

RESEARCH PAPER

Transforming Bank Customer Engagement through CRM Integration with Account Intelligence

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Abstract

The banking industry is racing away, from its legacy model, toward an ecosystem a shift propelled by fintech breakthroughs and the way customers now expect to interact with their money. By rolling out tech and reshaping services to match those shifting preferences banks are knitting more durable bonds with their clientele. Still the pivot brings its set of headaches—banks must juggle the urge to innovate digitally with the need to keep customers truly engaged stay within ever tightening frameworks and safeguard a flood of sensitive data.

This research examines how linking Assistant Customer Relationship Management (CRM) systems with a range of payment technologies—Digital wallets, QR codes, point of sale (POS) terminals, IMPS, UPI, NEFT and RTGS—can deepen customer engagement broaden inclusion and underpin sustainable growth, in the banking sector. Survey results and data analyses indicate that these innovations have noticeably improved both the accessibility and convenience of services. The study also scrutinizes the environment and the escalating relevance of Central Bank Digital Currency (CBDC). To preserve stability and security the Reserve Bank of India (RBI) has instituted rules governing payments, cybersecurity and consumer protection. The findings hint that while financial innovation can boost efficiency and broaden access it also demands oversight to curb risks such, as fraud and infrastructure constraints.

KEYWORDS:

Account Intelligence, AI-driven Analytics, Banking Digitalization, Big Data, CBDC, Cloud Computing, CRM Integration.

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Introduction

Technological innovationa cascade of shifts and the evolving expectations of customers are together reshaping the global banking landscape steering it toward a digital first approach. CRM systems have shed their role as data repositories emerging as tools, for engaging customers in this new terrain. Coupled with analytics and artificial intelligence (AI) digital CRM platforms give banks the ability to forge real time relationships that rest on payment infrastructures.

A Paradigm Shift: Digital Transformation and the Reimagining of Customer Engagement, in BankingDigital first operating models are swiftly edging out legacy infrastructures across banks reshaping the way the industry functions. At the time CRM has morphed into a insight driven hub that deepens client relationships while untangling strategic decision making a shift fueled by financial innovation for customer centric solutions.

From a Product centric Banking Mindset, to an one: tracing the evolution of CRM

The way CRM has evolved captures the banking sector's shift, from a view to a relationship oriented mindset. In the 1970s CRM debuted as an instrument for handling client data and lifting productivity. The rise of databases and contact management systems in the 1980s—coincident, with the personal computer boom—made modern CRM solutions achievable.

The next noteworthy breakthrough—electronic CRM (E CRM)—made its debut, in the mid 1990s riding the wave of the exploding internet. By funneling reservoirs of customer data into one place and sidestepping the tedium of paperwork e CRM gave banks the ability to gauge client needs in time via digital touchpoints. The payoff was unmistakable: cost reductions, a more convenient experience, for customers and markedly quicker reaction times.

CRM has stepped out of its role as a support function and now sits at the heart of enterprise strategy in today's digital era. To nurture relationships banks are swapping a mindset for a customer first approach leveraging sophisticated CRM platforms. Modern digital and social CRM tools lean, on data driven insights to craft experiences that truly engage customers. In the fast moving world of finance a solid digital CRM is the engine that pulls customers into the fold holds tight, to the ones already onboard shields the institution's brand and keeps the firm ahead of the pack as the market constantly reshapes itself.

People now weigh their banking experience, against the service level of global tech powerhouses like Amazon and Netflix as, against other financial firms. This has nudged expectations upward for interactions that're not only smooth but also finely tailored. Consequently, banks find themselves constantly pouring money into the advanced technology to keep their edge.

From handling interactions, to fostering supportive long lasting relationships that enhance customer lifetime value the transition from E CRM, to Social CRM underscores a heightened strategic shift.

