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Vesti, Helle; Rosenstand, Claus Andreas Foss; Gertsen, Frank

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Structured Literature Review of digital disruption literature

Helle Vesti

Aalborg Universitet, Rendsburggade 14, 9000 Aalborg, Denmark.
E-mail: hvesti0906@gmail.com

Claus Andreas Foss Rosenstand*

Aalborg Universitet, Rendsburggade 14, 9000 Aalborg, Denmark.
E-mail: cr@hum.aau.dk

Frank Gertsen

Aalborg University, Fibigerstraede 16, 9220 Aalborg, Denmark
E-mail: fgertsen@business.aau.dk

* Corresponding author

Abstract: Digital disruption is a term/phenomenon frequently appearing in innovation management literature. However, no academic consensus exists as to what it entails; conceptual nor theoretical. We use the SLR-method (Structured Literature Review) to investigate digital disruption literature. A SLR-study conducted in 2017 revealed some useful information on how disruption and digital disruption literature has developed over a specific period. However, this study was less representative of papers addressing digital disruption; which is the in-depth subject of this paper. To accommodate this, we intend to conduct a similar SLR-study assembling a body literature having digital disruption as the only common denominator.

Keywords: Digital disruption; structured literature review; SLR; digitalization; digital transformation; innovation management.

1. Investigating digital disruption

This research-in-progress paper is part of a collection of papers investigating digital disruption (Haase et. al., 2016; Rosenstand et. al., 2017; Gertsen & Tollestrup, 2017; Vesti et. al., 2017).

In our view, disruption refers to market-oriented disruption as described in the theory of disruptive innovation by Clayton Christensen (e.g. 1997). When disruptive processes, based on theoretical understanding, becomes fueled by digitalization, e.g. services or products being brought to market on digital platforms, services or products supported or created by digital tools, and consumed by digital users; then, digital disruption is at play (Vesti et. al., 2017, p. 2).

In the field of innovation management, the term "digital disruption" is frequently studied in contexts of what future challenges will be faced over the next 2-5 years regarding business models and digital strategies (Gassner, 2016; Hirt & Willmott, 2014; Karimi & Walter, 2015; Richardson, 2017; Weill & Woerner, 2016). Digital disruption is often defined along the mainlines of disruptive innovation theory combined with subjects like digital transformation, industry 4.0, or digital technologies with potency to cause disruption (Beardsley, 2018; Bernoff, 2013; Ford et. al., 2017; Herrmann et. al., 2018; Nielsen, Lund & Thomsen, 2017; Richardson, 2017). In academia no theory exists, nor a common consensus as to what digital disruption is and what it entails; except, perhaps the unclear definition: "Disruption in the digital domain" (Rosenstand et. al., 2017). It can be argued, that due to a level of inconsistency in definitions of digital disruption this is a crucial point to focus on - both in relation to the rapidly expanding digitization (Ismail, 2014; Kurzweil, 2005) and in relation to the field of innovation management.

Following Christensen's suggestion to "… integrate it [disruption theory (ed.)] with other perspectives" (Christensen et. al., 2015, p. 171) the authors has in a prior study discussed the global mega-trend of digitalization and argued that digitalization was a perspective to be integrated with the theory of disruptive innovation (Vesti et. al., 2017).

With intentions of looking into digitalization in relation to disruption theory a SLR-study was conducted in the winter of 2017. The study showed that the field of digital disruption is in a process of broadening out and the business appeal of the domain is slowly shifting to also incorporate technical and human science perspectives. Disruption in the digital domain covers themes in all industrial sectors; healthcare, logistics, retail, service and information, production, and entertainment industries etc. In addition to this; governmental, political, economic, social, and cultural areas were subjects discussed in relation to disruption in the digital domain (Kenney et. al., 2015; Schmidt and Cohen, 2010). The results from the study pointed to USA as the main contributor of disruption literature and to Asia[1] as the least contributing continent (Vesti et. al., 2017, p. 7-16).

