The Bottom Line

How platforms are transforming customer information management

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Abstract

Purpose

The purpose of this paper is to explain the development of ecosystems and platforms to manage customer information, and to identify the management, research and teaching implications of this evolution.

Design/methodology/approach

This article is based on research and industrial experience of two of the co-authors in customer relationship management, further developed with other co-authors in the field of business models, the research and teaching experience of the university authors, and cross-functional literature reviews in the areas of strategy, marketing, economics, organizational behaviour and information management.

Findings

The findings of this paper show that digitalization, cloud computing and new information-based platforms are beginning to change how customer information is being managed, creating new opportunities for improving marketing, customer relationship management and business strategy.

Research limitations/implications

Needs confirmation of views by primary empirical research.

Practical implications

Identifies the need for senior marketing management to examine closely how internal and external/public customer information platforms may enhance their capability for managing customers and setting new strategic directions.

Originality/value

Highlights the move to customer information platforms and identifies how senior managers should consider them as an option for better customer information management and as a basis for new business strategies.

Keywords

Customer information, ecosystem, marketing, platform, competitive strategy, information technology, strategy.

Paper type

Viewpoint

Disclaimer

The views and opinions expressed in this article are those of the authors and do not reflect the views of IDC.

Introduction

In this article, we review the development of platforms for holding large amounts of customer information and making them available within and across firms. We explain how the gathering, holding and use of customer information to manage customers and to create and use insight into customer behaviour has developed, assisted by the emergence of a new ecosystem of suppliers, and how digitalization has affected practice in this area, as well as some of the benefits and problems arising from this development. The review includes relatively recent developments, such as the deployment of artificial intelligence in managing customers, and the emergence of the Internet of Things as a new source of data from customer-owned assets. We explain the nature of cloud computing and how cloud-based platforms for holding customer information have arisen, giving examples from different sectors. We also explore some of the implications of these developments for business strategy, governance and compliance.

The nature of customer information

From mail order, through call and contact centres, to the Web

The practice of gathering, holding, analysis and use of customer data - their personal details, locations, interactions with media, enquiries, transactions, questionnaire responses and so on, began in the nineteenth

century, in the mail order industry. This developed into database marketing (Stone *et al*., 1996). The data was first used to support interactions between customers and companies by post, then by telephone– eventually via large call centres capable of managing conversations with hundreds or even thousands of customers at a time. The rising use of e-mail and the Web (including Web chat) encouraged the transformation of call centres into contact centres, as they began handling several kinds of electronic communications in different digital channels. Along with recording of interactions (including voice files, analysed by voice to text software, and website clickstreams), this led to an explosion in customer data volumes.

The difference made by Customer Relationship Management (CRM)

The CRM approach, especially in electronic form, has revolutionised how many companies market, allowing them to establish an increasingly automated and/or customer-driven dialogue with possibly millions of customers, based on customer information management (Stone and Woodcock ,2014). Digital data greatly increases the volume of customer data held (Stone and Woodcock, 2014), but generally, customers who engage digitally buy more (Sorenson and Adkins, 2014), so this has acted as an important incentive for companies to move their dialogue with customers to digital channels. An overview of the information collected and its use has been provided by Stone and Laughlin (2016).

Data volumes

The volumes for accesses and transactions on the Internet are large and growing fast. The Internet now hosts a rapidly growing proportion of human dialogue, in ways that are open to viewing and influencing by companies. This, combined with the growing reach, speed and capacity of mobile telephone networks, means that dramatic changes that have taken place in the volumes, frequency and effectiveness of use of the different media by which companies and customers exchange communication and in the devices and software used by consumers to exchange communications with companies and individuals and to organise and enjoy their lives. Interactive marketing and its associated analytics, particularly real-time high performance analytics, are opening up new marketing opportunities, leading to improved marketing return on investment. Social media can be used as information platforms too (Stone and Woodcock, 2013), to manage knowledge from customers or on behalf of customers (Chua and Banerjee, 2013; Flanagin and Bator, 2011; Padula, 2008; Sigala, 2012). Social media allow real-time sentiment and analysis and the immediate identification of new target customers, while social data is sometimes combined with geospatial, weather data or other sources to build a more complete picture of the customer's context (IDC, 2016a; Capgemini, 2015).

Customer insight

The first requirement for creating customer insight is to bring all the data together (Stone *et al*., 2004). Conventionally, this requires

- Integrating data from many source systems (including transaction processing systems), possibly into a data warehouse (which holds data about current and past transactions).
- Creation of data models to support that integration.
- Creation and application of metadata definitions (e. g. how an "active customer" is defined using different variables).
- Analysis – from straightforward statements of the state of customers, to analysis based on hypotheses about the state of play, to data mining to explore possible interrelationships in the data (Stone and Badgett, 2005).
- Providing resulting data and analyses to whoever needs it, wherever they are, by reports or individual data transfers (e. g. data about an individual customer during a transaction), on whatever platform or device users need.