CRM Phase	Era	Primary Focus	Enabling Technology	Impact on Bank Operations
Conventional CRM	Pre-1980s	Transactional Relationship Management	Physical files, early databases	Structured management of customer records and interactions
E-CRM	1990s–2000s	Multi-channel interaction, centralized data storage	Internet, computerized databases, CRM software	Reduced repetitive tasks, centralized access to customer data, emergence of online service channels
Digital/Social CRM	2010s–Present	Real-time personalization and collaboration	Big Data, social media, APIs, cloud computing, AI/ML	Deep customer insights, context-aware services, and interactive engagement through digital collaboration
CRM Phase	Era Approximate	Primary Focus	Enabling Technology	Impact on Bank Operations

2. Evolution of Crm in The Banking Sector

Within the banking sector CRM has moved from manual logs to AI driven engagement platforms. Modern solutions now blend APIs, big data analytics and predictive modeling to build customer profiles and support decision making.

2.1. How the Digital Payments Ecosystem Operates as a Data Conduit

The banking industry's pivot, to a model has been turbo charged by the adoption of digital payment solutions—digital wallets, the Unified Payments Interface (UPI) Immediate Payment Service (IMPS) National Electronic Funds Transfer (NEFT) Real Time Gross Settlement (RTGS). The like. In turn these channels flood the sector with a deluge of real time transaction data, a treasure trove that can be mined for actionable insights.

Its open architecture design the ease of plugging it in and the fact that transactions run without any steps have driven UPI to levels of popularity. By delivering a frictionless payment experience across a range of platforms the system has markedly boosted convenience while pulling people into the fold of financial inclusion.

The surge, in digital banking tools has gone hand in hand, with customer involvement largely because they let banks tailor services and make everything more convenient. Leaning on massive real time payment backbones also drags in a host of headaches. Even a brief glitch can gnaw at trust a bank's reputation and shave off a slice of revenue. Consequently, banks are forced to pour resources into reliability built in redundancy and lightning fast recovery processes to keep services humming and confidence.

While open, rapid payment ecosystems such, as UPI broaden access and fuel competition, they also drive banks to revamp their often convoluted legacy frameworks. That revamp demands sizable, capital outlays. It remains indispensable, for preserving technological relevance and staying competitive.

2.2. A Technical Blueprint Outlining how CRM and Payment Platforms can be tied Together in Time

Only an API first approach—where lightning fast digital payment rails are tethered to the core CRM via Application Programming Interfaces that guarantee real time data sync—can deliver an customer view. Moreover, the integration must bow to standards such, as ISO/ 2022 to safeguard interoperability across payment schemes.

The hallmarks of an integration architecture usually include the elements:

- Payment Gateway: the behind the curtain facilitator that shepherds transaction processing.
- A Centralized CRM functions, as the repository pulling together every fragment of customer data and each interaction, into one store. Within the analytics and reporting tier raw data is transformed into insights that can be acted upon.
- Middleware: it orchestrates real time data syncing making sure disparate systems stay in touch without a hitch.

Banks must dismantle the data silos that keep information locked away if they hope to capture a picture of consumer habits and shifting market currents. Leveraging an analytics environment—whether a Data Lake or a Data Fabric—that can juggle both batch ingestion and real time streaming makes that feasible. By pouring streams of transaction logs, into a distributed processing framework such, as Apache Spark banks can transmute raw numbers into strategic intelligence.

By reshaping transaction records into relationship intelligence the data driven architecture supplies banks with a fluid, ever changing comprehension of their customers supplanting the reliance, on static metrics.

2.3. The Tricky Bits of API First Integration

Although leveraging APIs to stitch together CRM and payment platforms can deliver advantages it also introduces a host of operational and technical challenges. The biggest hurdles arise from the incompatibility. Tangled complexity of the various systems involved. Moreover, many banks still run on legacy software that wasn't built for today's integration forcing teams to rely on custom development and specialized middleware.

Preserving data consistency and top tier quality, across systems throws up a snag. The unified framework must be elastic enough to absorb growth and shifting imperatives as the tide of customer data keeps surging—without undermining reliability or performance.

Security and compliance create another layer of complexity. Because CRM platforms hold customer data any integration must follow local data protection regulations employ robust encryption and align with international security standards such, as PCI DSS.

When data stays scattered and out of sync a CRM's predictive and analytical power takes a hit. That's why building a pipeline for ingesting and processing data isn't a nice to have—it's a must have, for a real time fully functional CRM ecosystem.

3. Integration of Digital Payments and Crm Systems

Integrating payment channels such, as UPI, NEFT and RTGS into CRM platforms unlocks customer insights while keeping data synced in real time. By adopting an API first architecture the resulting system retains cross platform scalability, robust security and seamless interoperability.

