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The building blocks of a cloud strategy: evidence from three SaaS providers

Additional Information:

The Building Blocks of a Cloud Strategy: Evidence from Three SaaS Providers

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Before looking to enter a cloud-based market, weigh industry characteristics and one's own stock of design capital.

(figure) The seven building blocks of a cloud-hosted SaaS business strategy

(table) The building blocks of a cloud business strategy as reflected in three cases.

key insights

* Motivated by the hype around providing application software via the cloud, many firms approach the cloud without a clear strategy, often resulting in disappointment.

* Deciding to offer cloud-based software must be part of a broader digital strategy informed by the industry characteristics in which a firm operates, as well as by the firm's existing stock of internal systems and processes, also known as its "design capital."

* A cloud strategy must also account for customers' views and concerns with cloud-based SaaS, particularly demand for security optimization and software customization.

Cloud computing refers to an on-demand network service that allows individual users or businesses to access configurable resources. It can also be defined as an on-demand delivery model enabling the synchronized delivery of computing resources (such as applications, storage, servers, networks, and services).[2] As it stands, there are three cloud computing delivery models: software as a service (SaaS), as in Salesforce.com and Google apps, delivering applications to end users over a network; platform as a service (PaaS), as in the Google app engine and Microsoft Azure, deploying applications to a cloud; and infrastructure as a service (IaaS), as in the Amazon Elastic Compute Cloud, renting storage, processing, and network capacity to host applications. Of the three, the SaaS model has gained the greatest momentum, given its economically efficient foundations and ability to satisfy user preferences for the ubiquitous availability of data and applications.[1]

From the perspective of application software providers, the SaaS model offers the obvious benefit of liberating them from the traditional low-level tasks involved in setting up IT infrastructures and deploying applications to client machines.[4] Providers are thus able to scale their investment with a view to growing their businesses,[9] focusing on innovation and creating business value.[7] Accordingly, cloud computing has been associated with other benefits that arise due to offering a controlled interface, a virtual business environment, increased addressability and traceability, and rapid elasticity and scalability.[5]

It is easy to understand why application software providers face increasing pressure to jump into the cloud and exchange their on-site application software for cloud-based solutions. However, the unfortunate reality is that most of the promised benefits have turned out to be a triumph of hype over reality. A 2013 *Forbes* article noted many firms are following a "no-strategy" approach in moving to the cloud, leading more often to failure than success;[8] for example, Adobe's Creative Cloud product line has been impeded by the skepticism of customers not yet ready to move to subscription-based services; concerns include file recovery in the event of a subscription lapse, and the need for more-tailored offerings for photography enthusiasts.[10]

As we aim to show here, there is a clear need for business managers to better understand the fundamental underpinnings of a successful cloud-based SaaS strategy (henceforth cloud strategy), which is defined as a "set of decisions required to create and deploy a network-based, information-service-delivery strategy that results in both cost savings and organizational agility."[5] A successful cloud strategy must encompass some of the key elements distinguishing a broader digital business strategy. These elements include a series of higher-order dimensions relating to the characteristics of a firm's respective industry and its existing stock of internal technological capabilities. Moreover, we show that complementing these dimensions with certain attributes of cloud technology related to the actual application software leads to the formation of distinct cloud strategies.

Components

A digital business strategy can broadly be understood as the means through which a firm engages in any category of IT activity; the strategic nature of this engagement implies the "dynamic synchronization between business and IT to gain competitive advantage."[6] Recent studies have identified more specific elements of a digital business strategy, examples of which include a firm's digital strategic posture[6] and the design-based dimension of a digital business strategy.[11]

