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The Strategic Value of Data Resources in Emergent Industries

Stanislav Mamonov
Montclair State University, mamonovs@mail.montclair.edu

Tamilla Mavlanova Triantoro
Quinnipiac University

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Stanislav Mamonov[a],[*], Tamilla Mavlanova Triantoro[b]

[a] Montclair State University, Department of Information Management and Business Analytics, School of Business, 1 University Ave, Montclair, NJ 07043, United States
[b] Quinnipiac University, Department of Computer Information Systems, School of Business, 275 Mt Carmel Ave, Hamden, CT 06518, United States

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ABSTRACT

In this paper we examine the strategic role of data resources in emergent industries. We contrast the resource-based view and the relational view theories to examine how data resources can help organizations create and capture value. We compare two organizations from two different industries to understand how different types of data resources can provide a competitive advantage. We also examine the role of strategic partnerships in capturing value created through the exploitation of data resources. We conclude that while data often serve as a required resource for entry into new markets, strategic partnerships play a critical role in capturing value created through the exploitation of data resources. The emergent partnership structures are remarkably similar across the two organizations. They target rapid market expansion through encapsulation of data resources within highly scalable web services and the use of standardized legal contracts. We also find that temporal decoupling between value creation and value capture can expose firms to the erosion of the competitive advantage gained through investment in data resources.

1. Introduction

The question of information technology (IT) contribution to organizational success is one of the central themes in Information Systems research (Melville, Kraemer, & Gurbaxani, 2004) and there is an active polemic on the role of IT in the formulation and execution of business strategy (Lepak et al., 2007; Rai et al., 2012; Saunders & Brynjolfsson, 2016; Wade, 2010). Data resources are generally viewed as an important organizational IT resource (Fisher, 2009), however there has been relatively little work examining *how* data resources contribute to value creation and capture in the context of *emergent industries* which are characterized by environmental turbulence and a lack of dominant business models. Data resources often require a significant investment in IT infrastructure and management costs. Understanding how data resources can provide a competitive advantage would help in the organizational strategy formulation and investment decisions (Xu, Zhang, & Li, 2016). These decisions are particularly important in the context of new ventures within emergent industries that are typically resource-constrained and have little room for strategic missteps (Gibbert, Hoegl, & Välikangas, 2007).

We draw on research in the developed industries as a starting point for the evaluation of how data resources can contribute to value creation and value capture in the emergent industries. Extant research on how IT creates value for a firm has been done from either the internal or the external perspectives. The internally focused view emphasizes the

role of unique organizational processes and resources in establishing a competitive advantage in a given market. The externally focused view emphasizes the role of inter-organizational partnerships in value co-creation. To understand how data resources are used and how they contribute to the organizational success, we draw on two theories widely used in the studies on IT value. The resource-based view (RBV) of the firm supports the internal view, and it posits that certain organizational resources, if maintained and used wisely, can provide a sustainable competitive advantage (Barney, 1991, 1995). The relational view (RV) of the firm supports the external view, and it posits that partnerships and cooperation among the firms as well as sharing resources are the keys to the inter-organizational competitive advantage (Dyer, 2000; Dyer & Singh, 1998). The RBV and RV theories make different recommendations for the strategic approaches to data resource exploitation in the context of developed industries and we evaluate the applicability of these theoretical perspectives in the context of emergent industries.

The necessity to evaluate the role of data as an IT resource in value creation is pertinent with the emergence of big data as a powerful resource that enables new business models and changes the ways companies do business (Chen, Chiang, & Storey, 2012). With the advances in technology and continually declining cost of computing and storage, firms are able to collect and store ever-growing volumes of data that have the potential to unlock new business opportunities. The new data resources bring a fundamental transformation to the creation of

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business value, requiring a re-examination of the contribution of data resources to value creation across different emergent industries. For example, digital marketing is powered by the behavioral consumer data captured across the web and mobile devices. These data enable precise targeting of individual consumers with specific advertisements related to consumer interests and preferences inferred through the digital tracks left by the consumers online. The opportunity to target individual consumers more accurately has accelerated the shift of marketing budgets to digital advertising and it is reshaping the marketing industry (CMO Council, 2015).

The following research questions are motivating our study:

How do firms leverage data resources to create and capture value within emergent industries?

What do emergent industry practices reveal about the potential gaps in established theoretical perspectives on the strategic value of data resources?

To address the value of data, we contrast the resource-based view and relational view of the firm using two case studies. The case studies examine two organizations in two different emergent industries and different types of data resources. This comparison is valuable because it contributes to the theoretical basis for our understanding of how data can impact value creation and how firms capture this value. We find that the emergent industry practices differ from the predictions of both RBV and RV theories. The companies in our study are neither exclusive in exploiting data resources (as predicted by RBV), nor develop open collaborations (as predicted by the RV theory). We discuss the emergent patterns of data resource exploitation that allow the firms to maximize the value of their data resources. Further, we also discover that temporal decoupling between value creation and value capture can undermine a firm's ability to capture value created through exploitation of data resources uncovering a critical condition for realizing the potential value of data resources.

The paper is organized as follows. The next section introduces the resource-based view. It also discusses data resources and the attributes that differentiate data from other types of IT resources. Then a relational view of the firm is introduced. This is followed by the presentation of two case studies and a critical comparison of these case studies from the RV and RBV perspectives. We conclude with a discussion of emergent industry practices and insights, contributions to theory and practice, limitations and opportunities for further research.

2. Theoretical background

2.1. The resource-based view of the firm

The resource-based view of a firm emphasizes the role of organizational resources in providing a competitive advantage (Barney, 1986, 1991, 1995). RBV suggests that firms possess two subsets of resources. The first subset enables firms to achieve a competitive advantage, and the second subset leads to a greater long-term performance (Barney, 1995; Wade & Hulland, 2004). For the organizational resources to be valuable, they have to be rare and appropriable to provide a firm with a competitive advantage. The advantage can be sustained for longer periods of time if the firm manages to protect the resources against imitation, transfer and substitution (Wade & Hulland, 2004).

One of the challenges in the resource-based view theory is the lack of a clear definition of an IT resource (Wade & Hulland, 2004). Ross, Beath, and Goodhue (1996) defined information systems resources as a set of three assets: human assets, technology assets and relationship assets. Powell and Dent-Micallef (1997) split information systems resources into three groups: human resources, business resources and technology resources. Feeny and Willcocks (1998) identified four IS capability areas linked to business, technical and interpersonal skills. These areas included business and IT vision, IT architecture design, information services delivery and information systems leadership. Bharadwaj (2000) offered a measure of IT capability that consisted of

six dimensions: IT business partnerships, external IT linkages, business IT strategic thinking, IT business process integration, IT management, and IT infrastructure.

Wade and Hulland (2004) grouped resources into either assets, tangible and intangible resources that can be used in producing goods and services, or capabilities, actions used to create goods and services. In Information Systems, assets may include hardware, software, networks, and infrastructure; whereas capabilities can include managerial skills and processes, such as systems development and integration (Wade & Hulland, 2004). Tangible IT assets are considered the easiest resources to copy, and therefore they are least likely to provide a firm with a source of sustainable competitive advantage. Meanwhile, capabilities and intangible assets are harder to imitate (Reed & DeFillippi, 1990) and they can drive the firm's performance (Teece, Pisano, & Shuen, 1997).