3.1 Tying. Payment Flows, with Predictive Modeling and Advanced Analytics

When CRM platforms tap into the deluge of payment data the massive stream of transaction records suddenly turns into an engine, for predictive analytics. By feeding that real time payment flow, into machine learning models banks can anticipate consumer behavior—spotting evolving spend patterns, seasonal buying quirks and early signs of churn.

- Make hyper personalization a reality by serving up investments, credit cards and loans that seem hand picked for each user's profile. Boost cross selling and upselling by digging into transaction history to determine the timing, for offering services. By adopting this approach, the CRM system moves away, from being a database and becomes a forward thinking intelligence engine that underpins strategic decision making while energizing customer engagement.

3.2 Segmenting. Managing Their Lifecycle

By looking at what's coming up banks can use CRM tools bolstered by payment data to segment their clientele.

- Preferred ways to pay. Wallets, RTGS, NEFT and UPI
- A timeline of the engagement lifecycle, broken down into its stages

- How often we. How valuable those exchanges are when banks break their customer base into segments, they can tailor loyalty programmes devise retention tactics and craft focused advertising drives. Take the high value users who habitually use UPI: they might be offered premium perks or cash back rewards while dormant accounts can be coaxed back with targeted marketing.

3.3 Uncovering. Mitigating Risk

A bank's ability to detect and halt fraud soars when it streams real time payment data into its CRM system.

- Anomaly detection: AI watches, for anything that sticks out—sharp jumps, in transaction size or locations that don't line up with the pattern.
- Adaptive fraud models: By feeding them a history of payment transactions the machine learning engines slowly refine their instincts becoming increasingly adept, at detecting fraud over time.
- Rapid response systems: Integrated alerts give teams the ability to jump into action instantly—be it reaching out, to clients or slamming the brakes on accounts. Through this security framework customer trust stays intact compliance is secured and resilience is bolstered.

3.4 Navigating Regulatory Compliance and Getting Audit Ready

With regulators such, as the Reserve Bank of India (RBI) tightening compliance requirements banks now see a CRM payment system as essential, for upholding accountability and transparency. The combined solution allows banks to:

- Prove you're playing by the rules—whether it's RBI, ISO/ 20022 or PCI/ DSS.
- Keep an audit log capturing each transaction and the metadata attached to it.
- Put in place access controls strip identifiers through anonymization and lock data with encryption to protect consumer information.
- When banks stick to these standards, they not meet their compliance obligations. Also lift their reputation coming across as genuinely trustworthy and secure.

4. Predictive Analytics and Account Intelligence

By harnessing analytics banks can now spot what customers need catch fraud before it spreads and serve them with personalization—AI and machine learning have upended the whole CRM landscape. To piece together data driven engagement plans these clever systems draw on insights, fluid segmentation and the tried and true RFM (Recency, Frequency, Monetary) model.

4.1 RFM Behavioral. Modelling

RFM modelling continues to be a cornerstone, in banking analytics, for deciphering customer engagement and the value they generate. Coupled with CRM and payment data it empowers banks to gauge their client base adeptly across three dimensions:

- Recency: Signals how close, in time a consumer's latest purchase occurred, which proves handy, for flagging those who've slipped off the radar or just resurfaced.
- Frequency: Tracks how often transactions occur helping sustain engagement tactics and assess loyalty.
- Monetary Value: Captures the magnitude of each client carving a divide, between those, with substantial net worth and those whose trading activity remains modest.

By pulling RFM scores and behavioral cues—such, as the transaction channels customers favors the devices they lean on and the patterns they exhibit, at times of day—banks can shape customer personas that evolve in real time. This lets them fine tune marketing and service strategies continuously driven by what people doing instead of relying on static historical data.

By tapping into analytics— behavioral models and RFM—banks can glimpse how customers may act down the road and fine tune their engagement tactics accordingly.

4.2 Account. Lifecycle Projections

By tapping into AI's ability to predict what clients will need next and how they'll handle money account intelligence moves, beyond the old school habit of profiling customers. Using analytics banks can now sketch out a customer's financial life cycle spotting the points where a loan, an insurance cover or investment counsel might be called for.

