

Banking, Financial Services, and Insurance (BFSI)

SPARK Matrix™: **Card Management Systems** **(CMS), Q3, 2023**

Market Insights, Competitive Evaluation, and Vendor Rankings

August, 2023



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Executive Overview

This research methodology includes a detailed analysis of global Card Management Systems (CMS) solution market dynamics, major trends, vendor landscape, and competitive positioning analysis. The study provides competition analysis and ranking of the leading CMS vendors in the form of the SPARK Matrix™. This research provides strategic information for technology vendors to better understand the market supporting their growth strategies and for users to evaluate different vendors' capabilities, competitive differentiation, and market position.

Market Dynamics and Overview

Quadrant Knowledge Solutions defines Card Management Systems (CMS) as:

“The platform that provides functionalities to support comprehensive lifecycle management for credit, debit, prepaid, smart-chip and all multi-application smartcards. The CMS platform enables organizations to handle all aspects of card management including billing, supporting multi-payment types including mobile and contactless, account management, clearing, settlement, credit scoring, dispute management, microfinance, and merchant servicing. The centralized platform supports a wide-range of card-associated activities and services including designing card products for attracting new customers and increasing card usage for existing one.”

The Card Management Systems (CMS) have significantly advanced from signatures to Magnetic strips to chipsets to NFC's (Wireless). These platforms have also evolved to accommodate a variety of payment card types and emerging card types that remain a critical component of the payment infrastructure. Despite its importance it's still lagging compared to other payment channels such as mobile payments, m-commerce, e-banking, owing to bottlenecks such as misused or blocked cards. Driven by continuous innovation and investments from leading investors, CMS platforms play a vital role in banking, and it has been a critical aid in CMS's market growth. These platforms provide a wide range of advanced functionalities for multiple use cases like multiproduct, multicurrency, multipayment types (including contactless, QR payments, NFC's, in app payments, and tokenization.)

Many leading CMS vendors are upgrading their CMS features and capabilities to address the growing financial challenges owing to current financial uncertainties in the world. They are offering capabilities such as payment via instalments, payments holiday, credit card expiry bypass, and virtual cards, helping both banks as well as financial institutions to address their customers' needs and comply to the regulations too. The instalment pay option enables banks to provide their customers with a payment plan for one-time purchases. They also enable banks to make repayment plans based on the customer's request, thus preventing crimes related to temporary payment management issues. Payments holiday option allows banks to temporarily hold interest as well as principal for longer periods thus it helps their customers especially during the lockdown also the credit card expiry bypass option allows banks to bypass the expiry date for all transaction types

Following are the key capabilities of CMS solutions:

- **Card Life Cycle Management** -The platform should support the complete lifecycle management of cards from issuing to acquiring on a single unified platform. These platforms enable issuers to design new card products instantly as well as providing integration to complex product types and product combinations for different card types. These platforms offer flexible fee calculation rules to enable issuers automate their fee structure and they help to create cards quickly by providing configuration tools. They also offer multichannel operability thereby enabling issuers to operate across multi channels, countries, and industries.
- **Multi-channel and Multi-payment Support** - The platform should provide support for multi-card products, tokenization and mobile payments and they should also offer value-added key features such as real-time fraud detection, multi-lingual, multi-payment, multi-currency support, multi-institution, and multi-territorial support. CMS platform should be flexible for easy operability of functions like card issuing, merchant acquiring, digital wallets, account management, payment switch, e-commerce, and digital banking. The platforms should be capable enough to manage all the aspects of card such as card life-cycle management, ATM management, billing, mobile payments, and contactless payment, clearing and settlement, point of sale, microfinancing, and electronic payments processing.
- **Account Management** - The CMS Platforms should make application processing; card issuance quicker and thus enhance smooth customer onboarding. The platforms should process the capability for KYC and smooth customer onboarding. These platforms should also offer real-time data management which helps the issuers update their customers regarding card transactions quicker and foster Customer Relationship Management. Additionally, these platforms leverage cloud and Software as a Service (SaaS) which helps both the banks and fintech institutions as well as their end users to get access to data of the end-users, process the end-user data and smoothly onboard the customers into the banking environment. These platforms should be able to seamlessly onboard and deboard customers, set privileges, personalized profiles, and track the account activity provide analytics such as transaction

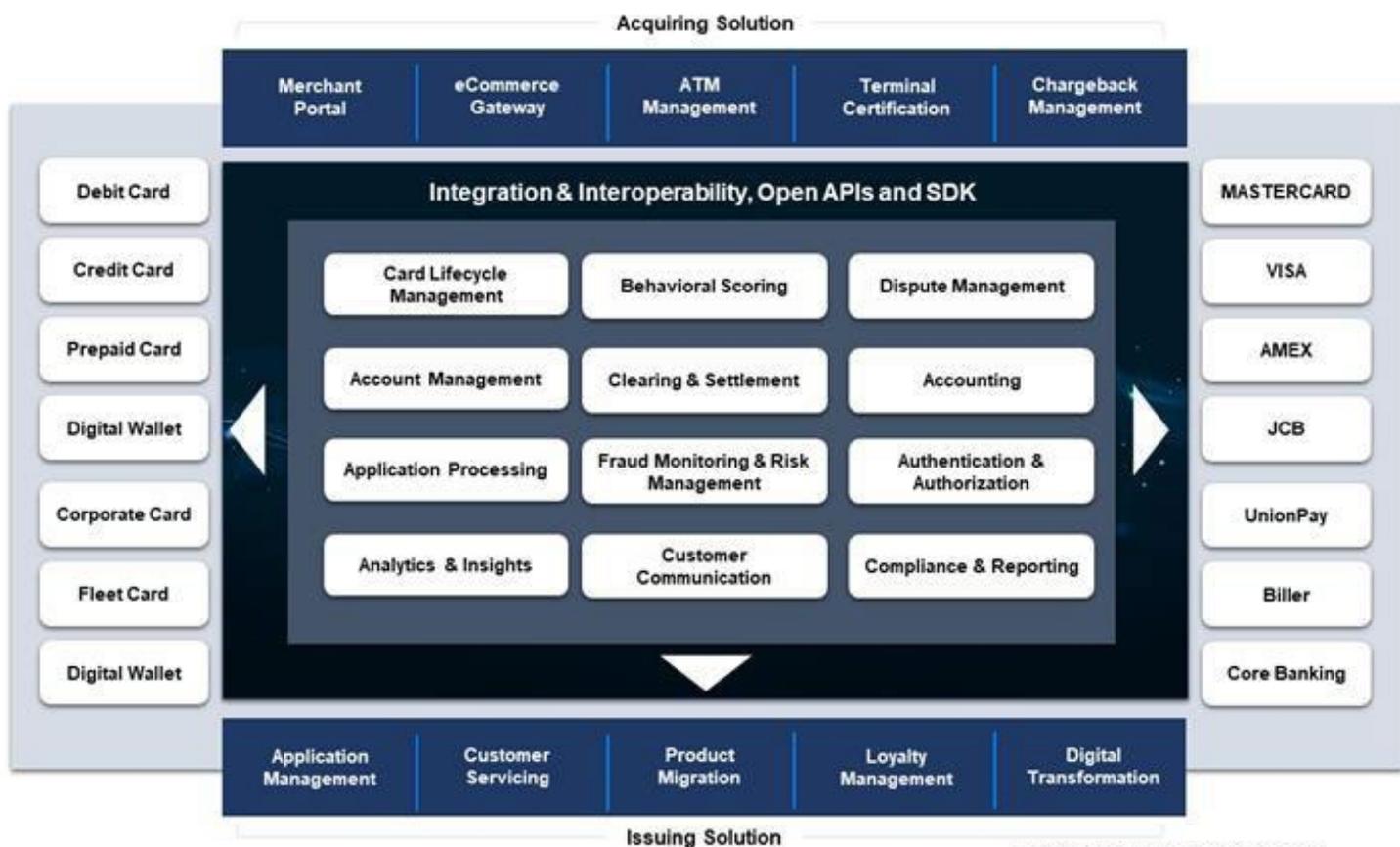
history, balance information and spend analytics. Banks and FIs should evaluate the Vendors based on their ability to provide a user-friendly interface or dashboards to have a holistic view of their end-users.

- **Clearing and Settlement** - A CMS platform should provide an accounting tool to manage the complexities in the payment business especially during the clearing and settlement cycle for authorized financial and non-financial transactions. These platforms should be able to detect and authorize the transactions on a real-time basis therefore enabling issuers to notify their customers. The platforms should be able to analyze and give actionable insights on billing and invoicing and try to make the processes simpler and less ambiguous. They should provide third party integration as well as comply with the global regulations. They leverage the AI/ML capabilities which enables organizations to customize and personalize their billing software and enable organizations to process and handle multiple transactions in less time and spot any anomalies or fraudulent transactions instantly. The key capability that the platforms should possess is they should be able to authorize and give actionable insights on the transactions and must be able to differentiate fraudulent transactions. Additionally, the card management platforms should deliver real time insights on the date and time of transactions, mode of transactions, payment methodology used and must be able to match the customer id and transaction id for tracking and recording a particular transaction. They should keep track of the transactions made by the end users and must be able to deliver whenever needed.
- **Analytics and Visualization** - The platforms should provide enhanced analytics and visualization as they are the critical functionalities in card management systems. Banks and FIs should assess their vendors based on their analytics and visualization ability and these platforms should enable them to track the cardholder activity, identify trends and spend patterns and analytics, and assess their risk exposures. The platform providers leverage the use of Machine learning to identify the patterns in data and make predictions which help the banks to avail themselves for actionable insights and make informed decisions. The vendors also employ data mining tools to extract insights from large datasets which can be used by their clients to analyze the trends in spendings, identify customer segments and make improved decisions in marketing perspectives.

- **Risk and Fraud Prevention** - The platforms should be able to analyze and give actionable insights on fraud-detection and behavioral scoring for all payment types. Many ML-driven CMS platforms have capabilities which can analyze real-time payment transactions and can detect any suspicious activities from the end-user side across multiple channels. They operate on a scoring matrix which can detect and analyze any abuse or manipulation and they also have the capability of making behavioral scoring of the consumers transaction history. They help in mapping the consumer's devices, location, and time with their transactional behavior in real-time thereby enabling organizations to identify any gaps or anomalies quickly. These platforms also follow the Risk-based authentication method to dynamically adjust the level of authentication required for any transaction based on the risk of fraud. Many CMS platforms with ML-driven capabilities use an expert rules-based engine for predictive analytics and behavioral profiling to facilitate accurate fraud-detection and prevention and employ tools like credit scoring, address verification and geolocation tagging to assess the fraud and provide actionable insights. They leverage the expertly defined rules, profiles, scoring methods enabling or
- **Compliance and Reporting** – These Card Management Systems must comply with both RBI (Reserve Bank of India) as well as global regulatory bodies like EBA (Europe Banking Authority), SEC (Securities Exchange Commission), PCI-DSS, PA-DSS, PSD2 and GDPR regulations and must maintain data such as e-payments, e-mandates, and e-identity.
- **Scalability** - Card Management System providers should provide their platforms which are scalable and interoperable with the banking ecosystem and third-party service providers as well. The underlying architecture of the platform creates a major impact on the scalability of the platform. The platform providers provide their platform as Software as a Service and their platform can be provided on-premises, cloud or hybrid which can enable their clients to avail themselves of a scalable platform. The microservices architecture of the platform which are small, and independent helps them to scale the platform on multiple territories and multiple systems. The caching nature of the platform helps with data management and improves the overall performance of the platform.

- **Customization and Configuration** - Customization and configuration of the platforms form the critical aspects of Card Management Systems (CMS) platforms. These platforms should be designed so that they can be customized and personalized to the specific needs and requirements of the banks and FIs. The Vendors leverage the use of web-based configurations tools which can allow organizations to configure the platforms through a web-based interface and the platform can be customized according to the needs of their customers without changing the underlying code. The interaction algorithms within the banking environment and with third-party service providers is achieved by the usage
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Figure: Figure: Card Management Systems (CMS) Framework



Competitive Landscape and Analysis

Quadrant Knowledge Solutions conducted an in-depth analysis of major Card Management System (CMS) vendors by evaluating their products, market presence, and value proposition. The evaluation is based on primary research with expert interviews, analysis of use cases, and Quadrant's internal analysis of the overall CMS market. This study includes an analysis of key vendors, including Fiserv, TSYS, Tietoevry, HPS, ACI Worldwide, CR2, BPC, Openway, Sopra Banking Software, Paymentology, Worldline global, i2c Inc, Software group, Marqeta, RS2 Software, Corecard Software, and PayCore.

Fiserv, Tietoevry, TSYS, HPS, ACI Worldwide, BPC, CR2, Openway, Sopra Banking Software, and Paymentology are the leaders in the global CMS market and have been positioned as the top technology and emerging leaders in the 2023 SPARK Matrix™ analysis of the CMS market. Companies like CR2, HPS, Paymentology, TSYS, Fiserv and Tietoevry have a dedicated product portfolio for Card Management Systems (CMS). They contain a wide array of features implemented in the platform that help them to respond to quicker market disruptions and changes. These players in the Card Management System space have faster go-to-market strategy products and are very responsive to emerging market trends like embedded-finance and autonomous finance. Some of the vendors have also developed their platform's abilities to focus on improving customer experience and help their clients in offering enhanced Customer Relationship Management (CRM). Companies like Openway group focus on multiple business models where they function as a CMS solution provider and solution accelerator to upscale the business models of their clients who depend upon the CMS solutions. These companies offer the highest value proposition in terms of technology and possess a good customer base with a considerable number of deployments across industry verticals. These companies also offer comprehensive features to meet the CMS - related needs of Large Banks, Small banks and FIs, Corporates, education industries, insurance agencies, governmental institutions, fleet card providers, travel companies, transport, merchants, Credit Unions, and small to medium-sized enterprises. Most vendors offer industry-specific or use case-specific customized solutions and are based out of North America, South or Latin America, Europe, Middle eastern, African, Australian, and Asia Pacific region.