However, data management technology is evolving rapidly, such that separate data warehouses are not always necessary.

CRM information is used for many purposes, from supporting marketing or business strategy, to managing operations and marketing, sales and service processes. It may be integrated with supply chain data (e. g. to identify customers awaiting deliveries), or with financial data (e.g. to identify debtor or other "bad" customers) (Stone and Laughlin 2016). Knowing which customers pay late or who are likely to commit fraud helps the finance function control debt and work with the marketing function to divest the company of debtors, or an insurance company's claims department to control the claims level.

Data analytics and insight

The term "analytics" as applied to customer databases mainly involves finding patterns and correlations in data about customers, their responses and purchases. Analytics uses advanced software based on classic (e.g. regression, analysis of variance, cluster analysis) and modern (e. g. neural networks) statistical techniques. Today, software for implementing these techniques usually incorporates visualisation software to help busy managers understand their customers and give them "customer insight". This involves combining data, analytics, research and database marketing (especially testing) to produce a deeper understanding of customers. A new category of managers – insight managers – has emerged, along with new categories of software/services (e. g. specialised analytics agencies). Users of customer and market data and analytics may be organised into departments called "consumer insight" or "customer intelligence", replacing the older "market intelligence" or "marketing information", reflecting the move away from less targeted forms of marketing. Companies are still learning how to manage these volumes of data (WBR Digital, 2017) and what to do with so much data, whether owned or non-owned (such as data arising from social media), structured or unstructured (e.g. voice, text, video) (Stone and Woodcock, 2014).

Customer information and the Internet of Things

A recent development is to associate customers with data generated by products and services. For example, where a smart meter is used to measure a home's energy consumption (or even energy generation), data on usage (which can be polled as frequently as the supplier needs for billing and energy management purposes) is associated with a customer record. As the idea of the Internet of Things (attaching intelligent devices to objects to enable them to communicate with and receive instructions via the Internet) spreads, many resultant data streams will be associated with individual customers. The same applies in industrial markets, where data streams on customers' usage of products and any variations in performance or quality problems, is often transmitted instantly to suppliers, allowing them to help their customers optimise product performance. Another trend that leads to the generation of more data is the move to sell products (hardware, software) as services, when the supplier can constantly monitor the use of the product by the customer (Stone *et al*., 2003a and 2003b).

Digitalization

The above trends form part of a wider trend, digitalization - the process by which a business, its people, its partners, ecosystems and enabling agencies (in some cases public ones) become interconnected in real-time, by exchanging digital information, and how they use this to commercial benefit (Laudon and Laudon, 2017).

Digitalization is being boosted by six factors:

- Hyper-connectivity -the ability to connect digitally at high speeds, from locally to globally, using everything from highly local communications such as Bluetooth and Near Field Communication, to satellite communication and enhanced Internet bandwidth through improved transmission and compression technology.
- Virtually unlimited computing power, whether processing or memory, available at low cost.
- Artificial intelligence and machine learning, allowing much smarter management of anything by ensuring that learning takes place quickly and results are immediately implemented.
- Cloud computing, ensuring secure availability of information anywhere for any approved use.
- Sensor-proliferation, allowing large amounts of information to be gathered from any point.
- Cybersecurity, advances in security which permit all the above without prejudicing data security.

One idea of digitalization is that, where possible and financially justified, a business should integrate all its core processes, systems and data onto a single platform. This makes them easy to manage, particularly as the business grows and serves more customers (without adding complexity). This approach helps provide information (from basics to advanced analytics and machine learning) on customers, products, services, payments, finances and assets to all appropriate business stakeholders – customers, staff, suppliers, business partners etc. The benefits of digitalization include improvements in output, sales, customer experience and involvement, staff experience and empowerment, and quality and efficiency. It should lead to simplification and streamlining of everything from individual processes to entire work programmes, and development of more robust and competitive business models.

Digitalization is supported by the following information technology strategies:

- Securely connecting all parts of the business – systems, data and tools – by integrating functional systems – human resources, financial, marketing, sales, operations, logistics etc. - into a single system and extending them to partners in the ecosystem, whether on platforms or social media.
- Using the Internet of Things approach, by connecting devices to the Internet, including using sensors and mobile devices to provide new and continuous streams of information and new ways of accessing them.
- Providing complete and mobile accessibility to systems and data ensuring that all employees (and where appropriate, ecosystem partners and customers or platform users) have the appropriate and where needed mobile access they need to achieve their objectives well and productively.
- Moving to the cloud, ensuring that systems, data and analyses are accessible quickly, flexibly and securely
- Turning all a business's data, from many sources and analyses, into insight which is real-time, accurate, predictive and easy-to-understand, using smart displays and dashboards, giving the right information to the right people or automated systems, anywhere and everywhere needed and making it easier to identify patterns and trends.
- Converting real time insight into automated action by connecting insight with systems that trigger actions.

Note the mention of "ecosystem" and "platform" in this section – these are described later.