The digital strategic posture is defined as a firm's degree of engagement in a particular digital business practice relative to the industry norm.[6] The degree to which a firm chooses to diverge from or converge on the industry norm in its ongoing digital business strategy is influenced by the interaction between its current digital strategic posture and three key elements of its industry environment: turbulence, concentration, and growth.[6] These elements are defined as follows: Industry turbulence is the rate at which a firm enters and exits an industry; concentration is the extent of competitive rivalry in an industry; and growth is the rate of increase in demand for the industry's output.[6] Mithas et al.[6] proposed that strong industry turbulence, low industry concentration, and low industry growth influence firms to develop digital business strategies that diverge from industry norms due to intense competition and the fact such norms are less reliable guides of future success.[6] In contrast, the same authors argue that low industry turbulence, high industry concentration, and high industry growth influence firms to develop digital business strategies that converge on industry norms, as these norms are reliable indicators of the possible success of particular strategic moves.[6]

As opposed to looking at external factors, Woodard et al.[11] proposed the design-based logic of a digital business strategy that examines a firm's internal systems and processes, or its "design capital." Design capital includes the firm's option value, or the breadth of opportunities afforded by its internal systems and processes, and technical debt, or expected cost or effort to exercise those opportunities.[11] Woodard et al.[11] further proposed that a digital business strategy should aim to manage the levels of option value and technical debt associated with a firm's design capital toward the ideal state of high-quality design capital characterized by high option value and low technical debt. This ideal state allows a firm to seize a range of market opportunities and respond to competitors' actions with speed and scale.[11]

Although a digital strategy is not synonymous with a cloud strategy, insights from these higher-level frameworks arguably serve as a useful foundation for better understanding how firms approach the cloud. This conviction stems from the fact that a cloud strategy is inherently embedded in a broader digital strategy, and also from the fact that the industry environment and a firm's internal capabilities are the main determinants of a firm's competitive strategy.[6,11] We draw empirical support for this insight by analyzing recent strategic decisions to offer cloud-based application software made by three firms.

Case Analysis

All three firms are located in the same European country but operate in different industries. Firm 1 is a telecommunications provider; Firm 2 is a small engineering-simulation-software provider; and Firm 3 is a mid-size company specializing in customer

relationship management (CRM) software. While it may take a while before one can conclude whether these companies' cloud strategies will ultimately be successful or not, by synthesizing the analyses of the three at the point they made their decisions, we contribute to both researcher and practitioner understanding of the different parameters firms must take into account when unfolding a cloud strategy.

Major telecommunications provider. Firm 1 is a large telecommunication provider serving both residential and business customers. The telecommunication industry is characterized by a high degree of industry turbulence, where there are frequent entries and exits of firms from different industries (such as those in the mobile applications industry offering customers cheaper alternatives for long-distance calls), high industry concentration (generally, only a few telecommunication providers compete in a given country, three in the country where Firm 1 operates), and high industry growth (demand for improved connectivity and speed are constantly increasing). In this environment, it is not immediately clear whether a firm's digital business strategy should diverge from or converge on the telecommunications industry norm, supplementing traditional offerings (such as voice calls and data offerings) with relatively nontraditional arrangements (such as mobile payments) by collaborating with firms in other industries (such as financial services).

An assessment of Firm 1's internal systems and processes (digital capital) positions the firm in the debt-constrained design capital state, or high option value and high technical debt.[11] While its telecommunication infrastructure appears to give it plenty of options

for entering the cloud business, significant investment is needed to make it IaaS-ready, as a recent **a 2012??** report stated, "We thoroughly discussed with [our] cloud architects … about the IaaS. Their response was positive, but it would be very expensive … " In such a debt-constrained state, depending on the level of its resource munificence, the firm will need to either abandon the option or reduce its debt.[11] Debt-constrained firms with access to abundant resources, as with Firm 1, can afford to reduce their debt without abandoning their strategic options.

