UNTANGLING THE AMBIDEXTERITY DILEMMA THROUGH BIG DATA ANALYTICS

TOR BØE-LILLEGRAVEN

Abstract: Ambidexterity theory suggests that the ability to simultaneously explore and exploit is linked to firm performance, but the empirical evidence to date is mixed. In this study, I review existing research on firm performance in the newspaper industry in order to identify the main causal factors in a single industrial context. Three broad categories emerge: media convergence, organizational ambidexterity, and business model innovation. By incorporating variables and arguments from these categories into a basic performance model, I develop a multi-dimensional conceptual framework of explore and exploit value chains. The article concludes with a discussion of how the explore/exploit framework can be operationalized using big data analytics, and recommendations for future research are offered.

Keywords: Ambidexterity, exploration-exploitation, organizational performance, big data, analytics capability, organization design

The "ambidexterity premise" suggests that organizations capable of exploiting existing businesses while simultaneously[1] exploring new opportunities may achieve superior performance compared to firms emphasizing one at the expense of the other (Raisch & Birkinshaw, 2008; Tushman & O'Reilly, 1996). But despite hundreds of studies over the past 15 years, the empirical evidence linking ambidexterity and firm performance remains mixed. Junni et al. (2013), in their recent meta-analysis of ambidexterity research to date, found that exploitation was linked to profits whereas exploration was linked to growth, but they point out that it is not clear *when* and *how* ambidexterity affects firm performance. They recommend that future studies should consider multiple, fine-grained measures within specific industry contexts to further our understanding of the ambidexterity-performance relationship (Junni et al., 2013: 19).

In this study, I follow their recommendation by examining ambidexterity in the empirical context of the newspaper industry. This is an appropriate context for studying the relationship between ambidexterity and firm performance, given that newspaper firms over the past

1 I would like to thank an anonymous reviewer for pointing out the ambiguity of the word "simultaneously" – does it exclude a cyclical emphasis on exploration and exploitation over time? In their original 1996 article, Tushman & O'Reilly introduce the idea of the ambidextrous organization, where exploration and exploitation are undertaken at the same point in time by structurally independent units, each having its own processes, structures, and culture. In a later study, the authors specifically emphasized that ambidextrous organizations do not switch between exploration and exploitation – they do both simultaneously (Tushman et al., 2002: 9). However, in their 2013 review of the ambidexterity literature, O'Reilly and Tushman expand the concept to include the idea of sequential/temporal ambidexterity, which suggests firms may in fact shift their emphasis between exploration and exploitation over time. I would add that this issue might be dependent on the level of analysis. At the level of the firm, a structural separation of organizational resources may allow for simultaneous exploration and exploration. However, this may not be feasible at lower levels of analysis – i.e., for individuals. See, for example, Gupta et al. (2006: 698), who argue that exploration and exploitation should be conceptualized as mutually exclusive when confined to a single domain (i.e., individual or subsystem), and that individuals accordingly must shift their attention and efforts between exploration and exploitation over time.

Journal of Organization Design
JOD, 3(3): 27-37 (2014)
DOI: 10.7146/jod.18173
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two decades have embarked on a digital transformation of their business to explore the value potential offered by the Internet, social media, and mobile devices while relentlessly exploiting the legacy print business (Lawson-Borders, 2006; O'Reilly & Tushman, 2013; Quinn, 2005; Tameling & Broersma, 2013). I investigate whether recent advances in big data analytics – the process of collecting, organizing, and analyzing large sets of data to discover patterns and other useful information – may hold the power to untangle explore-exploit complexities, providing firms with real-time insights into the trade-offs between pursuing new and old business, and potentially reduce the risks and uncertainties involved in exploring dynamic business environments in particular.

The article is structured as follows. First, I systematically review past research on the newspaper industry to synthesize what we know about firm performance in the digital age. Three categories of potential causal factors emerge from this review: media convergence, organizational ambidexterity, and business model innovation. Next, I use these factors to develop a multi-dimensional conceptual framework of explore and exploit value chains in the newspaper industry. This allows for an in-depth examination of the relationship between ambidexterity and firm performance. The article concludes with a discussion of how this framework can be operationalized using big data analytics and derives implications for future ambidexterity research.