Rethinking the scope of research

The scope of the study from 2017 included investigating both disruptive innovation theory as well as digital disruption; the latter being a relatively young concept and phenomenon within the academic field in contrast to the general theory of disruptive innovation. The statistical results in the study represented both papers on disruptive innovation theory as well as disruption in the digital domain which allowed us to deductively investigate how the literary field have developed over time. An in-depth analysis of the collected data allowed us to inductively investigate the literature. During this analysis we identified some theoretical papers that converged and somewhat overlapped with the digital domain.

In this study we have conducted a new SLR-study that speaks to research questions specific on digital disruption. By tweaking the research protocol and research questions we end up with a sharper research focus as well as a greater number of data-sources about digital disruption, creating representability as well as validity (Massaro et. al., 2016a, p. 771)

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[1] Information from graph showing continental distribution of contributions in the period 1985-2016 (Vesti et. al., 2017, p. 14)

We also aim to understand to what extent the definitions of digital disruption differ from one another and what percentage of papers/researchers consent on the definition of digital disruption.

Research questions

The following research questions are explored through the SLR to identify important aspects in the development of literature on digital disruption. In comparison to the prior SLR-study (2017) research question 1 to 4 are changed to only entail digital disruption while research questions 5 and 6 are new additions:

1. (RQ1): How has the digital disruption literature developed over time?
2. (RQ2): What is the research focus into digital disruption and how has this developed over the past 15 years?
3. (RQ3): Which methods are being utilized in research regarding digital disruption?
4. (RQ4): What are the most common denominators in applied definitions of digital disruption?
5. (RQ5): Where are the key contributors to digital disruption?
6. (RQ6): Has the field of digital disruption matured enough to develop a theoretical framework?

In this research in progress paper we address research question 4 and 5.

2. Methodology

This paper uses as mentioned a SLR method (Massaro et al., 2016a). An SLR is a method for studying a corpus of scholarly literature, to develop insights, critical reflections, future research paths, and research questions. It helps developing knowledge by connecting new research with the past. According to Light and Pillemer (1984, p. 169) "the need for a new study is not as great as the need for the assimilation of already existing studies". This idea has been more poetically expressed by great thinkers such as Bernard of Chartres and Isaac Newton: "If I have seen further it is by standing on the shoulders of giants[1]". In this spirit of scholarly discovery; therefore, SLRs contribute to developing research paths and questions by providing a foundation on which to build on prior discoveries. SLRs are a method that incorporates the latest research technologies for conducting a literature review. The SLR method complements traditional literature reviews because the approach helps to yield different outcomes that are defensible. We apply statistical method revealing other or alternatively strengthen existing findings. We argue that an assimilation of existing studies may provide new or other nuances to existing knowledge of how digital perspectives, cases, and technologies are being utilized, discussed, and researched in relation to digital disruption.

This paper utilizes the same SLR methodology as the beforementioned study conducted (c.f. 1. Investigating digital disruption). The main differentiators from the prior study are the following:
- An altered research-protocol and slightly alternated analytical framework
- Four reformulated and two new research questions

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[1] Letter to Robert Hooke (15 February 1676).

- One extra academic search-engine: Aalborg University Library (AUB)

In the planning phase of the SLR a research-matrix has been developed as an analytical framework to secure that a systematic approach was taken when gathering digital disruption literature. In Table 1 this is presented along with priority assessments designed to group all papers accordingly.

Table 1 Analytical framework

A. Parameters	A.1 Specifications/variables
Bibliographical/Source-info:	
• Ratings:	Journal ratings
• Journal/Publisher:	Where the article is published
• Year:	Year published
• Country/Region:	Origin of the source of data used in the research/
	Country first author affiliated to
Applied method:	Action research, intervention research
	Case study, non-intervention
	Conceptual paper
	Critique
	Discourse analysis
	Interviews qualitative
	Literature review
	Mixed methods
	Multi-case study
	Other
	Panel data or similar quantitative study
	Survey, questionnaire
Domain/area of interest:	Emerging markets
	Health sector
	Institutions and society
	Large-corporate
	Other
	Public-sector
	Start-ups
Reference:	Primary
	Secondary
Definition:	Defines digital disruption
	Converging definitions
	None