Considering other cloud-computing delivery models besides IaaS, Firm 1 decided to invest in developing its own cloud infrastructure, as well as new business models offering various SaaS -based products to end users (in this case, business users) instead of offering IaaS-based products to application service providers. Leveraging its current position as a trusted telecommunications provider and the well-known data-protection policy of the country in which it operates, Firm 1 targets enterprises operating in high security-loss environments with highly critical SaaS security optimization. The main value proposition Firm 1 offers to these enterprises is the security of their data, as the data does not leave the country (the cloud farms are located in the country where Firm 1 operates), and the security of their data processing, as the SaaS -based products will be hosted locally by Firm 1 itself.

Part of Firm 1's initiative is to collaborate with a CRM software provider to provide CRM SaaS to business customers. It is important to note that besides the existing enterprises the focal CRM provider serves, the immediate target customers of Firm 1 are

mid- and large-size financial enterprises in the country that are current subscribers to its telecommunications network. These financial enterprises are working in high security-loss environments and are likely to suffer major economic losses if the CRM system is subject to security attacks.[1]

However, the specific nature of the CRM SaaS, which supports multi-tenancy with high parameterization or customization, is technically very complex and can be very expensive. According to the firm's CRM corporate collaborators, their CRM software does not support multi-tenancy, because each client (tenant) tends to require system parameterization; that is, " … customers that buy the CRM software usually demand a customized system according to their business processes and therefore the support of multi-tenancy with high parameterization is technically very complex and expensive" (excerpt from our communication with a business development manager in Firm 1). This situation is a good example of how a firm's digital capital is intertwined with its client's technical needs, in this case, support for multi-tenancy with high parameterization. Having access to technical resources, Firm 1 is able to find a secure cost-effective solution to the multi-tenancy challenge of providing highly customized systems by deploying multiple software instances for different tenants at a single server; the client can thus achieve software customization while still enjoying the benefits of a cloud-based service.

As it turned out, Firm 1 decided to diverge from the industry norm; instead of offering the usual telecommunication infrastructure-related offerings, it aimed to offer SaaS to

business customers, thus altering its position in the current industry ecosystem from being a telecommunications provider to SaaS provider. Its new position as a SaaS provider will enable Firm 1 to enjoy multiple benefits " … as it enables vertical selling opportunities in addition to the license fees such as iPads [rental] and voice and data subscriptions … " (excerpt from an internal Firm 1 report). At the moment, " … the infrastructure to host the SaaS is an ongoing work and expected to be available by early 2016 … there is [still] a high business interest to start this SaaS project … within the next year" (excerpt from our communication with a business development manager in Firm 1).

Engineering-simulation-software provider. Our second case is a small provider of engineering simulation software specializing in computational fluid dynamics and multiphase flow heat transfers. Its software is sold globally and used mainly by research organizations and companies in the oil and gas industry, nuclear engineering, renewable energies, microfluidics, and advanced materials science (hereafter referred to as "client companies"). The client companies' use of this advanced software is limited by their access to computing power; only a few clients have the computational resources (parallel computers or clusters) required to run very demanding simulations, thus shrinking the size of the engineering simulation software market and contributing to low industry growth.

The competition for this already small market is fierce and dominated by two large companies, thus characterized by high industry concentration. "Unlike [the] commodity [software] market, the engineering simulation [software] market is highly oriented toward

a " … dominant design. This means the incumbents try to make their competitors obsolete by locking their customers into their software logic [and algorithms] … " (excerpt from an internal Firm 2 report). Although the software logic and algorithm may not be the most efficient (or even the most appropriate), client companies will incur high switching costs if they change from one software provider to another due to organizational latency, training, know-how transfer, and learning curves. This is a strong indication of low industry turbulence, as it is difficult for firms from different sectors to enter and exit the industry. To sustain itself in this small yet highly competitive market, Firm 2 also offers consultancy services. In this environment of low turbulence, high concentration, and low growth, it is not immediately clear whether its digital business strategy should converge on or diverge from the engineering simulation industry norm, implying (for small providers) the need to heavily supplement their software offerings with consultancy services. However, Firm 2 recognizes that providing a consultancy service is not as scalable as its software offering and thus (although it is the industry norm) may not be a sustainable strategy in the long run. As the founder of Firm 2 said in an interview with us, "[The consultancy service] is very labor intensive." Hence, the tendency is to follow a business strategy that diverges from the industry norm.