LITERATURE REVIEW: FIRM PERFORMANCE IN THE NEWSPAPER INDUSTRY

To identify relevant literature on firm performance in the newspaper industry, I used the EBSCO host database to conduct a systematic literature review by accessing Academic Search Elite, Business Source Alumni Edition, Business Source Complete, Communication & Mass Media Complete, eBook Collection (EBSCOhost), EconLit, ERIC, PsycARTICLES, PsycCRITIQUES, PsycEXTRA, PsycINFO, Regional Business News, and SocINDEX with Full Text. To ensure research quality, the search was limited to peer-reviewed scholarly journals published in English over the period 1994-2013. Table 1 is a summary of the search terms used and the number of articles found.

Table 1. Search terms used and number of articles found

Newspaper performance	*109*
Newspaper explore-exploit	*0*
Newspaper ambidexterity	*0*
Newspaper business	*235*
Newspaper innovation	*43*
Newspaper organization	*134*
Newspaper management	*84*
Newspaper multimedia	*23*
Newspaper convergence	*25*
Newspaper organization online	*4*
Newsroom management	*19*
Newsroom organization	*26*
Newsroom convergence	*51*

This search process yielded a total of 593 articles. When duplicates were removed, 358 articles remained. To identify articles that specifically focused on the newspaper industry, I examined each of the 358 articles for its industry context. The industry filter reduced the number of potentially relevant articles to 197. Each of those articles was content analyzed, looking at factors such as type of newspaper, firm performance, organization theories used for analysis, research methodology, empirical sample, and relevant findings (where applicable). The content analysis further reduced the sample of articles to 33 that specifically addressed firm performance in the context of the newspaper industry. The content analysis suggested three streams of research involving firm performance in the newspaper industry: media convergence, organizational ambidexterity, and business model innovation.

Media Convergence

One prominent media research stream concerns convergence – the integration of technologies, products, organizations, and business models among the previously distinct provinces of print, television, and online media. In the early 2000s, this stream of research theorized how integrated news organizations would provide superior news coverage and capture lucrative new audiences (Boczkowski, 2004; Deuze, 2004; Fioretti & Russ-Mohl, 2009; Kolodzy, 2006; Lawson-Borders, 2006; Quinn, 2005; Quinn & Filak, 2005; Singer, 2004). Much of the research focus has been on providing a normative, step-wise model to describe how newspaper firms can "become" convergent. Tameling and Broersma (2013), in their review of the convergence literature, note that the current research presents a "fuzzy picture of a confused profession," suggesting that convergence is not an end-goal for organizations but rather a continuous struggle to balance journalistic aims and profitability through a fundamental technological disruption. Legacy newspaper firms want to embrace the opportunities offered by digital technologies but have to "balance the certainties of their present business model with the uncertainties of a digital future" (Tameling & Broersma, 2013: 20). My review indicates that most convergence studies are found in the social sciences, rely on qualitative data, and offer limited insights into the specifics of newspaper firm performance – in particular, across print/online business domains. One notable exception is Graham and Greenhill (2013), who examined the influence of print/online convergence on the rate of print circulation change for 100 regional newspapers in the U.K. Their regression analysis suggested that established firms with premium pricing, multiple-platform distribution, and free online content had print circulations that declined less than other newspapers. Also, in a study of the relationship between organizational changes and performance in newspaper firms, van Weezel (2009) found that integration and outsourcing positively affect financial performance.

Organizational Ambidexterity

Ambidexterity suggests that the simultaneous exploration of new business opportunities and exploitation of existing businesses results in superior firm performance (Tushman & O'Reilly, 1996). Juggling new and old business is crucial for firm survival over time, but competition for attention and resources still means that explicit and implicit choices have to be made between new and old, as "exploration of new alternatives reduces the speed with which skills at existing ones are improved" (March, 1991: 72). A number of ambidexterity studies have used case studies from the newspaper industry as a context for studying the tensions between exploration and exploitation (Boumgarden, Nickerson, & Zenger, 2012; O'Reilly & Tushman, 2004, 2013; Tushman et al., 2002). These studies define the print business as exploitation and digital ventures as exploration. In one often-quoted case study, Tushman et al. (2002) examined how *USA Today*, a legacy newspaper firm, established an independent online operation in the mid-1990s to explore new business opportunities. Due to its poor performance, however, online was later integrated back into the parent print organization, where resources could be leveraged across explorative and exploitative domains. This case is used as an example of a successful ambidextrous organizational design and suggests that *USA Today* improved its performance as a result. It is not clear, however, how the ambidextrous organizational design specifically contributed to firm performance. Despite the proliferation of interest in the construct – including hundreds of empirical studies where ambidexterity has been positively linked with sales growth, subjective ratings of performance, innovation, and firm survival – the empirical evidence is still mixed. Junni et al. (2013), in their meta-analysis of 69 empirical studies, found that most of the empirical evidence to date was linked to subjective measures of performance through cross-sectional survey designs, and they recommend that future studies consider multiple performance measures and longitudinal data to further examine the mechanisms through which ambidexterity influences performance on multiple levels. Also, ambidexterity scholars are divided on whether exploitation and exploration involve "unavoidable tradeoffs" (March, 1991) or if the two factors are orthogonal to each other and firms can choose to engage in high levels of both at the same time (Burton, Obel, & DeSanctis, 2011; Cao, Gedajlovic, & Zhang, 2009).

