

Digitalization of Knowledge Development in the Media Industry

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Abstract: Disruption in the global media and publishing industry is prevalent due to digitalization and new business models. The Scandinavian media market have already for a decade experienced disruptive technology and digital changes. The old highly profitable two-sided business model of both selling newspapers and adds has evaporated. Remaining is a freemium or even worse – a free content and a small margin from selling online advertisements. To compensate for revenue reduction the media organizations digitalize, and consequently have made a lot of media workers redundant. To create competitive advantage in this digital landscape, the players in the media industry needs to utilize big data analytics to make better decisions and to learn. It requires media organizations to gather, process, and act on a lot of information by combining digital multisided platforms. To know customer preferences and behavior there is a strong need to analyze, learn and explore rich information sources. They also need to be better at knowledge management to transform insight from data to organizational changes. To date there is limited empirical research detailing this learning process involving big data analytics and knowledge management. We offer insight from a case study of one of Norway’s larger publishing houses, with ownership in several newspapers and online media platforms. The case study was conducted during 2021 and is based on 10 different interviews with newspaper editors, journalists, commercial managers, and business analysts. Learning is an essential part of developing dynamic capabilities and this study is built on frameworks developed on knowledge development by applying the 4I organizational learning framework as an analytical lens. Our findings reveal important triggers and barriers for use of digital analytical tools and organizational learning processes. Especially intuiting, by providing more granularity to this dimension of the 4I framework corresponding better to the contemporary digitalized organizational reality. From this in-depth study of big data we gain insight into organizational learning from the intuition process. What triggers information retrieval can be categorized in three different areas: Strategic, Development and Cooperative aspects. In terms of strategic, availability of analytical tools is a crucial factor for a data-driven publishing business. From a development perspective, hypothesis-testing, developing new business models and new services is the core of big data analytics. The last dimension identified is cooperation as it is easier to find a common ground and direction for the organization. Big data analytics creates a coordination element in the organization. Although big data is a frequent business concept, relatively few articles address the challenges of using business analytical tools for understanding how organizations convert knowledge and learn and from big data.

Keywords: knowledge management, big data, learning, media industry

1. Introduction

The Scandinavian media market have already for a decade experienced disruptive digital technology. The old highly profitable two-sided business model of both selling newspapers and adds has evaporated. Remaining is a freemium or even worse – a free content and a small margin from selling online advertisements. To compensate for revenue reduction the media organizations digitalize, and consequently have made a lot of media workers redundant. To create competitive advantage in this digital landscape, the players in the media industry needs to utilize big data analytics to make better decisions and to learn. Media organizations must gather, process, and act on a lot of information by combining digital multisided platforms. They also need to be better at knowledge management to transform insight from big data to organizational changes. Although big data has now become a frequent business concept, relatively few articles address the challenges of using business analytical tools or explore the possibilities for new theory around big data (George et al., 2014; Vaio et al 2021). Therefore, several researchers in recent years have emphasized the importance of a deep dive into even softer aspects of business analysis (Constantiou & Kallinikos, 2015; Markus, 2015; Mikalef et al., 2018, p. 548). This is justified by the fact that it can help organizations better understand customers' behavior, abilities, and preferences in relation to the organization's own capabilities (Pappas et al., 2018).

Knowledge management places focus on knowledge as a key resource for the company, and how the distribution of knowledge can lead to a competitive advantage (Grant, 1996; Tsoukas, 1996; Crossan et al., 2011). Several researchers point to knowledge sharing and learning in organizations as an important source of innovation, and that routines and processes for creating, sharing, and using knowledge can create the basis for a potential non-replicable resource base. Therefore, the last decade's investment in big data and data analysis points to a need to better understand how these data sources and information can promote learning by individuals that subsequently foster organizational learning processes. Crossan et al. (1999) explained this multileveled learning process as achieved through 4 stages: Intuiting, Interpreting, Integrating and Institutionalizing. With respect to

increased need for improved understanding of the relation between organizational learning and big data analysis there is especially a need further investigation into what triggers intuition (Laney & Buytendijk, 2013; Jenkin, 2013, p. 97). In 2011, Vera, Crossan and Apaydin linked the various fields of theory together in an integrated framework. In the framework, Crossan et al. (2011) both the similarities between the different concepts, and the themes that are specific to the different concepts. In the middle, the researchers have chosen to emphasize "learning processes that form the basis for routines and resources". We have added technology as a fourth field of theory in the framework, which forms the context and background for the study.

