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# Developing a research agenda for digital Accessibility in Multinational Enterprises

Andreas Deitmer ([andreas.deitmer@iscte-iul.pt](mailto:andreas.deitmer@iscte-iul.pt))

Instituto Universitário de Lisboa (ISCTE-IUL), Lisboa, Portugal  
Technische Hochschule Mittelhessen (THM) - University of Applied Sciences,  
BliZ - Study Centre for Blind and Visually Impaired Students (THM), Germany

J. M. Vilas-Boas da Silva ([jmvbs@iscte-iul.pt](mailto:jmvbs@iscte-iul.pt))

Instituto Universitário de Lisboa (ISCTE-IUL), Business Research Unit (BRU-IUL),  
Lisboa, Portugal

Monika Maria Möhring ([monika.moehring@muk.thm.de](mailto:monika.moehring@muk.thm.de))

Technische Hochschule Mittelhessen (THM) - University of Applied Sciences,  
BliZ - Study Centre for Blind and Visually Impaired Students (THM), Germany

## Abstract

Digital accessibility for disabled people is a hot topic of Corporate Social Responsibility, mandatory under current UN and UE dispositions. This research aims at investigating its company-wide administrative integration by developing a systematic process of enquiry producing a diagnosis tool under the guidance of the Soft Systems Methodology (RQ3). Absorptive capacity provided the theoretical umbrella for structuring the problem-situation (RQ1) by setting its Root Definitions. Thus, the expected scientifically supported diagnosing tool should generate feasible and desirable changes to the problem-situation perceptions (RQ2). *Digital Accessibility by Design in Service* was coined to define this innovative and relevant approach.

**Keywords:** Strategic Management, Digital Accessibility by Design, Soft Systems Methodology

## Introduction

### *Social relevance of the problematic*

The role of companies has changed during the last decades and the concept of corporate social responsibility has become increasingly important (Katerattanakul *et al.*, 2018).

While in the past, the goal of corporations has been solely profit maximization, nowadays companies are expected to have a positive impact on society and to consider social and environmental impacts in their business decisions (Stobierski, 2022).

Furthermore, by acting with Corporate Social Responsibility in mind, companies can benefit on many different areas (European Commission, 2022).

Recognizing this value, a Corporate Social Responsibility Strategy is implemented in many large and medium-sized companies (Abhishek, 2020).

As one aspect of Corporate Social Responsibility, digital accessibility can bring a lot of advantages, for example by driving innovation or by enhancing company's brand (WAI, 2018)

Hereby, Digital accessibility refers to the extent to which digital products, resources, and services (hardware, software, websites) and digital content are available for people with disabilities (Hellbusch and Probiesch, 2011; Kulkarni, 2019).

According to the World Wide Web Consortium (W3C) software, websites and mobile applications must be "POUR" (perceivable, operable, understandable, and robust) to be accessible (Management Association, 2020, p. 58; WAI, 2018).

#### *Political and legal relevance of the problematic*

Ever since the ratification of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) (United Nations, 2008), digital accessibility has been gaining in importance for public administration.

Barrier-free electronic documentation has thus become an important constituent of sustainable, social, and economic development strategy of the European Union (Maliszewska-Nienartowicz, 2020).

Directive (EU) 2016/2102 of the European Parliament and of the Council obliges all member states of the European Union, to incorporate the accessibility of the websites and mobile applications of their public sector bodies within their national legal systems (The European Parliament and the Council of the European Union, 2016).

Due to the entry into force of EU Directive 2019/882 and the resulting national legislative changes, many large and medium-sized companies will also be enforced to consider digital accessibility within their products, websites, and services within the next years (The European Parliament and the Council of the European Union, 2019).

So, companies which sell products that are seen as important by the European Union, are now facing continually increasing accessibility requirements of their products and services.

#### *State of the art and research gap*

The European Disability Forum regards companies and Market Surveillance Authorities as important key players for enforcement of the European Accessibility Act (European Disability Forum, 2020).

Many sources discuss the political, social, and economic importance of digital accessibility and the problems in achieving the accessibility goals (Kulkarni, 2019; Maliszewska-Nienartowicz, 2020). A number of guidelines for developers and disability advocates is set out (Hellbusch and Probiesch, 2011; McGrath, 2019; WAI, 2018).