Data resources are different from other IS resources used in resource-based research such as hardware, software, networks, and IT infrastructure (Wade & Hulland, 2004). Levitin and Redman (1998) analysed data as a resource and found that data have unique characteristics. Unlike other resources, data are shareable, and they can be utilized by many users at the same time, while producing different information products. Data are copyable and transportable, and considering the speed of transferring digital files, data can be transported efficiently. Data are non-fungible, meaning that although we can substitute one dataset with a similar dataset, we cannot substitute one data item with another data item because data items are unique. Data are versatile and can be used for many different purposes. Data are also characterized by depreciability. However, unlike other resources, data depreciates not from inevitable wear and tear, but from time. Newer data can have more relevance than old data, although data mining techniques can reveal interesting patterns in historical data. In addition, unlike many other resources, data are renewable and new data can be collected and analysed all the time (Levitin & Redman, 1998).

2.2. The relational view of the firm

In contrast to the resource-based view, which suggests that the source of competitive advantage is contained within the firm, the relational view argues that a firm's critical resources may extend beyond the firm's boundaries. In other words, firms that combine their resources in certain ways may realize an advantage over competing firms that are unable or unwilling to create partnerships (Dyer & Singh, 1998).

According to Dyer and Singh (1998), the competitive advantage of partnerships is based on four components. First, firms need to invest in relation-specific assets. Second, they should establish knowledge exchange and joint learning (Chuang & Lin, 2015; Youn, Yang, Kim, & Hong, 2014). Third, firms should combine their complementary resources and capabilities, especially if they are scarce, to create new products and services. Fourth, firms should promote effective governance mechanisms.

Grover and Kohli (2012) expanded the relational view by applying it to the IT context in a form of four layers. The asset layer involves specific IT skills or assets that enhance the relationship between firms. The knowledge layer is powered by common knowledge sharing platforms and analytics. The capabilities layer involves unique IT skills, and the governance layer provides effective management of the other three layers.

Focusing on the IT value, some layers may have more importance than others depending on the context. For example, Ceccagnoli et al. (2012) examined the partnership between platform owners and vendors participating on the platform. They found that in order to create value, this partnership focused on the asset layer and integrated IT assets to create network effects and provide more functionality on the platform. Ceccagnoli and Forman (2012) examined the role of a set of IT functionalities in the relationship of a supplier with multiple buyers and

found that the complementary resources and knowledge sharing were the most instrumental factors in co-creating value.

Data resources can be classified as a shareable asset. Data can be easily shared with partners, however similar to other relationship-specific assets, data have to be safeguarded to avoid opportunism, as suggested by Dyer and Singh (1998). Data are a useful resource to establish input for knowledge exchange and learning, and can be used for the development of new products, services and processes. Data can interact with complementary resources, such as additional datasets and analytics, and become a source of value that a partner could not capture individually. The governance focuses on promoting value creating initiatives such as investing in relation-specific assets, sharing knowledge or merging complementary resources (Dyer & Singh, 1998). Thus, the effective governance mechanisms may allow partners to make greater investments in relation-specific data resources; credibly assure partners that knowledge produced based on data resources will not be easily shared with others, and complementary resources will not be copied or duplicated.

The resource-based view and the relational view perspectives offer different recommendations on how firms should leverage data assets to create and capture value. On the one hand, the RBV perspective suggests that firms are best served by exclusively exploiting their data resources and safeguarding wherever possible from potential imitation and substitution (Soto-Acosta & Meroño-Cerdan, 2008). The relational perspective suggests that firms need to leverage existing resources to establish partnerships with other market participants that would help the firms to create and capture value (Cheng, 2011). To ascertain the validity of the predictions of the two competing perspectives, we conducted two case studies focusing on the two organizations in the two emergent data-intensive industries.

3. Research design and methodology

The question of how data resources affect organizational success requires the assessment of a broad set of contextual and organizational factors. Case study methodology is a recommended approach for the study of complex phenomena in real-world contexts (Eisenhardt, 1989; Yin, 1994). The two case studies presented here focus on two companies in two different emergent industries: small and medium business financing and online display advertising industries. The selection of the industries for the case studies is driven by three key considerations. First, we are focusing on two emergent industries that have significant practical implications. Second, we are examining two industries in which data resources play a key role in value creation. Third, we purposefully selected two structurally very different industries in order to expand our potential to capture unique patterns of strategic data exploitation. The choice of the companies in each of the respective industries was driven by two considerations related to the information content that we expected to gain from each context (Flyvbjerg, 2006). First, seeking to learn how companies can leverage data resources successfully in the emergent industries, we focused on the companies that displayed competitive leadership in the respective industries. The second criterion that guided our selection stemmed from the practical need to gain access to the executives in the respective companies in order to gain the insider perspective on the dynamics of data resource use in each industry.

The results and analysis presented here is a part of an on-going research program that began in 2013. The data presented here cover the period between November 2013 and July 2015. In order to maximize the internal validity of the case studies, we triangulated across multiple sources of information. We interviewed the company executives, and reviewed regulatory filings and other materials shared by the companies. Due to the potentially sensitive nature of some of the information that was shared by the executives during the interviews (publicly traded companies generally limit information disclosure), we do not identify the specific sources in the manuscript unless the stated

information is publicly available. Wherever it is possible, we provide references to publicly available documents that serve as a supporting source of evidence for our inference from the interviews. For the online display advertising case study, we also interviewed the executives from competing companies to further expand our understanding of the key industry practices.

We collected extensive notes during the interviews and we developed interview summary documents following each interview. In parallel with primary data collection, we also collected the secondary data from investor relationship web portals. Following data collection, we engaged in the iterative grounded process of data analysis (Seidel & Urquhart, 2013; Strauss & Corbin, 1997) using nVivo software (version 11), focusing specifically on the key constructs identified in prior RBV and RV research: IT resources, IT capabilities, partnerships and governance structures. We also focused on identifying management perceptions in relation to how data resources afforded a competitive advantage as well as potential threats to the sustainability of the competitive advantages gained through data resource exploitation.

Below we present an overview of the emergent market structures in the respective industries. In each case, we focus on the role of data resources in value creation and value capture. We also examine how data resources can provide the initial and the sustainable competitive advantages for the leading companies in the respective industries. Following the recommendations for "best practices" in case study research (Yin, 1994), we conclude with a comparative discussion on the role of data resources and IT-enabled partnerships as the critical sources of the initial and the sustainable competitive advantage in each industry.

4. Cases

4.1. Case 1. Alternative SMB financing industry

4.1.1. Industry overview

The 28 million small and medium size businesses (SMBs) provide nearly half of all jobs in the private sector in the United States and contribute about 48% of the gross domestic product (SBA, 2012). SMB owners often face challenges in obtaining financing from traditional banks for several reasons. First, SMB owners are typically time and resource constrained. Data from the Federal Reserve Bank of New York shows that obtaining a SMB loan from a traditional bank requires on average 33 h and the submission of loan applications to three banks (NYFRB, 2014). SMB owners can seldom afford the time required to apply for a traditional business loan. For those business owners, who manage to navigate the SMB loan application process at the traditional banks, the loan decisions are often negative. This is in large part due to the difficulty of assessing creditworthiness of the diverse types of SMBs operating in different industries, geographies, and having different operating histories. Traditional banks commonly rely on the owners' individual credit scores to base the SMB lending decisions (Experian, 2015). SMB owners frequently use their personal credit cards as a source of working capital. Consequently, higher than average typical monthly credit card balances negatively affect individual SMB owners' credit scores, undermining their ability to qualify for a traditional loan (Holmes, 2013). As a rule, SMB owners struggle to obtain loans from traditional banks and this undercuts SMB growth potential and it has a negative impact on the overall economy.