Some of the key capabilities offered by prominent CMS vendors include Card Lifecycle Management, multi-payment and channel support, account management, clearing and settlement, risk and fraud prevention, analytics, visualization and

dashboarding. In addition, some leading vendors offer integrated CMS platforms. There is a higher demand in the North American, South American, European, Middle Eastern, and African region for the CMS platforms such as BPC SmartVista CMS, HPS PowerCard CMS, CR2 BankWorld, Sopra Banking Software CMS, Openway Way4 digital platform, TSYS Prime CMS, and Fiserv CardValet CMS solution which cover multiple solutions such as Card Management Systems, Merchant Payment platforms, Digital Banking solutions, and Payment platforms through single integrated platform to achieve faster go-to-market products and also have lower total cost of acquisition pertaining to operations and customer acquisition. Whereas Paymentology offers dedicated solutions for small banks, credit unions, corporates, and large banks, covering multiple wants and needs through products such as Flex, Sprint, Pro, Enterprise and CR2 provides BankWorld digital application providing entire suite to solve customer needs pertaining to digital banking and card management solutions. CR2 also have developed enhanced contactless payments during the Covid-19 period where the transaction can be generated over the mobile application in the form of QR and cash can be withdrawn directly from the ATM without the need for cards.

The demand for integrated solutions is more prominent in the market with rise in technologies autonomous finance and embedded finance which has been greatly influencing the market as well the players in the market. Post covid scenario created the need for contactless payments which are scenarios that are continuously pushing the CMS vendors to offer innovative products. Costing has also become a major impact because the banks and FIs who depend upon the CMS solution are looking for lower cost of acquisition pertaining to the product. With the adoption of artificial intelligence and machine learning and advanced analytics and developing products considerably at a lower cost vendors can differentiate from each other and achieve first mover advantage in the market perspective.

Ultimately, the CMS leaders must continuously adhere to the changing customer needs and develop solutions with customer-centricity in the new digital era. The solutions should be developed to help their clients enhance their Customer Relationships with their end-users to have reduced churn rates and achieve customer loyalty. Utilizing technology and data will harness the success of CMS in the payments and cards arena.

Key Competitive Factors and Technology Differentiators

The following are the key competitive factors and differentiators for the evaluation of Card Management Systems (CMS) solutions and vendors. While the majority of CMS solutions may provide all the core functionalities, the breadth and depth of functionalities may differ depending on different vendors' offerings. Driven by increasing competition, vendors are increasingly looking at improving their technology capabilities and overall value proposition to remain competitive. Some of the key differentiators include:

End-to-end card lifecycle management: Users must look for modular integrated solution that enables FIs and other organizations to manage the entire card lifecycle right from issuing, acquiring, and switching through a single unified platform. Users should evaluate CMS solutions that support various card types including debit, credit, prepaid, smart chip, magnetic-stripe, EMV and virtual cards, tokenized and mobile payments and based on their organizational requirements. Leading vendors are offering integrated CMS solutions to cover any type of payment instrument processed through any available payment rails. Vendors are providing covering multiple touchpoints such as KYC and customer onboarding, behavioral biometrics, and secured customer data management to ensure seamless customer onboarding and deboarding. This enables Banks and FIs to have seamless operations and reduce the Total cost of acquisition, and operations pertaining to customer management.

Ease of Use: Users should evaluate CMS vendors that offer low code product configuration tools. Additionally, organizations should also evaluate CMS vendors that offer multi-lingual, multi-region, multi-language, multi-currency, multi-payment channel, and multi-institution support in terms of deployment, user interface, and local support to facilitate seamless integration with complex banking environments.

Omnichannel Support: Users should evaluate vendors that support in-store, online and mobile payments for a seamless customer experience. Vendors must transition from a channel-driven perspective to a single omnichannel view, in which they can offer multi-payment channel solutions for both issuers and acquirers through a unified payment platform. Leading vendors in the CMS market are offering omnichannel support to any payment type irrespective of the currency,

vertical, and device. This omnichannel payment platform helps in unifying the payment data and helps to generate a single view of an individual's habits, goals, needs and preferences. Hence, users are advised to evaluate vendors that offer an omnichannel solution for seamless personalized experience.

Cloud native capabilities: Although most of the CMS deployments continue to be on-premises ones by large organizations, many vendors are also offering cloud-enabled deployments with cloud-native capabilities to cater to small and mid-sized organizations. This allows vendors to offer cost reduction, easy installation, and easy management by users. Vendors also operate on multiple business models pertaining to cloud deployment which include providing a shared space between the platform provider and clients, dedicated private cloud for clients, public cloud operations or vendors themselves host the cloud ecosystem themselves on behalf of their clients which in turn help the Banks and FIs who leverage the cloud ecosystem from the Vendor's different business models proposed for quick product launches and lower total cost of acquisitions and operations.

Advanced Analytics: Users are advised to look for vendors who can offer advanced analytics capabilities to determine the behavior patterns of the defaulters and assist the users for determination of their spending. Vendors are also leveraging predictive analytics capabilities to understand the use of debit and credit card and portfolio performance in real-time and to identify and avoid malicious transactions. The use of advanced analytics also enables FIs to identify the emerging market trends. Leading vendors in the CMS market are also providing data like analytics capabilities that stores and processes structured, semi-structured and unstructured form of data, helping in mitigating data siloes and simplifying analytics. This would help organizations map the data and come up with personalized offerings which would result in possible sales and even increase the existing customer user base. Vendors also have partnerships with third-party providers to analyze the customer spending patterns, spend analytics, and segment customers and help the banks and FIs to deploy target marketing. The customer segmentation is done based on demographics, psychographics, purchase behavior and spending patterns. The analyses include Market Basket Analysis (MBA), Customer Lifetime Value (CLTV), Recency, Frequency, and Monetary (RFM), and Customer Churn analyses etc. The backend support operations can also be improved by providing accurate data pertaining to customer metrics to track and optimize customer interactions, identify areas of improvement, and resolve customer issues faster and efficiently. They help the banks and FIs in cost reduction pertaining to enhanced customer service operations. To improve the operations of the clients, Vendors leverage big data

and Business Intelligence (BI) to extract and gain insights on the customers and provide reports in the form of enhanced dashboards and help them gain a holistic visualization of their end-users.

Robust Fraud Detection Capabilities: Vendors in the CMS space are offering fraud detection and prevention solutions that help issuers and acquirers to combat the threat across the transactions across the various channels in real-time. Vendor leverage rule-based engine that helps FIs to continuously monitor the user activity, thereby ensuring that the activities are legit ones, and the fraudulent activity is prevented before the actual fraud takes place. Vendors are offering an alerting feature in which the customer can be automatically contacted via email, SMS, etc. if the transaction is detected as suspicious. Organizations are increasingly evaluating vendors with robust machine learning-based fraud detection solutions with greater emphasis on model performance, as the traditional rule-based fraud prevention systems are not effective in detecting the new types of frauds and suspicious activities. Hence, users are advised to evaluate the vendors based on their robust fraud prevention capabilities which will help them to stay ahead of the fraudsters. With rapid growth in the fraud management systems including shift from 3DS fraud systems to 3DS 2.0 fraud management systems with improved accuracy in risk detection, mitigation and management by analyzing the data from multiple touchpoints such as IP address of the device, biometrics from the end-user's side thereby helping them to reduce the number of false positives in outputs and posing a bigger threat for fraudsters to bypass the system. Furthermore, these systems also provide frictionless authentication by reducing the number of authentication points in the verification process thereby improving the end-user experience and the additional layer of security provided by these systems provides a wider range of security making the transactions more secured and help to reduce the losses occurred to banks, FIs and merchant in dispute and chargeback management processes.

Reporting and dashboarding: Major Card Management System (CMS) platforms provide comprehensive reporting, visualization, and analytics capabilities. These platforms offer various visualization capabilities, such as 2D-3D graphs, tree maps, heat maps, dendrograms, box-in-box, and flow diagrams. This helps users conduct an in-depth impact analysis and understand the ramifications of an incident. Vendors also provide pre-built reporting templates that enable users to comply with regulations such as ISO22301 and GDPR. It refers to generating reports to get a unified view of risk profiles, fraud patterns, active anomalies, devices with potential malware, and ongoing trends. These reports are submitted

for internal audits and are also used for complying with external regulations. The solution should also allow business users to create powerful visualizations to measure performance, derive deep insights, and make informed business decisions. Furthermore, CMS solutions offer centralized visualization capabilities that provide a unified view of network data, user behavior patterns, system data, and application data. This helps organizations navigate large datasets by gathering and collating data from multiple sources and presenting it in a single graphical presentation. Vendors leverage the usage of Dashboarding tools like Power-bi, Tableau to provide the comprehensive picturization of the Customer touchpoints and data which can be used by banks, and FIs to detect patterns and make informed decisions. The user friendly and interactive nature of the dashboard decides the selling point of the dashboarding and reporting capability of a Card Management System platform.

Quick product launch: Leading CMS vendors are continuously enhancing their product configurability to offer low-code and no-code-based tools suitable for business users. Advanced CMS platforms include product configuration tools enabling issuers to launch new card products easily without requiring complex customization. vendors in the CMS market are also providing web-based screens and flexible templates to facilitate quick product launch. These templates help in launching new digital products, alternative payment methods, virtual cards, and tokenization. Vendors are also offering a modular architecture to facilitate tailored integration and fast time to market for quick product launches. The architecture development is based on microservices and API marketplace integration enabling them to provide a scalable platform that can be integrated and expanded to multiple third-party and operated on a larger scale.

Regulatory and Compliance support: The CMS platform should support different compliance and regulations mandates. Users should evaluate CMS solutions that offer strong customer authentication capabilities, and support for global and regional, domestic scheme mandates and compliance. vendors in the CMS market are providing set of standards, operational and management reports that are required by local regulators and can be customized as per the user's business needs. Vendors provide support to multiple regulations such as GDPR act for data protection, Strong Customer Authentication (SCA) directive pertaining to European regulatory standards, PCI-DSS, PA-DSS regulations, Islamic finance, and ISO standard regulation support.

Breadth and Depth of Technology Capabilities: Organizations should evaluate CMS tools that offer comprehensive capabilities in terms of providing modern, microservices-based, and open technology architecture, offering end-to-end card lifecycle management functionalities for multiple card types and multiple payment types. Most CMS vendors are offering capabilities for card lifecycle management, application processing, authentication & authorization, behavioral scoring, dispute management, account management, clearing & settlement, accounting, fraud monitoring & risk management, analytics & insights, customer communication, compliance & reporting. However, the breadth and depth of these capabilities might vary by different vendor offerings. Additionally, the vendor's customer value proposition may differ in terms of ease of deployment, ease of use, price/performance ratio, support for a broad range of use cases, global support service, and such others.

Technology Vision & Roadmap: The CMS vendors are constantly enhancing and innovating their technology value proposition in terms of providing a holistic CMS solution, starting from application processing, authorization & authentication to compliance & reporting. The vendors are also focusing on offering an exceptional digital experience to customers through a seamless CMS authentication process. Driven by the continually evolving payment dynamics and market trends, CMS platforms should offer robust extensibility, flexibility to support the continued evolution of the CMS platform and associated payment technologies. CMS vendors should focus on providing advanced functionalities to support the evolving needs of supporting new cards and product types, emerging channels, and services. Leading vendors in the CMS market are also planning to expand their partnership ecosystem, enhance the cloud-native transformation, improve fleet capabilities, expanding the global footprint, introducing buy now pay later (BNPL) POS installment lending, etc. Organizations should carefully evaluate the vendor's existing technology capabilities along with their technology vision and roadmap to improve overall satisfaction and customer ownership experience for long-term success.

Vendor's Expertise and Domain Knowledge: Organizations should evaluate vendors' expertise and domain knowledge in understanding their unique business problems, use cases, and industry-specific requirements. Organizations are advised to conduct a comprehensive evaluation of different CMS platforms and vendors before making a purchasing decision. Users should employ a weighted analysis of the several factors important to their specific organization's use cases and industry-specific requirements. Users should employ a weighted analysis of

several factors important to their specific organization's use cases and industry-specific requirements. Requirements of key CMS features may differ significantly from financial institutions to banks, from SMBs to large enterprise organizations, and such others. Users should also look for a CMS solution with a history of successful large-scale deployments and carefully analyze the existing case studies of those deployments. Users should look for ease of use, comprehensiveness of offering, software's flexibility to adapt with constant market changes and regulatory requirements, minimizing total cost of ownership, and transparency. This should form the basis for preparing the best practice for CMS platform deployments.

Scalability and Availability: Vendors across the globe often provide card management solutions that can provide requisite speed, scalability, latency, and availability to meet their users' distributed payment environments across the line of business, payment types, channels, and geographic locations. The platform should support scalability to process a large volume of transactions per second (TPS) with sub-second response times. Organizations should evaluate vendors platforms' capability in supporting a large volume of real-time transactions with the sub-second response time. The requirements of key CMS features may differ significantly from financial institutions to SMB to large enterprise organizations. Users should also look for a CMS solution with a history of successful large-scale deployments and carefully analyze the existing case studies of those deployments.