A background literature review was conducted to assess the state of academic insight into the topic. A few relevant publications were identified, most thereof focusing on technical feasibility and political enforcement.

Their individual research gaps are identified, as follows:

- Research is aimed exclusively at disability advocates, whereas no information or support for the other identified key players is given (European Disability Forum, 2020).
- The origin of the lack of conscience concerning accessible contents in the industrial and private sector is not clearly identified (Ferri and Favalli, 2018).
- There is in clarity as to the mechanisms by which supranational guidelines are implemented into EU and national laws and regulations (Kulkarni, 2019).

- Mechanisms by which stakeholder engagement in national legislation take place are not analysed (Kulkarni, 2019).
- There are no clear recommendations for companies to support accessibility as an element of sustainable development (Maliszewska-Nienartowicz, 2020).
- Organisational and structural aspects of IT accessibility implementation have so far been neglected (WAI, 2018). As the integration of digital accessibility into a company affects almost all parts of the organization, managers play an important role in adapting the processes and building an accessibility culture (Digital Accessibility Services, 2022; Lewis, 2020; Manoharan, Madera and Singal, 2021; W3C, 2022).
- Organizational and structural aspects as well as the focus on national legislation in Germany are not covered (Hellbusch and Probiesch, 2011). While the technical requirements for digital accessibility of products have been extensively researched (ETSI, 2018; W3C, 2018), only few guidelines for companies exist on how digital accessibility can be integrated into a company's processes at the organizational level (Katerattanakul *et al.*, 2018). McGrath (2019) confirms that no consideration has been given to organisational and structural aspects and criteria of Web Content Accessibility Guidelines 2.1 and EN 301549.

These literature-based findings demonstrate a research gap on how companies may draw on political, organisational, and technical framework conditions in designing accessible digital products and services. The proposed research follows the purpose to fill the gap through *devising how decision-makers are enabled to manage the requirements for a company-wide integration of digital accessibility into intra-organisational administrative processes by developing a systematic process of enquiry to produce a diagnosis tool as the main outcome of a research exercise.*

#### *Research questions*

This paper aims at presenting the outline of an investigation to support a model to scrutinise managerial and dispositional capabilities of organisations and to devise a blueprint for sustained corporate digital accessibility operations in multinational companies to address the following questions:

RQ1: How to approach the topic i.e., which knowledge areas, political qualities, and structuring factors – theories, constructs, and concepts – must be included into the research agenda concerning digital accessibility in large firms?

RQ2: How to operationalise the topic i.e., which established managerial mechanisms and capabilities must be included into the research agenda concerning digital accessibility in large firms?

RQ3: Which scientifically established tools can scrutinise digital accessibility strategies in IT-related business and administrative processes of large firms?

#### *Research objectives*

The main objective of this research concerns the development of a digital accessibility framework for implementation of digital accessibility in large and mid-size companies within the European Union to promote equal opportunities for severely disabled people.

The following subordinate goals were defined to achieve this goal:

- a. To derivate the stakeholders' needs and categorization by industrial sectors
- b. To determine the requirements for digital accessibility in medium-sized and large companies
- c. To assess value of digital accessibility for medium-sized and large companies
- d. To develop a theoretical adaptation framework for companies and academia
- e. To empirical test the framework
- f. To analyse and discuss the test results
- g. To issue recommendations according to requirement groups

## **Methodology**

### *The methodological umbrella of Soft Systems Methodology (SSM)*

The SSM provides structured guidelines to address social interventions to bring in change to the real-world affairs in a holistic, focused, systematic, and controlled approach. It also offers ways of examining a problem-situation, as both a 'social system' and a 'political system' (Checkland, 1994) that might be useful to accommodate technological action. It emphasises explanation through learning rather than predictive testing by positioning the problem-situation within both the structural and cultural organizational contexts pursuing hermeneutical and phenomenological views i.e., a subjectivist perspective.

As a learning methodology, SSM aims at finding relevant views and choices to the situation. In this investigation, the conceptual model will be used as a source of debate about potential change providing the questions to ask concerning the existing situation (Checkland, 1994). Thus, this scientifically established diagnosis tool will be used to scrutinise digital accessibility strategies in IT-related business and administrative processes of large firms (RQ3).