Business Model Innovation

A third stream of research on firm performance in the newspaper industry concerns business model innovation (Bakker, 2002; Carter, 2009; Eppler & Hoffmann, 2012; Holm, Günzel, & Ulhøi, 2013; Lewis, 2004; Sullivan, 2006; Tang et al., 2011). Disruptive technologies, such as the Internet, have triggered changes in the prevailing business models of newspaper firms. The case studies of two Danish newspaper firms showed these incumbents "opening" their business models to ideas from outside the company or even the industry (Holm et al., 2013). The flipside of openness is increased complexity and involves a number of trade-offs, as more openness can help drive innovation and diversify revenue streams, but it also makes a firm more dependent on third parties. Although this study is well done, it does not address a key issue for legacy newspaper firms – namely that of managing two or more possibly conflicting business models simultaneously (Markides, 2013), and how this balancing act affects total firm performance. Difficulties in operationalizing the business model concept have led to its being used inconsistently, even as it has been applied to a wide range of situations (Harren, 2012; Holm et al., 2013). One notable exception is Tang et al. (2011) who examined how investment in "bricks" (i.e., the newsroom staff and resources that produce news content) helps build "clicks" (i.e., more online visitors and, subsequently, online advertising revenue). The authors conducted an econometric analysis of 12 years of longitudinal data from one multi-channel newspaper. The findings show that the basic success of the online business model ("clicks") depends on the investment in newsroom resources ("bricks").

EXPLORE AND EXPLOIT VALUE CHAINS

In this section, I synthesize factors and arguments from media convergence, organizational ambidexterity, and business model innovation to develop a conceptual framework of explore and exploit value chains in the context of the newspaper industry. This framework allows for a discussion of the various relationships involving ambidexterity and their implications for firm performance.

In the digital era, performance management has expanded from using only financial indicators to include complex non-financial measures as well (Bititci et al., 2012). My literature review suggested a similar evolution of performance measures in the newspaper business. For newspaper companies, financial performance is based on a 200-year old business model in which revenues come from two main sources: sales and advertising. Newspaper sales ("circulation") are typically either subscription-based (home delivery) or single-copy sales (at newsstands). The estimated number of total readers typically determines the advertising rates. Conversely, digital revenues for newspaper firms are based almost solely on advertising: the more readers your online site (or other digital products) attract, the higher online ad rates you can charge. Online performance measures have evolved significantly from the advent of the Internet until today, from simple measures of online page impressions (how many times a web page is displayed by a hosting server) to complex measures involving the browsing patterns of individual online users on multiple digital platforms.

A resource-based view of the firm suggests that firm resources determine financial performance relative to the competition (Barney, 1991; Otto & Aier, 2013). Several studies have shown a positive correlation between key resources and revenues in the newspaper industry (Blankenburg, 1989; Cho, Thorson, & Lacy, 2004; Mantrala et al., 2007; Tang et al., 2011). To differentiate themselves from the competition, and attract large enough print and online audiences to sustain their business, newspaper firms make investments in key resources, which in turn produces high-quality content, which improves market penetration and yields higher revenues (Lacy, 1992). I propose that this basic financial performance model be updated to include factors associated with media convergence, organizational ambidexterity, and business model innovation.