The evolution of the digital marketing ecosystem

The new ecosystem emerges

Increasingly, to manage the growing volume of data, firms turn to an ecosystem of suppliers, including suppliers of

- Software to hold the data and make it available or to analyse it.
- Additional data to enhance the value of data the company already holds.
- Data storage and data analysis.
- Customer interaction software and services, who use the data on behalf of the company to manage interactions with customers (e. g. outsourced contact centres, marketing agencies).

Ecosystem evolution allows suppliers to understand and reach their target markets faster, more accurately and more cost-effectively, facilitating customer retention and development while paradoxically also making it easier for new entrants to attack incumbents' customers and for bad customers to commit fraud (Stone and Laughlin, 2016). An easier digital customer experience tends to lead to customer being more willing to give data (My Customer, 2017), so there are additional benefits to using systems which have focused on optimising the customer interface digitally. The evolution of the digital marketing ecosystem (Stone, 2014) is complicated by its convergence with the information and communications technology (ICT) ecosystem, itself evolving rapidly. For example, recent developments in the marketing ecosystem include application of artificial intelligence to what would already have been considered advanced software for automating campaign management or for personalizing campaign communications to the needs and characteristics of customers.

Marketing and ICT ecosystems

In marketing, ecosystems have less coherence than in ICT, where ecosystems are defined mainly by groupings of suppliers around the main software or platform providers. At the centre of ICT ecosystems lie software designs, standards and application programming interfaces that allow independent developers to interlock with the leader's software, as well as marketing and service partnerships, or (in the case of platforms), the provision of services that allow companies to shift their applications onto a platform easily and cost-effectively. The ecosystem leader focuses on building, managing and servicing the ecosystem and defending it from competitive invasion.

The ICT ecosystem continues to evolve due to:

- Rapid development and unconstrained competition and innovation in technology (computing, telecoms – latter stimulated by privatisation and liberalisation), from components through to final products.
- The rapid development of global ecosystems, helped by open systems and publication of Application Programming Interfaces by the main players, allowing all kinds of suppliers to add value and compete.
- Increasing independence of geography, so anything can be done anywhere (from storage and processing in the cloud to transaction and communicating wherever the individual is).

Intrinsic to the ecosystem idea are co-evolution, co-opetition and value co-creation (Adner, 2006; Adner and Kapoor, 2010; Mann *et al*., 2012; Brandenburger and Nalebuff, 1996; Fjelstad *et al*., 2012; Iansiti and Levien, 2004; Kapoor and Lee, 2013; Selander *et al*., 2010; Selander *et al*., 2013; Teece 2007) and an "explosion of alliances" (Dyer and Singh, 1998, p. 661) Participation in ecosystems is a necessity (Selander *et al*., 2013). Firms may create digital business ecosystems to achieve competitive advantage (Perry *et al*., 2012; Sarasvathy, 2001).

The internal ecosystem

To match this 'external' ecosystem, an 'internal ecosystem' develops in larger companies, merging capabilities of different departments, some of which used to work separately (Stone, 2014). A particularly important recent addition to this ecosystem has been deep expertise in privacy issues associated with the holding of personal data, in response to the needs of new regulations, of which more later. People in this internal ecosystem must be kept updated and working with their company's external ecosystem, through training, internal communication, good management and through ensuring that senior managers are fully aware of the external and internal ecosystems, how they work and how they are evolving. The part of the external ecosystem with which a given firm connects may be evolving so fast that its people must keep up-to-date with developments in it, preventing them from looking inwards to colleagues in their internal ecosystem. This good connection with the external ecosystem may ensure that their employer gets the best performance, but can lead to poorly integrated performance and to conflict. However, the burden of managing the ecosystem can be shifted from a client company to a supplier which takes on the role of ecosystem manager by providing a platform – as do the many large cloud providers such as Amazon, Microsoft and IBM.

Platforms for managing customer information

Recognition that customer information needs to be used more widely, within a complex ecosystem, leads to the development of platforms for managing data. The reasons for this include:

- The need for the company to use the latest, most advanced techniques and capabilities for holding, managing and analysing data and making it available across the company and perhaps to its partners.
- The fact that the company is working with a large business partner that has a much better capability than the company's for gathering, holding, managing and analysing data.
- The company may have changed business model (Stott *et al*., 2016; Parnell *et al*., 2017) or acquired a business with a different model and adapted it for its own use, with the new model requiring a higher volume or improved use of customer information.

- A commitment or even legal requirement by the company to make some or all its customer and/or other data available to customers and others, combined with the recognition that the company's own data storage and management capability are not suitable for this (e. g. not enough capacity or security).

In some cases, information may be hosted entirely by platform providers, but a given company's data may also be partly resident on within-company/organization and shared databases (shared with business partners and in some cases competitors, or through open data initiatives, particularly in the public sector). This "hybrid" approach is not uncommon.

But what is a platform?

