, leading to various adverse results (Gligor et al. 2021). The use of Blockchain to implement Ricardian contracts – legally binding contracts that are machine-readable – could result in the end of the B2B Sales role (Sood and Pattinson 2020). Loyalty management, a component of the Marketing dimension of CRM, is the most explored domain in the context of Blockchain for CRM technology. It is argued that Blockchain can provide customers with real-time exchange and redemption of rewards points (Wang et al. 2018), increase capabilities of multi-brands and firms exchange with the use of tokens (Weldon and Epstein 2019), and enhance social capital and community feeling for the consumers (Antoniadis et al. 2019). For instance, Lufthansa, Singapore Airline, Cathay Pacific and Air Asia have converted their air miles benefit schemes into digital wallets using Blockchain and gamification to offer a better experience and brand value for their customers by augmenting their brand loyalty (Fromhart and Therattil 2016).

Method

This research is exploratory in nature and seeks to provide a snapshot of the realities of Blockchain and CRM. Returning to our research question, RQ1, we seek to identify any vendor-sourced or vendor-developed Blockchain solutions available to those CRM vendors' customers. Given the prevalence of vendor-sourced options in the enterprise systems domain, we decided to focus first on identifying the most prevalent CRM vendors, reasoning that these would be the best able to invest in developing solutions to emerging technologies in ways that smaller vendors would not. Also, since these are the vendors with the predominant market share of vendor-based CRM enterprise systems, an understanding of Blockchain in these systems would be a fair estimator of Blockchain and CRM across all CRM systems used in industry.

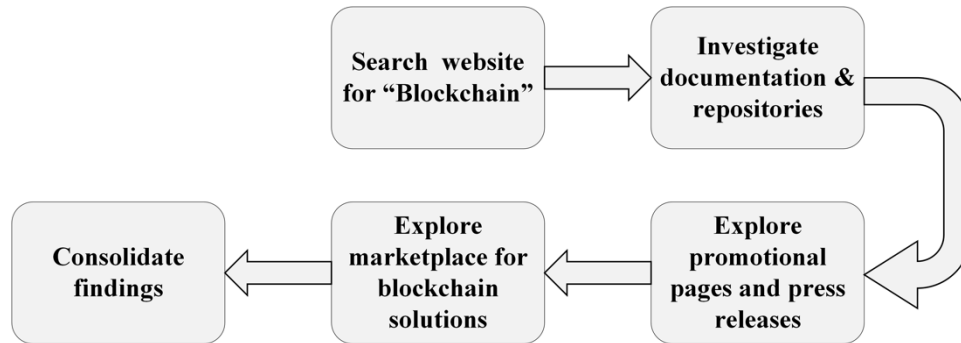


Figure 2. Process for evaluating top CRM vendors' Blockchain offerings

To determine the major vendors in the CRM space, we reviewed research by *Gartner, Inc.* In particular, we consulted Gartner's *Magic Quadrants* for CRM. Magic Quadrants aim to place software vendors in one of four locations across a two-dimensional plane. For example, vendors ranked highly in *ability to execute* and in *completeness of vision* are classified as *Leaders* (Drew et al. 2019). CRM technology spans so many functionalities that no single Magic Quadrant exists for CRM vendors; indeed, Gartner produces 15 Magic Quadrants related to CRM, such as *CRM Sales Technology*, *CRM Customer Service & Support Technology*, and others (Thompson 2021a). Evaluating the vendors occurs first through an initial search for Blockchain solutions on the official vendor websites. We next search vendor documentation repositories to identify the most official technical documents available for any Blockchain offerings. We incorporate vendors' own promotional pages, press releases, and videos surrounding the Blockchain offerings. Finally, we examine relevant vendor Marketplaces to identify any 3rd party solutions ready to integrate into the main CRM vendor platforms.

Results

The six vendors Adobe, Microsoft, Oracle, Pega, Salesforce, and SAP emerge as the most frequently present vendors across the CRM magic quadrants (Thompson 2021b). Each of these vendors is evaluated below.