In this way both the state of the art and the specific requirements of each problem-situation of each company are determined. SSM is made up of seven stages (Checkland, 1994, p. 163). Stages 1 and 2 should express the situation without imposing a particular structure on it but including as many perceptions as possible and by identifying systems relevant to problem solving. The concise statement of 'what' is a system that seems relevant to the problem-situation is known as a root definition (RD) (Stage 3) (e.g. Manjate and Vilas-Boas, 2021). The conceptual model is 'an account of the activities which the system must do in order to be the system named in the definition' (Checkland, 1994, p. 169). In SSM, the system is not part of the real world, but it is the organised process of enquiry (Checkland, 1988).

Furthermore, Checkland (1994) considers that formal systems should enable to check that the conceptual model is not fundamentally deficient (Stage 4a). In Stage 4b the analyst should examine the models for validity in terms of other systems thinking that he/she outstandingly admires. In Stage 5, the objective of the comparison was to understand better the degree of complexity of reality (Checkland, 1994).

In this investigation, the conceptual model will be used as a source of debate about potential change supplying the questions to ask concerning the existing situation (e.g. Silva, 2002). In Stage 6, the comparison between the model and the perceived reality from the case studies will provide room for a dialectical discussion from which feasible and desirable changes to the perceptions of the problem-situation should come out and so, new ideas for relevant systems (RQ2). The debate caused by human involvement and, by the social and political aspects may constrain the potential changes and it may generate the need for another methodological iteration (Checkland, 1994).

Finally, Stage 7 of SSM concerns action to improve the problem-situation.

### *Research strategy and data gathering*

According to the nature of the problem and to the research purpose, a qualitative case study strategy was found to be adequate because it stresses the importance of getting close to the people and the situations being studied, by capturing the richness of people's experiences in their own terms and by making sense of the situation without imposing pre-existing expectations (Silva, 2002).

There are field contacts, already at an advanced stage for including the participation of IBM and Continental subsidiaries at Frankfurt, as sponsors of the qualitative case studies. These cases will provide data to perform the empirical test of the diagnosis tool.

This will be done by designing an inquiring semi-structured questionnaire by formulating the questions based on the dimensions of the variables extracted from the propositions of the conceptual model. This questionnaire will be applied in face-to-face interviews conducted by the researchers at the sponsors premises.

After the empirical test and subsequent revision, this systematic process of enquiry regarding the status of the art of digital accessibility strategies in large firms conducted under the SSM guidance can be considered as a credible tool to appreciate the state of the art concerning the status of the digital accessibility of the service of the companies where it is going to be applied.

## **Proposing a relevant approach to problem solving**

### *Structuring the problem by identifying relevant systems*

Absorptive capacity (ACAP) has been pointed out as a driver of competitive advantage in knowledge acquisition and in related development of new products and services (Wales et al., 2013). In the domain of social sustainability, ACAP might facilitate the adoption digital accessibility knowledge.

Cohen and Levinthal (1990) define absorptive capacity as the ability of the organization to recognize the value of external information, assimilate it, and apply it. Moreover, Eisenhardt and Martin (2000) consider that new competencies and abilities might originate on knowledge created, extended, and modified by absorptive capacity (ACAP) as a dynamic capability (Zahra and George, 2002). These researchers also suggest the division of ACAP into Potential Absorptive Capacity (PACAP) and Realised Absorptive Capacity (RACAP). Furthermore, social integration mechanisms overcome the barriers between PACAP and RACAP (Zahra and George 2002).

The major objective of structuring is to explicitly formalise the problem-situation perceived in correspondence with the presumed realities that will follow. Some preliminary anticipation concerning the absorptive capacity umbrella, just leaves hints hanging on for later recovery, detail, and development in the roots definition section to avoid future conflicting arrangements.

### *Establishing the root definitions*

The root definitions support the development of a conceptual model by including several views concerning the eventual improvement of the problem-situation related to feasible and desirable changes to be implemented. Moreover, PACAP enables the adaptation to a changing environment through the acquisition and assimilation of external knowledge.