Oliver Wyman, a management consulting firm, estimates the unmet demand in the SMB financing industry at $80-$120 billion (Carroll & Hoffman, 2014). This presents a tremendous business opportunity. The evolution of the Internet as a business-to-business (B2B) service channel offers a novel conduit for acquiring and servicing SMB loans by non-traditional lenders. However, the challenge of assessing SMB creditworthiness requires the development of a novel approach to credit scoring.

4.1.2. Company overview

OnDeck Capital was founded in 2007 to specifically focus on SMB lending and the company quickly established itself as a leader in this space (OnDeck, 2014). The company built a proprietary credit-scoring model leveraging transactional business bank account data as the key source of information about SMB creditworthiness. Intuitively, this approach makes sense. SMB owner ability to repay a loan is directly dependent on the free cash flow generated by the business. The bank accounts provide a reliable third-party source of this information.

Traditionally, obtaining the transactional bank account data was relatively difficult. SMB bank statements were typically provided to SMB owners in hard copy and converting paper bank statements into usable data required a significant effort. Fortunately for the early players in the non-traditional SMB lending space, another innovative firm made it much easier to obtain electronic copies of transactional bank account data. Yodlee, an innovator in the financial industry, developed a cloud based financial institution management platform that is being used by 9 of the top 15 largest banks in the United States (Yodlee, 2015). Among other services, Yodlee provides real-time access to transactional data in business bank accounts. The information can be retrieved in seconds, provided that the account owner authorized the disclosure. OnDeck partnered with Yodlee and built a proprietary credit scoring model based on the financial transactional data captured in the bank accounts. Instead of focusing on the personal SMB owners' credit scores, OnDeck assesses the financial health of the applicant SMBs reflected in the transactional business bank account data (OnDeck, 2014).

OnDeck faced a significant cold start problem in assessing SMB loan credit risk. To assess the creditworthiness of a new SMB loan application, the company needed to have past loan performance data that could be used to predict loan repayment. To gather the data necessary to build the credit-scoring model, OnDeck collected industry, financial and geographic data about the businesses that applied for loans. To determine the outcome of individual lending decisions, the company needed to risk its own capital and issue loans to the SMBs applying for credit. According to the company, the average value of a loan issued by the company is $35,000 (OnDeck, 2014). This means that the company risked $70 million in capital to collect just 2000 records to build the initial credit-scoring model.

OnDeck went public in December 2014 and the company shared its operating performance results with the investors in the pre-IPO disclosures. OnDeck announced that in the period between 2007 and 2014, the company had issued over 27,000 SMB loans with the combined value over $1.2 billion (OnDeck, 2014). The collected data presents an invaluable data resource underpinning OnDeck operations. Our discussions with the company senior management revealed that the first version of the credit-scoring model built by OnDeck in 2008 could not evaluate creditworthiness of more than 35% of loan applications − the company simply did not have enough historical data to assess the risk. OnDeck Capital reports that the fifth version of its credit-scoring model can evaluate 99% of the applications that the company receives (OnDeck, 2015).

Being the first mover in the alternative SMB financing space afforded OnDeck the opportunity to gain the initial advantage over the later entrants into the market by building the key intangible data asset (past SMB loan performance data) that underpins the company ability to reliably assess SMB credit risk. This early advantage also offers the benefit of the virtuous information cycle (Aral, Brynjolfsson, & Wu, 2006). The ability to reliably assess credit risk gives OnDeck an advantage in establishing a profitable underwriting business and consequently attracting external capital at lower rates (OnDeck, 2015). Successful SMB loan underwriting generates more data that improves the quality of the model supporting the underwriting decisions. Given the initial advantage developed by OnDeck, one would expect that the company place in the SMB financing space would be secure. However, the company IPO filing also had unintended consequences.

OnDeck pre-IPO disclosures (OnDeck, 2014), that were released in the third quarter of 2014, revealed the attractiveness of the alternative SMB lending business to other potential market participants. Shortly following the disclosures, a new set of players entered the SMB financing market. Many of these players came from the personal loan industry (Lunden, 2015). The personal loan businesses lend to individuals. Personal loan risk assessment is typically based on individual factors (individual credit score and verifiable income) (Fargo, 2015). The personal loan industry attracted regulator attention for potentially abusive practices in so called "payday loans". The "payday loans" were saddling lower income individuals with high interest loans that were effectively impossible to repay (Younker, 2015). The regulatory scrutiny that threatened the traditional personal lending business model forced the major players in this industry to search for new sources of revenue. Consequently, a number of the "payday loan" companies rebranded themselves as SMB loan providers (Lunden, 2015). Without the benefit of historical loan-performance data and driven by the voracious appetite for new revenue, the new players in the SMB financing space often offer terms to potential clients that are not supported by any financial business performance records provided by the applicants. In a recent conversation, a senior OnDeck manager lamented that he experienced many cases where applicants rejected OnDeck loan offers after receiving seemingly "too good to be true" terms from the personal loan companies that appear to underestimate the apparent default risk. The new competition is undermining OnDeck margins. OnDeck 2014 Annual Report states that "the fourth quarter of 2014 marked our eighth consecutive quarter of price reductions as we continue to pass savings along to our customers", reflecting the growing competition in the SMB financing space (OnDeck, 2015).

4.1.3. Case analysis

Evaluating the case from the resource-based (RBV) perspective, it is clear that the historical loan performance data are a key data asset in the industry. Acquiring even the minimum dataset to build a predictive credit default model requires a significant investment of time and capital. Time is required to evaluate loan performance over a period of time. SMB loans are typically 6 months to 2 years in duration. The development of this data asset provided OnDeck with the initial advantage in the SMB financing industry. However, the early mover advantage gained by the company is threatened by imitators that may risk financial capital without the requisite risk assessment of loan applications. The consequences of this type of competition is that the value created by the lender employing informed credit-risk assessment models is competed away through better financial terms available to potential borrowers from less informed lenders in the industry. The end result of the competition is difficult to predict as either of the following scenarios may play out. It is possible that the less informed lenders will start to fail under the weight of the loans that default. It is also possible, that while the less informed lenders will take heavy financial penalties for their early bad loans, the ones that survive will collect sufficient historical loan performance data to build good credit risk models and become informed competitors going forward.