In terms of its digital capital, Firm 2 is in the low-quality design capital state, or low option value and high technical debt.[11] Such a firm, depending on its level of resource abundance and technical capability, can aim to either reduce its technical debt or create different value options.[11] By default, Firm 2 is constrained by a lack of resources but at the same time enjoys a strong relationship with academic stakeholders. As the founder of

Firm 2 told us, "We are working closely with a research institute in a local university,"

thus enabling Firm 2 to exit a low-quality state by increasing its technical capabilities.

Since the market is small, not very adaptable, and dominated by two large companies,

Firm 2 is considering (with the aid of its academic contacts) deploying its software as a

cloud computing hosted service. Firm 2 also reported "Companies on the edge of starting

engineering simulation activities are not willing to invest in IT infrastructure acquisition

and long term maintenance contracts. They rather [tend to] spread [their] investment over

time, much like any other operation consumable. Furthermore yearly software license

fees constitute a financial burden, especially when the software vendor enjoys a quasi-

monopoly situation. [In this context] cloud computing appears … [to be] a real alternative

answer to engineering needs … " (excerpt from an internal Firm 2 report). Since the

engineering data is not sensitive and the simulation process need not be performed in a

highly secure environment, the cloud-hosted SaaS solution seems to be a viable way for

Firm 2 to compete with the dominant players in the current market and help increase its

market share.

Firm 2 realized the high switching costs associated with its product offering implies the

decision as to which simulation software to adopt is in the hands of client companies' top

managers, who may not be familiar with algorithms and simulation-software logics. For

their engineers to use inefficient software on daily basis could thus be frustrating. With a

Web-based cloud-computing hosted service, Firm 2 is able to invite these engineers to

test their software during a free trial period, without having to access or use their

companies' own computational resources. Firm 2's aim is to allow the engineers who are the real users of the simulation software to use it and test its efficiency and accuracy in a cloud environment, hoping they can then convince their top management to switch to Firm 2's software.

The switching cost from on-premise software to a cloud-computing hosted service is marginal. Moreover, since the cloud-based simulation software is meant to allow virtually anyone to perform highly demanding engineering simulations, with no infrastructure prerequisites, Firm 2 intends to increase its share of the target market beyond that of the large companies with computational resources in place. Firm 2 is currently working with a cloud broker and a cloud infrastructure provider to implement its cloud-based solution and bring its software to the cloud. Firm 2 intends to " … use it exactly in the same way as planned: it will lock new customers by offering them trial access without software installation … " (excerpt from an internal Firm 2 report).

CRM software provider. Firm 3 is a mid-size software company specializing in CRM software. Firm 3 reports "[The CRM software] is available as fat client: it has iPhone and iPad applications and also has a Web front-end. This allows customers to flexibly use the front-end that is most suitable for their processes. [For example], sales personnel can use the iPad version to be fully mobile while being with the customer, so a call center agent can use the fat client perfectly optimized for his tasks … " (excerpt from a from an internal Firm 3 report). Our analysis of Firm 3's industry environment is as follows. The CRM software industry is characterized by low industry turbulence (where firms' entries

and exits from different industries are less frequent), high industry concentration (few well-known CRM software providers), and high industry growth (increased demand for CRM software, especially from small- and mid-size companies). In this environment, the literature predicts Firm 3's digital business strategy should converge on the industry norm, because it is relatively easy to clearly determine the optimal level of IT investment and its potential for success.[6] The industry norm for firms like Firm 3 that offer on-premise CRM software is to supplement this traditional offering with the SaaS version of CRM software. As our conceptual framework would predict, Firm 3 indeed views cloud computing as a new opportunity that could extend its business and thus plans to provide the SaaS version of its CRM software, offering it alongside the on-premises version. Firm 3 says, "As the current [on-premises] CRM version already fulfils the main characteristics of online access with multiple devices, no local data storage, and scalability, the private offering can mainly be seen as a marketing enhancement … " (excerpt from an internal Firm 3 report).