Adobe

Although it is debatable why Gartner would categorize Adobe as one of the leading providers of CRM since they do not provide a complete CRM product, we believe this is because Adobe has individual solutions (Adobe 2022) that represent some targeted aspects of CRM. For example, Adobe *Marketo Engage* is Adobe's marketing automation platform that provides measurable results to keep customers engaged. Another solution is Adobe Commerce, which helps organizations build multichannel commerce experiences for B2B and B2C from a single platform. In addition, Adobe is in collaboration with Microsoft, and organizations can integrate Adobe's applications into Microsoft Dynamics 365 (Microsoft 2021). For example, creating personalized experiences can be achieved using Adobe Experience Manager Forms in conjunction with Microsoft Dynamics 365 as a back-end data source to deliver interactive and personalized

communications. Adobe appears to have no vision of incorporating Blockchain technology into its CRM solutions. However, they introduced Content Credentials (Beta) as a feature in Adobe Photoshop that gathers all information related to in-progress content where this information is tamper-evident. Thus, users can see the history and attribution of a piece of artwork before it enters the Blockchain (Adobe 2021).

Microsoft

Microsoft Dynamics 365 Customer Engagement is a collection of software as a service that represents sales, customer service, marketing, and field service. Microsoft debuted its Blockchain technology by introducing its Azure Blockchain as a service (BaaS) in 2015. Microsoft's goal was to provide a certified Blockchain marketplace. They provided guidance to their partners emphasizing the importance of Blockchain, and how they can use Azure Blockchain (Spies 2017). However, Microsoft announced that Azure Blockchain Service was retired on September 10, 2021¹. They advise their customers to use *ConsenSys Quorum Blockchain Service* as a direct replacement (Altimore 2021). *ConsenSys* is an Ethereum software company that provides different tools to help users develop decentralized applications. Quorum is a fully managed ledger service that allows organizations to deploy and manage their consortium networks².

In terms of third-party Blockchain solutions, Smart Stamp Document Sealing with Blockchain technology is a product add-on embedded in any business application such as CRM (Microsoft Dynamics 365, Salesforce, SugarCRM, etc.), enterprise resource planning systems (SAP, Microsoft Dynamics 365 NAV (BC), AX (FO)), document management platforms (Microsoft SharePoint, etc.). It allows documents to be sealed with one click where users do not need to be experts of the underlying technology of this add-on (Connecting Software 2022). This add-on is the result of a third-party collaboration between Connecting Software, a provider of synchronization and integration software, and Cryptowerk, a data integrity company.

Oracle

Oracle provides its customers with Oracle Blockchain Cloud Service (OBCS). It is a pre-assembled cloud platform as a service (PaaS) for building Distributed Applications (dApps), running smart contracts, and maintaining a tamper-proof distributed ledger database. It is built on top of the open-source Hyperledger Fabric developed by the Unix foundation. Oracle BaaS introduced two key concepts (Onik and Miraz 2019). First, OBCS holds a turn-key sandbox that is solely designed for the developers. Second, independent software vendors (ISV) facilitate easy deployment of Blockchain technology regardless of their vendor. OBCS can be integrated with Oracle's different business applications and third-party ones through cloud adapters. In terms of CRM, they provide adapters for their application, Oracle Siebel, and other external CRM providers such as Salesforce. For instance, Arab Jordan Investment Bank (AJIB) utilizes Oracle Blockchain solution to facilitate cross-border payments of their customers where Oracle Blockchain enables them to share customer information with third parties in a secure manner. Hence, AJIB provides customers more convenience, speed and simplicity when transferring money.

Pegasystems

Pegasystems' Blockchain Innovation Kit was deployed as part of Pega *Infinity*, described as "the industry's only unified digital foundation that connects front-end digital customer experiences with back-end process automation" (Russel 2018) pg. 1. How Blockchain manifests within *Infinity* appears to be focused on the two dimensions of digital process automation (DPA) and client onboarding/*Know your Customer (KYC)* (Pegasystems 2018; Tharaken 2018). The Blockchain Innovation Kit purportedly allows integrating applications developed on the Ethereum Blockchain with Pega's *KYC* and *Client Lifecycle Management (CLM)* applications. We downloaded the *Blockchain Innovation Kit*, which contains sample Ethereum-based smart contracts, sample *KYC* and *CLM* integration components, and prebuilt applications to evaluate use cases such as disease management. The sample smart contracts aim to demonstrate ways to facilitate basic read/write operations in the Ethereum Blockchain (Pegasystems 2021). An attempt to access official

¹ <https://azure.microsoft.com/en-us/solutions/blockchain/-overview>

² <https://consensys.net/quorum/>

documentation³ resulted in a *Page Not Found* error and notification that the content had been removed. A further investigation of postings on Pega's *Community* via the search term "blockchain" results in five results, including a post from January 2020, where a Pega user reports a Blockchain integration component is not compatible with their version of Pega: version 8.3⁴. No one from Pega responded on the message board to the compatibility issue. The Blockchain Innovation Kit website was last updated on September 28, 2021 (Pegasystems 2021).