Evaluating the case from the relational view (RV) perspective, it becomes evident that partnerships are being formed. In the ongoing competition, the main objective of both well-informed and poorly-informed market participants is to gain as much market share as possible. In this environment, partnerships with companies that can offer access to the SMB owners is very important for the long term success. Recognizing the importance of such partnerships, OnDeck developed a platform that allows small business consultants to offer SMB loans to their clients in exchange for a fee. OnDeck has also signed an agreement with Intuit, the maker of popular QuickBooks accounting software used by many SMB owners. The strategic partnerships supported through IT platforms will allow OnDeck to reach their target audience and they will likely prove to be the critical strategic asset in defining long-term company success. Fig. 1 summarizes the key data resources and industry participants in SMB financing.
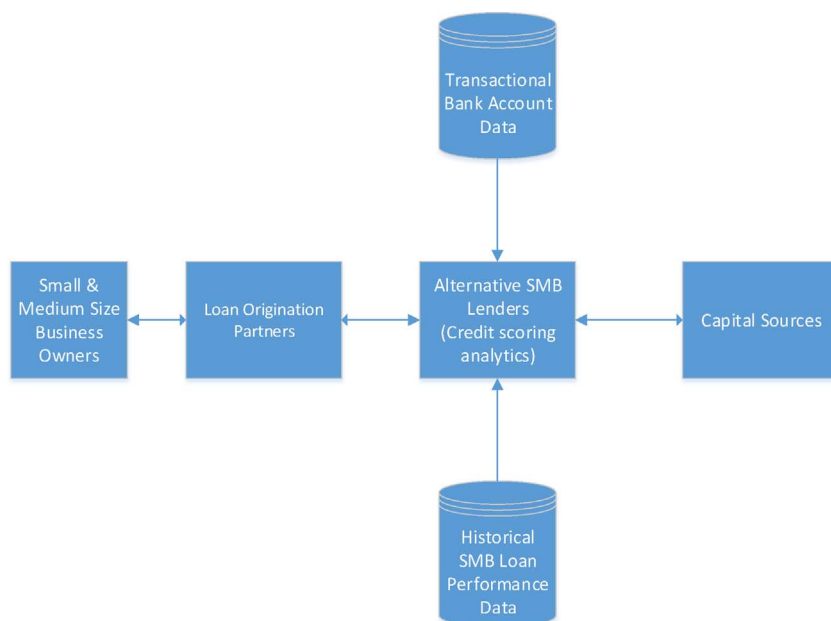
Fig. 1. Alternative SMB Financing Industry Structure.

4.2. Case 2. Online display advertising industry

4.2.1. Industry overview

Online display advertising industry focuses on solving the challenge of connecting the right prospects (consumers) with the right product (brand) at the right time and with the right offer. While the challenge of connecting the right prospect with the right brand is not unique to online advertising, online consumer behavior is particularly well suited for solving this challenge computationally. Accurate predictions of consumer interests benefit all market participants. When the right match is made, consumers are exposed to the ads that are relevant to them individually and the advertisers can significantly improve the return on their investment in advertising. To achieve these goals, consumers are routinely tracked online by many data aggregators that monitor consumer activity across popular web sites by placing cookies (unique identifiers) on consumer computers. While the online consumer tracking is generally done anonymously, it is often possible to identify consumers personally through their online behavior and even to connect online behavior with offline activities (e.g. purchases at specific retailers) (Rijmenam, 2015). Such wealth of information about the online and offline consumer behavior can be instrumental in optimizing the advertising messages shown to individual consumers online.

Online marketing is rapidly gaining its share of the overall marketing budgets (Ad Council, 2015). Online display advertising is expected to reach $77.37 billion globally in 2017 (eMarketer, 2016). The sophistication of online consumer targeting has evolved rapidly in the past several years. Online Ad Exchanges, that sell available advertising inventory in near real-time as the consumers load the web pages, now handle more than half of all available online display advertising inventory (Intelligence, 2015). The Ad Exchanges bring together Publishers, operators of content web sites that make money by selling advertising, and Advertisers, entities interested in displaying ads to specific consumers. Potential ad impressions are offered on Ad Exchanges as the consumers visit specific web pages and Advertisers have about 100 milliseconds to place bids for the available inventory (Intelligence, 2015). The second best bid auction format stimulates the bidders to reveal their reservation prices and the bid floor levels offer the same for the Publishers. Floor prices reflect the minimum bids that would be accepted by a Publisher on a specific advertisement spot. The floor levels are typically known only to the exchanges and they are hidden from the Advertisers.

Both Publishers and Advertisers engage in optimization efforts.

Publishers typically work with supply-side platform providers (SSPs) to increase the advertising revenue yield by tracking and modelling advertising demand, updating the floor prices and routing their inventory to specific exchanges. Advertisers commonly engage demand-side platform (DSP) providers to evaluate the potential interest of every consumer in a specific product or service and to optimize their bidding strategies to yield the desired prospects. Both SSPs and DSPs commonly rely on third-party data aggregators to enrich the data that they collect themselves. Fig. 2 outlines the key relationships between market participants in online advertising.

Consumer data plays a critical role in online advertising optimization. Behavioral tracking facilitated by placing cookies typically follows consumers across a panel of about 15,000 web sites that serve as proxies for consumer interests and current purchase considerations. For example, a visit to the ESPN web site would signal a general interest in sports, while a visit to cars.com would serve as a signal of possible consumer interest in purchasing a car. Estimates suggest that companies engaged in online consumer tracking collect information on roughly 190 million consumers in the United States and about 500 million consumers globally (Criteo, 2015a). Collecting data on such scale generates petabytes of data on a weekly basis and requires sophisticated technical infrastructure to support data collection and analysis. To understand the role of different IT assets in providing the initial and the sustained competitive advantage in the online display advertising industry we will focus on Criteo, a leader in the online advertising optimization industry.

4.2.2. Company overview

Criteo was founded in Paris, France in 2005 and the company went public in 2013 (Criteo, 2015a). The company initially focused on developing recommendation engine solutions for e-retail clients and Publisher web sites, but it quickly emerged as a leader in online marketing. In its latest annual report for 2014, Criteo reported revenues of €745 million (approximately $846 million) with 83.7% of the revenues coming from outside of France (Criteo, 2015a). The company is unique in the online advertising space in that it offers solutions to both Publishers and Advertisers. It counts over 10,000 Publishers and 7000 Advertisers as clients. Criteo effectively performs SSP and a DSP functions for their Publisher and Advertiser clients respectively. The company reports having delivered over 1.7 trillion targeted ads in 2014 and generating over $16.5 billion in sales from targeted ads for their Advertisers (Criteo, 2015a). Criteo infrastructure includes several globally
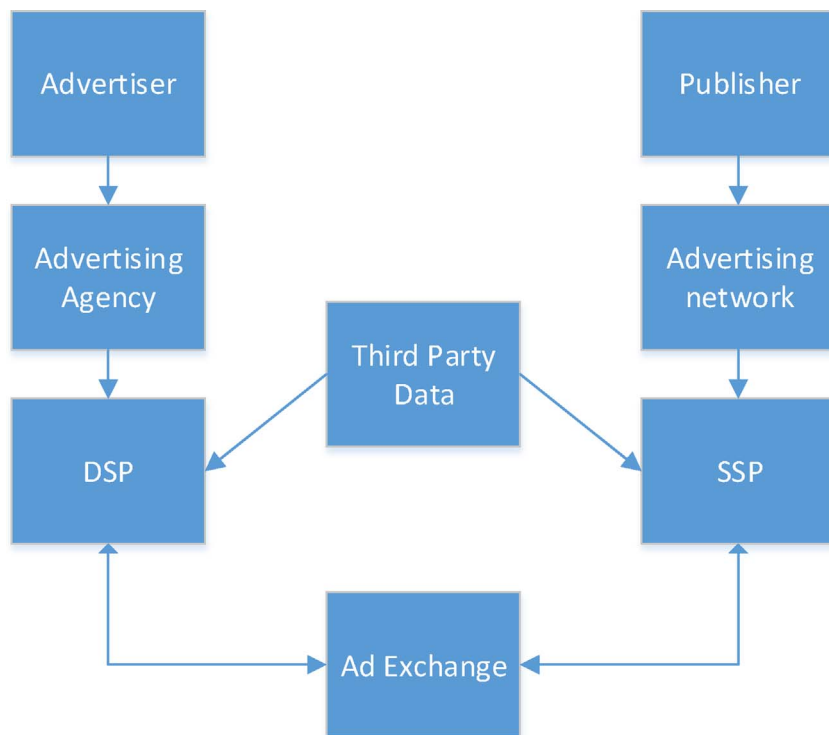
distributed data centers hosting over 11,000 servers with the combined storage capacity over 38 petabytes.