Our own assessment of Firm 3's internal systems and processes (digital capital) positions Firm 3 in the debt-constraint design capital state sector (high option value and high technical debt[11]). A significant investment is required to produce the SaaS version of the software, and there is internal Firm 3 concern about going in this direction, as the following excerpt from a Firm 3 report indicates: "The question of whether the CRM [software] should be offered in the cloud or not is omnipresent. This dilemma involves various factors. As [the company] is not a big software producer, this dilemma needs to be taken seriously, as [the required] financial investment can hardly be covered in case of

a failure." In such a debt-constrained state, Firm 3 should either abandon the option or reduce its debt, depending on the level of its resource munificence.[11] Firm 3 recognized that the significant resources needed to develop the SaaS version of its software is a strategic necessity, as it said in an internal report " … there is not only the question whether it is worth to invest into a cloud solution, but also whether it is possible for [the company] to survive in the long run without a cloud solution … " As noted earlier, the current industry norm is for CRM software providers to offer a cloud solution, "… the topic is brought up [in the company] as the customers start asking for it" (excerpt from a Firm 3 email memo).

Understanding an aggressive move to compete with the big providers of CRM SaaS would be quite difficult and most likely lead to a price war, Firm 3 sought to identify a number of unique selling propositions that were difficult for its competitors to imitate before moving to the cloud. Specifically, it saw a regional advantage, a legal advantage (storing customers' data according to country-specific-laws), and a know-how advantage (about a specific security algorithm). These unique selling propositions stem from the fact that the business users who work with client data are in high-security-loss environments and face considerable economic loss if the CRM system would suffer a security attack,[1] as well as from the fact that Firm 3 has already built significant levels of personal trust with its clients.

Firm 3 mainly serves customers in its home country and a customer base consisting mainly of large organizations in various industries, especially in the retail,

pharmaceutical, and insurance sectors. With selling propositions in mind, Firm 3 decided

against a public cloud offering, as it saw a number of constraints that would disrupt its

existing business model, beyond even its in-depth, personal relationships with all of its

customers. Shifting to a public cloud offering would also imply a cultural change within

the company that would be difficult to achieve. Firm 3 opted instead for a private cloud

solution, as it would be largely compatible with its existing personalized services. This

new offering might attract new customers that do not want to operate the application

themselves but do want their own private application. The only constraint in this case was

the lack of a data center where the application could be hosted. As running such a data

center is not its core business, Firm 3 decided to outsource the task to a well-known

provider that could ensure the scalability and, more important, the security demanded by

its customers.

Insights

Analyzing these cases, we reached two main conclusions. First, in addition to the five

building blocks related to the external environment and a firms' broader internal digital

capabilities, all three firms had to account for certain requirements of their customers

with respect to cloud technology before deciding how to approach them with a cloud-

based SaaS offering. In particular, we found customers' requirements involving software

security and customization are the two main attributes that determine a firm's decision to

change its on-premise software to cloud-based SaaS. The criticality of security

optimization depends on whether target users are working in high- or low-security-loss

environments,[1] whereas the importance of software customization depends on the type of software being offered.

Second, we found the three firms developed three different strategies in terms of utilizing the cloud to compete in their industries, as well as their value propositions. In our empirical examples, Firm 1 can be seen as an innovator, Firm 2 as a disruptor, and Firm 3 as an optimizer. We define innovators as firms offering cloud-based application software to create new revenue streams by moving into an adjacent ecosystem or marketplace. In the course of this extension and transformation, innovators often have a chance to combine elements of the value propositions and value chains that were previously unrelated, and so increase their competitive advantage.[3] The cloud is not only a technology that enables businesses to embrace opportunities for innovation,[3] it also serves as a catalyst for business-model transformation.