The term platform has many uses in business and information technology. The definitions are related to each other. Platforms are a subset of a much wider topic – co-operation between firms in innovation, which Li and Nguyen (2016) have summarised well. Concepts used to analyse this area include classic competition and innovation theory, dual creation of value, knowledge sharing and management, game theory, spill-overs, transaction costs of collaboration (which we could interpret here as relating to the costs of setting up platforms which other companies can engage with), co-creation, user-innovation and many others. Platforms are therefore a fertile field for investigation of these concepts, as well as being the latest step in the move from products to solutions for many firms (Stone *et al*., 2003a and 2003b).

In information technology, a platform was originally just the environment (hardware, operating system, web browser or other software) in which program code is executed. The term was then extended to applications (e. g. spreadsheet, accounting), combinations of applications (e. g. office suites), cloud computing or software as a service (allowing users to build software and applications from components not hosted by their own company), and so on. Some platforms require software using them to be adapted to the platform, while others allow an open approach.

Once a platform is established, value creation can come as much from other companies who use the platform (e.g. content creators) (Aksulu and Wade, 2010), as from the company that originated the platform, including for the customers of the platform creator. This can lead to developers inverting the firm (Parker *et al*., 2016), so that firms will choose to innovate using open external resources instead of closed internal ones. In this situation, firms will need to manage external value creation as carefully as they manage internal value creation.

How platforms develop and survive

Platforms can be defined as building blocks that an ecosystem can use to develop complementary technologies, services or products or as components shared between products (Gawer, 2009; Boudreau, 2007). A platform's components are produced by several firms' efforts or the industry ecosystem. Platforms can be real and/or organizational as well as digital (e. g. business franchises, postal systems, shopping centres and airports). There are degrees of alterability in platforms. Some are open to any user to adopt and adapt, others partially so. A central benefit of platforms is risk reduction, particularly for smaller firms, where risk is a barrier to innovation (Molinillo and Japutra, 2017).

To maintain a platform's advantage, third-party developers must be encouraged to develop products that use it. If developers do not provide applications that customers need, another platform may take over, so the platform owner may encourage certain developers to move forward, take them over or develop an in-house capability. A successful platform, such as Amazon's, has big economies of scale and may dominate a whole market, making it hard for other players to compete (The Economist, 2017).

Given the strategic importance of platforms, it is worth considering whether firms strategize to create platforms. Some platforms emerge as a by-product of some other business strategy, and if the strategy is successful, the firm realizes that it has created a platform, and starts to manage it as a platform. However, as knowledge about the success of platform strategies becomes more widely diffused in industry, firms may create platforms explicitly, or at least move quickly from a product or service strategy to a platform strategy.

For example, in social care, new models of provision (mostly app-based), by companies such as Vida and Supercarers in the UK and in the US, Honor, Hometeam and HomeHero, are being developed, using a new approach to recruitment, training and management of carers, matching care clients with carers, involvement of families and provision of real time information, improving communication and transparency. The net result is better quality and lower cost provision, perhaps with different payment models. Vida Care, a social care company, started by providing a very cost-effective care service, matching clients to carers, using such an approach, but moved quickly to selling the platform to other care companies (Crow, 2017).

Platforms, ecosystems and strategy

The rise of platforms is being driven by several transformative digital technologies. Bonchek and Chaudary (2013) single out cloud computing, social media and mobile telephone. The cloud enables a global infrastructure for production, so anyone can create content and applications for a global audience. Social networks connect people globally and maintain their identity online. Mobile technology allows connection to this global infrastructure anytime, anywhere. To this we would add "big data" - the ability to collect, store and use massive volumes of data, some of which arises from increased use of mobile technology and social media. In addition, rapid progress in analytics and artificial intelligence have greatly increased our ability to analyse these much greater data volumes. Meanwhile, progress in communication technology has increased our ability to transmit and receive high volumes of data. The result is a globally-accessible network of businesses, workers, consumers and public and third sector bodies, creating enterprises, contributing content, buying and providing goods and services, and improving openness and quality.

Economics of platforms

Economists use the term "two-sided market" rather than "platform". Low or zero pricing on one side of the platform (e.g. attracting many newspaper readers) may allow the platform owner to price high on the other side (e.g. charging advertisers high prices), as many consumers/readers enters due to the low price. This makes it profitable for advertisers to advertise on the platform. A platform needs to attract enough agents on one side of the market to attract enough agents on the other side, and vice versa i.e. a critical mass on both sides.

A platform may be open or closed or somewhere between. An open one can take several forms. Using Linux as an example, Eisenmann *et al*. (2011) consider the following four forms: (1) anyone is entitled to use Linux, whether an individual or firm (demand-side user role); (2) anyone can supply Linux-compatible software applications (supply-side user role); (3) anyone can bundle the Linux operating system (OS) with server or computer hardware (platform provider role); and (4) anyone can make contributions and improve to the Linux OS, so long as he/she respects the rules of the open source community (platform sponsor role). In contrast, the iPhone is closed in all four dimensions except the first, as anyone is entitled to use an iPhone.