What is truly remarkable is that Criteo established this position with seemingly little in the way of technical innovation. The company reports that it has only a single patent issued in France, and only three patents issued in the United States, while six patent applications are pending (Criteo, 2015a). The very limited technical intellectual property portfolio suggests that Criteo is primarily relying on commodity hardware and common algorithmic solutions to perform advertising optimization for their clients. Interviews with senior executives from several companies competing with Criteo confirmed this observation. Nearly all industry players rely on Hadoop clusters for data capture and logistic regression models for advertising optimization. Our interviews with the executives also revealed that the minimum technical infrastructure required to capture petabytes of data and to build predictive models is quite expensive, with the minimum required investment of $50-60 million for the infrastructure. While the minimum required investment is a significant barrier for industry entry, there is little that differentiates the competing offerings in the market from one another in terms of the underlying technology.

In addition to the minimal differentiation in terms of technology, the time sensitivity of the underlying data further undermines the value of data resources possessed by the companies engaging in advertising optimization. The most recent consumer behavior data offers the best clues to the specific consumer interests and the data beyond the most recent few weeks generally have little predictive value (Chen & Stallaert, 2014). The rapid decay in the value of collected information means that there is very little opportunity for the individual companies engaged in advertising optimization to gain an advantage by collecting more historical data. Petabytes of historical data have little value beyond just a few weeks from the moment of collection.

Although the company executives are hesitant to publicly discuss company strategy, it is clear that Criteo management recognized these industry constraints early on and instead of developing intellectual property to protect its market position, the company instead invested heavily in developing partnerships with its Publisher clients. Criteo has built one of the largest advertising networks in the industry that

includes over 10,000 Publishers. While the advertising network relies on commodity technology, its value stems from the access that it offers to advertisers. Larger advertisers prefer to work with advertising networks that can reach a wide audience. Since Criteo offers a one-stop solution for accessing and optimizing advertisements across a broad network, it has attracted a loyal patronage from top-tier advertisers. This creates a virtuous cycle of partner relationships supported through IT infrastructure. The company offers access to a large audience, which attracts advertisers. Criteo's ability to monetize the publisher web sites through advertising attracts new high quality publishers to join the advertising network. Criteo annual report states that the company revenue from established accounts grew 146% from 2013 to 2014 (Criteo, 2015a). The most recent filings from the company suggest that this trend continues (Criteo, 2015b).

4.2.3. Case analysis

Evaluating the case from the resource-based (RBV) perspective, it is clear that data resources encompassing online consumer behavior, while costly and essential for advertising optimization, are generally treated as a commodity. This is in part due to the fact that companies in the industry use similar technology to collect and analyze data, thus there is no technology differentiation between them. In addition, data decay rapidly, therefore creating a competitive advantage based on collecting, storing and safeguarding more historical data is not beneficial. The nature of the online advertising market also imposes structural constraints on the industry participants. Companies have a very narrow window of opportunity to turn data into analytical insights and capitalize on the insights by showing the right advertisements to the right consumers. Data collection, analysis and advertisement delivery have to happen on 20–100 ms timescale. These constraints have forced service standardization at the technical (web service) and governance (legal contracts) levels.

Evaluating the case from the relational view (RV) perspective, it is evident that partnerships play an important role in value creation. Criteo, the leading company in the market, has recognized the relative commodity value of consumer data and the company has invested a great effort into building its Publisher partner network. Criteo

standardization of technical services and legal contracts has allowed the company to build a network of more than 10,000 content web sites where it controls at least a part of the advertising space. The wide reach of the advertising network attracted a stable portfolio of brand advertisers, in effect reflecting the benefits that are common to two-sided markets (Armstrong, 2006; Rochet & Tirole, 2006). In other words, Criteo has successfully leveraged what effectively appears to be a commodity data resource to position itself as the intermediary in an important two-sided market thus enjoying the strategic benefits of this positioning (Eisenmann, Parker, & Van Alstyne, 2006).

5. Discussion

5.1. Cross-case analysis

Applying the resource-based view of the firm perspective to the case studies, we find a significant variation in the type of data resources that are critical to the two industries. Loan performance datasets are relatively small, however they are very costly to obtain. A single record in the dataset requires the lender to risk $35,000 in capital on average. Obtaining a two thousand record dataset requires putting $70 million of capital at risk. The historical loan performance data is a critical data asset in the SMB financing industry and the past loan performance data retains value over a long period of time because it captures the fundamental relationships between business cash flows and the loan default risk. The industry analysis reveals the presence of "naked" imitators, companies that effectively highjack the analytical capabilities of the early entrants that made the requisite investment in building the data assets and developed analytical expertise. The "naked" imitators decouple the risk assessment process from the loan offers and exploit the analytical capabilities of the first movers for their advantage by offering to beat loan terms from the informed underwriters. This activity is leading to margin erosion in the industry and it is undermining the value of the historical loan performance data (Table 1).

The data resource utilization profile in the online display advertising industry is quite different. The digital consumer data represent an essential asset for companies engaged in demand and supply side advertising optimization. The industry operates with big data of petabyte size. These data require a substantial investment in technical infrastructure for capture and analysis. The industry also faces a rapid depreciation of the data value because the most recent consumer behavior is the best indicator of current consumer interests that can influence consumer response to advertising. Although the financial investment required to capture the data is significant (estimated at $50-60 million), there are numerous data management platform providers that can supply the behavioral consumer data and therefore the data resources in the online display advertising industry are largely treated as a commodity with a very limited useful lifespan. Table 2 summarizes the key dimensions of data resources according the RBV perspective.

The following insights emerge from the cross-industry analysis of the data resource utilization.

First, data resources can be valuable in spite of the size. Depending on the contextual factors and the nature of the business, both big data and small data resources can be extremely valuable.[1] While big data resources are beneficial for the advertising industry, the SMB financing industry illustrates the value of relatively small datasets.

Second, data resources can have a very limited useful lifespan. The data resources commonly used in the online display advertising industry require a significant investment in infrastructure to collect due to the size of data collected in real time, however the value of information retrieved from these data depreciates rapidly.

Third, data resources may be a subject to "naked" imitation. The example of the SMB financing industry reveals that it is possible to

imitate data resources by effectively decoupling analytical capabilities tied to data resources (business loan credit risk assessment) from business function (loan offer). Imitators in the SMB space make loan offers to prospective borrowers contingent on the successful procurement of a loan offer from the company possessing the required credit default risk evaluation expertise thus bypassing the need to collect the data required for credit risk assessment themselves.

The RBV perspective on the data resource utilization reveals that data resources play a critical role in unlocking business opportunities. The SMB financing and online display advertising industry examples illustrate how data resources can facilitate not just entry into new markets, but the creation of new industries. However, data resources in themselves do not afford a source of sustainable competitive advantage to the first movers that make the investment in the requisite data resources. The initial advantage gained by the first movers can face challenges from "naked" imitation and it can also be eroded by the time-sensitive nature of the data resources that rapidly depreciate over time.