So, a few theories might be associated to this organizational process of absorptive capacity, as follows (RQ1):

- Strategic Management: Setting objectives formulating and/or forming a strategy (Mintzberg and Waters, 1985) and designing an aligned organizational structure (Chandler, 1962) considering the accessibility requirements might result into the

situation that we coin as “Accessibility by Design” in this assignment, which is always preferable to last hour fixes. So, one might expect that the strategic objectives include a relevant dimension concerned with the social aspects in contrast to the traditional exclusive interest of the financial dimension (Mintzberg, 1979).

- Corporate Governance: It is important to include the several perspectives of digital accessibility according to the different theories of Corporate Governance because the reality is multidimensional. Examples of theories of Corporate Governance that may introduce several views of the topic, sometimes even conflicting are, as follows: Agency Theory (Eisenhardt, 1989), Shareholders Theory (Smith, 2003), Stakeholders Theory (Freeman and Reed, 1983), Resource Dependency Theory (Sherer and Lee, 2002), Transaction Cost Theory (Coase, 1937), Political Theory and Business Ethics (Abdullah and Valentine, 2009). Although there is no unique accepted definition of corporate governance, it can be defined as a set of processes and structures for controlling and directing an organization closely linked to a norm, defining their “goodness”. Therefore, digital accessibility is easily accepted as a relevant topic to be considered in Corporate Governance and/or in Corporate Social Responsibility (Lindgreen and Swaen, 2010).
- Institutional and Organisational Theories: This research will pursue a normative approach to Institutional Theory by setting legitimate criteria to choose between alternative decisions concerning the definition of collective well-being. Digital accessibility is part of this solidary organizational context where both intra and inter-organisational collective and legitimate interest are also put together with an inclusiveness view of the members as participants (Collins and Makowsky, 2005). Morality occurs at the social level i.e., at the institutional level, not at the level of the work systems design. Their design should merely follow the defined moral rules i.e., the normative guidance that concerns the legitimacy enabled both by law and by current ethics. Thus, digital accessibility is primarily a legitimate moral issue to be formalised at the institutional level and then, followed by legitimised mandatory implementation practice, which is then culturally accepted assuming its technological feasibility. Moreover, Scott (2014) argues that organisational design is shaped by institutional forces because the institutional environment represents a wider cultural framework that shapes how formal organizations are structured around both technical and social systems i.e., the work systems. Moreover, the design of work systems might be defined as the design of positions as identified by Mintzberg (1979), within a reductionist perspective, or even as the design of the structure if all the groups of parameters are considered. To sum up, as organisation theory concerns the design of organisations (King, Felin and Whetten, 2010), the decisions concerning the impact of digital accessibility should also be investigated in this important domain.
- Innovation and Knowledge Management: Successful innovation requires an integrated design process i.e., integration in the design of the enterprise, the design of the product, as well as the design and implementation of new technologies. Such an integrated design effort requires good collaboration and management of the designs and should be supported by efficient knowledge management techniques and tools (Du Preez and Louw, 2008). According to Burma (2014), knowledge management implies a process to produce new relevant information regarding the development of existing knowledge and organize it to be available for any user to access. This author also adds up that to ensure the transfer and sharing of information is one of the most crucial processes towards competitive advantage. Both innovation and knowledge management might be influenced by digital accessibility of which

needs require investigation also in this domain in the scope of high-tech industries (Möhring, 2013).

- Sustainability Management: Sustainability theory as well as its practice i.e., topics such as Triple Bottom Line (TBL) topics (e.g., Elkington, 1994, 1998), Global Reporting Initiative (GRI) (GRI, 2022), the 2030 Agenda for Sustainable Development of the UN (Council of Europe, 2022), among others are closely related to social issues (e.g., Littig and Griessler, 2005) and to digital accessibility, which requirements might also be investigated in this domain.