Currently many organizations across several industries experience how digitalization (Vial, 2019) affect collaboration patterns and learning processes within their organizations. Our investigation into the Norwegian media corporations' transfer from business models based on advertising to user-based subscriptions – gathering, processing, and disseminating user-generated data has become an important part of editorial value creation and business development. We lean towards a comprehensive theoretical basis, with support in the 4I-model (Crossan et al., 1999). The model conceptualizes organizational learning as a multi-level dynamic process, spanning the individual, group, and organizational levels, including intuiting, interpreting, integrating and institutionalizing processes, as well as feedforward and feedback processes.

Our research question is: What is the role of digital analytical tools in knowledge management and how does it affect organizational learning?

We apply the 4I framework to identify, categorize and analyse which role analytic tools have in individual and collective learning, and its significance in terms of organizational learning processes through in-depth understanding of these how these learning processes unfold in the case of a large Norwegian media house. We determined three triggering mechanisms for information handling: 1) strategic, 2) development and 3) cooperative.

Theoretically this paper contributes with insight on how one of the largest Scandinavian media firms utilize big data analytics and how they handle information and search for new knowledge and learning. Based on this empirical case study we learn about how big data contributes to knowledge development. The study's empirical findings are based on ten interviews with editorial managers, journalists, commercial managers, and business developers of a Norwegian media group. The paper is divided in the following sections: Theoretical background, methodology, presentation of the findings and concluding discussion.

2. Theoretical background

Recent research has documented that there is no unambiguous definition of knowledge and knowledge management in an organizational context (Bibi et al, 2021; Serenko, 2022). Common to the various paradigms is that knowledge is broadly defined as either explicit or tacit (Nonaka & Takeuchi, 1995). The objectivist view of knowledge considers information and data as a discrete object that exists separately from humans, which in turn acquires knowledge and puts knowledge to life. Explicit knowledge can be easily formulated, disseminated, and therefore also made available. This perspective often conceptualizes knowledge sharing in a classical transmitter-receiver model, assume that explicit knowledge can be relatively easily applied in a new context (Hislop et al., 2013, p. 152). Critics of this view believe that codifying and storing knowledge in ICT-based repositories will not provide useful knowledge, as it depends on the person and organization using it. Therefore, practice-based perspective emphasizes that the sharing of knowledge requires that one actively derives and constructs meaning behind data from an interaction process. Collaborative tools, collective knowledge sharing, and networks are therefore central to practice-based ICT systems, which facilitate the distribution, sharing and active use of knowledge in an organization (Hislop et al., 2013, p. 166). The concept of tacit knowledge was introduced by Polanyi (1967), who argues that people often know more than they can easily express.

While some have argued that knowledge can only exist in individuals, several researchers highlight knowledge as a collective phenomenon in the form of shared routines, assumptions, perspectives, and values (Collins, 2007; Ebbers & Winjberg, 2009; Hecker, 2012; Razmerita et al., 2014; Hislop et al., 2013, p. 21). Spender (1996) is among those who early classified a collective level of knowledge on an equal footing with the individual (Hislop et al., 2013, p. 21). In his matrix, he divides knowledge into four generic types of knowledge: objective, collective, automatic and conscious. Objective knowledge represents explicit knowledge in groups, such as formal organizational routines or rules. Collective knowledge represents tacit knowledge in groups, such as informal

organizational routines or established norms. Automatic knowledge is silent, individual knowledge based on pure intuition, and is more challenging to formulate, explain and learn from. Conscious knowledge, on the other hand, is more explicitly individual knowledge that is easier to formulate and explain, and therefore also easier to acquire and share with others (Spender 1996; Hislop et al., 2013). This division allows us to better understand the collective mechanisms that occur in knowledge and learning processes between individuals in organizations. Knowledge sharing in organizations is a key research area as it can potentially contribute to a non-replicable resource and knowledge base (Carlile, 2004), an effect that has been strengthened in terms of digital development. Several key authors have argued for a more knowledge-based organizational theory that explains organizational competitive advantages (Ghoshal & Moran, 1996; Grant, 1996; Kogut & Zander, 1992; Crossan et al., 2011, p. 156).