Integration and Interoperability: Seamless integration and interoperability with vendors' existing technologies are amongst the crucial factors impacting technology deployment & ownership experience. The CMS solution should offer seamless integration and interoperability with multiple fraud analytics solutions, third-party risk signals, and mobile security applications to ensure smooth operation, information exchange, and flexibility of implementation. The solution should also support integration with third-party device compliance solutions, payment service providers, and gateways. Users should evaluate vendors' capability to provide out-of-the-box integration with best-of-breed technologies and custom integration. Also, users should assess the CMS platform in offering breadth and depth of integration capability specific to their existing tools and infrastructure.

Use Case Support: A CMS platform should be able to cater to a wide range of use cases, including transaction monitoring to prevent card fraud, real-time payment infrastructure upgrades, card service processes for issuing and processing cards, supporting the dispute resolution process, seamless integration with core banking, card production, payment factory launches, unified processing platforms

for digital transformation, wallet platforms, centralized retail settlement solutions, quick launch of banking products and services, fully digital bank with customer onboarding, loyalty functions, etc. To ensure a seamless customer experience for improving business objectives and meeting organizational goals, users should evaluate CMS vendors whose products can support their organization and industry-specific use cases.

SPARK Matrix™: Strategic Performance Assessment and Ranking

Quadrant Knowledge Solutions' SPARK Matrix™ provides a snapshot of the market positioning of the key market participants. SPARK Matrix provides a visual representation of market participants and provides strategic insights on how each supplier ranks related to their competitors, concerning various performance parameters based on the category of technology excellence and customer impact. Quadrant's Competitive Landscape Analysis is a useful planning guide for strategic decision makings, such as finding M&A prospects, partnerships, geographical expansion, portfolio expansion, and similar others.

Each market participant is analyzed against several parameters of Technology Excellence and Customer Impact. In each of the parameters (see charts), an index is assigned to each supplier from 1 (lowest) to 10 (highest). These ratings are designated to each market participant based on the research findings. Based on the individual participant ratings, X and Y coordinate values are calculated. These coordinates are finally used to make SPARK Matrix.

Technology Excellence	Weightage	Customer Impact	Weightage
Card Lifecycle Management	7%	Product Strategy & Performance	20%
Multi-payment and Multi-channel support	10%	Market Presence	20%
Account Management	5%	Proven Record	15%
Clearing & Settlement	7%	Customer Service Excellence	15%
Analytics and Visualization	10%	Unique Value Proposition	15%
Risk & Fraud Prevention	15%	Ease of deployment	15%
Compliance and Reporting	7%		
Scalability	10%		
Customization vs Configuration	7%		
Integration & Interoperability	7%		
Vision & Roadmap	5%		

Evaluation Criteria: Technology Excellence

- **Card Lifecycle Management:** Issuing, acquiring, all card types (credit, debit, prepaid), issuance to closure, automated transaction fee calculation, account settlement.
- **Multi-payment and Multi-channel support:** Tokenization, mobile payments, contactless payments, Point of Sale (POS) payments, ATM Management, multi-currency, international payments, digital wallets, merchant payments, online payments, omnichannel support and others.
- **Data Integration:** Seamless integration with third-party data sources, internal datasets, government databases, device IDs, etc., facilitated through real-time API connections, ensures robust and efficient data enrichment.
- **Account Management:** Creating, maintaining, and managing customer accounts and account management processes.
- **Clearing & Settlement:** Clearing and settlement processes, billing and invoicing, dispute, and chargeback management.
- **Analytics and Visualization:** Intuitive UI, visualization techniques, standard and customized reporting, real-time reporting.
- **Risk & Fraud Prevention:** Analyzing real-time transaction, suspicious activity check, abuse detection accuracy, risk scoring accuracy, behavioral scoring, ML techniques used.
- **Compliance and Reporting:** Maintaining and managing local and global compliance and supporting various reporting standards and market adaptability of different markets, complying to various data protection acts.
- **Scalability:** Number of customers and transactions handled, integration with various ecosystems, quicker product launches.

- **Customization vs Configuration:** Ease and level of customizability vs configurability based on issuers need, personalization and customization capability of the platform according to issuers needs and end-users needs.
- **Integration & Interoperability:** Ease of integration with international and national card schemes, other core banking systems, card manufacturers, switch interfaces, fraud systems, ERP, data warehouses, APIs covering all issuing and acquiring activities.
- **Vision & Roadmap:** To what extent does the product vision align with its buyers' needs in terms of acquiring, satisfying, and retaining customers? Does the vision promote a strong focus on the customer and a positive customer experience? How well does the vision align with current and future customer preferences? Does the company have a clear plan in place for implementing its vision through product improvements, innovation, and partnerships within the next year? Does the company possess the necessary resources and abilities to accomplish its planned roadmap?

Evaluation Criteria: Customer Impact

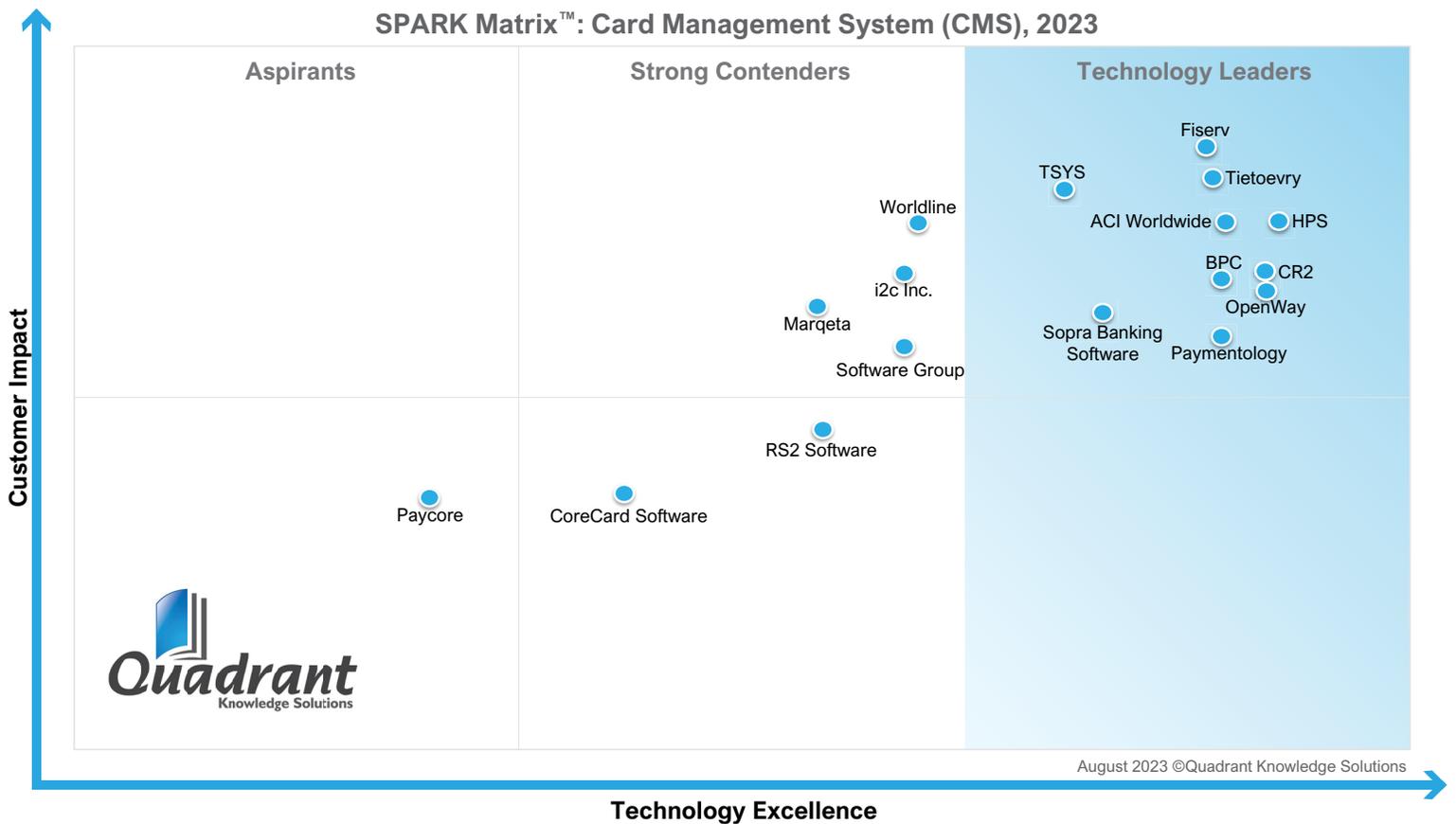
- **Product Strategy & Performance:** Evaluation of multiple aspects of product strategy and performance in terms of product availability, price to performance ratio, excellence in GTM strategy, and other product-specific parameters.
- **Market Presence:** The ability to demonstrate revenue, client base, and market growth along with a presence in various geographical regions and industry verticals.
- **Proven Record:** Evaluation of the existing client base from SMB, mid-market and large enterprise segment, growth rate, and analysis of the customer case studies.
- **Customer Service Excellence:** The ability to demonstrate vendors capability to provide a range of professional services from consulting, training, and support. Additionally, the company's service partner strategy or system integration capability across geographical regions is also considered.

- **Unique Value Proposition:** The ability to demonstrate unique differentiators driven by ongoing industry trends, industry convergence, technology innovation, and such others.
- **Ease of Deployment & Use:** The ability to provide superior deployment experience to clients supporting flexible deployment or demonstrate superior purchase, implementation and usage experience. Additionally, vendors' products are analyzed to offer user-friendly UI and ownership experience.

SPARK Matrix™: Card Management Systems (CMS), Q3, 2023

Strategic Performance Assessment and Ranking

Figure: 2023 SPARK Matrix™
Strategic Performance Assessment and Ranking)
Card Management Systems (CMS) Market



Vendor Profiles

Following are the profiles of the leading Card Management Systems (CMS) vendors with a global impact. The following vendor profiles are written based on the information provided by the vendor's executives as part of the research process. The Quadrant research team has also referred to the company's website, whitepapers, blogs, and other sources for writing the profile. A detailed vendor profile and analysis of all the vendors, along with various competitive scenarios, are available as a custom research deliverable to our clients. Users are advised to directly speak to respective vendors for a more comprehensive understanding of their technology capabilities. Users are advised to consult Quadrant Knowledge Solutions before making any purchase decisions regarding CMS Solution and vendor selection based on research findings included in this research service.

Fiserv

URL: <https://www.fiserv.com/>

Founded in 1984 and headquartered in Brookfield, Wisconsin, USA, Fiserv, a prominent global fintech and payments enterprise, specializes in delivering comprehensive solutions across international markets. Its offerings encompass a wide spectrum, including global commerce, merchant acquiring, billing and payments, and point-of-sale (POS) services. Notably, Fiserv's focus is solely on non-US markets. The company provides an extensive range of solutions tailored to various industries. For instance, it serves large enterprises by delivering an omnichannel experience, optimizing customer engagement, streamlining billing and payments, and facilitating connected commerce through its product, Carat. This product also boasts a globally scalable ecosystem. Additionally, Fiserv's product, Clover, is designed to assist small businesses. It empowers them to establish, process, and manage payments, while also aiding in merchant acquisition.

The company serves credit unions (small or large) by helping them build an adaptable and scalable technology ecosystem to meet evolving business needs and provide digital and offline experiences to their customers. Public institutions like government, education, healthcare, and utility agencies also get benefitted from Fiserv as the company helps these institutions manage costs, streamline workflow, and provide a secured environment for highly regulated billing and payments.

The company offers card management system solutions that covers the end-to-end card lifecycle from issuing and origination to transactions and collections. The key capabilities of the card management system solution offered by Fiserv are card lifecycle management, multi-payment and multi-channel support, account management, clearing and settlement, analytics and visualization, risk and fraud prevention, and compliance and reporting.

Fiserv has acquired Finxact, a core banking platform provider which helps Fiserv to utilize the SaaS based platform provided by Finxact thereby providing a differentiated and seamless digital banking experience. Finxact's banking platform uses a cloud-native architecture with a robust set of modern APIs, empowering banking, and financial institutions to create products and integrate services according to their customer needs.

The CMS solution offered by Fiserv complies with the global regulations such as PCI-DSS, PA-DSS, PSD2, and GDPR regulations.
performance.

Analyst Perspective

The following is the analyst perspective of Fiserv's offerings in the global Card Management system (CMS) Market.

- Fiserv's multinational CMS solution is applicable for banks and fintech institutions offering web-based multilingual capabilities ensuring flexible access to account information for their clients. The company offers end-to-end card management capabilities from issuing and acquiring to fraud management and data analytics and insights with web-based features that help banks to provide seamless consumer experience.
- Fiserv operates as a service provider, offering both issuing and acquiring solutions to merchants. Through its merchant management system, merchants can effectively monitor real-time transactional data generated by payment gateways. Fiserv's VisionPlus software serves as an enterprise account processing platform for a range of customer payment cards, including loans, prepaid, credit, and debit cards. This platform seamlessly integrates with other systems, providing a comprehensive perspective on customer account relationships. The platform covers various aspects such as issuing, acquiring, consumer credit, branded and private-label card programs, personal/corporate cards, prepaid card programs, e-commerce revolving and deferred lines of credit, third-party processing, and integration. It plays a pivotal role for banks and fintech companies in overseeing and nurturing their customer relationships.
- Moreover, the platform boasts support for dual currency and e-cards, and the cards offered by Fiserv hold certifications from Visa, MasterCard, and American Express. Fiserv offers EFT/ATM card management to streamline electronic transaction authorization and fee assessment management by linking signature to self-service channels, including ATM, point-of-sale (POS), credit card, telephone banking and private client banking. Furthermore, Fiserv

offers debit and credit card management through its CardValet solutions allowing cardholders to control their finances in real-time.