- Take stock of your happiness: Scan the ebb and flow of your income, savings and spending to gauge your risk level and creditworthiness.

- / Lead journeys: Provide clients with advice so they can make smarter financial decisions covering everything from saving objectives to EMI handling and budget planning.
- Leveraging this technique CRM solutions morph from data vaults into financial counselors proffering timely context sensitive interventions that amplify customer loyalty and nurture trust.

4.3 Real Time Decision. How They Drive Personalization

Machine learning driven real time decision engines are slipping into an ever expanding roster of CRM platforms. They spring into action the instant a customer does something parsing transaction data on the fly. This gives banks the ability to:

- Act Quickly send out the right offers, alerts or fraud notices.
- Adapt on the fly: Improve accuracy and future interactions by learning from customers' responses.
- Offer experiences: fine tune every customer interaction—whether it's an email a dashboard view or a product suggestion—to align with each individual's preferences and behavior.
- This flavor of real time personalization nudges up customer lifetime value cranks up engagement and helps lock in retention.

4.4 Navigating Ethical AI and Responsible Data Use

As AI driven platforms sharpen their abilities staying true to norms and transparent practice becomes indispensable. Banks must double check that their algorithmic models are just intelligible and fully aligned with data privacy statutes.

Some of the concepts are:

- Cutting bias: models must be engineered to avoid outcomes, in service provision or loan access.
- Data privacy compliance: each process must align with statutes such, as the GDPR, RBI guidelines. Must obtain explicit consent, from customers.
- Explainable AI: Decisions—such, as risk classification or credit scoring—need to be clear and understandable, for both regulators and consumers. By grounding AI in ethics and responsibility fairness is assured confidence grows and the long term health of banking systems is secured.

5. Regulatory Compliance and Data Security

Adhering strictly to regulatory frameworks is essential in the digital banking ecosystem to ensure system stability, maintain customer trust, and uphold transaction integrity. Regulators such as the Reserve Bank of India (RBI) have established standards for digital payments, data security, and cyber security.

5.1 Digital Payment Governance and RBI Guidelines

The RBI established a number of governance frameworks aimed at enhancing transparency and safeguarding the public in order to control and secure digital transactions. Important prerequisites consist of-

- Data Localization: In order to preserve national sovereignty and auditability, banks are required to keep all payment-related data in India.
- Two-Factor Authentication (2FA): Required for all online transactions in order to safeguard transaction security and stop unwanted access.
- KYC and AML Compliance: To confirm identity and detect questionable activity, CRM systems need to interface with Know Your Customer (KYC) and Anti-Money Laundering (AML) systems. Banks can guarantee automated compliance tracking, real-time reporting, and smooth audit readiness by integrating these compliance features into CRM systems.

5.2 RBI Guidelines and Digital Payment Governance

The Reserve Bank of India (RBI) has put in place a number of frameworks to regulate digital transactions, including:

- Requirements for data localization Banks have to keep payment data in India to maintain auditability and sovereignty
- 2FA, or two-factor authentication: This feature is necessary for digital transactions in order to prevent unauthorized use.
- KYC and AML Compliance: CRM systems must interface with Know Your Customer (KYC) and Anti-Money Laundering (AML) protocols in order to ensure identity verification and halt illicit transactions. To ensure seamless reporting, audit readiness, and real-time compliance monitoring, CRM systems must be designed to adhere to these regulations.

5.3. Cyber Security Architecture within CRM

Ecosystems multi-layered cybersecurity architecture is required by modern CRM platforms in the banking industry in order preserve client data and guarantee operational resilience. The following are the crucial components :

- Encryption in Transit and at Rest: To guard towards interception or security breaches, all client information and transaction records should be encrypted using industry standards like AES or RSA.
- AI-Powered Threat Detection: Machine learning models keep an eye on systems all during the day to look for phishing attempts, malware intrusions, and unusual behaviour.
- Role-Based Access Control (RBAC): Reduces insider threats and data misuse by limiting access to sensitive information to authorized personnel only. When taken as a whole, these steps help banks better protect themselves from online attacks while maintaining consumer trust in online banking.

5.4 Real-Time Fraud Detection and Response

Threat identification, assessment, and reacting are made possible by AI-powered fraud detection mechanisms integrated into CRM systems. They carry out vital tasks like: Finding odd transaction patterns, like unforeseen increases in transfer amounts or unexpected geolocations, is known as pattern recognition.