3. Methodology

This research was constructed as an embedded case study, and aims at theoretical replication whereby different results are likely for theoretical reasons (Ridder, 2012). The case study was conducted during 2021 in Norway of one major player in the Norwegian media industry. Data from the interviews were coded and analyzed according to the major themes emerged in the interviews, and the material was analyzed within each theoretical area before cross-comparisons were undertaken to identify similarities and differences among the firms' initiatives. All the quotes from the interviews have been approved by the individuals interviewed, and quality checked, and additional information was added when necessary. Data collection and preliminary structuring were conducted by the two last authors during the spring 2021. We have divided our findings into three sections – according to the major themes that emerged in the interviews. They were all recruited by using the “Snow-ball” (Heckatorn, 2011) method, searching for reliable sources with appropriate expertise within their companies. This study is based on the ‘Gioia methodology’ (Gioia, Corley & Hamilton, 2013) developing first-order concepts from the interviews and extracting the most important insights from the first order insights to second-order insights. We have used a deductive orientation for interpreting data and grouped together information in second-order concepts.

We have conducted ten interviews with journalists, editors, business developers and analysts at both employee and management level in a Norwegian group company within media, technology, and digital growth, hereinafter referred to as the group. We have limited the study to the group's media investment at three respective media houses owned by the group, as well as some respondents with the group as employer. In our research phase, the informant presented the challenge of including more individuals and subject orientations in the work around digital business analysis in the organization. Regarding the group management's desire to anonymize the group - as well as competition considerations and considerations for the participants in the project - we have anonymized both the group, the media houses, and the respondents. The group management has not had access to the data material or the content of the study.

3.1 The research context

In the last 20 years, the group has experienced a strong shift from physical newspaper sales to digital cash flows - and extensive changes in competition conditions. Based on this, media houses have invested in business analytical tools and digital platforms with the aim of making analysis and presentation of user and market-based data available and simplified. The technology includes storage, processes, and sensors, and quantifies all data in contact with the company's digital business models across the organization's business units. The goal of the analysis tools is to turn data into insight, which in turn drives action based on a robust and understandable data set. Interactive dashboards, storytelling and insight sharing functions will thus help knowledge organizations' decisions and processes to become more data-driven (Tableau, 2020). The group has a pronounced focus on knowledge sharing and has also invested in digital tools that include communication, accounting, coordination, external statistics, decision making and business analysis. The company also has a goal that more individuals will be able to perceive, analyze and present data material in the development of new business models and digital cash flows. This applies not only to managers or group employees, but to a greater extent to editorial staff with areas of responsibility that do not necessarily involve analytical positions or responsibility for major strategic decisions. This vertical and horizontal knowledge and learning process will then form the basis for more and varied competence to be involved in further development and implementation of the company's strategy.

4. Empirical Findings

To answer the research question: What is the role of digital analytical tools in knowledge management and how does it affect organizational learning? We focus on analysis tools with focus on the intuition process in the 4I model presented by Crossan et al. (1999) at the individual level. A major challenge associated with analyzing learning processes on an intuitive level is its preverbal nature. To examine this process among the respondents, we asked respondents about their digital routines, routines related to information retrieval, motivational factors, and attitudes to various analysis tools. The findings presented below are identified based on the two dimensions Jenkin (2013) describes as triggers of information gathering; intention and mechanism.

4.1 Organizational learning with a focus on intuition processes

A key research question has been to further understand users' intuitive encounter with digital analysis tools in their search for new information and insights. This is done with the assumption that strategic decisions are made on an informative and up-to-date information basis, and that analysis tools today are an important tool for storing, retrieving, and presenting data as well as communicating and distributing an information need to several individuals.

4.1.1 Triggering factors for information retrieval

In the data material, we have identified three triggering factors that explain how the respondents intuitively seek out and use business analytical tools for information gathering: 1) strategic 2) development and 3) cooperative aspects. Here we will present some of the data material we base this claim on.