First, consider factors suggested by the business model innovation literature. Holm et al. (2013) suggested that in the digital age, newspaper firms must manage the co-existence

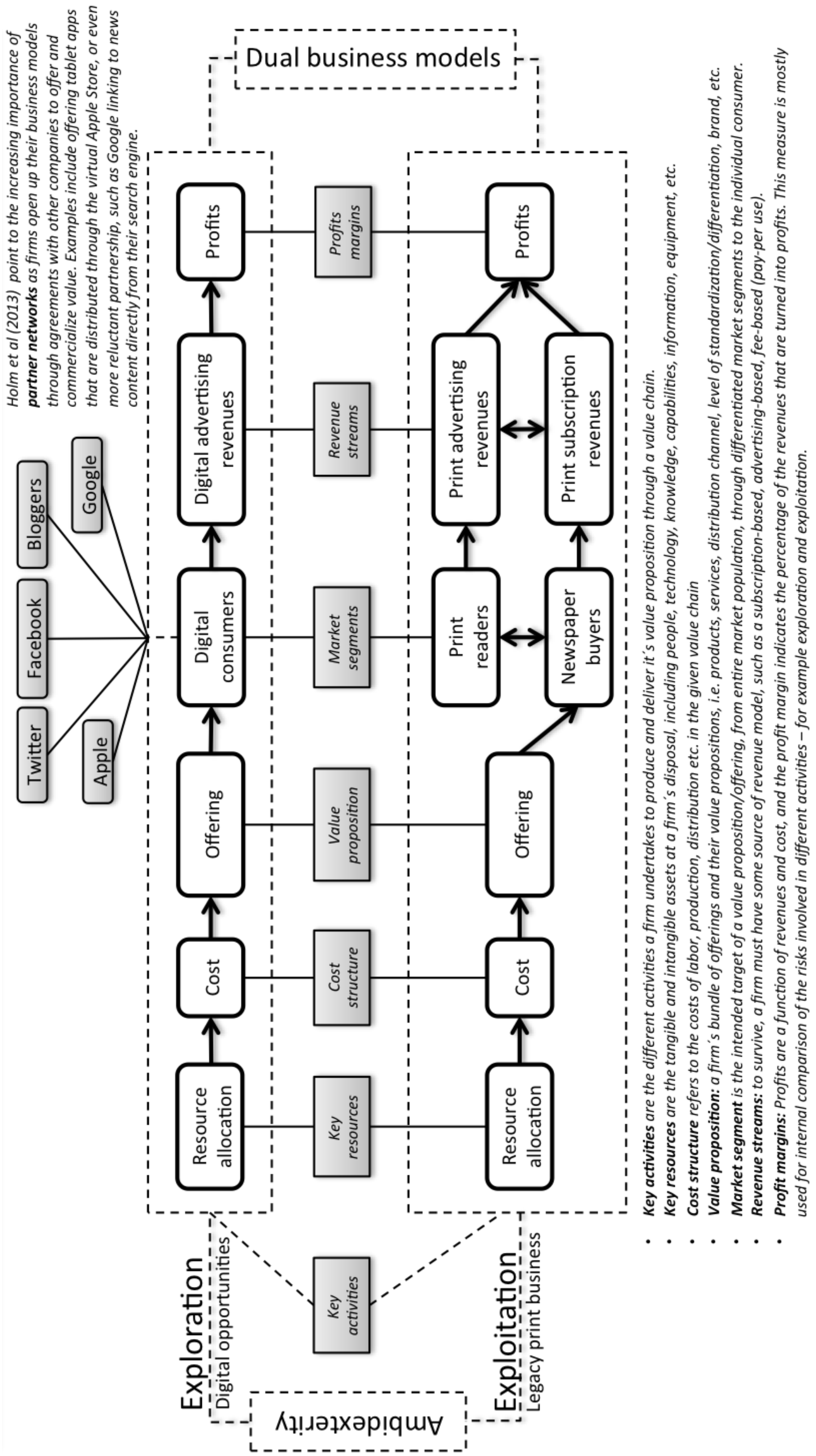

Fig. 1. Explore and exploit value chains

of their traditional print business model with emerging and potentially disruptive digital business models. They suggest that business model "building blocks" include key activities, key resources, cost structure, market/customer segments, and revenue model.

Second, consider the recent theoretical linkages between business model innovation and ambidexterity (Markides, 2013), particularly how the ambidexterity framework can be used to guide research in the industry and address the challenge of managing dual business models simultaneously.

Third, acknowledge the conflicting demands ambidexterity places on the explore and exploit value chains. These include allocating resources between explorative and exploitative activities; managing diverse product offerings across multiple market segments; and potentially cannibalizing returns from the subscription-based legacy business.

Fourth, consider the link between organizational ambidexterity and performance, where previous empirical studies have broadly linked exploration to growth and exploitation to profits, but how and when ambidexterity affects the firm's value chains remains unclear.