A successful platform involves balancing between encouraging its diffusion and ensuring appropriability of returns (West, 2003), creating and exploiting network effects, reassuring users that they will not be locked in, and promoting production of differentiated goods demanded by different user segments (Eisenmann *et al*., 2011). However, a platform can also cut users' switching costs and promote competition between platform providers, reducing profitability (Eisenmann *et al*., 2011). If multi-homing costs (the costs to users of using more than one platform at the same time) are high, one platform may dominate (winner-takes-all). A firm's ecosystem strategy consists of decisions to whether to open a platform, how much subsidy (if any) to offer downstream developers, and whether to bundle in competition with other developers' products (Parker and Van Alstyne, 2013).

Multi-sided platforms are now one of the main foci of economic research, reflecting the reality of platform evolution, in which a platform may be created by one company, hosted by others, with different categories of supply-side and buy-side users (Evans and Schmalensee, 2016). This makes the marketing and pricing much more complicated, but opens up new ways for companies to enter markets and achieve dominance.

Organizational aspects of business model and platform innovation

There has been little research on the human capital aspects of external and internal ecosystems and platforms, with the exception of discussion of the role of leadership in business model innovation (Parnell *et al*., 2017). One area worth exploring is the possibility that platforms may be incompletely or inappropriately shared within organizations, leading to problems in areas of strategy, policy and implementation, because different management groups do not see the value in using or in sharing data. The internal ecosystem is key to the development of a platform, as all the platform designers and users contribute to its strength. Recognition and inclusion of employee input has long been understood as a route to increase motivation and build employee engagement. Zejnilovic *et al*. (2012) researched innovation proposals made by employee-users through an idea management system, suggesting ways for companies to incorporate the contribution of employees as user-innovators.

A new platform is a significant innovation. Building innovation capability is included by Svahn *et al*. (2017) in their review of how firms embrace digital innovation and how they handle competing concerns in terms of capability (existing and requisite), focus (product versus process), collaboration (internal versus external) and governance (control versus flexibility). Kamprath and Mietzner (2015) suggest the need for more emphasis on competences needed to meet technology challenges, arguing for a more strategic approach to human resource development

Investment in supporting changes in policy and new business models is key to organization-wide innovation. Herbes *et al*. (2017) give the example of Renewable Energy Cooperatives (RECs) in Germany, where old models had proved unprofitable but cooperative members' attitudes towards risk and new business models led to insufficient investment and a lack of the right competences. Wargin and Dobiéy (2001) suggest that successful companies manage transition to new business models by being nimble and flexible and by focusing on creating value through their people. They identify that the digital economy calls for new leadership and management practices, some of which emerge from start-ups. Key elements in the required leadership are authenticity of approach, being close to customers and strong commitment. In their research at DaimlerChrysler and Ford, General Motors and Hewlett Packard, Wargin and Dobiéy (2001) highlight the need for leadership that creates a culture of recognition and opportunities for career development.

Employees may lead an advanced digital personal life, using their own devices, so one trend has been the adoption of 'bring your own device' policies, allowing connectivity from individuals' own devices (whichever operating system or browser is used) to Virtual Private Networks. Use of a familiar platform environment can have benefits in both engagement/satisfaction, as well as reducing costs of device provision. This also facilitates recruitment and training.

Except in the skills area, little work has been done on the organisational aspects of platform innovation, so we must assume that platform innovation is an extension of other systematic innovation. Collecting and analysing the new digital data requires employees who can deal with the technical requirements of data collection and analysis as well as having cross-functional business skills. Increasingly, companies require data science skills to be embedded in functions like marketing, sales and customer service, or use else they need pre-configured dashboards to supplement this lack of skill. Digital transformation is creating a shortage of skilled IT workers, especially in the US and Europe where organizations are focused on reskilling labour to meet these new digital demands (IDC, 2017; OECD, 2016). To deal with this shortage, organizations are developing "blended workforce strategies" including new partnerships, contingent workers, and artificial intelligence and robotics to fill the skill shortages gap (IDC, 2017). Many organizations are changing traditional talent models to ones extending to contractors, freelancers and robotics (Gatty 2017). Gatty refers to the Randstadt report (Randstadt, 2016), which highlights staff and talent scarcity. With the advance of automation and the increased use of temporary staff workers, companies are devising frameworks to incorporate freelancers and robotics in their innovation efforts. Todd (2016) suggests that the sharing model promoted by Uber is spreading, and predicts a radical change in how organizations handle their resources. Of course, hiring on this basis can promote instability and put knowledge at risk.

All these developments enhance the attraction of using customer information platforms, provided that security and confidentiality are guaranteed and intellectual capital protected.

Platforms and clouds

The platform approach to strategy has been facilitated by the arrival of cloud computing, which involves Internet delivery of hosted services, so companies can use computing resource rather than their own. This allows companies to manage fluctuating workloads, paying as they use, and move workloads to and from the cloud, according to resource requirements and availability. Cloud computing can be private (user's own), public (third party) or hybrid (a combination). It can be provided as an infrastructure (effectively basic services), platform (where development takes place on the cloud) or software (the cloud hosts software applications). Some firms have moved to buying platform as a service through buying software as a service, A special case of the latter is where advanced analytical software, including artificial intelligence and machine learning, are hosted. Because of perceived security risks of shared use, cloud providers offer very high levels of security, sometimes better than that of a client's own systems.