- The CardValet solution presents an application that seamlessly integrates with clients' mobile banking platforms through a simple sign-in process. This app offers the capability to send real-time alerts for both PIN and signature transactions conducted using debit and credit cards. It empowers cardholders to efficiently oversee, monitor, and report specific transaction types, swiftly identifying any unauthorized activities and ensuring a smooth banking experience. Additionally, cardholders have the flexibility to personalize and customize the app to align with their preferences. Fiserv's transaction processing capability offers a wide range of bank platforms with in-house and outsource environments. The platform covers end-to-end account processing solutions enabling BFSIs to manage transactions, reduce risks and manage disputes. Fiserv also offers contact and service centers that enable banks to address customer disputes and maintain healthy customer relationship management.
- One of the key differentiators of Fiserv includes sophisticated portfolio management which enables traders and investment managers with critical portfolio management, trading, and administrative tools through an integrated environment. It supports clients in analyzing and managing portfolios and making proactive decisions across multiple trading programs including separately managed accounts, mutual fund advisory, exchange traded funds and non-discretionary programs.
- The platform's data analytics capability empowers banks and enterprises to efficiently extract substantial volumes of data using a robust API architecture. It then aggregates, analyzes, and translates this data into actionable insights, facilitating customer behavioral profiling. This enables banks to make well-informed decisions, enhance customer experiences, and personalize interactions. Furthermore, the platform assists banks in tailoring value-added products to align with customer needs and requirements, while also automating CRM solutions – another significant differentiating factor. Geographically, Fiserv has a major presence in North America, followed by EMEA, and Latin America. The platform supports multiple use cases such as card portfolio performance monitoring, risk assessment and management, and customer relationship management.

- Fiserv encounters increasing competition from emerging vendors showcasing innovative technological solutions, as well as enduring competition from established players. Nevertheless, leveraging their industry expertise, advanced CMS capabilities, and strategic mergers and acquisitions, Fiserv is strongly poised to further solidify its position in the global CMS market.

Tietoevry

URL: <https://www.tietoevry.com/>

Founded in 1968 and headquartered in Espoo, Finland, Tietoevry was formed because of the merger between Tieto and Evry. The company provides an array of digital services along with tailor-made modular card services, designed to cater to the unique needs and demands of its clients.

Tietoevry has a distinct product and service portfolio. It encompasses Tietoevry banking, which offers payment software, card services and processing, credit management, and banking-as-a-service solutions tailored to the needs of the BFSI sector. In addition, Tietoevry Care focuses on serving the healthcare industry by providing services like resource planning for healthcare and social care in municipalities and Nordic regions. The company also specializes in delivering modular and comprehensive data-driven healthcare solutions.

The key capability of the platform includes card life cycle management, multi-payment and multi-channel support, account management, clearing and settlement, analytics and visualization, risk and fraud prevention, scalability and compliance and reporting.

Tietoevry offers a card management system platform that includes various products and services. This platform covers issuing, acquiring, processing, merchant services, and financial crime prevention.

Tietoevry's card management system platform enables organizations to significantly lower operational costs while offering scalability for rapid product launches. Tietoevry's card management solution offers a range of key features and functionalities. These include multi-payment and multichannel support, account management, analytics and visualization, risk, and fraud prevention, as well as compliance and reporting. The solution is also designed to meet global regulatory standards such as ISO, PCI DSS, and PA DSS security standards.

Analyst Perspective

Following is the analyst perspective of Tietoevry's offerings in the global card management system (CMS) market:

- Tietoevry provides a flexible and customizable platform that empowers organizations to modify their current operational procedures. This platform facilitates seamless integration with various systems, allowing organizations to achieve scalability across channels and regions. It helps organizations enhance their management capabilities, enabling faster time-to-market and providing better control over their services.
- Tietoevry provides comprehensive card issuing services that cover the entire value chain of card issuance. It offers customizable modules that are specifically tailored to meet the unique requirements of businesses, facilitating their expansion. The key features of Tietoevry's issuing services include card management and authorization processing, card security, card ledger, cardholder application, mobile payments, cardholder support services, dispute management, and other value-added services.
- The company offers a wide range of services that encompass the complete electronic payments lifecycle. These services include card acquisition, efficient card servicing, swift credit transfers, transaction processing, clearing through various payment channels, and comprehensive card lifecycle management.
- The platform offered by Tietoevry empowers businesses to personalize and customize cards based on user preferences. It provides a comprehensive service suite, including local expertise, for various aspects such as card design, compliance verification, print start services, card personalization, fulfillment, PIN services, and assistance resolving disputes or addressing fraud. These services assist organizations in maintaining secure business continuity and recovering from potential issues. Furthermore, Tietoevry supports omni-channel transactions, including ATM, POS, e-commerce, online, and mobile payments. The solution incorporates integrated financial crime prevention measures that span across the entire customer journey. This includes gathering data from multiple sources at each stage of the customer journey and analyzing it to derive actionable insights for the prevention of financial crimes.

- The financial crime prevention services offered by Tietoevry encompass key aspects such as fraud monitoring services to prevent economic losses, anti-money laundering measures, and an identity suite. These services can seamlessly integrate with an organization's existing infrastructure, leveraging the platform's features like interoperability, managed services, transaction monitoring, card fraud prevention, and rules management.
- Tietoevry offers additional functions such as card administration, including card renewal, replacement, blocking, regional blocking, maintenance, and setting activity limits. It also provides real-time push notification services, internet PIN delivery service, PIN Management Service (PMS), and customer-chosen PIN service.
- The key differentiator of the platform offered by Tietoevry is it empowers businesses to personalize and customize cards based on user preferences. It provides a comprehensive service suite, including local expertise, for various aspects such as card design, compliance verification, print start services, card personalization, fulfillment, PIN services, and assistance resolving disputes or addressing fraud. This helps organizations ensure secure business continuity and recover from any potential issues.
- Geographically, Tietoevry has its major presence in Europe especially in Nordic countries, and extends its service in the UK, Ireland, Germany, and Spain. Tietoevry provides products and services to various industries such as Banking and Financial Services (BFSI), education Energy and Utilities, Pulp, paper, fiber, tissue, and packaging, Healthcare and welfare, public sector industries, Digital commerce, and Project portfolio system (PPS). The company supports multiple use cases such as transaction monitoring to prevent card-fraud, real-time payment infrastructure upgrades, card service processes for issuing and processing cards, supporting dispute resolution process and seamless integration with core-banking, and card production. The company also provides a range of card types, which encompass sustainable cards, biometric cards, metal cards, micro cards, and wearables.
- Tietoevry might face competition while expanding its global footprint as the company has a major presence in the European region. With its comprehensive card management capabilities, the company has an opportunity to expand its operations globally.

- Regarding roadmap, Tietoevry is planning to expand its digital business by enhancing its virtual cards and mobile payments; expand its partnership ecosystem and enhance the documentation and developer experience by providing sandbox portal for easy onboarding. The company also plans to provide the latest API technology, plan, and set architecture for meeting the future needs of data analytics, and refine product development.

TSYS

URL: <https://www.tsys.com/>

Founded in the year 1983, headquartered in Georgia, USA, TSYS is a leading financial service firm that offers merchant processing and payment solutions for businesses. It offers PRIMESM a comprehensive card management solution supporting both issuing as well as acquiring via a single platform. PRIME platform is offered under the TSYS brand internationally. The platform's distinctive capabilities use its digital technology framework TSYS InterActivSM to provide open platform services, unique integration layer, modular and highly scalable architecture, digital enablement supporting multi product and services, comprehensive fraud and risk management solutions, multiple deployment options, and payment scheme mandate compliance.

The key capabilities of TSYS Prime include card lifecycle management, multi-channel payment and support, account management, clearing and settlement, analytics and visualization, risk and fraud prevention, and compliance and reporting.

TSYS merged with Global Payments (NYSE, GPN) in the year 2019 to provide comprehensive payment technology and provide scalability and flexibility in the payment technology business. The merger has helped both the players in improving issuing and acquiring, higher authorization rates and optimizing fraud detection and have created solutions to help Banking and Fintech institutions to provide improved solutions in Point of Sale, e-commerce, mobile commerce, unified commerce, unattended retail, IoT, integrated software, payroll, paycard, prepaid, reporting, customer engagement, analytics, and marketing across the organizations. TSYS has partnered with a global data analytics services company Experian® to TSYS Portfolio Management to PRIMESM licensing clients. This partnership has led to user-friendly analysis of behavioural analytics, active decisioning, sophisticated strategy design capabilities, and simulation tools for consumer behavioural profiling.

Analyst Perspective

Following is the analyst perspective of TSYS Prime's offerings in the global card management system (CMS) market:

- PRIME offers function-rich, and comprehensive, and centralized card management platform which can integrate both front-end as well as back-end operations for both issuers and acquirers and serves fintech and banking institutions globally.
- PRIME offers a globally scalable platform with unrivalled speed to market supporting multi-currency, multi-language, multi-product issuing and acquiring, multi-scheme, multi-channel acquiring capabilities. PRIME's digital capabilities provide support for all payment types and value-added services such as 3Ds support, real-time fraud prevention, data analytics and behavioral scoring for actionable insights.
- TSYS provides multiple deployment options for banking and financial institutions via PRIME both on-premises as well as digital deployments via data centers (Physical and virtual). The platform also provides services via flexible models such as PRIME application management, PRIME hosting, or PRIME in-house cloud processing.
- PRIMESM dispute manager, an intuitive web-based solution, allows automating the dispute management process. It uses intuitive rule-based technology to organize the workflow using expert-guided workflows and helps businesses to reconfigure their workflows and comply with the regulations at the same time. Automated case deadline monitoring helps businesses to cater to dispute and chargeback resolutions immediately.
- PRIMESM Fraudguard integrates card as well as merchant management with authorization in real time. The Fraudguard solution provides a web-based case management solution which involves both issuer as well as acquirer thereby monitoring fraud detection in transactions and providing actionable insights in real time. This enables organizations to reduce costs in both operational as well as chargeback perspectives. The key differentiator of PRIME includes a scalable hardware agnostic platform, with comprehensive integration capabilities through an advanced integration layer and a robust suite of APIs for seamless integration and supports card types like prepaid, credit, and debit cards.

- The platform leverages extensive behavioral data and scoring tools and sophisticated analytics to analyze the purchase behavior and make scoring sheets for the customers. The entire process is centralized to automate the entire process thereby reducing manual work and therefore reducing the cycle time consumed per step/stage. This helps businesses to retain their customer loyalty by reducing the bottlenecks in the processes and helps them to avoid attrition rates and retain customers.
- Geographically, TSYS has a strong presence in Europe, Middle Eastern and African region and its rapidly growing in the Asia Pacific and Latin America region. With its flexible deployment models, customer-centric digital architecture, biometric authentication, and service driven culture TSYS extends its support for multiple business verticals.
- The business keeps investing in improving platform technology, services, omnichannel, and cloud-enabled capacity. The company is advancing its PRIME Customer Services module with sophisticated Information Architecture (IA), structure, navigation/key usability flows, and visual design.
- PRIMESM has made its investments in the development of InterActiv independent microservices to enable automated orchestration and the production of new goods and services faster-to-market, free from application dependencies, are other PRIME roadmap highlights. Another advancement is the expansion of the current API library to accommodate more RESTful APIs. TSYS is still concentrating on deepening the integration of AI & ML across PRIME products for enhanced analytics and insights. To optimize real-time data pipelines with smooth client consumption, the company also wants to use Apache Kafka for event-driven data and investigate blockchain.
- PRIME is complaint with regulations such as PCI, and PCI-DSS, with a dedicated team ensuring the platform stays compliant with the regulations on a quarterly basis.

ACI Worldwide

URL: <https://www.aciworldwide.com/>

Founded in 1975 and headquartered in Miami, USA, ACI Worldwide specializes in delivering real-time digital payments software and solutions. Their offerings cater to both card and consumer payments management solution through a comprehensive card suite namely ACI Enterprise Payments Platform that key functional capabilities such as card lifecycle management, multi-payment, and multi-channel support, clearing and settlement, analytics and visualization, risk and fraud prevention, compliance and reporting, and customization and configuration. The key functional offerings within the card management suite includes enablement for emerging and alternative payment methods, API infrastructure, orchestration and integration capabilities, account management, chargeback management, clearing and settlement services and payment scheme connectivity and compliance.

ACI Worldwide's enterprise payments platform integrates type kind of channels, including a third-party processor or APIs, to payment rails or schemes. The Card Management module of ACI Worldwide's Issuing solution comprises online authorization services that enable authentication, routing, and authorization while functioning as an intraday balance system for real-time authorization.

The logical architecture of the system allows access to both accounts and payment instruments via APIs and web services while managing them separately. The system enables transactions utilizing any data as an identifier, allowing the target to be identified using phone numbers, e-mail addresses, customer ID numbers, and tokens. Through a range of integrated capabilities, the account management capability controls the entire card & customer lifecycle to maximise consumer engagement and communications, bill presentation, collections, payments, and acceptance settlement. The solution's dispute management functionality aids in streamlining the dispute management procedure across all different payment schemes. Moreover, it provides connectivity to high-value networks and cross-border networks through Swift. The platform also facilitates connections to numerous domestic networks using ISO20022, ISO8583, and proprietary protocols. Additionally, ACI Worldwide ensures compliance with key regulations such as PCI-DSS, PA-DSS, and GDPR in their card management solutions.