Unlike innovator strategies, companies classified as having disruptive strategies share the perception that cloud-based application software offerings can generate completely different value chains. We define disruptors as firms that either radically reformulate customer value propositions or generate new customer needs in their current ecosystems. Disruptors have the potential to capture inimitable competitive advantage by creating disruptive mechanisms in existing markets or industries. Such firms typically provide customers with what they either were unaware of or did not realize they needed. While businesses using this model face greater risk, they also tend to gain higher rewards. Cloud computing enables the radical transformation of existing markets or industries by

enabling businesses to be more agile and adopt technology-integrated business strategies in place of technology strategies based on business strategies.[3]

We define optimizers as firms drawing advantage from cloud computing to improve their existing customer value propositions within their existing ecosystems. Optimizers can expand their value propositions by offering enhanced products and services, improved customer experience, and/or more extensive channel-delivery options;[3] they also tend to be more risk-averse than innovators and disruptors. By supporting fast experimental implementation of new application software offerings without need for substantial upfront costs, cloud computing drives improvement across an optimizer's value propositions and value chains.

Important to note is that adopted strategies are contingent on the configuration of the focal firms with respect to the initial five building blocks, as well as the remaining two blocks related to their target clients' requirements of the application software through the cloud. The figure here outlines the seven building blocks that largely determine whether a firm should use cloud computing to innovate, disrupt, or optimize its business model. The first five are derived from the two frameworks of digital business strategy we discussed earlier, namely those of digital strategic posture[6] and design-based logic of digital business strategy.[11] The remaining two, or the criticality of security optimization and demand for software customization, emerge from the cases and refer to clients' requirements with respect to a cloud-based SaaS offering. These two attributes of the

software appear to complement the broader categories of a firm's industry environments and digital capital.

The first three building blocks, which we categorize as the characteristics of the industry in which a firm operates, include the degree of turbulence, concentration, and growth rate of the industry.[6] It has been established that high (low) industry turbulence, low (high) industry concentration, and low (high) industry growth would influence a firm to develop a digital business strategy that diverges from (converges to) industry norms.[6] In our three empirical examples, we observed two scenarios. In one, Firm 3 operates in an industry with low turbulence, high industry concentration, and high industry growth, and so has designed a digital business strategy that converges to the industry norm to optimize its existing software offering by adding a SaaS version of the software. Firm 3 imitates what happens in its industry without much innovation or attempt to disrupt industry norms. In the other, Firm 1 operates in an industry distinguished by high turbulence, high concentration, and high growth, whereas Firm 2 is in an industry characterized by low turbulence, high concentration, and low growth. For these two firms, it is not immediately clear whether they should diverge from or converge on their respective industry norms with regard to developing cloud-related strategies.

The next two building blocks—option value and technical debt—refer to firms' design capital (in terms of internal systems and processes).[11] While Firm 1 is in the debt-constrained design capital state (high option value and high technical debt), Firm 2 is in the low-quality design capital state (low option value and high technical debt[11]), but its

close relationships with local academic institutions and researchers enables it to escape a low-quality state by accessing the technical capabilities it needs from these institutions. Leveraging its current position as a trusted telecommunication provider and the well-regarded data-protection policy of the country in which it operates, Firm 1 decided to invest considerable resources to innovate and alter its position in its industry ecosystem, from telecommunications infrastructure provider to SaaS provider specializing in servicing business users in high-security-loss environments, meaning Firm 1 is diverging from its industry norm.