Field-perspective on Digital disruption:	Start-ups Business and management Computer Science Cultural industries Design thinking Education Engineering and production Government, society, politics Health science Humanities Innovation and entrepreneurship Other
Theme of research:	Advantage through digitalizing Creating frameworks, models and techniques Entrant / Incumbent Digital business cases Digital business model Digital consequences Digital technology examples Digital transformation Hardware examples Price-performance Relation between digital and disruption Relation between scale and digital Relation between digital and scale Research questions Supply / demand

Data collection and processing

To ensure a rigorous and exhaustive literature review the research group collected a dense set of data related to search key-words. This first step ensured that the first 25 page-hits of Google Scholar as well as all hits revealed in AUB search engine were scrutinized. After this, combinations of the two root and variations of these were searched with the criteria of choosing papers being that root A and B (c.f. Table 2) are chained, all sources where allowed to include varied articulations of root A + B e.g. "digitization disrupting the (...) industry".

Considering the lack of citations recorded on recent papers (before 2016) the citation-count has not been a valid priority criterion for this study. Most relevant papers have appeared during 2017 and 2018 and some are still research in progress papers being peer-review. By looking only at journal rankings and excluding the citation criterion, we have less information on variables such as impact-factor to assess qualification from which may, in theory, decrease validity and reliability of the study. To accommodate this, the criterion of papers having references to primary or secondary sources is added. To make sure that papers based on the newest research that may contain interesting discussions or other nuances to digital disruption but does not have either journal ranking nor valid references, gets a chance of being coded, we add a last priority assessment stating that "digital disruption" is consistently applied throughout the paper (and not just in the heading and abstracts).

This generated a large set of data varying from literature reviews, interviews, panel surveys, case studies, and more. The total number of papers and books that went into the SLR research protocol is 103 with a publication cut at April 2018.

Table 2 Data assessment through construct validity

A. Parameters *B.1 Specifications/variables*

Rules in applying key-words and combinations in data-collection:

Root/Constant[1] (A)	Root/Constant (B)	Addition/area of interest to A+B
Digitization	Disruption*	(Concrete) *-field/domain* *-technology* *-business(model)* *-system* (Abstract) *-process* *-transformation* *-growth* *-scale*
Alterations of A	**Alterations of B**	
Digitize Digitally Digital*	Disrupt Disruptive Disrupting	--"--

*Highly prioritized search-combination

Priority assessments for input NVivo;

1st priority assessment: Journal rankings[2]; (ABS: 1-4*/ABDC: C-A*/Den17: 1-2)

Primary or secondary references present[3]. Primary: e.g. Christensen (1995, 1997, 2003) Henderson (2006), Adner (2006) etc./Secondary: e.g. Karimi & Walter (2015), Bolden & O´Regan (2016).

2nd priority assessment: If none of the priority assessments present, then quick-coding needs to detect *five or higher* mentions of roots – needs to have a balanced distribution.