Analyst Perspective

Following is the analyst perspective of ACI Worldwide's offerings in the global card management system (CMS) market:

- ACI Worldwide's Card Management Solution offers a complete card management solution for corporate, pre-paid, tokenized, smart, and debit cards. It operates in two modes for clearing and settlement: issuing, which makes sure that the right clearing files are produced after the right reconciliation processes, and acquiring, which processes in-bound clearing files, performs matching and reconciliation, then performs interchange pricing analysis before carrying out GL and settlement activities. Additionally, ACI Worldwide provides an automated case management tool that uses an intelligent workflow approach to create, assess, handle relevant actions, and close cases.
- The clearing and settlement services provide connectivity to the payment networks. It also generates network settlement files and performs network reconciliation. Moreover, it offers an interface for managing adjustments, disputes, and reports. In addition to handling updates, disputes, and reporting, it does network reconciliation and creates network settlement files. With the orchestration capabilities, users can arrange these business services in succession or in parallel to define the full transaction path for a new service. The solution offers a set of APIs for the many business operations that take place throughout a transaction. Accounts or payment methods may be connected to QR codes and social media accounts via the API infrastructure.
- The ATM management feature of Enterprise payments platform covers the end – to – end needs of the banks pertaining to ATM management. They help the banks to reduce the Capital Expenditure (CAPEX) by enabling them to provide fully managed ATM solution as a service. The solution also eliminates the need of multiple disparate systems and control and cover all the aspects of ATM terminal management from a single centralized control. Furthermore, the platform also helps the banks to increase the transaction volumes, revenue opportunities and cross-sell opportunities at the ATM terminals. The distinguishing features pertaining to increase the customer experience include digitally and remotely accessible services, cardless account access and funds distribution, real-time insights on transaction history, video banking for

guided access, user-based customized messaging, real-time fully supported transaction monitoring and fraud prevention, and modern graphical based user interface.

- ACI's model generator helps banks and Fintechs to achieve faster go-to-market products pertaining to machine learning models. Furthermore, they can make use of ACI's fraud scoring services to leverage the risk models effectively. ACI's fraud management portfolio offers a comprehensive range of services, including real-time card checks, fraud detection, digital and online fraud prevention, internal and anti-money laundering measures, behavioural biometrics, real-time alerting, combatting account takeover fraud, and preventing financial crimes across networks by utilizing network intelligence technologies.
- Some of the key differentiators for ACI Worldwide's CMS solution includes rule-driven product creation, fast time to market, collection of rest APIs for easier integration, non-functional requirements of the solutions; covering any type of payment instrument processed through any available payment rail; to enable business flows and rules for fast deployment of new customer services. Additionally, it provides orchestration capabilities, allowing for the swift deployment of new customer services through business flows and rules.
- Furthermore, the company also help their customer to comply with 3DS regulations in fraud management and CNP regulations for transactions by providing optimized transaction risk analysis. ACI's fraud management system effectively addresses unique pain points such as lost/stolen card, card-not-present and e-commerce fraud, counterfeiting, identity theft, and card not received issues. Additionally, their cloud-based managed service for fraud management leverages advanced tools like artificial intelligence, machine learning, and behavioural analytics to detect and address anomalies, all under the guidance of expert professionals.
- In terms of geographical presence, ACI Worldwide has a strong presence in Europe, followed by APAC, MEA, Latin America, and North America. The solution supports a variety of use cases, such as buy- now-pay-later, rapid, and digital issuance, and customer control. It develops loyalty programs and integrates various payment methods. The company serves banks (retail, wholesale, and transaction) as well as payment processors, acquirers, PSPs, central infrastructures, and card networks.

HPS

URL: <https://www.hps-worldwide.com>

Founded in 1995 and headquartered in Casablanca, Morocco, HPS is a multinational company and a leading provider of payment solutions and services for issuers, acquirers, card processors, independent sales organizations (ISOs), retailers, mobile network operators (MNOs), and regional and national switching solution providers around the world. PowerCARD represents HPS's extensive range of solutions designed to address the complete payment value chain. This suite offers comprehensive payment processing technology through an open platform, ensuring the smooth execution of numerous transactions across multiple channels. These transactions can be initiated through various means of payment. PowerCARD's card management system suite offers key capabilities and features such as card lifecycle management, multi-payment and multi-channel support, account management, clearing and settlement, analytics and visualization, risk and fraud prevention, compliance and reporting, scalability, customization, and configuration.

PowerCARD Suite helps banks and FIs cover the entire issuing lifecycle, including card offering, card and user origination, user verification and smooth customer onboarding, decision making, embossing and delivery, associated client services, billing and payment, and collections management. In a digital realm, PowerCARD expands its reach, empowering clients to significantly enhance and expand their offerings. This is achieved through seamless connectivity to a variety of digital channels, utilizing the API network. The platform's versatility allows clients to effortlessly onboard customers, oversee account and card lifecycles, promote additional products, offer impeccable customer service, and facilitate self-service capabilities for end-users.

PowerCARD suite helps provides extensive coverage of solutions to banks and FIs to solve their problems and concerns which include advanced product offerings, gaining a competitive edge on the market and competitor banks, faster adapting to the new forms of payments, providing fully digitized and personalized customer experience, gain high volumes of sales on both consumer market (Retail or B2C), and corporate market(B2B).

The card management system provided by PowerCARD platform complies to global regulations such as PCI-DSS, PA-DSS, GDPR and Islamic finance.

Analyst Perspective

Following is the analyst perspective of HPS's offerings in the global card management system (CMS) market:

- PowerCARD is a comprehensive suite of solutions covering the entire payment value chain in multiple payment channels. The payments solution is completely digitalized and offered through virtual cards, PAN-less cards, mobile payments, NFC payments, wearables, tokenization, instant payments, and QR Codes. The PowerCARD suite enables multi-channel functionality through its PowerCARD-Connect API. This API serves as an interface for seamless integration with diverse third-party systems or applications, supporting web service technologies including SOAP, JSON, and REST.
- The orchestration ability of the solution manages workflow and optimizes processes and functionalities. The clients can thus manage their digital wallets including instant P2P/P2B/B2B payments by leveraging the single message protocols and instant settlement capability of the suite. Delivered in a Software as a Service (SaaS) model, the suite can be deployed on-premises, in the cloud, or even in a combination of both. This interoperability is accomplished through a microservices architecture, in which business services and orchestrator services operate in a stateless manner, with communication facilitated via message brokers.
- The PowerCARD-Issuer solution encompasses a comprehensive range of products and services that pertain to the issuance and management of various card formats. These formats span the prepaid spectrum, including payroll cards, multicurrency prepaid cards for corporates and small businesses, cards tailored for students, fleet cards, pension cards, gift cards, remittance cards, and more. In the debit spectrum, coverage extends to corporate, small business, and consumer segments, offering debit cards, multi-currency cards, and pre-authorized debit cards. Furthermore, in the credit spectrum, the solution offers purchasing cards, fleet cards, lodge cards, corporate cards, and purchasing cards for corporates. Small business cards for small businesses (SMEs), combined cards, multi-currency credit, virtual cards, charge cards, charia cards, installment cards, and credit cards for the retail or consumer segment are some of the products and services offered by HPS for players in the SME space. The modes of card issuance include virtual cards, hybrid cards, magnetic stripe cards and contactless cards.

- The process flow of the issuing cycle comprises linking the payment instruments to the designated credit, debit, loan, prepaid and loyalty account source, empowering digital enablement, innovative payment options, omnichannel experience and easy replacement and upgrade on the products.
- The PowerCARD suite's credit scoring capability seamlessly interfaces with third-party scoring systems and credit bureaus. This integration allows banks and financial institutions to utilize these resources for evaluating the credit scores of their end-users. Furthermore, the suite's automated billing, invoicing, clearing, and settlement processes offer complete automation, along with access to reconciliation reports. This enables banks and financial institutions to streamline their internal validation and accounting procedures.
- PowerCARD suite implements real time fraud prevention logic and risk mitigation features by providing comprehensive data to the back-office operations at the card, client, and account levels. Additionally, PowerCARD-BI offers a comprehensive view through interactive dashboards, providing end-users with instant access to analytics and metrics with a single click. This facilitates cost-saving efforts by presenting a consolidated picture.
- The standout feature that sets the PowerCARD suite apart is its digitization and tokenization capability. In a virtual issuance setting, the dynamic CVV code undergoes frequent changes, ensuring secure transactions on cards while being available across various accounts. This seamless transaction experience is facilitated by the suite's unique aspects. Notably, the PowerCARD scheme-agnostic tokenization platform grants access to multiple token service providers across e-commerce and quick commerce platforms, as well as wallet providers like Apple Pay, Samsung Pay, and Android Pay. Furthermore, it enables NFC payments through mobile devices and wearables. These features enable the user experience across the transaction cycle to be more transparent, secure, and obtain maximum usage of the digital cards. The flexible environment of the suite enables users to have access to multiple accounts through one card, or multiple cards linked to one account, or multiple cards linked to multiple accounts.
- Furthermore, the PowerCARD suite also offers personalization of the card and payments services. It enables their clients to create and manage loyalty and reward programs by leveraging the highly flexible rule engine, interoperability, and security. The suite empowers banks and financial institutions to generate and oversee youth cards. These cards can be tailored and individualized to suit

the preferences of young end-users, incorporating designs that are merchant-specific, transaction-specific, currency-specific, and region-specific. These capabilities allow banks and financial institutions to effectively target potential new customers based on various demographics and psychographics.

- Geographically, HPS maintains a significant presence within the European, Middle Eastern, APAC and African regions, and is growing in the North American region. The Suite offers support for a wide range of use cases encompassing card issuers, service providers, merchant acquirers, payment facilitators, processors, national and regional switch solution providers, large retailers, Fintechs, non-bank credit institutions like credit unions, and Mobile Network Operators (MNOs).
- Looking at HPS's future, the technological dimension will involve the implementation of PowerCARD solutions via their microservices architecture and also enhancing their cloud capabilities. On the strategic front, HPS aims to augment its organic growth through mergers and acquisitions while enhancing its range of payment services. Furthermore, HPS is also focusing on its expansion in the American region. In terms of industry focus, HPS is extensively working on their products and services to strengthen their business in the retail industry.

BPC

URL: <https://www.bpcbt.com/>

Founded in 1996 and headquartered in Baar, Switzerland, BPC is a global provider of end-to-end solutions for banking, payments, commerce, and mobility industries. BPC's flagship product, SmartVista, offers a comprehensive suite of software solutions tailored to cater to diverse markets and clients, ranging from commercial banks of the first and second tiers, neobanks, fintech companies, payment service providers (PSPs), processors, national payment systems, retailers, merchants, microfinance institutions, to government entities, transport operators, and smart cities. The company offers an extensive range of products and services across multiple sectors. Within SmartVista suite, BPC provides comprehensive card management solution, which covers many aspects of banking business, from issuing of any card types: consumer, business, consumer Prepaid (open loop and closed), payroll, expense, prepaid, gift, private label, commercial cards of all types - debit, credit, prepaid, to management of these instruments with full life-cycle and personalisation process, to provision of such services and features such as buy now pay later, digital banking and merchant apps, e-wallets, digital lending, API banking, merchant management, e-government solutions and ecosystem creation, billing and invoicing, and more. In the payments vertical, BPC offerings include issuing and acquiring, QR payments, e-commerce, payment hubs, and tap-to-phone (SoftPOS) solutions, among others. Whereas in the commerce vertical, additionally to that, they cater to Buy Now Pay Later, Tippiy, Billing and Invoicing, GL-accounting, Merchant management and merchant apps, loyalty management, automated fare collection for smart city environment, marketplaces for SMEs and B2B segments, and Payment Orchestration services.

BPC Card Management solution offers key capabilities and features for issuers such as card lifecycle management, multi-payment and multi-channel support, account management, clearing and settlement, analytics and visualization, risk and fraud prevention, compliance and reporting, scalability, and customization and configuration. The solution offers flexible configuration tools that assist issuers in swiftly creating innovative card products, thereby reducing the time required to introduce new digital offerings to the market. BPC's solution supports the complete card product management lifecycle, encompassing information pertaining to issued cards and linked accounts, card and account transaction histories, customer applications, customer account limits, as well as financial

data. SmartVista Card Management ensures the automation of both internal and external processes, facilitating bulk and ad hoc updates and changes to product setups and configurations. The system inherently supports virtual, contactless, and tokenized card products.

Within the system, there exists a credit product module designed to accommodate various types of credit services, all of which can be fully parameterised. These encompass traditional revolving and non-revolving lines of credit for both consumers and businesses, bridge credits, trade financing, instalment plans, and buy-now-pay-later products. These services are rooted in the concept of providing a comprehensive cycle of service, ranging from initial onboarding with embedded scoring and profiling, all the way through to refinancing and collection.

BPC's Card Management solution provides robust omnichannel support, facilitating seamless connections across mobile, web, online, chatbot, USDD channel, and IVR platforms. The billing and invoicing features of the solution enable the integration of multiple payment channels to ensure a smooth payment experience. The merchant administration tools permit the utilization of custom templates, streamlining the importation of invoice data. Invoices can be automatically emailed to customers, complete with user-friendly click-and-pay buttons. Payments received for invoices are promptly reviewed to ensure compliance with regulations and to mitigate risks.