Salesforce

Salesforce's Blockchain offering, *Salesforce Blockchain*, debuted via a 2019 press release. Described as a low-code Blockchain platform built upon Hyperledger Sawtooth, Salesforce Blockchain was purportedly implemented by Arizona State University to create a unified *Learner Trust Record*, (Salesforce Inc. 2019). A search for more information revealed a video outlining the use of Blockchain in Salesforce to track the provenance and ownership of luxury handbags. It demonstrates the creation of custom Blockchain-based objects (i.e., distributed objects) alongside standard Salesforce custom objects. To the viewer, whether a custom object is stored in the standard cloud relational database model underlying Salesforce's classic offerings or whether the object is stored in a distributed ledger solution, is hardly distinguishable. As the handbag changes ownership, each new owner is automatically created in Salesforce as a new prospect account, allowing for passive lead generation at every stage of purchase, including aftermarket purchases (Salesforce Inc. n.d.).

Salesforce has begun teaching Blockchain on its online learning platform, the gamified MOOC, *Trailhead*. The learning module, *Blockchain for Salesforce*, outlines a collection of use cases, which may be of interest to CRM practitioners and which Salesforce's Blockchain offering could facilitate (Trailhead 2021). It does not appear to be possible, however, to test or explore Salesforce Blockchain within Trailhead, and an attempt to replicate functionality from the handbag video was unsuccessful – there was no apparent ability to create a custom distributed object. A search for "blockchain" on Salesforce's *AppExchange*⁵ revealed 11 apps, including two free APIs (*IBM Blockchain Platform for Salesforce* and Object Frontier's *Blockchain Adapter for Salesforce*), besides solutions offering the ability to engage with bitcoin directly from Salesforce (*Kripto*), and some third party solutions that only incidentally utilize Blockchain technology, such as Pravici *Pocketcred*, which claims to facilitate Blockchain-based vaccination credentialing directly from Salesforce.

SAP

SAP launched its own Blockchain-as-a-service (BaaS) offering in 2018 called *SAP Cloud Platform Blockchain*, which purportedly provides customers access to both Hyperledger Fabric and Multichain. Accessible as a service within the SAP *HANA* Data Management Suite, this solution claims to be a comprehensive integration of Blockchain into SAP's platform (Zube and Perez 2018). At the time of its launch, SAP's BaaS was branded as one component of the SAP *Leonardo* package, which included functionality surrounding a large number of emergent technologies, including machine learning, internet of thing (IoT) support, big data, and analytics capabilities. Collectively branded as *systems of intelligence*, these systems are envisioned as enrichments to existing SAP *systems of record* (Zube 2018), such as the standard relational CRM database. Despite previous promotion of business partners utilization of SAP Blockchain solutions (e.g., (Huillet 2019)(Hackett 2019; SAP News 2019)), an attempt to identify SAP Blockchain's current state as of 2022 was not straightforward. For example, an attempt to visit <http://www.sap.com/blockchain>, a link provided in (Zube 2018), redirects to <https://www.sap.com/products/intelligent-technologies.html>, which promotes SAP's AI and IoT offerings, but gives Blockchain only a one-word mention buried in the details. SAP continues to make available official documentation on the SAP Blockchain adapter (SAP Portal 2022).

³ <https://collaborate.pega.com/documents/pega-blockchain-innovation-kit-documentation>

⁴ <https://collaborate.pega.com/question/need-pega-blockchain-innovation-kit-compatible-pega-83>