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[1] The rule of the *constant* is that it must be present in every search combination of key-words in Google Scholar, considering that searching between additional keywords such as digital, innovation and technologies would generate too many papers not related to disruption theory.
[2] Obtained from Harzing.com 52nd edition, February 2014.
[3] Primary references to disruption theory is Christensen and Henderson primarily. This could also be other central contributors to the theory by Christensen. Secondary references are to be understood as papers regarding digital disruption that contains a reference to either one of the highest rated papers (either disruption theory or disruption in the digital domain) of the data-protocol of the prior SLR-study (Vesti et. al., 2017).
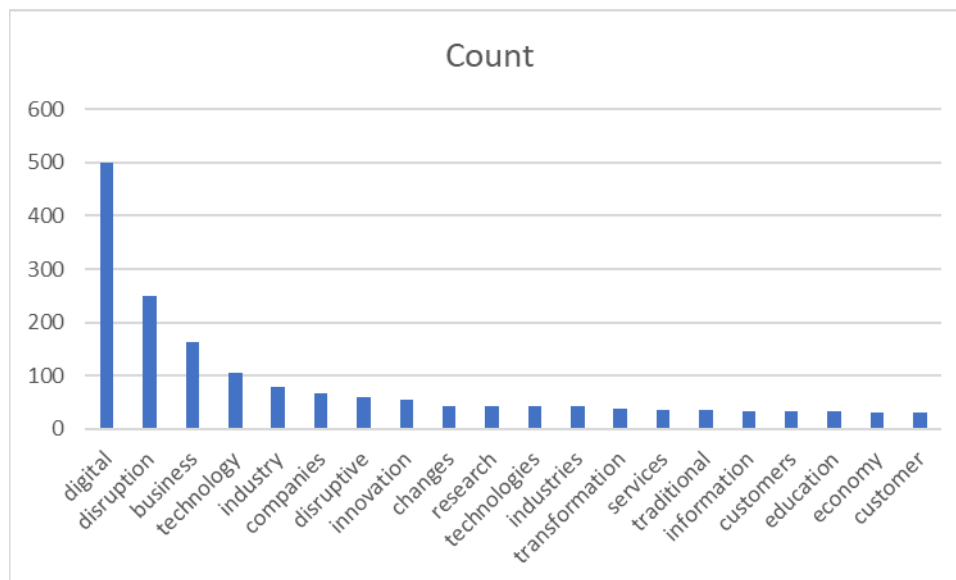
The research-process is divided into four stages; in the first stage the analytical framework and research protocol is constructed (Table 1). The second stage consists of a structured literature search. In the third stage, all the collected literature goes through a prioritization and assessment process (Table 2). The papers are then imported to the software NVivo for coding. In the fourth stage visual representations of data are created followed by analytical tabulation and a discussion of the results. All sources of data are restricted to articles and books of academic interest.

Naturally, the choice of using SLR which entails a strict research framework and protocol limit literature findings to only entail literature that has explicit references to digital disruption. This methodological approach has been assessed to be the most effective when investigating a phenomenon or concept; our first paper was emphasized on gathering the highest rated/most popular and most cited works regarding disruption theory and disruption in the digital domain in academia.

3. Insights and results in process

In this chapter we evaluate the findings of the research process so far. We discuss research question 4 and 5 plus additional findings, which might impact the analytical framework (c.f. Table 1).

(RQ4): What are the most common denominators in applied definitions of digital disruption?

Figure 1: A word-cloud created from query run by NVivo. Specifications are: "Most frequently used words in: Headlines, abstract and keyword-sections" (size indicates frequency, 103 papers coded in total)

Figure 2: Top 20 frequent words and counts from 103 papers.

Figure 2 display the top 20 most frequently used words and counts. All papers seem to have a frequent point of departure in technology and innovation management. The types of domains vary among *software development, healthcare, finance, education, logistics, digital media entertainment, marketing, service, information,* and *retail.* Besides from digital and disruption, the words *business, technology, industry, innovation,* and *changes* are the top 5 most mentioned which substantiates the relevance for further development onto digital disruption literature (theoretical frameworks, concepts, definitions) regarding the scientific field of innovation management. *(Digital)Transformation, information* and *costumers* are also central words to mark regarding digital disruption research. Disruptive + innovation as well as *traditional* and *costumers* are also frequently reoccurring words in a majority of collected papers, this also matches a measurement of 42% digital disruption papers having primary references to the theory of disruptive innovation.