On the other hand, RACAP enables knowledge transformation and exploitation through the implementation of the new knowledge into the firm's operations. So, a few theories might be associated to this organizational process of absorptive capacity, as follows (RQ1):

- Service Science (e.g. S-D Logic, design of services, service provider/service experience): S-D logic might be summarized as a process where “value co-creation occurs through [both] social and economic actors, involved in resource integration and service exchange, establishing nested and interlocking service ecosystems..., which serve as the context for future value co-creation activities” (Lusch et al., 2016). The point is about introducing a concern with digital accessibility in the dimension of value co-creation pursued by the social actors during the design and implementation of a system providing a service. Moreover, in classical marketing, a simple definition of value is the difference between a customer's evaluation of benefits, which might include both outcomes and experience and, costs (Goldstein et al., 2002). Therefore, there is again room to include digital accessibility as a significant part of the service experience to enrich the chosen implementation alternative.
- Technological Push: Institutions and technology can be directly linked, as also suggested in Vargo and Lusch (2016). Moreover, digital technology as an operant resource (Constantin and Lusch, 1994) of a service ecosystem can provide a significant opportunity to the development of service innovations and business platforms. Thus, digital accessibility as a recognized relevant social concern is an integrant part of the service ecosystem belonging to the networked business platform that operationalises the formalisation of the organisation or its institutionalisation as an operand resource (Constantin and Lusch, 1994) that is transformed by the technology (i.e. the operant resource) according to an accepted normative.
- Design of Digitalised Services: Research in service design has accentuated the beneficial nature of co-creation, as follows: i) it fosters the fit between services and its users; ii) it leverages a mutual understanding between involved actors; and, iii) it supports the development of new and existing services. However, other authors suggest that co-creation can exhibit associated risks, such as: i) participants not having an equal voice in co-creation efforts; and, ii) the sustainability of ideas (Vink and Oertzen, 2008). This is illustrative that inclusiveness of design is a currently discussed topic that deserves high attention when «digital accessibility by design in service»<sup>1</sup> is being discussed.
- Digitalisation Technologies (e.g. Augmented Reality (AR), Industry 4.0 (I4.0), Internet of Things (IoT), Cyber-Physical Systems (CPS), Radio Frequency Identification (RFID), big data analytics, cloud computing, etc.): Industry4.0 is seen as a set of different technologies and concepts regarding the organization of a value chain. In I4.0, the concept of change is based on radio frequency identification

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<sup>1</sup> Term coined by this research



technologies (RFID), CPS, IoT and data mining (Big Data) (Wang *et al.*, 2017). Big Data processes and analyses a large amount of data from different sources into useful information that might be used by all the participants during the adding value activities (e.g. Lee, Bagheri and Kao, 2015). Moreover, Cloud Computing concerns the utilisation of data storage and computing power, without direct management by the user. It might be distributed over many locations i.e., the I4.0 data centers (e.g., Ray, 2018; Montazerolghaem, Yaghmaee and Leon-Garcia, 2020). In addition, Industry 4.0 is characterized by the digitalization and interconnection of the companies' manufacturing systems, business models, products, and value chains. These two cornerstones of Industry4.0 make the interconnection between the physical world and the virtual or cyber one (Camarinha-Matos *et al.*, 2017). Together with the implementation of CPS and IoT, this interconnection assures a more efficient use of the information gathered by the RFID technologies (Zawadzki and Żywicki, 2016). The use of IoT might also connect all the players present in the value chain where the organizational services both inter- and intra- organizations are offered and used by the participating actors. Finally, Augmented Reality (AR) is another powerful digital tool that enables and leverages an interactive experience of a real-world environment where the real-world objects are enhanced by computer-generated information concerning the senses i.e., visual, auditory, haptic, somatosensory, and olfactory (The Huffington Post, 2016). These technologies are indeed part of an updated implementation of *digital accessibility by design in service* and so, they must be considered in the domain of the Realised Absorptive Capacity.

In summary, the objective of implementing a «digital accessibility by design in service» approach making use of a technology push that is strategically aligned might be achieved by considering the enumerated knowledge areas as cornerstones of the Root Definitions. In this way, the RD might ensure the status of a kind of “preliminary hypotheses or propositions” by determining the perspective under which the situation will be examined, by preventing the problem-solver from taking only one view and by promoting the improvement of the problem-situation by pursuing a systematic approach. This improvement will also be related to the changes to be implemented that should seem feasible and desirable to both analyst and problem owner. Consequently, they seriously increase the chance that changes to be proposed are useful because they are supported by a credible process of enquiry arising from the future development of the conceptual model and its concomitant theoretical validation i.e., stages 4, 4a and 4b of SSM.