The RV perspective emphasizes the importance of partnerships for creating and capturing business value. Applying the relational perspective to the SMB financing and online display advertising industries, we find that both industries reveal the importance of strategic partnerships in converting the first mover advantage into a sustainable leadership position. In the case of the SMB financing industry, unlocking the value created by OnDeck required not just developing a novel approach to SMB risk assessment, but also reaching the potential clients. OnDeck developed a strategic relationship with a key vendor in the SMB service space (Intuit) thus gaining access to the millions of small businesses that already use the Quickbooks accounting platform. OnDeck also developed an IT-enabled platform that offers partnerships to SMB consultants and advisors. In other words, OnDeck leveraged its unique capability in assessing SMB credit risk supported by its valuable loan performance dataset through partnerships with other companies that have existing SMB relationships.

Application of the relational view in the online display advertising industry also reveals the importance of partnerships in creating a sustainable competitive advantage. Although the data resources are essential for behavioral optimization in digital marketing, the resources are highly time sensitive and historical data offer little in the way of business value. Further, the digital advertising market attracted many entrants that began data collection, effectively turning the behavioral consumer data into a commodity. Recognizing this trend, Criteo, a leading company in the online display advertising industry, invested heavily into building partnerships with Publishers. This focus reflected the importance of the audience reach as the key factor in advertising budget allocation − the larger advertisers need global reach. It also reflects the complementarity of capabilities and resources between the traditional publishers and the technology companies in this industry. The Publishers specialize in content development that attracts an audience to online resources. The technology providers create value by optimizing monetization of the user traffic by personalizing the digital advertisements shown to each visitor.

Applying the four level framework proposed by Grover and Kohli (2012), we find that in both industries, the SMB financing and the online display advertising, there is little in the way of asset, knowledge or capability sharing. In both industries, the companies that made an investment in developing data assets have tightly integrated those assets within the core IT-enabled scalable services that they offer, however the data assets are not shared with any partners and neither is there sharing of knowledge nor capabilities. Further, the two case studies do not support the Relational View proposition (Dyer & Singh, 1998) that trust provides an effective governance structure in supporting value co-creation. Both OnDeck and Criteo rely on legal contracts to precisely structure their relationships with the key partners. Table 3 summarizes the observed asset, knowledge, and capability sharing arrangements as well as the governance structures within each

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[1] We thank the anonymous reviewer for this suggestion.

Table 1
Data sources.

Case study	Data sources
SMB Financing	Primary data sources: Several rounds of interviews with senior executives in November 2013, March 2014, March 2015, June 2015. Secondary data sources: OnDeck Capital S1 Statement, OnDeck Capital Annual Report 2014, OnDeck Capital Investor Presentation, Q1, 2015.
Online Display Advertising	Primary data sources: Interviews with executives in display advertising industry, December 2013, April 2014, April 2015. Secondary data sources: Criteo Annual Report 2014, Criteo Investor presentation Q1, 2015.

Table 2
RBV Dimensions of Data Resources in the SMB Financing and Online Display Advertising Industries.

	SMB financing industry	Online display advertising industry
Data resource	Past loan performance data.	Consumer behavior data.
Size	Relatively small dataset, however the feature set is growing.	Big data, petabytes of data covering 500+ million consumers across 15,000+ web sites.
Appropriability	Past loan performance data is required for risk assessment of new business loan applications.	Recent online consumer behavior data is required for digital advertising optimization.
Assessment of rarity	The data resource is rare, requires a significant investment of capital and time to obtain.	The data resources are potentially available from multiple third parties.
Vulnerability to imitation, transfer and substitution.	The early entrant in the industry is facing "naked" imitation from competitors that do not possess the data resource.	The data resource is highly time sensitive, information loses value quickly.

Table 3
RV Layers in the SMB Financing and Online Display Advertising Industries.

	SMB financing industry	Online display advertising industry
Key partners	SMB service providers, (e.g. Intuit, business advisors).	Publishers, advertisers.
Assets	Assets are not shared with partners. Assets are converted to services. Loan performance data powers the risk assessment within an integrated SMB loan service.	Assets are not shared with partners. Assets are converted to services. Consumer behavior data is embedded in the SSP/DSP service.
Knowledge	Proprietary knowledge (SMB credit scoring expertise) is not shared with the partners.	Proprietary knowledge (publishers and advertisers matching) is not shared with the partners.
Capabilities	No joint capabilities development. IT-enabled systems enable partner revenue growth.	No joint capabilities development. IT-enabled systems enable partner revenue growth.
Governance	Standardized contractual relationships.	Standardized contractual relationships.

industry.

In summary, we find that, consistent with the RBV perspective, data resources play an essential role in facilitating market entry and participation in the observed emergent industries. However, valuable proprietary data resources do not offer a guaranteed source of sustainable competitive advantage. In the SMB industry, competitors lacking data resources are able to piggy-back on the analytical capabilities of the companies that built the resources. In the online display advertising industry, the large addressable market has attracted dozens of competitors offering advertising optimization services that have little in the way of differentiation in terms of the underlying technology.

In these circumstances, consistent with the RV perspective, the strategic focus both in SMB and online advertising industries is on developing relationships with partners. However, assets, knowledge and capabilities are not shared, and not governed by trust.

5.2. Contributions

Our study contributes to both theory and practice. By contrasting the research-based view and the relational view perspectives in the context of two organizations in two different emergent industries and two different types of data resources, we contribute to the integration of the divergent perspectives on the role of IT resources in business strategy. Our results suggest that the RBV and RV theories offer complementary perspectives on the potential synergies between valuable data resources and strategic partnerships, yet the emergent industry practices differ from the theoretically expected configurations suggested by either theory. While the RBV perspective advocates investment in rare resources that would be exclusively exploited by the firm, the RV theory suggests that the firms should instead invest in resources

that would support partnerships. We find that firms do make investments in rare and appropriable data resources. They also engage in strategic partnerships in order to increase the market value of their data assets. However, the structure of the partnership interfaces that we observe in both the SMB financing and online display advertising industries is different from the recommendations of the RV perspective.

The data resources are encapsulated within services that effectively preclude partner access to the underlying data assets, while enabling scalable exploitation of the data assets and analytical models built on their foundations. The service interface offered by OnDeck to its partners can assess the credit risk of a SMB loan applicant. The services offered by Criteo serve double duty capturing clickstream data and returning advertisements to Criteo partners. Standardization of the partnership interfaces also allows for the standardization of the legal contracts detailing the structure of the strategic partnerships. The emergence of the legal contracts as the key governance structure in partnership relationships also differentiates the emergent structures from the propositions of the RV theory that suggests that less formal structures and trust are important governance mechanisms (Gallivan & Depledge, 2003).

Another important theoretical insight that emerges from our analysis is the key role of tight temporal coupling between value creation and value capture in the firm's ability to capture value created through the exploitation of data resources. In case of Criteo, the temporal gap between value creation (figuring out which is the best ad to show a particular consumer on a particular page) and value capture (actually displaying the advertisement) is very small – typically < 10 ms. This allows the company to reliably capture the created value. In case of OnDeck, value creation (assessing an SMB application credit risk and making a loan offer) and value capture (applicant's acceptance of the

Table 4
RBV and RV Recommendations vs. Emergent Industry Structures.