The broader SmartVista solutions suite, which encompasses Card Management, includes omnichannel Fraud Management capabilities. These capabilities encompass real-time transaction analysis, robust customer authentication (SCA) as required by the PSD2 regulation for EU cards, biometric transaction security, tokenized card numbers, behavioural biometrics, pre-integration with third-party fraud prevention solutions, EMV 3DS support, dispute management and chargebacks, BSA/AML services, as well as KYC services.

BPC's Card Management solution is accessible through both SaaS and on-premise propositions. It interfaces with the SmartVista Integration Platform (SVIP), BPC's proprietary integration platform module, allowing partners and third parties to configure their own connections. The system owner retains management capabilities over the connected interfaces and endpoints.

Moreover, the solution encompasses various portals to enhance customer and merchant management. This includes a customer service portal for onboarding,

operator tasks for customer servicing, a merchant portal for diverse merchant management activities, a payroll portal for managing various payroll programs, and a dispute portal for comprehensive dispute and claim management.

Driven by low-code/no-code development within a BPMN compliant workflow, BPC's Card Management solution boasts a modern architecture rooted in event-driven principles. This architecture offers flexible settings functionality and is available in both cloud-based and on-premise deployment models, with the added flexibility of switchable commercial models (beginning in the cloud before transitioning to on-premise). The solution supports multiple configurable interfaces and endpoints, with the ability to add new interfaces seamlessly without incurring downtime. Supported connection types include SOAP, REST, JSON, ISO8583, ISO20022, SQL Extractor, Kafka, Rabbit MQ, IBM MQ, and other standard and custom channels.

Analyst Perspective

Following is the analyst perspective of BPC's offerings in the global card management system (CMS) market:

- SmartVista Card Management solution, which covers many aspects of banking, payments, commerce verticals, provides impressive functionality to players. From issuing of any card types to management of these instruments with full life cycle and personalization process. In addition, issuers, acquirers, merchants, fintechs benefit from a diverse array of configuration options, encompassing products, fees, limits, restrictions, financial processing, authorization, routing, event processing, notification, batch and end-of-day procedures, workflows, templates, flexible fields, as well as reports and extracts. Moreover, Card Management solution has the capacity to accommodate custom business logic (procedures), extend the database model, create custom GUI, devise custom formatters and integrations, and extend APIs, providing users with a highly adaptable and tailored experience. The company supports the full cycle of card product management that includes information about issued cards and linked accounts, cards and account transaction history, customer applications, customer account limits, and financial data. The solution also supports virtual, contactless, and tokenized card products by default. Additionally, Card lifecycle management provides full tracking starting from the application ending to the card delivery and activation enablement.

- The solution also offers a card personalization module that supports the end-to-end cycle of card generation from data preparation to delivery tracking. The solution is also adhered to various compliances in different international card schemes with addition to locally adopted and developed products. The card products supported by SmartVista module includes Credit, Debit, Prepaid, Corporate, commercial, Virtual, eWallets, Token, Gift, Family, Travel, Loyalty, and Rewards.
- The SmartVista card management system solutions provides omnichannel support through extensive coverage across mobile channels, web/ online channel, chatbot channel, USSD Channel, and IVR channel by integration. The platform can be deployed and operated in both models as Software as a Service (SaaS) and on-premises providing hybrid mode of deployment (both on-premises and Cloud). The platform's operational capability is based on low code principles and incorporates BPMN (Business Process Modeling Notation) compliant workflows. It efficiently handles both real-time and offline processing, seamlessly integrating online transactions and event processing with batch and reconciliation tasks. The SmartVista Integration Platform serves as Middleware, allowing partners and third parties to configure their connections independently, while the overall network management remains under the control of the system owner. The features of the Integration platform comprise of a 'SMART' service bus, built-in graphical UI for configuration, supporting tools for configuration, connections to API marketplaces and web services, payments specific protocols and connectors, flexibility in building custom functionality, integration with SmartVista products, logical connectors for handling complex messages, real-time and batch message processing, and both horizontal and vertical scalability.
- Card Management solution by BPC offers digital customer onboarding with eKYC capabilities and integration with 3rd party via a configurable workflow (BPMN) engine based on the SmartVista Integration Platform component. The solution also provides configuration tools to help issuers create innovative card products.
- SmartVista's fee engine helps issuers embed and automate their fee structures through a wide range of transactional and event-driven fees. This capability supports various fee calculation algorithms, including fixed value, fixed value threshold, fixed value tiered, percentage value, promotional fee, percentage value threshold, percentage value tiered, and combinations of these types. In addition, the capability supports both online and offline fee calculation.

- The solution fully supports the entire clearing and settlement process for all authorized financial transactions, following the issuer's predefined rules. Moreover, the solution extends its support to non-financial transactions, encompassing balance inquiries, statement requests, card activation, card blocking, limit adjustments, and PIN changes. Issuers can also generate fees for all types of transactions. To manage the intricacies and sophistication of business payments, SmartIssuer incorporates an accounting tool.
- The solution also offers a customer portal including features such as customer onboarding, typical operator tasks for customer servicing, and extensive search capabilities; a payroll portal for management of various types of payroll programs with bulk uploads, additional approvals, employee hierarchy management; and dispute portal for full cycle dispute and claim management. The solution also offers a credit product module that supports various types of credit services with full parameterization.
- Card Management by BPC stands out with its key differentiators, including settlements support between partner financial institutions, facilitating seamless transactions. Moreover, it efficiently separates issuing businesses, all under a single platform, streamlining operations. Other distinguishing features include unique commission opportunities and extensive customization options for maximizing the financial return on incoming transactions. SmartVista Card Management also empowers flexible customer management while ensuring end-to-end customer identification and dynamic evaluation of customer profitability.
- The solution provides full-fledged risk and fraud management capability that helps card issuers detect and prevent fraudulent activities across all payment channels in real time. The solution covers real-time transaction monitoring and allows performing statistics profiling on any level – card, terminal, merchant, or device. The analytics tool includes a business-driven rules engine for transaction scoring and applies machine learning techniques for fraud analytics and modeling.
- The additional features of the Fraud management suite include Strong Customer Authentication (SCA) for Eu Cards pertaining to PSD2 regulation, transaction security involving biometric authentication, tokenization of the card and transactions, 3rd party support for fraud prevention, KYC, BSA and AML, dispute and chargebacks during transactions and real-time fraud monitoring.

- Additionally, the platform provides horizontal scalability providing high TPS rates enabling nationwide solutions for e-government initiatives like instant payments, CBDC wallet schemes, real time tax-collection, marketplace integration, subsidies and benefits distribution, and custom payments etc. The pricing of the platform will also differ according to the business model that banks and FIs wish to deploy their solutions.
- In terms of geographical presence, BPC has a major presence in Europe, followed by MEA, APAC, and the Americas. The platform caters to various use cases, including clearing and settlement, reporting, fully digital banking with customer onboarding, loyalty functions, and more. The company's clientele spans across multiple industry verticals, encompassing retail banks, national payment systems, payment service providers, fintech/paytech firms, airlines, Internet companies, eCommerce platforms, and neobanks.
- In terms of BPC banking technologies roadmap, they have planned their expansions in technology by providing customized products and solutions for SMEs covering mobile merchant apps and portals, corporate products, NFC, QR and non-card methods, sandbox analytics, liquidity management, local wallets support, cryptocurrencies and tokens, e-government solution enhancements for tax-collection, treasury payments, social benefits distribution, and national ID on blockchain. Their other future roadmap covers APAC and LATAM expansions, and SaaS services for Fintechs, Neobanks and technology firms.
- The challenges faced by BPC include lack of customer awareness on the current technological capabilities of modern payment platforms, legacy systems and outdated regulatory framework and policies. However, with sophisticated capabilities and its customer-centric approach to the solutions it provides, and roadmap the company is well positioned to compete in the card management systems market.

CR2 Software

URL: <https://www.cr2.com/>

Founded in 1997 and headquartered in Dublin, Ireland, CR2 is a provider of a digital banking and payments platform titled BankWorld, that allows banks to optimize end-to-end digital customer journeys across mobile, internet, self-service, and payments in a cost-effective manner. BankWorld is designed with a flexible integration framework and a robust API architecture which allows seamless integration and operation within a bank's existing environment. The platform's key value proposition lies in its customer-centric approach, enabling banks and financial institutions to establish and maintain comprehensive relationships with their customers. Through advanced administration tools, internal users in the bank's environment can effectively assist end-users in various digital banking, card management, and payment processing solutions. This ensures a smooth and efficient customer experience within an omnichannel context.

BankWorld's card management system offers key capabilities and features like card lifecycle management, multi-payment and multi-channel support, account management, clearing and settlement, analytics and visualization, risk and fraud prevention, compliance and reporting.

The platform can be easily customized and extended independently by the bank using the platform's configuration and Digital Tooling capabilities. BankWorld's architectural design enables boundless scalability, where the platform can scale both vertically and horizontally and facilitate unparalleled TPS performance results, where sub second response times can always be achieved irrespective of the number of concurrent users.

The BankWorld platform offers operations across various channels, including unstructured supplementary service data (USSD), mobile wallet, bank branches, Internet, ATM, chatbots, open banking, and embedded finance. It encompasses a wide range of features such as identity and access management, permissions management, user entitlements, ATM driving/switching for CMS Life Cycle Management, open banking API framework, digital banking apps, card/account payment rails, analytics and data visualization, workflow orchestration, and an integration framework.

The card management system of BankWorld platform complies to global regulations such as PCI-S3, Card scheme mandates, local regulatory obligations and industry standard card schemes related protocols.

Analyst Perspective

Following is the analyst perspective of CR2 Software's offerings in the global card management system (CMS) market:

- CR2 software offers a comprehensive card management system through its highly configurable platform, BankWorld. The platform's card management system stands out with its unique features, which streamline and expedite card creation and control processes. It also provides extensive access to bank cards for third-party systems, enhances security measures, and supports multiple use cases. The card issuing process is driven by APIs, allowing for efficient card issuance, control, and transfer. BankWorld facilitates multi-currency prepaid cards, enabling users to manage multiple currency positions and set balance limits. Additionally, the platform incorporates a KYC tool, reporting capabilities, and access to the API marketplace. The card issuing process includes 3D secured authentication with M2P ability, ensuring secure transactions for ecommerce.
- The platform's CardWorld acquirer reconciliation and settlement (CARS) module takes care of the clearing and settlement process. This comprehensive module efficiently manages tasks such as dispute and chargeback management, rejections, retrieval requests, second presentments, and fee collections related to the clearing and settlement process. The billing presentment and payments processing is digitized to enable billers/suppliers to expose invoices/ bills for partial or full payment using an on-demand lookup facility or pre-requested bill hosting facility. BankWorld manages the entire process by leveraging the core banking APIs and interfaces, directly through backend messaging gateways such as those operated by SWIFT, Visa, and MasterCard.
- The card management system also provides robust support for fraud monitoring and management. It includes features like real-time fraud detection and monitoring to help banks and financial institutions identify and mitigate fraudulent transactions promptly. This capability allows them to tackle fraud effectively and ensure a secure environment for their customers. The fraud management process flow includes the detection and decline of fraudulent transactions, card status change, status notification, real-time alerting of the fraudulent activity, rules configuration to identify and assess the fraud type, rules cataloging, simulating the fraud and mitigation, transaction history

analysis and blocking or unblocking the card about the fraud accordingly. The system can proactively reject fraudulent transactions before they are processed, providing added security and protection for their end-users against fraudsters. The fraud management system's pattern analysis feature helps define rules to analyze beyond individual transactions to check for more sophisticated transaction patterns.

- The card management process is entirely API driven, where the specific card is given access and link to the specific accounts irrespective of the bank type and card type, encompassing features such as the creation of a debit card, credit card, prepaid card, get card balance and mini statements. The platform provides consumers with the ability to control and manage their own cards which includes the ability to Freeze, Unfreeze, Manage spending limits, Travel restrictions and Merchant Category restrictions. This entire feature is agnostic to countries, merchant types and transaction limits.
- The native tokenization of cards and provisioning of NFC payment services within CR2's Mobile App, is a key differentiator of the card management system offered by BankWorld. In this capacity, the platform acts as a centralized ecosystem provider and enabler, granting its clients access to token service providers and token service requestors. This functionality empowers banks and financial institutions to offer tokenization services and enable NFC payments for their end-users. This feature is more relevant in Asia, Middle East, and African markets where banks want an all-in-one package, and it is indeed a benefit that could be used by a customer either in-house or providing services to others in this region.
- The BankWorld platform also facilitates QR code cash withdrawals, encompassing a simple process flow as follows which includes initiating the transaction, the user can access the Mobile App geolocation services to locate the bank's ATMs followed by initiation of the transaction from the mobile phone by selecting the account and amount that they would like to withdraw and the customer scans the QR code that is displayed on the ATM screen and the transaction request is then sent to the BankWorld platform, where the authorization process takes place and the transaction is validated, the ATM automatically dispenses the cash.
- Geographically, CR2 Software holds a significant customer presence in the Middle Eastern and African regions, with a subsequent presence in Europe,

APAC, and Australia. The platform offers support for multiple use cases related to Banking and Financial Services Institutions, addressing various pain points. The pain points encompass card personalization by both banks and third parties, clearing and settlement, reporting, digitization of customer onboarding, cost-effective customer acquisition, seamless customer service across larger geographical areas, and leveraging payment and remittance services.