4.1.2 Strategic

The respondents seek out digital analysis tools mainly to learn more about the status of different target groups, user preferences and results related to various business initiatives to increase digital user revenue. One respondent describes that analysis tools are deeply integrated into work and learning routines, and that reaping learning from analysis tools is central to being able to pursue projects, initiatives, and processes further:

"It flows right into getting to learn and deciding a further path and what activities we are going to plan. It goes hand in hand with the work tasks (...). We need to see if we hit the target audience, the target, and generally look at whether our content is engaging" (R10).

Insight is described as an important reference point in the form of target figures, current status and analysis of measures and projects. This finding is reflected by other respondents, who also highlight digital analysis tools as a key source of learning, and an important starting point in product development and new business initiatives. Another editorial respondent who works as a journalist and group leader justifies this in a firm and stated strategy.

"For the editorial staff, it is very much related to this strategy for digital subscribers. A clear goal has been set for all houses to be digitally sustainable during 2021. So, it is tangible, both for us and for [the group]" (R7).

Availability of analysis tools and insights is a crucial factor for a data-driven development of editorial products and services. An editorial manager believes that number and data-driven assessments based on real-time data can contribute to creating added value for the customer and loyal subscriptions, through quantitative measures such as sales, customer dropout, coverage percentage, age distribution and gender distribution:

"SAS (airline) can provide "fast track" and "lounge", but what can we do to make them want to be with us? This is really what I use digital analysis for, and I immerse myself in it every single day" (R9).

However, this finding can be seen in contrast to respondents who are journalists, who state the scope of available tools and the possibilities as overwhelming. Although analysis tools have been made available with a call for active use and exploration, editorial respondents report lower use of analysis tools compared to editorial managers and commercial respondents. A respondent who works as a journalist state early in the interview that analysis tools are not a big part of everyday work:

"There are so many tools, so I do not keep up. We have switched to something called [analysis tool] now. I have not started with that at all, I must admit" (R8).

When asked what the respondent perceives as the underlying reasons for this, the answer is that the respondent does not experience clear guidelines on use and expectations related to his work tasks. At the same time, the respondent states that analysis tools are indirectly a larger part of everyday work through daily discourse:

"It is used when we go through the numbers at the morning meetings or in our group, where we often talk about how much sales we have (...). So, it's not like we're not dealing with this at all. But I as an individual probably use it very little in everyday life" (R8).

4.1.3 Development

While most of the respondents emphasize the opportunity to explore and find data and insights, several of the respondents also emphasize that product and concept development is an important intention for actively seeking new information. This largely applies to so-called hypothesis testing, where several of the group's digital products both originate from and are developed using tests using extensive data and analysis tools. One respondent elaborates that testing hypotheses can give an indication of potential in a development project, and is central to the development of new products and services:

"My working day consists very much of having a long portfolio of ideas and hypotheses on things we believe can create value, and then there are finding ways and strategies to validate these ideas and put them into action" (R1).

Another respondent (R4) with a background as a business developer also states the tools as an intuitive way to seek out already established hypotheses. At the same time, the respondent outlines a high threshold for implementing changes in the media houses' product portfolio. The strategy of data and insight as a distributor of decision-making authority is described as an important driver for innovation and business development:

"These are important changes that we are working on today, and we must prove hypotheses, changes, and sales processes in, for example, a regular article or our daily sales. If we make changes, it should be based on tests of tests. We must have data that supports the decisions we make" (R4).

An editor highlights a clear development related to individuals' everyday work considering the implementation of the data-driven strategy. In the past, decisions were often based on subjective strategic assessments, as opposed to numerical and data-driven assessments based on real-time and analytical data. When asked how organizations and individuals have related to analysis over time, the respondent talks about a clear development in line with the organization's strategy to become more data-driven:

"Before, we had several theories, and we got some confirmed as well. But it was often from the way we made paper newspapers; that the famous desk sat and decided what should be in print, what should be big and what should be small. Many of them had quite good "fingerspitzengefühl", but it was not analysis" (R9).