Consolidating all of these variables into a single conceptual framework leads to the multidimensional model of explore and exploit value chains shown in Figure 1. This model takes into account the argument that the ambidexterity dilemma is a "nested" issue (Birkinshaw & Gupta, 2013; March, 1991; Markides, 2013; O´Reilly & Tushman, 2013) that transpires at multiple levels in a firm and its ecosystem.

UNTANGLING AMBIDEXTERITY-FIRM PERFORMANCE COMPLEXITIES WITH BIG DATA ANALYTICS

The "ambidexterity premise" suggests that digital exploration and print exploitation can be aligned for superior performance, but this balancing act is complicated by differences in the distribution of costs and returns across the two value chains. Moreover, outcomes associated with digital exploration are more uncertain than the outcomes associated with print exploitation. I propose that big data analytics can help practitioners as well as researchers untangle these explore/exploit complexities. Big data analytics offers practitioners and scholars the opportunity to dynamically track and measure the outcomes of organizational strategies through two distinct but interrelated performance dimensions: "On the one hand, (big) data is used for the incremental improvement and optimisation of current business practices and services…On the other hand, new products and business models can be innovated based on the use of data" (Hartmann et al., 2014: 5).

There is already some empirical evidence linking big data analytics with firm productivity and profitability (e.g., McAfee & Brynjolfsson, 2012), but most of the research to date is anecdotal and case-based, leaving a research gap in regards to exactly how big data can improve firm performance. I propose that these two performance dimensions – optimization of current business and innovation in products and business models – can be framed through the theoretical lens of organizational ambidexterity. Such a framing allows for the use of well-established ideas and concepts from the ambidexterity literature, and it builds on existing industry-specific research to further our understanding of performance management in the era of big data analytics.

Big Data Implications for Exploration

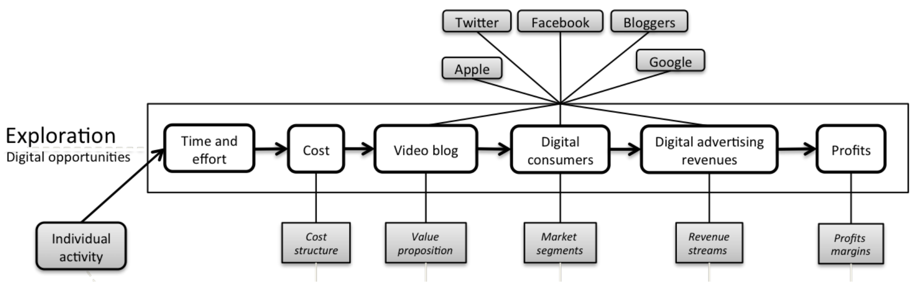

Fig. 2. Big data implications for digital exploration: access to ubiquitous, high velocity real-time data and continuous feedback mechanisms

Access to ubiquitous, high-velocity data allows for the continuous analysis of the micro-foundations of explorative activities as they "…evolve on a minute-to-minute, day-to-day basis, rather than being constrained to assessing snapshots such as quarterly inputs and outcomes or sales cycle trends" (George, Haas, & Pentland, 2014: 325). For example, in the newspaper industry, big data analytics could track in real-time the efforts of individual reporters creating different types of content (text, video, photos, blogs, etc.), thereby giving insights and continuous feedback into firm and individual productivity as well as the specific cost-structure of each piece of content as it is being produced. Such content objects could then be combined into a particular offering aimed at existing (exploitative) or new (explorative) market segments, which in turn may have very different revenue streams and profits.

The defining quality of big data is the granularity and the velocity of the data, which allows for the focus to shift from the number of resources (traditionally measured as FTE or full-time employees) to providing fine-grained, concurrent information about individual behavior, giving insights into the micro-foundations of organizational ambidexterity (Rogan & Mors, 2014) as well as allowing for real-time decision making (Galbraith, 2014). A whole range of advanced analytics can be used to gain further insights from big data, including A/B testing, cluster analysis, forecasting, data mining, visualization of large data sets, content analysis, and network analysis. For example, a reporter working for the legacy print newspaper could a spend a full workday experimenting with making a digital interactive video-blog for the web edition of the newspaper, which is subsequently shared on Facebook and Twitter. Through network analysis, it is possible to track in real-time how this particular blog is re-posted and viewed by individuals across social media. This information can then be combined with data from Google analytics to determine the exact amount of ad revenues this particular digital blog generates as it drives traffic to the newspaper web site. Through content analysis, A/B testing, and cluster analysis, it can be determined which blog framings or formats yield the most Twitter "re-tweets," or web-site traffic, but also which Facebook users generate the most story "shares" and "comments" through their individual networks. In another example, the reporter could engage in the recent trend of native advertising by writing sponsored stories (e.g., praising a particular product) which are then published online in a format very similar to an actual news story but in fact is a form of paid advertisement. This practice is quite controversial, as readers sometimes have a hard time telling the difference between sponsored stories and "the real thing." At the firm level, there is also the danger of losing credibility by engaging in paid journalism, but that cost may be outweighed by the potential ad revenues generated from the native ads. Through big data analytics, the impact of such explorative ventures can be tracked in real-time.