Resource-Based (RBV) recommendations:	Relational View (RV) recommendations:
Firms should make investments in rare and appropriable resources and safeguard them from imitation and substitution.	Firms should invest in partner-specific data resources and leverage the resources to create value through knowledge sharing and joint learning.
Observed emergent industry practices:	
Resources are embedded within services that are offered to partners	
Standardized legal contracts facilitate rapid expansion	
Temporal gaps between value creation and value capture exist	

offer and subsequent repayment of the loan) can be temporally decoupled. A SMB loan applicant can explore other potential offers after an offer from OnDeck is received. This temporal decoupling allows competitors, including those lacking credit risk assessment capabilities, to make competing offers, thus eroding OnDeck's ability to capture value created through its proprietary SMB credit risk model. Temporal decoupling between value creation and value capture thus presents an important strategic threat in the context of emergent industries built on the foundation of data resources.

Table 4 summarizes the predictions of the RBV and RV theories and contrasts them with the emergent industry structures.

Our study also makes several contributions to practice. Our first contribution to practice emerges from the analysis of the commonalities of strategies employed by both OnDeck and Criteo in the respective industries. While the two industries share little in common in terms of the structure or the core data resources, the emergent strategies employed by the early entrants that are successfully managing the transition to more mature industry structures are strikingly similar. In both cases, the companies have used the initial advantage gained through novel applications of data sources and information technology to develop standardized IT-enabled service offerings and immediately focused on the development of standardized, contractually governed partnerships that accelerated the adoption of the IT-enabled services by a large network of customers and partners. This approach affords the protection of valuable proprietary data resources, because they are encapsulated in IT systems and prevent any partner from misappropriating the data. At the same time, encapsulation of data resources and analytical capabilities in standardized IT-enabled service offerings maximized the efficiencies in marketing the services to potential clients.

Our second contribution to practice is rooted in the observation of the importance of temporal coupling between value creation and value capture. While investments in data resources can enable value creation through unique analytical capabilities, potential decoupling between value creation and value capture can prevent companies from being able to harvest the full value created through their data resources. We expect that this threat would be present across different contexts beyond the two case studies presented here. For example, TripAdvisor made a significant investment in building a unique data resource consisting of consumer reviews on hotels, restaurants and attractions, however the company cannot be sure to be able to capture the full value created through the exploitation of data resources, because TripAdvisor will only capture value if a visitor makes a booking through TripAdvisor. There is little that stops consumers from extracting value from TripAdvisor reviews and then making a booking through an unaffiliated third party. Similarly, to what we observed in the case of OnDeck, there is temporal decoupling between value creation and value capture and it can undermine the company ability to capture value. Our recommendation to the industry in overcoming this challenge would focus on optimizing the connection between value creation and value capture such that potential customers are incentivized to complete the transaction on the respective platform. This can be accomplished through time-limited offers and loyalty rewards.

Lastly, we would like to note that no research is without limitations. Our analysis employs the case study methodology that affords the study of complex phenomena in natural contexts, but it is nonetheless limited by the selection of the specific case studies. Consequently, the results may not generalize to other contexts. Further research would be required to evaluate the generalizability of the results presented here.

6. Conclusion

Prior research on information technology as a source of competitive advantage has been largely limited to mature industries (Meyer, Estrin, Bhaumik, & Peng, 2009; Yiu, Bruton, & Lu, 2005). Less is known about how companies can leverage information technology for a competitive advantage in the emergent industries. Also, little is known about how companies can leverage data for a competitive advantage. To address these gaps in research, we drew on the resource-based and relational view theories and we conducted a comparative case analysis of two emergent industries: SMB financing and online display advertising industries. These industries were selected because both represent rapidly growing sectors of the economy and data resources play a central role in value creation in both industries. Further, the two industries have very different patterns of data usage. Whereas SMB financing data is relatively small, costly to obtain and valuable over the longer term, online display advertising data is typically on a petabyte scale commodity that depreciates rapidly.

Our analysis reveals that the emergent industry practices differ in important respects from the predictions of both theoretical perspectives. While the resource-based view of the firm emphasizes the exclusive exploitation of assets for the long-run success of a firm, the relational view posits the importance of inter-organizational collaboration and investment in jointly controlled assets to support interorganizational learning. We find that firms do invest in the development of proprietary data resources and analytical capabilities, however the leading companies in the two industries that we analysed are critically dependent on their partners for unlocking the business value of their data and analytical assets. To unlock the value of their assets, the firms develop standardized services accessible to their strategic partners and they rely on standardized legal contracts for rapid expansion in the emergent markets. We have also uncovered the critical role of temporal decoupling between value creation and value capture that can interfere with the firm's ability to capture full value created through the investment in data resources.

References

Aral, S., Brynjolfsson, E., & Wu, D. J. (2006). Which came first, it or productivity? Virtuous cycle of investment and use in enterprise systems. *Virtuous cycle of investment and use in enterprise systems.*

Armstrong, M. (2006). Competition in two-sided markets. *The RAND Journal of Economics, 37*(3), 668–691.

Barney, J. B. (1986). Strategic factor markets: Expectations, luck, and business strategy. *Management Science, 32*(10), 1231–1241.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120.

Barney, J. (1995). Information technology and sustained competitive advantage: A analysis IT and competitive advantage. *MIS Quarterly, 19*(4), 487–505.

Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: An empirical investigation. *MIS quarterly,* 169–196.

Carroll, P., & Hoffman, B. (2014). *Financing small businesses.*

Ceccagnoli, M., & Forman, C. (2012). Cocreation of value in a platform ecosystem: The case of enterprise software. *MIS Quarterly, 36*(1), 263–290.

Chen, J., & Stallaert, J. (2014). An economic analysis of online advertising using behavioral targeting. *MIS Quarterly, 38*(2), 429–449.

Chen, H., Chiang, R., & Storey, V. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly, 36*(4), 1165–1188.

Cheng, J.-H. (2011). Inter-organizational relationships and information sharing in supply chains. *International Journal of Information Management, 31*(4), 374–384.

Chuang, S.-H., & Lin, H.-N. (2015). Co-creating e-service innovations: Theory, practice, and impact on firm performance. *International Journal of Information Management, 35*(3), 277–291.

Council, C. (2015). *Big shift to digital and data marketing is shaking up client relationships with Ad/media agency partners.* Retrieved from: http://www.cmocouncil.org/press-

detail.php?id = 5078.

Criteo (2015a). *Criteo annual report 2014*. Retrieved from: criteo.investorroom.com/sec.

Criteo (2015b). *Criteo reports record results for the third quarter 2015 and reiterates its full-Year 2015 outlook despite negative foreign exchange impacts. Criteo investor relations.* Retrieved from: http://ir.criteo.com/2015-11-04-Criteo-Reports-Record-Results-For-The-Third-Quarter-2015-And-Reiterates-Its-Full-Year-2015-Outlook-Despite-Negative-Foreign-Exchange-Impacts.

Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review, 23*(4), 660–679.

Dyer, J. H. (2000). *Collaborative advantage: Winning through extended enterprise supplier networks.* Oxford University Press.

eMarketer (2016). *Digital ad spending to surpass TV next year.* Retrieved December 26, 2016, from: https://www.emarketer.com/Article/Digital-Ad-Spending-Surpass-TV-Next-Year/1013671.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review, 14*(4), 532–550.

Eisenmann, T., Parker, G., & Van Alstyne, M. W. (2006). Strategies for two-sided markets. *Harvard Business Review, 84*(10), 92.

Experian (2015). *Why you might have two credit reports.* Retrieved from: http://www.experian.com/credit-education/business-and-credit.html.