Platforms for managing information

Platforms can offer shared capabilities or facilities, or shared information, or both. Examples of digital platforms that exchange data (often customer data) include bank or credit card clearing or accepting systems, travel reservation services, online gaming/gambling and aggregators (e. g. in insurance and travel Two-sided markets and network effects were used to explain behaviour in credit card (Rochet and Tirole, 2001) and software markets (Parker, 2000; Van Alstyne, 2005).

When firms collaborate to create information platforms, critical elements for success include economies of scale, knowledge sharing, market size and volatility, strategic partner selection, intellectual property rights, spill-over effects, collaboration costs, trust and commitment, opportunism and overall collaboration strategy (Li and Nguyen, 2016). An additional benefit of using a platform can be that legal issues of data sharing and portability (a customer' right to ask for their data to be moved from one company to another when they switch supplier) and compliance with data protection regulation may be managed by the platform owner. A successful information platform usually requires the platform provider to capture one or more sets of information that are exclusive or nearly so.

Platforms and analytics

On platforms, information is increasingly subject to advanced analysis, using the latest software to identify patterns of segmentation, to forecast and to produce visualisations. In its most recent forms, this includes the deployment of artificial intelligence. This has led to growing demands from large organizations, as they hear of the apparent successes in deploying artificial intelligence on data held by big platform companies, to use the high volumes of data in more productive and faster ways e. g. to provide a more comprehensive and higher quality context to transactions or to provide suggestions as to how to manage interactions to maximise the opportunity presented by the customer contact.

The cloud, platforms, information and strategy

The combination of cloud, platform and information is proving to be a very powerful way for firms to redefine their businesses and to enter new businesses. IDC (2016c) predicts that creating industry clouds will become a leading market entry strategy for both IT providers and industrial firms. Industry clouds are defined as cloud-based services that provide broad industry value by aggregating cost reduction, operational benefits, risk mitigation, and/or insight creation via pooled information.

The two types of industry clouds are:

- Where a company provides cloud-based services to other companies in their industry (i.e. hospitals providing services to other hospitals)
- A cloud-based platform through which companies in an industry collaborate towards a common goal, such as improving industry insight and/or capability, as shown in the insurance examples below.

Industry clouds are also often sold as a turnkey, multi-tenant, pre-integrated offerings, featuring application programming interfaces (APIs) and a standard user interface that may be customizable, with subscription or usage-based pricing and metering

Many companies have used cloud computing to create a competitive platform through improved use of customer information. IDC (2016b) tracks the creation of these services. Business to business markets also have many such examples, which may share customer information or provide ways to facilitate transactions or check status and performance in the supply chain, check legal compliance, benchmark, manage shared operations or shared problems (e.g. product recalls). Here are two examples from IDC's report:

- In the medical area, Optum One in the US has a cloud database that contains claims, clinical and demographic data, used for retrospective and prospective analysis of population risk, including care management workflow capabilities to enable risk-based care management. The aim is to support decision making in care by identifying high risk patients and gaps in care early and thereby reduce costs and complications for patients. Optum's clients upload their own data, platform offers individual analytics as well as community benchmarks.
- In financial services, Pindrop's patented phone-printing technology analyzes 147 characteristics of the audio signal for the most precise, accurate analysis of calls available. It can determine true caller location and device type, Caller ID (identity) spoofing, voice distortion, and gateway hijacking. Pindrop holds the world's largest database of phone number and automatic number identification (ANI) reputations. Gathered from a consortium of customer attack data, honeypots (numbers specifically designed to attract calls from "bad" customers) and more, this data includes a number's past fraud attempts, complaints, and risk factors. Pindrop solutions analyze voice biometrics to create unique voice prints. Pindrop compares characteristics of a speaker's voice against a database of known attackers to blacklist or whitelist repeat callers. Their product detects more than 80% of fraudulent calls and prevents more than 96 percent of potential fraud losses.

Customer information platforms – case studies and empirical observations

The origin of customer information sharing

Where one company has information that another (usually non-competing) company might find useful, it was common for the former to share its list, either directly or through a list broker. This practice continues today, though with more legal restrictions due to data protection requirements and ethical concerns, while survey companies continue to collect data from customers and sell it. Today, in most countries, if one company wants to share information about individual customers with another company, it can only do so if it has specific permission to do so from the customer, or if this is permitted by law. The latter is common in financial services (for example, banks can share information about customers with poor credit records).

Efficient internal sharing of data (e. g. between functions) generally demands an internal platform (what used to be called an enterprise customer database), as well as the tools required to access it in different ways e. g. for contact centre staff to be able to match callers with existing customers or known prospects, or for marketing managers to carry out the analyses required for segmentation and targeting. The platform for the latter would once have been labelled a data warehouse, designed specifically for rapid analyses and summarisation of data, perhaps using specific tools for analysing data and for visualising results.