- In terms of CR2 Software's roadmap, the company have planned their expansions in technology by shifting their business model from service oriented to microservices enabled platform architecture. The other future roadmap covers Africa, Middle eastern region, Eastern and Central European region and APAC expansions, and improvement in SaaS, encompassing Card issuing as a Service which is a hosted service allowing lower aggregate deployment footprint and Continuous Integration and Continuous Delivery (CDCI) approach for achieving quicker Go to Market strategy.
- Banks are often faced with many card management solution challenges, including system migration, card scheme certification, regulatory obligations, and card management system performance. CR2 solution address all these challenges, as the platform and company has adopted an agile development framework, DevOps, which allows them to navigate through difficulties pertaining to technological advancements and market trends seamlessly. CR2 continuously strategically invest in product management, professional services, and development teams, facilitating a transition from service-oriented architecture to microservices architecture to embrace cloud and hybrid deployment topologies. With its sophisticated capabilities and customer-centric approach to solutions. CR2 Software is well-positioned to compete effectively in the card management systems market. Their roadmap for future advancements further strengthens their competitive edge in the industry.

OpenWay Group

URL: <https://www.openwaygroup.com/>

Founded in 1995 and located at Belgium, OpenWay is the developer of Way4, an all-in-one online cloud-ready digital banking and payment software platform encompassing a comprehensive portfolio. This portfolio spans account management, card issuing, merchant acquiring, transaction switching, digital wallets, tokenization, consumer finance, BNPL, and fleet cards within the payment industry. OpenWay's clients are tier 1/2 FIs and ambitious fintech start-ups, including payment processors, banks, fintechs, acquirers, PSPs, payment facilitators, consumer finance, telecommunication, governmental agencies, transport, oil and green energy companies. Some OpenWay's key customers are NEXI and Worldline in Europe, Network International and Equity Bank in MENA, Banesco and Comdata in North and South Americas, Lotte Finance and SmartPay in Asia, and Ampol in Australia. Way4 is the choice for companies seeking high quality, cost-efficiency, real-time processing, product and service flexibility, faster time-to-market, scalability, high performance, stability, and innovation.

The platform supports various types of payment instruments such as any types of cards, mobile wallets, BNPL, A2A payments, tokens, and wearables. It was designed as an omni-channel platform with support of ATM, POS, e-commerce, mobile, and API. It allows management of the whole payment card and digital wallet lifecycle, including customer management, account management, dynamic pricing, management of hierarchies, transaction processing, products configuration, transaction switching, authentication, authorization, fraud prevention, and loyalty programs.

Distinguished by its unique architecture, Way4 platform unifies back- and front-office operations, enables online accounting, multi-level parameter-driven configurability with unlimited number of currencies, and offers data-rich APIs. This enables FIs and fintechs to create their unique offerings quickly, personalise digital customer experience, and optimize their pricing strategy. Way4 is delivered across the globe and offers variety of delivery models: on-premises, in the cloud (AWS, MS Azure, Oracle Cloud), hybrid, or dedicated Software as a Service (SaaS).

Analyst Perspective

Following is the analyst perspective of OpenWay Group Way4 Platform's offerings in the global card management system (CMS) market:

- The Way4 platform of OpenWay Group is a flexible and scalable platform that enables its clients in the BFSI industry and fintechs to run multiple business models on their platform by providing services and products such as card issuing, account management, merchant acquiring, transaction switching, omnichannel digital banking, digital wallets, e-commerce gateway, loyalty programs, fleet cards, and BNPL, enabling FIs and fintechs to define their business rules, workflows, routing, and transaction scripting. The key feature of the platform includes online back- and front-office, support of any payment instruments and the omni-channel, high level of parameterisation, high availability, scalability from small projects to portfolios of thousands of millions or cards and wallets and millions of merchants.
- Way4 embraces a modern technological stack and follows industry-standard integration patterns, including business-oriented REST OAS3 API, ISO 20022 / NEXO, ISO 8583, SQL/NewSQL/NoSQL databases, data streams, Kotlin, and JSON. It offers versatile integration options, including file-based (XML, flat files), API / Web services (Restful API, SOAP API, XML over http), and supports online messages like ISO 8583 dialects and ISO 20022.
- The Way4 business logic is rule-based and parameter-driven. It operates on a Java-based Application Server and an Oracle RDBMS, with apps mainly in Java as well as a data manipulation layer in PL/SQL. Build-in no-code editors as well as Groovy scripting are used for customization of the presentation layer, API's and interfaces. This foundation allows users to establish their workflows while offering transaction scripting and routing capabilities. Furthermore, the platform ensures high data availability through data centre replication, offers end-to-end encryption, and incorporates tokenization. These features facilitate a comprehensive deployment of technologies such as EMV, QR, NFC, as well as integrate with MDES (Mastercard Digital Enablement Service), VDEP (Visa Digital Enablement Program) and other digital services and token vaults of the payment schemes. The centralized ecosystem provided by the platform helps the banks, FIs and fintechs launch card products like credit, debit, prepaid cards, fleet cards, virtual and loyalty cards, wallets and tokenization, corporate and family schemes. The platform also enables personalization and

customization to fit the end-users needs. Automated workflow management can enable OpenWay clients to achieve faster go-to-market, achieve scalability from thousands to thousands of millions of clients as well as reduce costs and achieve high profitability. The card management ecosystem is integrated through APIs and SDKs which enhances both internal and external integration. It supports SOAP and REST API standards for communicating with external systems. The ecosystem can be built on cloud as well as on-premises for scalability purposes and the platform also helps in card portfolio management.

- The merchant acquiring solution provided by Way4 platform helps merchants expand their services in multiple regions, channels, and segments globally. Furthermore, the platform offers transaction personalization and customization services through providing enhanced transaction data. Additionally, the platform also helps acquirers and PSP in payment channel expansion, facilitates POS and e-commerce acquisition and enable multi-sources of payment acceptance.
- One of the key differentiators of the Way4 platform includes an end-to-end solution for cross-border fleet cards issuing and acquiring, by enhancing the scalable nature of the platform the company help in reducing the costs by digitizing the merchant channel in the fleet card business. Merchants have the flexibility to internally customize and personalize their fleet card offerings or choose to outsource this process. The platform's composable architecture seamlessly facilitates both fleet card issuance and acquisition, while also enhancing fraud detection and mitigation measures. Additionally, the platform ensures compliance with multi-payment and multi-channel requirements, enabling clients to readily accept international payments. Among its key features are tokenization, loyalty programs, and digital wallets.
- This comprehensive Way4 solutions aid clients in shaping their customer relationship management (CRM) efforts. By providing online data streaming and conducting analyses such as market basket analysis, customer journey mapping, and customer lifetime value assessment, clients can tailor promotions and personalized offers for the cards provided to end-users. For example, if we continue considering the fleet industry, the platform simplifies and optimizes fleet card management by automating both front-end as well as back-end business processes, thereby providing comprehensive management on fleet company onboarding, petrol station or driver, tariff management, invoicing, VAT handling, and comprehensive settlement between multiple parties. The

platform extends risk monitoring services to beneficiaries, allowing them to generate comprehensive reports. Additionally, essential business applications related to fleet payment processes, including CRM and ERP, are seamlessly integrated into the client's ecosystem through APIs.

- The risk and fraud management capabilities of the platform play a crucial role in identifying and addressing potential risks in real time, particularly when suspicious activities are detected. This empowers FIs, processors and fintechs to make well-informed decisions in a timely manner. As such, for the fleet business the company provides a user-friendly, web-based solution known as the Way4 Fleet Manager portal. This platform offers self-service capabilities to fleet managers, enabling them to access real-time insights into customer spending. This functionality aids in the effective management of fleet cards and driver expenditures in real-time. Consequently, it streamlines customer support for fleet card processors. The portal empowers fleet managers to independently carry out a diverse array of actions, reducing the need for direct involvement from card processors.
- Geographically, the company boasts a robust presence in Europe, succeeded by the Asia Pacific region, the Middle Eastern and African region, Latin America, and finally, the North American region. In terms of industry verticals, the company caters to a diverse range, including banks, fintechs, processors, acquirers, consumer finance, telecommunication companies, fleet enterprises, and government agencies. The Way4 platform provides extensive support for various use cases, including but not limited to multi-currency capabilities, revenue options for issuing, wallet and loyalty solutions, innovative cloud-based payments, adapting to pandemic-related trends, enabling payments within an ecosystem, ensuring scalability and flexibility, prioritizing security, facilitating omnichannel experiences, offering personalized features, being adaptable to diverse payment methods, and providing a comprehensive set of rich APIs.
- Way4 is the only payment processing software platform certified for the highest security standard PCI SSF not only for the Oracle-based cloud-ready solution but also for No-SQL microservice solutions. The platform also provides compliance to SEPA (Single Euro Payments Area), PSD2 (Payment Services Directive 2), Shariah (Islamic Finance), and major regional standards. Way4 possess authorized certified interfaces and integrations based on both ISO 20022 and ISO 8583, the platform also enables banks and Fis, processors and fintechs to comply with the regional compliances as well.

- OpenWay Group is well known as an early-bird innovator which helps the company and their clients to get ahead of the competitors, including disruptive companies. With its functional capabilities, customer value proposition and their service excellence client portfolio OpenWay Group is well-positioned to maintain and grow its market share in the global card management systems market.

Sopra Banking Software

URL: <https://www.soprabanking.com/>

Founded in 2012 and headquartered in Paris, France, Sopra Banking Software (SBS), a subsidiary of Sopra Steria Group, is a prominent global provider of banking and financial solutions. Within its portfolio, SBS offers a comprehensive payment and card management platform, encompassing a wide array of applications. These applications encompass the management of prepaid, debit, and credit cards, as well as functionalities for single credit transfers (SCT), simplified due diligence (SDD), foreign exchange, and high-value transfers.

The company delivers a versatile platform that accommodates various local payment methods, empowering end-users with the ability to instantly initiate, receive, and request funds. This seamless experience is facilitated by real-time execution, notification, clearing, and settlement of transactions.

The key capabilities of the platform include card lifecycle management, multi-payment, multi-channel support, account management, clearing and settlement management, analytics and, visualization, risk and fraud analysis and prevention, and compliance and reporting.

Furthermore, Sopra Banking Software has successfully concluded the acquisition of Fidor Solutions, the software subsidiary and expert in digital banking from Fidor Bank. This strategic acquisition is set to significantly amplify the promotional endeavours of Sopra Banking Software's digital banking solutions. It particularly aims to broaden the scope of user functionalities accessible through its digital banking engagement platforms (DBEP).

By harnessing the specialized knowledge of Fidor Solutions in advisory services and customer-centric digital banking offerings, Sopra Banking Software is strongly positioned to fulfil its industry objectives.

Analyst Perspective

Following is the analyst perspective of Sopra Banking Software's offerings in the global card management system (CMS) market:

- The Sopra Banking Software offers centralized card management to manage various aspects of banking cards. These solutions include card issuance, activation, deactivation, transaction monitoring, fraud detection, risk management, and reporting. Sopra's solutions are designed to streamline card operations, enhance security, and provide a seamless experience for both financial institutions and their customers.
- The platform provides customers with the flexibility to utilize their cards according to their specific needs and preferences. Through the platform's digital environments, users can easily access pre-configured cards, ready for immediate use. Moreover, the platform offers customers a range of customization options, empowering them with self-service capabilities to modify transaction limits, PIN codes, implement parental controls, and enable geo-blocking settings. Additionally, the platform facilitates fund initiation and availability for end-users through Sopra Banking software's cloud-native instant payments solution. This technology ensures compliance with regulations set by international regulatory organizations such as PCI DSS.
- Sopra Banking Software employs a centralized cloud-native microservices architecture, which empowers banks to seamlessly integrate various services onto a centralized platform. This approach allows banks to enhance scalability across their organizations through customized and personalized features. The software also enables banks to expand omnichannel by providing multipayment multi-currency support. The platform also offers real-time customer credit scoring and behavioral scoring via its real-time database monitoring. The platform equips banks with real-time fraud management capabilities, harnessing the potential of AI/ML to combat financial crime effectively. Additionally, the platform offers seamless compatibility with major Clearing and Settlement Mechanisms (CSMs) in Europe, including STET, EquensWordline, Deutsche Bundlesbank, EBA clearing, and TET.
- A notable distinction of Sopra Banking Software lies in its support for a variety of payment instruments, encompassing prepaid, debit, and credit cards, as well as SCT, SDD, and NSCT functionalities. Moreover, the platform facilitates

open banking platform management for banks, thereby elevating their customers' digital experiences.