### **Discussion and conclusions**

Digital accessibility for people with disabilities is a hot topic of Corporate Social Responsibility that is becoming mandatory for companies, under both UN and UE dispositions. This research aims at investigating its company-wide administrative integration by developing a systematic process of enquiry to produce a diagnosis tool as the main outcome under the guidance of the Soft Systems Methodology. The research question 3 (RQ3) – *Which scientifically established tools can scrutinise digital accessibility strategies in IT-related business and administrative processes of large firms?* – is addressed in this way. SSM enables the accommodation of technical change concerning digital accessibility both social and politically by pursuing a subjectivist perspective that might incorporate the views of several stakeholders. An empirical test (Vilas-Boas, 2009c) was added up to the SSM process to increase the credibility of the diagnosing tool, in addition to the theoretical validation of the conceptual model resulting from the Root Definitions.

The Absorptive capacity (ACAP) was chosen to provide a relevant theoretical umbrella for structuring the contents of the problem-situation i.e., to address the RQ1 – *How to approach the topic i.e., which knowledge areas, political qualities, and structuring factors – theories, constructs, and concepts – must be included into the research agenda concerning digital accessibility in large firms?* The structuring of the contents of the problem-situation corresponds to the stage 3 of SSM, which is about defining its Root Definitions. RD will support the activities that the system must do according to the research purpose. This is neither the best, nor a unique solution (Vilas-Boas, 2009a). This process will *just* generate a relevantly supported validated (Vilas-Boas, 2009b) conceptual model that is purposefully chosen by the researcher and so, he/she must be able to defend it by political arguing as defined by Lehane (1989). ACAP is divided into Potential ACAP (PACAP) and Realised ACAP (RACAP). Potential ACAP enables the adaptation to a changing environment through the acquisition and assimilation of external knowledge by setting the problem Root Definitions after Strategic Management, Corporate Governance, Institutional/Organizational Theories, Innovation/Knowledge, and Sustainability Management. Moreover, Realised ACAP enables knowledge transformation and exploitation through the implementation of the new knowledge into the firm's operations by proposing the inclusion of Service Science, Technological Push, Digitalized Services Design and Digitalisation Technologies to approach the topic.

Moreover, the propositions resulting from the conceptual model supported by the RD, which originates the enquiring process to operationalise the diagnosis tool should be tested to their falsifiability (Popper 2005). The conjectures that anticipate the propositions are coming from an in-depth literature review in the knowledge areas that are part of the Root Definitions should also be selected according to established stable criteria (Lindblom, 1987), which still need to be defined. These latter two issues are part of a scientific research process and must be addressed as a recommendation for further work.

Finally, it is also expected that the resulting diagnosing tool might generate feasible and desirable changes to the perceptions of the problem-situation to address the RQ2 – *How to operationalise the topic i.e., which established managerial mechanisms and capabilities – must be included into the research agenda concerning digital accessibility in large firms?* To sum up, *Digital Accessibility by Design in Service* was coined as the label to define this innovative and relevant approach.

#### *Expected results and contributions*

The expected results of the research will serve as a guideline for decision makers in medium-sized and large companies in the European Union concerning the operationalisation of digital accessibility for disabled people. This is an important added value for the knowledge area by closing the research gap and developing a generic digital accessibility framework.

As a contribution to theory, this research is expected to identify aspects of under-researched socio-economic, socio-cultural, organisational, managerial, and technical design implications of the adoption of a new legally binding IT accessibility directive within complex business organisations. Thus, it will provide a validated conceptual model to position and address the problem in the organisational context.

As a contribution to research, this research is expected to develop an enquiring tool by which both current and further habitats (e.g. SMEs, countries other than Germany) can analyse and investigate as to their intra-organisational IT accessibility governance.

At last, as a contribution to practice, this research is expected to enable a field diagnosis concerning the implementation of digital accessibility and potentially IT innovation in

general. By its qualitative approach, it should also uncover so far unleveraged mechanisms that impede or foster the socio-technological adaptation process and overcoming them by applying relevant strategic approaches to effective performance.

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<sup>2</sup> The complete list of references supporting the text might be supplied by the authors on demand.