⁵ <http://appexchange.salesforce.com>

Discussion

The major CRM vendors have all but proven the efficacy of Gartner's Hype Cycle and appear to be, themselves, in the *trough of disillusionment*. From an initial rush to develop, launch, and evangelize some form of BaaS for their platforms around 2018-2019, to the current deflection, redirection, or removal of web content, the major CRM vendors are just as susceptible to the hype cycle as any other organization. The CRM vendors might be likened to a once-proud parent, eager to evangelize the success of their creations, but increasingly disappointed in their "children's" performance. For these CRM vendors, Blockchain is now truly the awkward adolescent, sent to its room following a major disappointment. Microsoft's retirement of their Azure BaaS solution is the most forthright dismissal of the integrated Blockchain option of any of the CRM vendors. Although Oracle has introduced its Blockchain solution (OBaaS), it is still relatively new undertaking for the company (i.e., late 2018). It has the promise to be a game changer in the CRM domain because its Blockchain cloud service can be integrated with other CRM systems that are considered Oracle competitors (e.g., Salesforce)⁶. Pegasystems' Blockchain offering does not appear to be compatible with the latest versions of its platform and is oriented toward narrow subcategories of CRM. Salesforce has published the most proof of its Blockchain advancements, but the apparent lack of a dedicated page to a current Blockchain offering and the emergence of 3rd party solutions on Salesforce's AppExchange marketplace suggest its in-house Blockchain capabilities are not a priority. Perhaps the sentiment of Blockchain for CRM by the major vendors is encapsulated by web post made by a member of SAP's Innovation Center: "We're looking at concepts, technology, existing implementations, and future ideas in the Blockchain space[...] to figure out if the technology is a business disruptor, a good technology for specific scenarios[,], or simply overhyped - and not relevant for business" (SAP n.d.).

Our analysis of CRM vendors underscores that integration challenges still exist and supports prior research surrounding CRM 4.0 (e.g., (Kinnett and Steinbach 2021)) indicating specific use cases remain scarce. The full potential of Blockchain and CRM might not be achieved by those six vendors; instead, the full realization of CRM and Blockchain could be the responsibility of new players. Although CRM Blockchain-based vendors are still emerging, there are some existing initiatives worth considering. For example, *Cere* Blockchain is building a complete solution on the Blockchain that aims to solve CRM's biggest issues in customization, efficiency, and secure & privacy-preserving data sharing⁷. *Cere* Network claim that they are developing an ecosystem that embeds Blockchain technology into the application's core foundation. So, any updates, changes, customizations, and integrations will need to go through a much higher and vigorous level of approval before being committed. *Cere* is set up as a decentralized SaaS with an enterprise-first focus, as opposed to just another generic Layer-1 Blockchain project. Through *Cere*'s plug-and-play data onboarding procedures and APIs, consumer data becomes tangible on the Blockchain, making it suitable for efficient and secure utilization and processing on the decentralized data network.

Another vendor, *Loyyal*⁸, is reinventing how customer incentives are created, rewarded, and managed. They claim that by using proprietary Blockchain and smart contract technology, *Loyyal* brings a host of benefits to a highly fragmented industry and offers brands an innovative way to unlock the billions of dollars in value held captive in legacy loyalty programs today. With *Loyyal*'s Blockchain-as-a-Service (BaaS), clients have all-inclusive access to the Platform, enterprise-grade hosting services, development tools, support services, and our ever-growing network of partners. According to their website, they are in partnership with some of the big corporations such as IBM and Deloitte.

Conclusion & Future Work

This paper identifies the leading vendors of CRM solutions and explores how these vendors approach Blockchain technology. The previous research on CRM and Blockchain is enriched with promises and expectations where scholars seem to envision unrealistic applications of both technologies. This research suggests that leading CRM vendors are struggling both to define relevant use cases and to integrate

⁶ <https://www.oracle.com/jo/customers/ajib-1-blockchain-cl.html>

⁷ [Cere Co-founder and CEO press release](#)

⁸ <https://loyyal.com/>

Blockchain into their current systems, no longer considering either to be a priority. This posture from vendors implies they are in what Gartner describes as the *trough of disillusionment*.

Most CRM vendors' Blockchain initiatives are hype-driven, indicating a shortsighted vision that requires substantial academic intervention. The complexity of Blockchain technology coupled with the vastness of the CRM domain (see Figure 1) creates a need for more research activities. Yet, we believe academia should not explore the potentials of CRM and Blockchain in total isolation of industry initiatives. For instance, highlighting the features of Blockchain technology and embedding them into possible theoretical CRM use cases does not assist in advancing both technologies.

Based on the outcomes of this research, we believe further examination is essential. First, we propose to validate and extend our current research of the top CRM vendors' Blockchain perceptions through direct contact, such as through surveys, focus groups, or semi-structured interviews. Similarly, we intend to conduct an empirical study that explores industry professionals' perceptions of CRM and Blockchain potentials. The objective of this future work is to bridge the gap between the two distinct technologies, and whether these professionals realize possible applications that have been overlooked by academia. Finally, additional future work should identify the current, common limitations and challenges faced by organizations implementing CRM and determine objectively whether Blockchain even ought to be considered as a potential remedy for specific issues. In the absence of this approach, Blockchain continues to remain – at least in the context of CRM – a solution in search of problems.

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