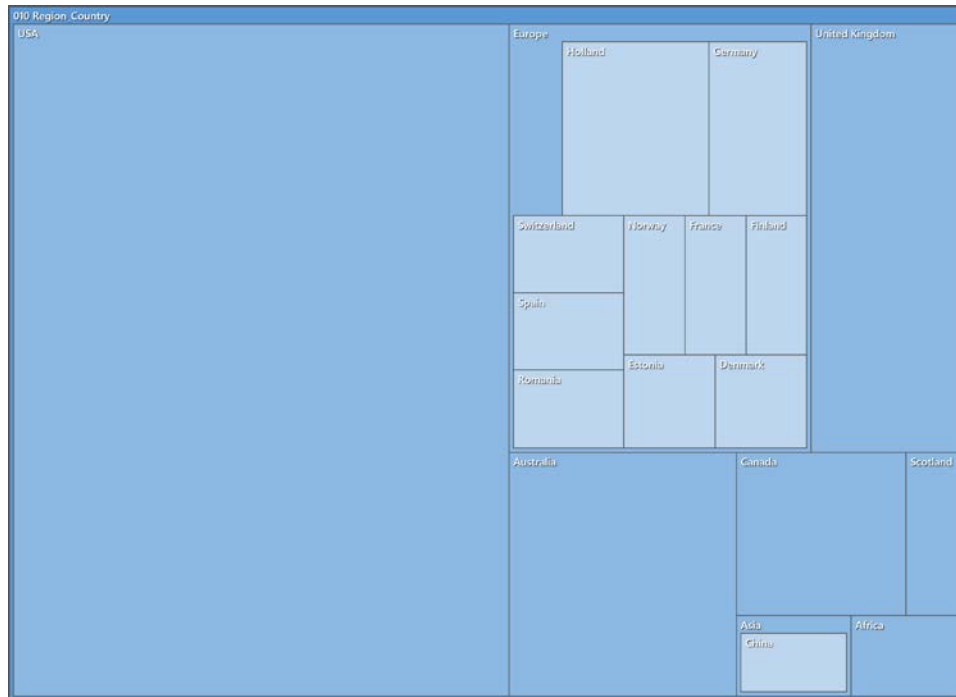*(RQ5): Where are the key contributors to digital disruption?*

Figure 3: Chart displaying hierarchical order 103 papers based on Regions / Countries.

As we see in the chart (Figure 3), the new research has revealed that China is currently represented which was not the case in the last SLR (Vesti et.al., 2017). We also see that Scotland has become part of the contribution group to digital disruption literature. Both mentioned countries are not majorly represented but represented none the less. Out of the 70 papers added 89% is published/research-in-progress as of 2016-2018 (cut at 1st of March).

Like the findings from the last study, USA is the dominating contributor to literature regarding digital disruption. However, the statistical results from the last study reflected both contributing countries to disruptive innovation theory as well as digital disruption; some papers where in the converging zone of the two (describing somewhat disruption in the digital domain). Because of this, we argued that it may have been a misleading result, and that the main reason for the status of USA could be caused by Clayton Christensen´s affiliation to Harvard University. Based on our recent findings we can now assess with higher certainty that USA is the dominating contributing country to literature specific regarding digital disruption.

Additional findings

What we also discovered one paper used digital disruption in a theological context (Baker, 2017). Another newly discovered domain/area of interest in the context of digital disruption was the fashion industry (Allen, 2013) and papers where digital disruption is applied to cases dealing with problem areas connected to entire countries/continents (Muk, 2014; Tohmatsu, 2012). In addition to these domains dealing with job search and recruiting have also been added to the list (Joyce, 2016; Bradley et. al., 2015).

One coding-session revealed that digital disruption often is applied as a term describing any type of change or disturbance connected to digitization/digital transformation in general – often with emphasis on specific digital technologies and what role they play in creating this disturbance.

Findings in this study also substantiates the statement that digital disruption is rarely framed as a study per say; the findings from our recent coding session shows, that the term is frequently partaking in definitions on other scientific areas of interest rather than playing the leading role. Based on such findings, we can, so far, assess, that most researchers are discussing cases of what they understand to be digital disruption rather than focusing on establishing a more universally applicable definition based on a consensual understanding. We have observed a growing tendency of using digital disruption as a common term in many scientific papers without having established some sort of common consensus (among other researchers) as to what it is and what it means. With more papers dealing with the subject of digital disruption being published in various fields and domains this tendency makes opinions and definitions more divided and therefore gives us more of a reason to propose a broader applicable definition on what digital disruption is.

4. Areas for feedback

- What additional methodologies can support our interest in founding a new theory on disruptive innovation? Is the SLR a good choice still?
- Are there other search engines fitting for this type of study?
- How can we approach the vastness of the area in a structured way? Do we need more loose or strict research protocol to capture literature of relevance (specifically to the field of innovation management)?

5. Literature

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