- Instant alerts: To stop losses, suspicious accounts are automatically frozen and customers are notified.
- Risk scoring: Giving transactions scores related to risk allows for the prioritization of high-risk cases and the automation of low-risk approvals. This proactive defines model is essential for preserving security, regulatory compliance, and customer trust in the rapidly evolving digital payment landscape of today

Table 2: Compliance & Security Components in CRM-Integrated Banking

Component	Functionality	Technology / Standard
RBI Compliance	Ensures data localization, KYC, AML adherence, and transaction integrity	RBI Guidelines, ISO 20022
Data Encryption	Protects sensitive information during storage and transmission	AES-256, RSA
Role-Based Access Control (RBAC)	Restricts data access to authorized personnel	RBAC Framework
Fraud Detection Engine	Detects suspicious activity and triggers real-time alerts	AI/ML Models, Behavioral Analytics
Consent & Privacy Management	Tracks customer consent and enforces ethical data use	GDPR, RBI Consent Protocols
Audit Trail Logging	Records all access and data changes for transparency	CRM Audit Modules
Compliance Dashboard	Provides centralized oversight of alerts, reports, and breaches	Real-Time Monitoring Tools

6. Central Bank Digital Currency (Cbdc) Implications

In the banking sector, the emergence of Central Bank Digital Currencies (CBDCs) brings both groundbreaking opportunities and strategic challenges. While CBDCs promise efficiency, innovation, and transparency, they also pose a risk of disintermediation for commercial banks. To remain competitive in this evolving landscape and deliver enhanced value in a CBDC-supported economy, banks must upgrade their infrastructure, adapt to new regulatory standards, and expand their service offerings.

6.1 Strategic Impact of CBDCs on Commercial Banks

The introduction of CBDCs by central banks, such as the Reserve Bank of India (RBI), affects commercial banks in two primary ways:

- Disintermediation Risk: Traditional banks may lose their role as intermediaries if consumers start transacting directly with central banks via CBDCs, leading to a decline in deposit bases and lending capabilities. On the other hand, CBDCs offer banks the opportunity to deliver innovative digital services that enhance efficiency and transparency, such as programmable money, instant settlements, smart contracts, and automated compliance systems. To stay relevant, commercial banks must leverage their expertise in financial innovation and customer relationship management to reposition themselves as providers of value-added services within the CBDC ecosystem.

6.2 Infrastructure Modernization for CBDC

Integrating CBDCs into the existing banking system requires a secure, scalable, and interoperable infrastructure capable of handling real-time digital transactions. Key components include:

- **Compatibility with Distributed Ledger or Blockchain:** Banks need to update their core systems to interact with tokenized or blockchain-based CBDC platforms.
- **API-Driven Architecture:** Secure APIs are essential for seamless data exchange between CRM systems and CBDC transaction layers.
- **Real-Time Reconciliation Engines:** Automated, real-time reporting and ledger reconciliation systems are crucial for instant settlement. Legacy banking systems must undergo significant architectural redesigns, focusing on flexibility, resilience, and compliance readiness to support low-latency, high-frequency CBDC transactions.

6.3 Policy Alignment and Regulatory Readiness

The advent of CBDCs introduces new regulatory and compliance challenges for banks. Key requirements include:

- **Integration with Digital Identity and KYC Frameworks:** CRM systems must align with national digital identity infrastructures to enable compliant CBDC onboarding.
- **Automated Tax and Compliance Mechanisms:** As CBDC transactions may include embedded tax logic, CRM platforms should automatically calculate, report, and record liabilities.
- **Enhanced Transparency and Auditability:** Banks must ensure complete traceability of CBDC flows through detailed reporting and secure audit logs. Close collaboration with regulators will be crucial to align institutional policies, maintain compliance, and build trust in the new digital monetary environment.