Big data analytics thusly offers the ability to link resource allocation, cost structure, value proposition, market segments, revenue streams, and profits (see Figure 2) – and, as indicated in the example above, give feedback regarding the return on investment of a full day´s work on making a digital story. For firm management, such individual data can then be aggregated to assess the viability of explorative ventures and thereby systematically reduce the risk and uncertainty involved in digital exploration, making the returns on alternative resource investments more predictable. The rich data also allows for the examination of "outliers" that may represent the innovation frontier (George et al., 2014).

Big Data Implications for Exploitation

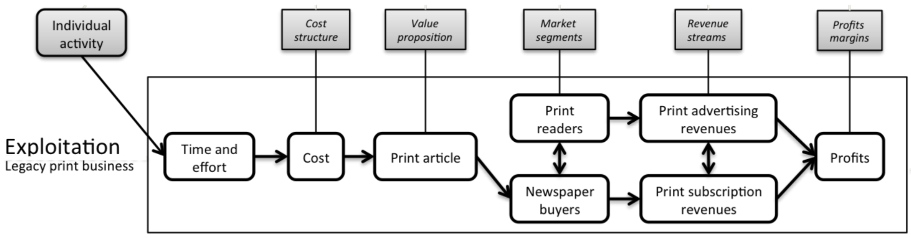

Fig. 3. Big data implications for print exploitation: Limited access to sample-based, low-velocity data with limited feedback

Paradoxically, the richness of real-time insights into the effects of digital exploration may actually complicate decision making in the legacy (print) part of the business, where the available performance data remains largely static, and events traditionally unfold at a much slower pace. Even though resource allocation, productivity, and cost structures presumably can be measured in real-time in the exploitative value chain, tracking and measuring market performance of the printed offerings in real-time is not possible. Instead, that is done through surveys of representative samples of individuals from different market segments to assess if they have read the newspaper or particular sections of it such as advertisements. Such surveys are conducted at regular intervals and are representative of the general population as such, and they allow for comparison to competing products as well as the identification of general trends and average tendencies.

Similarly, the revenue streams from the print business are often based on long-term, pre-paid subscriptions. Print advertisers traditionally commit to buying large volumes of advertising space in the printed newspaper, often a year at a time. In the digital space, in contrast, advertisers may literally bid for advertising space in real-time as an attractive consumer is loading a web page on an online news site. The slower velocity of the data from print exploitation implies that there is no direct linkage and feedback mechanism between individual effort and effect. If we return to the example of the print reporter who spent a full workday making a digital interactive blog or a native advertisement, then let´s assume this effort came at the cost of him or her making one less story for the printed newspaper. The incremental effect of this on the print side of the business may be tricky to measure. Most likely, another print story took its place, and newspaper readers are none the wiser for it – unless they discovered the interactive blog and decided to spend their time reading it instead of the printed newspaper.[2]

The arguments above suggest that when considering the context of the newspaper industry, big data analytics holds the power to reverse the logic of the explore/exploit framework (March, 1991) by actually making returns from experimentation with new digital opportunities more positive, proximate, and predictable. Conversely, the returns from exploiting the existing print business have become more uncertain, distant, and often negative. The process is modeled in Figure 3.

SUMMARY AND RECOMMENDATIONS

The purpose of this study was to address the gap in our understanding of when and how ambidexterity creates value for firms. Synthesizing arguments from theories of media convergence, organizational ambidexterity, and business model innovation, I proposed a value chain framework that allows for a more in-depth understanding of the interrelations between exploration and exploitation. The empirical evidence to date suggests that ambidexterity (the simultaneous pursuit of print exploitation and digital exploration in the newspaper industry) is linked to superior firm performance, but this evidence is based mostly on subjective measures of financial performance. My model allows for a more granular analysis of when and how ambidexterity affects firm performance in the context of the newspaper industry. Previous ambidexterity studies have shown that exploration is linked to growth whereas exploitation is linked to profits. I go beyond these arguments, furthering our understanding of the interaction mechanisms between six dimensions of the explore/exploit value chains: resource allocation, cost structure, value proposition, market performance, revenues, and profits.