- Sopra Banking Software's card management system platforms offer several key differentiators, including rapid product launches, concurrent support for multiple interfaces, loyalty, and reward modules, and built-in behavioral analysis features. Additionally, these platforms provide comprehensive end-to-end issuing and acquiring capabilities.
- Another pivotal distinction of the platform is its request-to-pay services, which play a crucial role in bridging gaps within the financial services industry. Leveraging a cloud-native platform and microservices architecture, the platform enhances optimization of IT investments. Comprising pre-assembled components, the platform exhibits high scalability, thereby enabling clients to swiftly initiate product launches. Furthermore, it provides customers with optimized and secure request-to-pay services, ensuring both efficiency and heightened security measures.
- Furthermore, the platform's AI capability enables banks and financial institutions to make customer-centric, integrated digital banking solutions in increasing digital banking and digital transformation activities. It provides services like ATM and POS management, card issuance, payment order acquisition, clearing and settlement, card lifecycle management, and card data management.
- Geographically, Sopra Banking Software maintains its primary presence within the European Union and the Middle East. Additionally, the company has established substantial operations in the Asia Pacific region and Latin America. Focusing on industry verticals, Sopra Banking Software's core emphasis lies in serving the banking and finance sector. While encountering considerable competition in the North American region, the company showcases resilient growth within the global card management system market. This can be attributed to their strong customer-centric approach, utilization of a sophisticated cloud-based platform, and the comprehensive functional capabilities offered by their card management system.
- Sopra Banking Software's upcoming trajectory involves a strategic investment in establishing a partner ecosystem. This initiative aims to enhance the features and functionality of the digital banking platform, ultimately delivering more

optimized solutions for their clients. Consequently, this approach empowers Sopra Banking Software to cater to end-users effectively and economically with heightened efficiency.

Paymentology

URL: <https://www.paymentology.com/>

Founded in 2015, and headquartered in London, England, Paymentology is a worldwide issuer-processor enterprise that serves banks, neobanks, FinTechs, and the telecommunications industry. The company furnishes these sectors with essential technology, support, and scalability, enabling effortless issuance and processing of various physical and virtual card types across diverse regions and geographies. In 2021, the company was acquired by Salt-pay, a Europe-based global payments business, in conjunction with Tutuka, an African-based company with expertise in providing technology support for FinTechs, Telcos, transfer providers, mobile wallets, and digital banks. The merger led to the establishment of a unified brand operating under the name Paymentology.

Their product portfolio comprises four products catering to different businesses that include Flex for growing business and small FinTechs, Sprint for SMEs, Pro for Banks, Neobanks and large FinTechs, and Enterprise for Top-tier banks. Furthermore, they also support the banks, and FinTechs with advisory services, Card products, technology and implementation support, data intelligence, and credit and debit solutions. They also help in the digital transformation of banks and FIs from legacy systems and environments and help them achieve faster go-to-market product launches and stay ahead of the market and competitors.

The platform architecture is multi-cloud and can be accessed through shared or dedicated processing instances. It offers scalability across multiple regions and currencies. The deployment options for the platform include Software as a Service, with various models such as public, private, and shared spaces. It can be deployed on premises, in the cloud, or in hybrid modes. Additionally, the company offers card programs tailored for non-financial institutions, specifically targeting remittance providers, payroll companies, shopping malls, and retail and corporate brands across different regions. Paymentology's card management system offers key capabilities and features such as card lifecycle management, multi-payment and multi-channel support, account management, clearing and settlement, analytics and visualization, risk and fraud prevention, compliance and reporting, scalability, customization, and configuration.

The card management system platform provided by Paymentology complies with global regulations such as PCI-DSS, PA-DSS, GDPR, PSD2, and Islamic finance

Analyst Perspective

Following is the analyst perspective of Paymentology's offerings in the global card management system (CMS) market:

- The card management system consists of features containing product creation (Creation of cards), card and account lifecycle management (KYC, Customer onboarding and limits management), credit management (credit card issuing and management), instant issuing, pin management, card formatting (physical, virtual, and P2P etc.), and tokenization. The issuing processing feature consists of card issuance processing, AI/Rules engine, networking and smart routing, authorization, settlement, stand-in-engine, reconciliation, reporting, flexible operational account ledger management, and cryptography management. They also provide value added services such as spend analytics on a real-time basis, risk and fraud management, BIN Sponsoring, credit scoring, loyalty management, digital vouchers and coupons, front end operations management and support for white labelling of products, and growth advisory.
- The card lifecycle management encompasses the following features such as customer registration, account creation, card creation, card activation and status change. This entire process is managed by leveraging the API architecture possessed by the platform. The platform's scalability and adaptability extend to supporting multi-channel payments, empowering its end-users to conduct transactions across various channels. Furthermore, the platform facilitates banks and financial institutions in initiating and managing credit cards. This is achieved by enabling these institutions to offer a range of payment options, including multiple payments, full payments, partial payments, or minimum payments. The card management system platform provides the complete analytics of every transaction of the end-user which enables their clients such as Banks and FIs to leverage the data provided by the platform to provide the credit scoring for their end-users. Furthermore, the platform acts as the ledger to create invoice/ statements displaying account and transactional information thereby enabling the invoice and billing process seamless. The platform smoothly handles the clearing and settlement cycle by utilizing data from the Basel I file across multiple schemes. It processes this information by matching the transactions recorded within the system and then delivers settlement advice through a data feed. This process aids banks and financial institutions in determining the nature of the party involved (whether it's a 2nd or 3rd party) and facilitates transaction settlement.

- The platform utilizes a rule-based analytics engine, which comprehensively defines rules by utilizing data elements from ISO 8583 standards. It validates transactions against these rules. The platform's high validation accuracy empowers banks and financial institutions to blacklist specific merchants or countries. This capability enables the implementation of transaction-based triggers, limits management for transactions, and identification of the counterparty involved. The transaction feed provided by this platform is on a real-time basis containing the complete information of the transaction. It also enables its clients to provide a complete comprehensive report to their end-users on a demand basis.
- The differentiating feature of the card management platform is the fraud management system tool used. The platform leverages a 3DS 2.0 fraud monitoring system which ensures the configuration of rules subjective to the merchant level providing end-to-end fraud management of the transaction cycle. The alerting and reporting capability of this feature is on a real-time basis. It enables its clients to make informed decisions instantly and provides enhanced customer experience to their end-users.
- Additionally, the platform's tokenization feature has been enhanced and is deployed through its token platform. This platform connects users to token service providers (TSPs), facilitating the tokenization of cards and enabling their usage across various devices and with merchants. The solution includes a connection logic between the SDK and mobile device enabling the transaction to happen through single integration between the networks to reduce complexity thereby providing enhanced support to token service providers like Samsung pay, Apple pay, and Android pay. The platform also provides API and Test Sandbox Environment to provide more accuracy in data analytics and insights.
- The platform's most notable distinguishing feature lies in its exceptional scalability and flexible nature. It empowers end-users with the ability to maintain a single account for numerous cards or connect multiple accounts to a single card. These accounts could encompass various types such as debit, savings, and credit cards in currencies like FX, PHP, USD, and SGD. These combinations can be adjusted across multiple metrics to align with the preferences and requirements of the end-users. The achievement of these

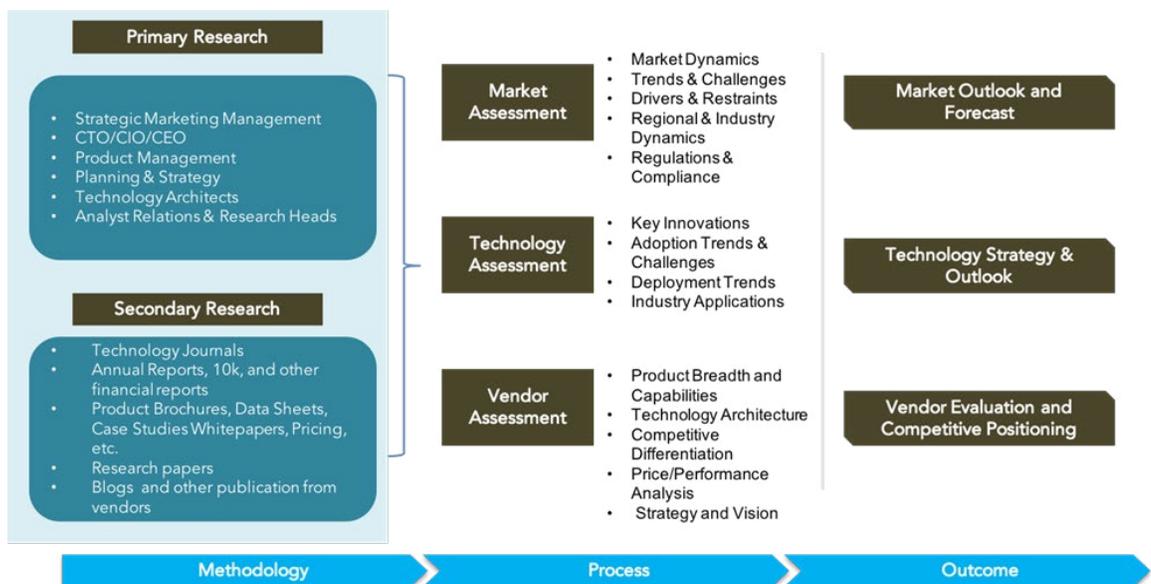
seamless integrations is facilitated by the FAST (Framework for Authorizations and Settlements) and the PayRule engine. In terms of geographical presence, Paymentology as a major presence in Middle Eastern, African, and European region. The platform supports multiple use cases pertaining to banking and financial services Institutions, telecommunications industries, governmental institutions, airline and transport industries, retail, and corporates pertaining to issuance of physical and digital cards, pay salaries, benefits and incentivize their customers and employees. The company provides both products and services that can be white-labelled and seamlessly integrated into their client's existing environments. They help governmental institutions to launch national health and subsidy cards, create student and university payment experiences, avail services in the AgriTech payment products, and launch national transport and fleet cards. They help the Telecom industries in tokenization and help them streamline their customer relationship management processes by leveraging their marketplace platform.

- In terms of Paymentology's roadmap, the company has planned their expansions in technology by integrating with multiple third-party service/product providers to achieve faster product development and go-to-market strategy. The company is also investing to improve their fraud monitoring and detection features, data enrichment, and improve their credit and related products.
- The geographical roadmap of the company includes achieving new target markets in APAC, and Australian region by making their product customized and adaptable to the regional requirements of the countries and achieving integration with the national switches. The company has also planned to partner with more core banking systems and SIs to penetrate large scale products.
- Paymentology faces challenges in navigating the diverse set of regulations presented by countries across different geographical regions, particularly in relation to the localization of payment rails. While the payment rail market is populated by numerous participants, adapting the platform to align with specific local regulations consistently proves to be a cumbersome task for industry players. Paymentology is actively engaged in enhancing the scalability and adaptability of their platform to ensure compliance with varying local regulatory standards. They are also committed to tailoring their product to meet the specific requirements of their clients. Furthermore, with

their advanced technological capabilities and customer-centric approach to solutions, coupled with a well-defined future roadmap, the company stands in a favorable position to competitively engage in the card management systems market

Research Methodologies

[Quadrant Knowledge Solutions](#) uses a comprehensive approach to conduct global market outlook research for various technologies. Quadrant’s research approach provides our analysts with the most effective framework to identify market and technology trends and helps in formulating meaningful growth strategies for our clients. All the sections of our research report are prepared with a considerable amount of time and thought process before moving on to the next step. Following is the brief description of the major sections of our research methodologies.



Secondary Research

Following are the major sources of information for conducting secondary research:

Quadrant’s Internal Database

Quadrant Knowledge Solutions maintains a proprietary database in several technology marketplaces. This database provides our analyst with an adequate foundation to kick-start the research project. This database includes information from the following sources:

- Annual reports and other financial reports
- Industry participant lists
- Published secondary data on companies and their products
- Major market and technology trends

Literature Research

Quadrant Knowledge Solutions leverages on several magazine subscriptions and other publications that cover a wide range of subjects related to technology research. We also use the extensive library of directories and Journals on various technology domains. Our analysts use blog posts, whitepapers, case studies, and other literature published by major technology vendors, online experts, and industry news publications.

Inputs from Industry Participants

Quadrant analysts collect relevant documents such as whitepaper, brochures, case studies, price lists, datasheet, and other reports from all major industry participants.

Primary Research

Quadrant analysts use a two-step process for conducting primary research that helps us in capturing meaningful and most accurate market information. Below is the two-step process of our primary research:

Market Estimation: Based on the top-down and bottom-up approach, our analyst analyses all industry participants to estimate their business in the technology market for various market segments. We also seek information and verification of client business performance as part of our primary research interviews or through a detailed market questionnaire. The Quadrant research team conducts a detailed analysis of the comments and inputs provided by the industry participants.

Client Interview: Quadrant analyst team conducts a detailed telephonic interview of all major industry participants to get their perspectives of the current and future market dynamics. Our analyst also gets their first-hand experience with the vendor's product demo to understand their technology capabilities, user experience, product features, and other aspects. Based on the requirements, Quadrant analysts interview with more than one person from each of the market participants to verify the accuracy of the information provided. We typically engage with client personnel in one of the following functions:

- Strategic Marketing Management
- Product Management
- Product Planning
- Planning & Strategy

Feedback from Channel Partners and End Users

Quadrant research team researches with various sales channel partners, including distributors, system integrators, and consultants to understand the detailed perspective of the market. Our analysts also get feedback from end-users from multiple industries and geographical regions to understand key issues, technology trends, and supplier capabilities in the technology market.

SPARK Matrix: Strategic Performance Assessment and Ranking

Quadrant Knowledge Solutions' SPARK Matrix provides a snapshot of the market positioning of the key market participants. SPARK Matrix representation provides a visual representation of market participants and provides strategic insights on how each supplier ranks in comparison to their competitors, concerning various performance parameters based on the category of technology excellence and customer impact.

Final Report Preparation

After finalization of market analysis, our analyst prepares necessary graphs, charts, and table to get further insights and preparation of the final research report. Our final research report includes information including competitive analysis; major market & technology trends; market drivers; vendor profiles, and such others.

Client Support

For information on hard-copy or electronic reprints, please contact Client Support at ajinkya@quadrant-solutions.com | www.quadrant-solutions.com