4.1.4 Cooperation

The latter identified intention, cooperatively, is reflected with greater consensus across subject orientations in the data material in comparison with strategic and development. Several respondents state that they use analysis tools to be able to communicate and collaborate across based on a common understanding. Analysis and insight have a central cooperative and collaborative role, as analytical tools and insight are a central source of learning and reference. When asked about a respondent's use of analysis tools, the respondent points out insights as an important means of gaining a foothold in various ideas and initiatives:

"I would say that they are the most convincing arguments, you cannot get anywhere without numbers. It is to get a breakthrough" (R1).

On the same question, an editorial respondent has a slightly different view of analysis tools considering common discourse and collaboration. The respondent describes the focus on numbers as occasionally alienating and as a learning barrier for parts of the editorial staff. The respondent believes that qualitative assessments and an editorial value base to a greater extent appeal to editorial staff:

"I have observed new managers who are very concerned about numbers, that it does something with the "standing" they get in parts of the editorial office. They may lose some people they could have brought with them if they had had another line of argument" (R7).

While analysts and business developers more often focus on parameters such as sales, distribution, and customer dropout, several of the editorial respondents emphasize more qualitative parameters such as societal relevance and impact. A respondent with an editorial background further describes both positive and negative aspects of basing editorial production on number-driven insights. The respondent states that a balance is needed between the use of quantitative and qualitative decision bases:

“We do not live in a bubble; we must be up to date on what people are interested in. Then I think it is good to follow, and it gives us good insight into what catches people. There is also the danger that you drop important cases, precisely because there are things that you think will generate higher numbers than by another parameter” (R8).

To the same question about intuitive use of analysis tools, another editorial respondent answers that there is great diversity in the arsenal of tools and the introduction of new digital aids. The respondent emphasizes that efforts to acquire new digital knowledge are extremely important, to be able to use the tools in line with their purpose:

“New tools are coming all the time. Both tools that can simplify the workflow and everyday work, but which can also be used to convey our content. Acquiring new digital knowledge continuously is extremely important, in the part of the organization that I am at least” (R2).

5. Discussion

To answer the research questions: “What is the role of digital analytical tools in knowledge management and how does it affect organizational learning?”, we have applied as an analytical lens the 4I model of Crossan et al. (1999). Based on Jenkin's (2013) recommendation to examine information gathering and digital tools in the light of the framework, we see that analysis tools have a prominent and varied role in the group, with both follow-up relationships and falsifications in organizational learning processes and level differences. Our findings related to the role of analysis tools in different parts of the 4I model support the recommendation to look further at an extension of the 4I model. We find findings in all learning processes that support the fact that information gathering, and analysis tools play a significant and increasingly important role in the group.

From this in-depth study in learning from big data systems we gain insight into organizational learning from the intuition process. What triggers information retrieval can be categorized in three different areas: Strategic, Development and Cooperative aspects. In terms of strategic, availability of analytical tools is a crucial factor for a data-driven publishing business. Both for editorial and business development recognizes the importance of having big data analytics available in their everyday work. From a development perspective, hypothesis-testing, developing new business models and new services is the core of big data analytics. The reliance on data is essential for making better business decisions. The last dimension identified is cooperation. Big data is a tool for greater consensus, as it is easier to find a common ground and direction for the organization. Big data analytics creates a coordination element in the organization.

6. Conclusion and future work

Our study contributes to a categorization and conceptualization of the role of analysis tools in organizational learning processes, and the individual's seeking role in organizational learning processes. By drawing on the significance that the tools have had on individuals' intuition and search process, collective discourse and strategic implications, the problem bridges the gap between digital exploration and organizational learning with the intention of forming a more thorough conceptual framework to understand both the role of analytical tools and their practical significance. Analytical tools have received a greater focus in the last decade, and several companies have realized that the data they own - and not least the way they use it - can contribute to competitive advantages (Pappas et al., 2018). As we explore the use of big data analytics within an organizational learning framework and include technology as a key factor and by highlighting the intuiting aspect – with focus at the individual level and their ability to comprehend the big data information and collaborate with technology. This has consequences for the Intuiting stage of the 4I framework. Further research should seek to identify organizational learning processes related to digital tool also at the other 3 stages of the 4I organizational learnings process, and in general seek to identify good organizational learning practices involving man-machine collaboration.

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