I would like to see future empirical studies use big data analytics to test the proposed model on both the individual and firm level of analysis (e.g., by means of A/B testing). It would be useful to examine how the ambidexterity-performance link is moderated on the firm level by alternative resource allocations. For example, what are the specific performance implications of having individuals divide their time between print exploitation and digital exploration, as opposed to specializing in one or the other? Also, what are the firm performance implications

2 I would like to thank an anonymous reviewer for pointing out that the blog and the print story need not be substitutes, but rather that the writing of the blog might subsequently lead to the reporter writing a better print story. That is, the two might potentially be complementary. If so, a given investment or action might yield positive returns in both the explorative and exploitative value chains. This is a good example of how insights from big data analytics could have theoretical implications for the ambidexterity concept.

of investing in content creators versus advertising/sales resources, web traffic managers, pricing specialists, conversion rate optimization experts, or data scientists? What is the distribution of costs and returns of such alternative resource investments over time?

Big data analytics offers the opportunity to consider the micro-foundations of both ambidexterity strategies and activity by allowing for the examination of how business opportunities are exploited and/or explored in real-time as well as longitudinally. However, I would argue that the *sine qua non* of big data analytics is the potential to move ambidexterity research beyond its current focus on survey-based industry studies and selected case studies (which yield a great deal of detail but offer limited generalizability) towards more rigorous research designs where voluminous and diverse sources of data from multiple time-periods are analyzed to find patterns that our current theoretical models cannot.

O'Reilly and Tushman (2013) note that as the innovation frontier increasingly moves outside incumbent firms, the explore/exploit balancing act becomes more complex. In the context of the newspaper industry, the logic of open innovation is fundamentally different from the traditional business paradigm that has sustained the newspaper industry for almost three centuries. Future studies should consider how both incremental and disruptive innovations are distributed in the larger ecosystems in which firms reside. And, as George et al. (2014) point out, once such correlative linking patterns are identified, the next big data challenge is to explore causality. Hopefully, the model proposed here offers a theoretical and operational starting point for future studies investigating the impact of ambidexterity as well as big data analytics on multiple levels, from the individual and organization to the larger industrial context.

REFERENCES

Bakker P. 2002. Free daily newspapers – business models and strategies. *International Journal of Media Management* 4(3): 180-187.

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

Birkinshaw J, Gupta K. 2013. Clarifying the distinctive contribution of ambidexterity to the field of organization studies. *Academy of Management Perspectives* 27: 287-298.

Bititci U, Garengo P, Dörfler V, Nudurupati S. 2012. Performance measurement: Challenges for tomorrow. *International Journal of Management Reviews* 14(3): 305-327.

Blankenburg WB. 1989. Newspaper scale and newspaper expenditures. *Newspaper Research Journal* 10: 97–103.

Boczkowski PJ. 2004. *Digitizing the News: Innovation in Online Newspapers*. The MIT Press, Cambridge, MA.

Boumgarden P, Nickerson J, Zenger TR. 2012. Sailing into the wind: Exploring the relationships among ambidexterity, vacillation and organizational performance. *Strategic Management Journal* 33: 587-610.

Burton RM, Obel B, DeSanctis G. 2011. *Organizational Design: A Step-by-Step Approach*. Cambridge University Press, New York, NY.

Cao Q, Gedajlovic E, Zhang H. 2009. Unpacking organizational ambidexterity: Dimensions, contingencies and synergistic effects. *Organization Science* 20: 781-796.

Carter AY. 2009. Global perspective: Seeking a new business model for newspapers. *Journal of Communications Research* 4(2): 80-92.

Cho S, Thorson E, Lacy S. 2004. Increased circulation follows investments in newsrooms. *Newspaper Research Journal* 25(4): 26–39.

Deuze M. 2004. What is multimedia journalism? *Journalism Studies* 5(2): 139-152.

Eppler MJ, Hoffmann F. 2012. Does method matter?: An experiment on collaborative business model idea generation in teams. *Innovation: Management, Policy & Practice* 14(2): 217-232.

Fioretti N, Russ-Mohl S (eds). 2009. *Merging Media, Converging Newsrooms*. Giampiero Casagrande Editore, Lugano, Italy.