The insurance industry – a case study

In many countries, insurers can share information on customers who have made fraudulent declarations to obtain insurance or about claims (Stone and Laughlin, 2016). In the UK, the Claims Underwriting Exchange (CUE) records all data from motor, home and personal injury claims. It can be used by any UK insurance company or intermediary to see a person's previous claims, helping prevent multiple claim fraud and false claim histories. The Insurance Fraud Register (IFR) lists those convicted of insurance fraud and can be used by all UK insurance companies when processing a claim or deciding to accept a risk. My Licence Database, accessible just by keying in driving licence and national insurance numbers, allows checking validity of a driving license, and is linked to the Driver and Vehicle Licensing Agency database, allowing insurance

companies to check the veracity of claims on driving offence convictions. Similar data sharing takes place concerning vehicles, identifying whether they were once written off or whether they are ensured. The Motor Insurance Database (MID) shows whether a UK registered vehicle is insured and with which company. Used mainly by insurers and the police, it can also be used by citizens to check that their own vehicle is insured.

eGovernment and public sector platforms

In government and the public sector, information sharing is widespread. It may be supported by strong laws (e. g. government rights to access any data held by anyone, for law enforcement purposes, including tax collection). This may operate to the benefit of the individual, e. g. identity management that allows a citizen to obtain additional services without having to prove identity. For example, in the UK, which has no identity cards, data on identity is shared between the Driver and Vehicle Licensing Agency and the Passport Office.

How marketers use information today

How marketers collect and consume data has evolved into obtaining digital data from various internal or external sources (IDC, 2016a). For example, Unilever developed a 'People Data Program', collecting data from traditional CRM, social media, contact with customer service and other marketing or research related customer data. Twitter is used to produce real time customer insights to measure the performance of new product launches, the effectiveness of advertising and uncover product or service issues long before customers call in to report them, improving the return on marketing and advertising spend while reducing customer service costs, with all data and analysis being on one platform, ensuring high quality insights, quicker response and lower costs (Capgemini, 2015). A standardised repository has been created based on the most common questions, allowing employees to query the data directly.

Turning to cloud information management platforms

The high volume of customer data and many data collection points make it hard to control and manage customer data effectively, let alone draw coherent insights which can be used to inform strategic customer decision making (My Customer, 2017). Platforms allow multiple sources of data to be imported, tagged, sorted, coded and deployed. Generally, the storage of the customer data is more efficient and secure, but it can also be shared more easily with other companies who are also clients of the same platform company, within the constraints of data protection.

Governance and compliance

The sharing of customer data, as we have seen, can lead to problems of compliance with data protection requirements. It can also lead to confusion about ownership of the data, which may have been gathered by or for several companies, often using automated processes which not only gather and concentrate the data but also determine which data is worth keeping. This area is being explored in the context of new data protection laws (Actiance, 2017), but is likely to become more rather than less problematic.

Summary

Customer information management has progressed significantly since the days of mail order. A complex ecosystem of suppliers has come into being, supported by rapidly evolving enabling digital technologies, to help companies manage their customer information, including the emergence of cloud computing and its capacity to support large shared information management platforms.

This evolution is shown in overview form in Figure 1, which shows the progression from a "normal" ecosystem, to outsourcing, to full platform outsourcing, with various non-system marketing support services indicated on the right-hand side of the diagram (dotted line boundary).

Take in Figure here

Figure 1: Customer information ecosystem
Source: Adapted from Stone and Laughlin (2016)

This article has also identified that this evolution has been a result of a complex interaction of strategy and management practice, one which has not so far been well documented in research.

Conclusions

In this rapid account of the rise of customer information platforms, it has been impossible to probe some of the more difficult questions concerning their use in marketing and competitive strategy. For example, customer information platforms often derive their strength from their relative openness to other users of the platform who use it to promote their products (as with Amazon's selling platform or Google's advertising platform). Any sellers who wishes to use these platforms must pay the price, but there are many ways to explore the value of the platform information, including using the platform as a consumer to see what results are returned.

If a weakness is detected (in terms, for example, of poor sales results), a firm can try to make their use of the platform more effective, or set up a different platform, perhaps using information from the first platform (as do the many sites which extract results from these main platforms). This competition is not just in the form of an alternative customer information platform, but may also be an alternative sales platform. For example, Citymapper combines Transport for London's (TfL) real-time data on bus journeys with its own data on journey enquiries (attracted by Citymapper's use of the TfL data) to establish its own bus service. In the airline industry, the openness of data about flights, arrivals, departures and airport usage from various sources, including global distribution systems (like Sabre) and the International Air Transport Association (IATA), gives low cost airlines a strong basis to plan and set up their own more closed individual platforms.