Unlike Firm 1, which also diverges from its industry's norm, Firm 2 hopes it will disrupt the operations of the current industry players by offering SaaS for engineering simulation instead of innovating by establishing a new revenue stream through a cloud-based offering. It considers this a radical solution that will allow it to disrupt the current top-down nature of its clients' decision making about engineering-simulation software, and thus break through the dominant market players. By offering a Web-based cloud-computing hosted service, Firm 2 can invite its potential customers' engineers—the ultimate users of its software—to test it during a free trial period without them needing to access or use their own companies' computational resources; it hopes these engineers will then convince top management in their organizations to adopt its software.

There are two main reasons for this apparent difference in the strategies of Firm 1and Firm 2. First, engineering-related data for simulation purposes does not need security optimization; neither the storage nor the processing of the data has to be fully secured.

This makes it easy for Firm 2 to disrupt the market by inviting the engineers who they hope will be their software's ultimate users to test it by uploading engineering-related data to the cloud, avoiding having to access or use their organizations' own computational resources to test the software. It would be difficult to disrupt the current market through a free trial of a Web-based cloud-computing-hosted service if demand for data-security optimization was high. And second, the software offered by Firm 2 need not cater to users' demand for software customization. Engineering-simulation software has a specific logic and algorithms that are relevant for each engineer using it. A less-critical security optimization and a low demand for software customization ultimately drive Firm 2's attempt to grow its market share by adopting a disruptive cloud strategy.

Even though the attributes of the industry environment seem to be the main driver of Firm 3's cloud strategy, our analysis of its clients' demand for security optimization and customization complete its detailed plan. Considering the high potential risk to customers' data and the high demand for software customization, Firm 3 decided to offer a private cloud-based application software solution. Unlike Firm 1, Firm 3 is in a state of debt-constrained design capital (high option value and high technical debt). However, Firm 3 cannot invest as much in infrastructure and know-how as Firm 1. Investing aggressively to acquire necessary infrastructure and know-how, Firm 1 is able to deploy multiple software operations for different tenants on a single server, enabling it to offer customization while still being able to pursue the cost benefits of multiple tenancy. With only limited resources to invest, Firm 3 continues to seek to collaborate with a well-

known cloud infrastructure provider to offer its customization services through a private cloud-based system, thus optimizing rather than innovating in terms of its cloud offering.

The table here outlines the seven building blocks of a cloud strategy and the resultant strategies adopted by the three firms in our study. Note there can be other combinations of the seven building blocks than those we cover here, nor is it our aim to present all possible combinations; for instance, we anticipate having distinct structural characteristics (such as a start-up firm without an existing customer base, as in our empirical examples) would most likely lead to distinct configurations in our scheme. In this respect, any future study that would examine how startup companies strategize their cloud-based SaaS offerings according to our framework would complement our findings.

Conclusion

Our main aim here is to assist researchers and practitioners in utilizing the building blocks identified as essential ingredients for analyzing a firm's cloud strategy. We thus provide an overarching framework consisting of seven building blocks encompassing the characteristics of the firm's industry environment, internal digital capabilities, and target clients' requirements for the particular cloud-based offering. These blocks ultimately determine how firms embark on a cloud-based SaaS strategy.

While significant challenges exist for firms offering application software through the cloud, we find it important to start right and better understand the main building blocks of

such an endeavor. Innovation, optimization, and disruptive strategies represent possible ways for firms to leverage the cloud to advance their value propositions. It is important to highlight we do not advocate any one approach as superior to the others; rather, the strategies identified here should be viewed as a viable aftermath of a firm's industry characteristics (turbulence, concentration, and growth), stock of digital capital (option value and technical debt), and clients' requirements for the cloud-based SaaS offering (criticality of security optimization and software customization).

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pull quotes

"The question of whether the CRM [software] should be offered in the cloud or not is omnipresent."

We found customers' requirements involving software security and customization are the two main attributes that determine a firm's decision to change its on-premise software to cloud-based SaaS.

The cloud is not only a technology that enables businesses to embrace opportunities for

innovation, it also serves as a catalyst for business-model transformation.