Galbraith JR. 2014. Organizational design challenges resulting from big data. *Journal of Organization Design* 3(1): 2-13.

George G, Haas M, Pentland A. 2014. From the editors: Big data and management. *Academy of Management Journal* 57(2): 321-326.

Graham G, Greenhill A. 2013. Exploring interaction: Print and online news media synergies. *Internet Research* 23(1): 89-108.

Harren H. 2012. Management of multiple business models: Determining the optimal organizational strategy. Unpublished Doctoral Dissertation, Technical University of Berlin.

Hartmann PM, Zaki M, Feldmann N, Neely A. 2014. Big data for big business? A taxonomy of data-driven business models used by start-up firms. Working Paper, Cambridge Service Alliance.

Holm AB, Günzel F, Ulhøi JP. 2013. Openness in innovation and business models: Lessons from the newspaper industry. *International Journal of Technology Management* 61(3/4): 324–348.

Junni P, Sarala M, Rikka TV, Tarba SY. 2013. Organizational ambidexterity and performance: A meta-analysis. *Academy of Management Perspectives* 27(4): 299-312.

Kolodzy J. 2006. *Convergence Journalism: Writing and Reporting across the News Media*. Rowman and Littlefield, Lanham, MD.

Lacy S. 1992. The financial commitment approach to news media competition. *Journal of Media Economics* 5(2): 5–21.

Lawson-Borders G. 2006. *Media Organizations and Convergence: Case Studies of Media Convergence Pioneers*. Lawrence Erlbaum, Mahwah, NJ.

Lewis KJ. 2004. Australian newspapers online: Four business models revisited. Media International Australia Incorporating Culture and Policy. *Quarterly Journal of Media Research and Resources* 111: 131-144.

Mantrala MK, Naik P, Sridhar S, Thorson E. 2007. Uphill or downhill? Locating your firm on a profit function. *Journal of Marketing* 71(2): 27–43.

March J. 1991. Exploration and exploitation in organizational learning. *Organization Science* 2: 71-87.

Markides C. 2013. Business model innovation: What can the ambidexterity literature teach us? *Academy of Management Perspectives* 27(4): 311-323.

McAfee A, Brynjolfsson E. 2012. Big data: The management revolution. *Harvard Business Review* 10 (October).

O'Reilly CA, Tushman ML. 2004. The ambidextrous organization. *Harvard Business Review* April: 74-83.

O'Reilly CA, Tushman ML. 2013. Organizational ambidexterity: Past, present, and future. *Academy of Management Perspectives* 27(4): 324-338.

Otto B, Aier S. 2013. Business models in the data economy: A case study from the business partner data domain. *Proceedings* of the 11th International Conference on Wirtschaftsinformatik (WI 2013) 1: 475–489.

Quinn S. 2005. Convergence's fundamental question. *Journalism Studies* 6(1): 29–38.

Quinn S, Filak VF (eds.). 2005. *Convergent Journalism: An Introduction*. Elsevier, Burlington, MA.

Raisch S, Birkinshaw J. 2008. Organizational ambidexterity: Antecedents, outcomes, and moderators. *Journal of Management* 34: 375-409.

Rogan M, Mors ML. 2014. A network perspective on individual level ambidexterity in organizations. *Organization Science* 25: 1860-1877.

Singer JB. 2004. More than ink-stained wretches: The re-socialization of print journalists in converged newsrooms. *Journalism and Mass Communication Quarterly* 8(4): 838–856.

Sullivan D. 2006. Business service model promotes better newspapers. *Newspaper Research Journal* Fall 2006.

Tameling K, Broersma M. 2013. De-converging the newsroom: Strategies for newsroom change and their influence on journalism practice. *International Communication Gazette* 75(1): 19-34.

Tang E, Sridhar S, Thorson E, Mantrala MK. 2011. The bricks that build the clicks: Newsroom investments and newspaper online performance. *International Journal of Media Management* 13(2): 107-128.

Tushman ML, O'Reilly CA. 1996. The ambidextrous organization: Managing evolutionary and revolutionary change. *California Management Review* 38: 1-23.

Tushman ML, Smith W, Wood R, Westerman G, O'Reilly, CA. 2002. Innovation streams and ambidextrous organizational designs: On building dynamic capabilities. Working Paper 03-106, Harvard Business School, Boston, MA.

van Weezel A. 2009. Organizational changes in newspaper firms and their relation to performance. *International Journal of Media Management* 11(3-4): 144-152.

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