The use of the term "platform" is not universally accepted. It may just refer to a shared capability (in the case of this article, shared customer information storage and access). However, the term is becoming accepted as meaning a big shared capability, cloud-hosted, controlled by a platform owner, and in the case of customer information, a capability which includes access (whether directly or indirectly, fully or partially) to customer information. As such, the implications for leaders are clear.

Implications for leaders of marketing, CRM, customer insight and information management

The above developments mean companies have more options to enter markets or improve management of their customers than previously, especially by using platforms containing information about customers they do not yet have (for market entry) or using platforms which contain information about their existing customers (to sell more to them and defend them from competitors). For this to work, marketing directors, managers and leaders of insight and information systems must understand the value of platform information, capitalise on it or create (perhaps working with partners) their own platforms for their own ecosystems – a revisiting of information management as competitive advantage (Porter and Millar, 1985). However, we predict that increasing numbers of firms will use information-sharing platforms with strong analytics capabilities, provided platform providers continue to make it attractive financially and easy operationally, as they do today.

Implications for research into strategy, marketing and information management

Research into platforms has a strong pedigree, as this article explains. As we have seen, some platforms are multi-sided, an outcome of co-operation of firms from many different sectors or sub-sectors, intermediaries and final customers, each benefiting and paying or investing in different ways. They may be hosted independently by a trusted third party. Business to business platforms are usually more integrated among their partners than business to consumer platforms, helping partners conduct their businesses more efficiently. Sectors tend to differ in their use of platforms, depending on the competitive structure of each sector and on the type of product or service supplied through them. Therefore, research is needed on the development and use of platforms in different sectors and across sectors, to provide the basis for a stronger theoretical approach. Also, research must keep pace with the increasing interconnectedness of different platforms, and account for the increasing complexity of ecosystems and platforms.

The management of platform development, implementation and marketing also needs much more research. Today, the academic world is excited by the existence of platforms, but platforms do not spring from nowhere. They may be the outcome of years of systems development and of a complex customer management process, supported by the building of internal skills and the development of partnerships and other business relationships (the internal and external ecosystems). This area needs more study.

Implications for teaching of strategy, marketing and information management

Platforms are one result of the widespread digitalization of industry. Teaching of corporate strategy, marketing strategy and information management finds it hard to keep pace with the speed of development. For example, in information systems, conventional data management teaching often focuses on data as managed either as transaction processing databases or data warehouses. While this is so in many companies, increasing numbers of organizations are giving the whole problem of data management, including hosting applications using the data, to cloud providers, whose enormous storage, processing, communications and analytics capabilities make the distinction between the two types of database irrelevant from the users' perspective. This is part of a more general problem, that information management, strategy and marketing teaching tends to be backwards rather than forward looking, focusing on accounting for what has been rather than what may be. Textbook authors have been warned!

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THE SUPPLY SIDE

Product & service suppliers
Develop & sell products to individual customers, manage customers, retain them, ensure delivery of value while avoiding bad customers & bad behaviour

Intermediaries, aggregators, affiliates and channels
Market, sell and service outputs of products and service

TELECOMMUNICATIONS SYSTEMS & SERVICES

Telecommunications services suppliers, such as contact centres & associated software suppliers
Help product & service suppliers establish & maintain contact with their customers & meet their service needs

Telecommunications network & handset suppliers
Help product & service suppliers to be in touch with their customers anywhere, any time

SYSTEMS & DATA – SOFTWARE & SERVICES

Database software suppliers
Help product & service suppliers hold & access data (for processing, analysis & at point of contact with customers) & in some cases visualise the outcomes of analysis so decisions can be made better & quicker

Data suppliers
Supply data to enhance product & service suppliers customer databases e.g. individual & household/company characteristics, sourced from other companies, the electoral roll, credit referencing

Analysis software suppliers and consultant
Enable analytics to be undertaken

Interaction software & services suppliers
Supply software that translate data into actions (e.g. offers to individual customers)

Web software providers (browser, search engine, social media etc.)
Provide ways of finding & managing customers & in some cases the analytics to help product & service suppliers understand effectiveness

Application providers
Provide specialist software to enhance product & service suppliers offerings or make access to them easier for customers

MARKETING & MANAGEMENT SERVICES

Training organisations
Help all companies in ecosystem maintain & develop the skills they need

Recruitment companies
Specialise in recruiting managers & other staff for product & service suppliers, with skill sets required to manage any of the required areas

Marketing/management consultants
Help suppliers of products & services strategize & manage in all areas, usually focused on strategies & tactics

Marketing agencies
Help suppliers of products & services develop & implement marketing & communications strategies & targeted campaigns, using direct & digital techniques

Market research companies
Help suppliers of products & services understand their customers & prospects

Government & regulators
Supply laws & regulations to control how product & service suppliers behave

PLATFORM HOSTING: Cloud database management companies
Managing product & service suppliers' customer databases (wholly or partly)

FULL PLATFORM: Cloud marketing as a service companies
Managing product & service suppliers' customer databases (wholly or partly), hosting marketing, analytics and other software