6.4 Service Diversification and Customer Engagement

CBDCs enable the implementation of entirely new models for financial inclusion and customer engagement. Examples include:

- **Programmable Loyalty Rewards:** CBDCs can be configured to offer incentives based on specific customer behaviours, locations, or time periods.
- **Integration of CBDC Wallets:** CRM dashboards can present various perspectives on transaction records, the status of smart contracts, and balances in both fiat and CBDC.
- **Tools for Financial Inclusion:** CBDCs have the potential to enhance CRM accessibility and interaction by reaching out to underbanked or unbanked communities through mobile-first solutions. To capitalize on these developments, banks need to rethink their CRM strategies to incorporate CBDC-native experiences, blending digital empowerment, automation, and customer engagement.

Table 3: CBDC Implications for CRM-Integrated Banking

CBDC Impact Area	CRM Adaptation Required	Strategic Benefit
Disintermediation Risk	Wallet integration, customer retention modules	Preserve customer relationships
Infrastructure Modernization	Blockchain-ready CRM, real-time engines	Enable instant settlement and smart logic
Regulatory Compliance	KYC sync, tax automation, audit trails	Ensure legal alignment and transparency
Service Innovation	Programmable rewards, CBDC-native dashboards	Boost engagement and loyalty
Financial Inclusion	Mobile-first CRM, vernacular support	Expand reach to underserved populations

7. Conclusion

In the digital age, the evolution of CRM is transforming the banking industry by integrating data analytics, artificial intelligence, and regulatory expertise into a cohesive ecosystem. These comprehensive CRM frameworks not only enhance customer engagement but also strengthen governance, trust, and innovation potential. Future advancements should focus on CBDC interoperability and AI governance.

7.1 Strategic Integration:

Customer Relationship Management as the Core of Digital Banking CRM has transitioned from a simple transactional tool to a central hub of strategic intelligence, reflecting a major shift in banking philosophy. By incorporating data analytics for customer

insights, AI and machine learning for fraud detection and predictive engagement, and regulatory foresight for compliance and governance, banks have become part of a secure, customer-centric digital ecosystem. CRM has evolved from a backend system into the digital brain of modern banking. By merging data analytics, intelligent technology, and regulatory insight into a single ecosystem, CRM's progression in the digital era is revolutionizing the banking sector. Integrated CRM systems enhance governance, trust, and innovation capacity while also boosting engagement. Future developments are expected to focus on CBDC interoperability and AI governance

7.2 Future Roadmap: Intelligent, Inclusive, Interoperable To sustain their momentum and relevance, banks should focus on three primary pillars:

- **AI Governance:** To ensure fairness and transparency, as well as to develop ethical, understandable, and unbiased AI models for CRM systems.
- **CBDC Interoperability:** Upgrade customer relationship management systems to seamlessly integrate with digital currencies issued by central banks, facilitating programmable money and smart contracts.
- **Inclusive Banking:** Utilize behavioural nudges, vernacular interfaces, and mobile-first platforms to engage those without access through intelligent CRM. These pillars will shape the next generation of banking, which will be digital, equitable, and resilient.

7.3 Final Reflection:

CRM as a Catalyst for Trust and Innovation In an era of rapid financial innovation and increasing consumer expectations, trust is the currency of engagement. Thoughtfully designed and ethically managed CRM systems support:

- Innovation Capacity through data-driven product development,
- Customer Trust through secure, transparent interactions,
- Enhanced governance through real-time compliance and auditability.

With CRM at its core, banks are well-positioned to lead the future of the financial industry, even though the path ahead demands constant adaptation.

8. Consent for Publication

The author declares that the chapter's contents are original and have never been published elsewhere. All essential institutional and ethical clearances have been obtained for its release. Publication Permission (Extended)

The author confirms the following:

- **Originality:** Each piece of information, in this chapter stems from its research and analysis. It has never been submitted or published anywhere else.
- **Institutional approval:** Having obtained all permits, from the institutions the research aligns with ethical standards and complies, with internal review procedures.
- **Ethical Clearance:** In cases where it was required ethical approval was obtained for gathering data designing the survey and extracting digital banking insights. The research complies with the guidelines issued by the regulators and university ethics committees.
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By making this declaration the chapter is poised to meet publication standards while adding a contribution, to the growing body of knowledge, on digital banking and CRM integration.

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The author affirms that there are no conflicts of interest to disclose.

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The author, with conviction affirms that:

No Conflict: No financial stakes, sponsorships or commercial relationships were present that could have influenced the research findings, analysis or interpretations in this chapter.

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