Fargo, W. (2015). *Know what lenders look for.* Retrieved from: https://www.wellsfargo.com/financial-education/credit-management/five-c/.

Feeny, D. F., & Willcocks, L. P. (1998). Core IS capabilities for exploiting information technology. *Sloan Management Review, 39*, 9–21.

Fisher, T. (2009). *The data asset: How smart companies govern their data for business success, Vol. 24.* John Wiley & Sons.

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry, 12*(2), 219–245.

Gallivan, M. J., & Depledge, G. (2003). Trust, control and the role of interorganizational systems in electronic partnerships. *Information Systems Journal, 13*(2), 159–190.

Gibbert, M., Hoegl, M., & Välikangas, L. (2007). In praise of resource constraints. *MIT Sloan Management Review, 48*(3), 15.

Grover, V., & Kohli, R. (2012). Cocreating IT value: New capabilities and metrics for multifirm environments. *MIS Quarterly, 36*(1), 225–232.

Holmes, T. E. (2013). *Used wisely, small-business cards can keep business afloat.* CreditCards.cfm.

Intelligence, B. (2015). *The Programmatic Advertising Report: Mobile, video, and real-time bidding drive growth in programmatic.* Retrieved from: http://www.businessinsider.com/buyers-and-sellers-have-overwhelmingly-adopted-programmatic-with-mobile-leading-growth-2015-3.

Lepak, D. P., Smith, K. G., Taylor, M. S., Lepak, D. P., Smith, K. E. N. G., & Taylor, M. S. (2007). Introduction to special topic forum: Value creation and value capture: A multilevel perspective. *Academy of Management Review, 32*(1), 180–194.

Levitin, A. V., & Redman, T. C. (1998). Data as a resource: Properties, implications, and prescriptions. *Sloan Management Review, 40*(1), 89–101.

Lunden, I. (2015). *Disgraced payday lender wonga sells SMB business to orange money, cuts 325 jobs.* Retrieved from: http://techcrunch.com/2015/02/24/wonga-everline-job-cuts-klein/.

Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Review: Information technology and organizational performance: An integrative model of IT business value. *MIS Quarterly, 28*(2), 283–322.

Meyer, K. E., Estrin, S., Bhaumik, S. K., & Peng, M. W. (2009). Institutions, resources, and entry strategies in emerging economies. *Strategic Management Journal, 30*(1), 61–80.

NYFRB (2014). *Joint small business credit survey report, 2014.* Retrieved from: https://www.newyorkfed.org/medialibrary/media/smallbusiness/SBCS-2014-Report.pdf.

OnDeck (2014). *OnDeck S1 registration.* Retrieved from: http://www.sec.gov/Archives/edgar/data/1420811/000119312514405349/d772825ds1.htm.

OnDeck (2015). *OnDeck annual report 2014.* Retrieved from: https://investors.ondeck.com/investor-overview/overview/default.aspx.

Powell, T. C., & Dent-Micallef, A. (1997). Information technology as competitive advantage: The role of human, business, and technology resources. *Strategic Management Journal, 18*(5), 375–405.

Rai, A., Pavlou, P. A., Im, G., & Du, S. (2012). Interfirm IT capability profiles and communications for cocreating relational value: Evidence from the logistics industry. *MIS Quarterly, 36*(1), 233–262.

Reed, R., & DeFillippi, R. J. (1990). Causal ambiguity, barriers to imitation, and sustainable competitive advantage. *Academy of Management Review, 15*(1), 88–102.

Rijmenam, M.v. (2015). *The Re-identification of anonymous people with big data.*

Rochet, J., & Tirole, J. (2006). Two-sided markets: A progress report. *The RAND Journal of Economics, 37*(3), 645–667.

Ross, J. W., Beath, C. M., & Goodhue, D. L. (1996). Develop long-term competitiveness through IT assets. *Sloan Management Review, 38*(1), 31.

SBA (2012). *Small business GDP: update 2002–2010.* Retrieved from: https://www.sba.gov/content/small-business-gdp-update-2002-2010.

Saunders, A., & Brynjolfsson, E. (2016). Valuing information technology related intangible assets. *Management Information Systems Quarterly, 40*(1), 83–110.

Seidel, S., & Urquhart, C. (2013). On emergence and forcing in information systems grounded theory studies: The case of Strauss and Corbin. *Journal of Information Technology, 28*(3), 237–260.

Soto-Acosta, P., & Meroño-Cerdan, A. L. (2008). Analyzing e-business value creation from a resource-based perspective. *International Journal of Information Management, 28*(1), 49–60.

Strauss, A., & Corbin, J. (1997). *Grounded theory methodology: An overview* (1st ed.). Sage Publications, Inc.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509–533.

Wade, M., & Hulland, J. (2004). Review: The resource-based view and information systems research: Review, extension, and suggestions for future research. *MIS Quarterly, 28*(1), 107–142.

Wade, M. R. (2010). The Formation and value of IT-enable resources: Antecedents and consequences fo synergistic relationships. *MIS Quarterly, 34*(1), 163–183.

Xu, X., Zhang, W., & Li, L. (2016). The impact of technology type and life cycle on IT productivity variance: A contingency theoretical perspective. *International Journal of Information Management, 36*(6), 1193–1204. http://dx.doi.org/10.1016/j.ijinfomgt.2016.08.007.

Yin, R. (1994). *Case study research: Design and methods.* Beverly Hills, CA: Sage publishing.

Yiu, D., Bruton, G. D., & Lu, Y. (2005). Understanding business group performance in an emerging economy: Acquiring resources and capabilities in order to prosper. *Journal of Management Studies, 42*(1), 183–206.

Yodlee (2015). *Yodlee annual report 2014.* Retrieved from: http://ir.yodlee.com/annuals-proxies.cfm.

Youn, S. H., Yang, M. G., Kim, J. H., & Hong, P. (2014). Supply chain information capabilities and performance outcomes: An empirical study of Korean steel suppliers. *International Journal of Information Management, 34*(3), 369–380.

Younker, K. (2015). *Payday lending regulations could turn lenders into delinquent borrowers.* Forbes.

Stanislav Mamonov is an Assistant Professor at the Feliciano School of Business, Montclair State University. He received his Doctor of Philosophy in Business at The Graduate Center, CUNY. Prior to joining academia, Dr. Mamonov was a successful serial entrepreneur having spent more than 15 years as co-founder, CTO and CEO in a series of e-commerce ventures. His research focuses on applied business analytics, strategic value of information assets as well as information privacy and security related topics. His research has been published in *International Journal of Electronic Commerce, Communications of the Association of Information Systems, Computers in Human Behavior, Information Systems Management* and *Journal of Information Privacy and Security* among other journals.

Tamilla Mavlanova Triantoro is an Assistant Professor of Computer Information Systems in the School of Business at Quinnipiac University. She received her Ph.D. in Business at the City University of New York. Tamilla's research interests extend over multiple areas including Business Data Analytics, User Experience Design, and Business Strategy. Tamilla's current research focuses on the role of data resources in organizations, gamified technology experience, and competitive positioning. Tamilla's research has been published in the *Decision Support Systems, International Journal of Electronic Commerce, Information & Management, ACM Transactions on Human Computer Interactions*, and presented at the *International Conference for Information Systems, Americas Conference on Information Systems, the Hawaii International Conference on System Sciences* and other academic conferences and industry events.