THE IMPACT OF USING IT ARTEFACTS ON ORGANIZATIONAL ATTENTION: THE CASE OF A CITY HALL

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THE IMPACT OF USING IT ARTEFACTS ON ORGANIZATIONAL ATTENTION: THE CASE OF A CITY HALL

Research in Progress
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Abstract
Using the concept of organizational attention proposed by William Ocasio (1997), which states that formal, informal and unofficial communication engages collective attention in issues and action alternatives relevant for decision, our study investigates the role played by IT artefacts in shaping attentional engagement. Based on a case study of the City Planning Division of the Porto City Council in Portugal, our findings reveal that IT artefacts channel attentional engagement, expanding or hindering the ability to understand situations. When shifts in attention are promoted by a changing strategy (the dominant pattern of attention) without the corresponding change in the IT infrastructure, serious difficulties may arise in sharing perceptions that strongly bind collective cognition and action to the achievement of organizational goals (collective attentional engagement). In order to circumvent arising problems, unofficial IT-supported communicative practices tend to emerge. Our exploratory research extends the literature on organizational attention and information systems by providing insights on the impact of IT use on organizational attention.

Keywords: IT use, organizational mindfulness, attentional engagement, exploratory case study.

1 Introduction
William Ocasio (W. Ocasio, 1997) defines attention as the “noticing, encoding, interpreting, and focusing of time and effort by organizational decision makers on issues and answers” (p. 189). Attention is a scarce and critical resource that is distributed in the organization to allow for the focus on a diverse set of issues and action alternatives, collectively perceived as relevant to achieve strategic goals. Organizational inattention may have serious consequences on the collective ability to anticipate disrupting events, devise effective solutions to problems and successfully adapt to changing contexts (Hoffman & Ocasio, 2001; Knippenberg, Dahlander, Haas, & George, 2015).

Organizations do not only have to deal with the large amount and variety of external information, but it also has to make sense of the internal information. In this context, the management of organizational attention assumes particular relevance, mostly notably the factors affecting collective attentional engagement required to solve problems and seize opportunities.

The communicative practices in the organization guide attentional engagement, understood as the intentional allocation of cognitive resources to problem solving, planning, sense making and decision making. Communicative practices in governance and operating channels shape interactions by setting (i) the technologies and communication tools that must be used, (ii) the rules for participation in the acts of communication, (iii) the language to be used and how to use it, and (iv) the interactions considered as appropriate (Ocasio, Laamanen, & Vaara, 2018). The study described in this paper provides empirical evidence for the role that IT-supported/enact communicative practices play in shaping attentional engagement and building organizational mindfulness.
2 Attention in Organizations

Organizational attention emerges from the interplay of three attentional processes (William Ocasio, 2011): attentional perspective (top-down), attentional engagement (top-down and bottom-up process) and attentional selection (attention outcomes).

In organizational attention literature, the dominant strategy corresponds to the dominant attentional perspective in the organization. It defines how the organization, as a whole, is willing to allocate resources. However, the various units and functions often define local perspectives that coexist with the dominant, and may or may not be aligned with it. Attentional perspectives promote heightened awareness of specific sets of issues and alternative actions; they are discussed and negotiated within and between the governance channels of communication (Pettigrew, 1977).

Through attentional engagement, organizational actors, intentionally and in a sustained way, allocate cognitive resources to problem solving, planning, sense making and decision making.

The communication dynamics produced by attentional engagement, continuously creating and modifying attentional perspectives, result in the selective attention paid to issues and action alternatives. By selectively choosing what stimuli will be attended, the organization deals with the complexity and variety of available information to avoid the cognitive overload of decision-makers.

2.1 ATTENTIONAL TRIANGULATION AS A MINDFULNESS-LIKE STATE IN ORGANIZATIONS

Rerup et al, (2009) describes three dimensions of organizational attention: stability, vividness, and coherence. According to Rerup and his co-authors, the three dimensions must be triangulated to maintain a balance between them when dealing with a set of issues relevant to decision and action (Rerup et al., 2009). Triangulation of attentional dimensions is thus a mindful like state.

Stability of attention refers a constant attention to the aspects (issues and action alternatives) considered relevant to decision making; attention lasts uninterrupted for the time needed to understand those aspects. Vividness of attention implies a rich and relatively broad understanding of a set of interrelated aspects; the mind focuses on the analysis of various aspects at the same time in order to generate complex interpretations of situations, even when contradictions are found in the available information. Coherence of attention implies that at the various organizational units, functions and authority levels, attention is similar, complementary and compatible and, as a result, the organization pays proper attention to organizational and environmental stimuli as implied by the attentional perspective in place.

Each dimension of attention produces incomplete understandings of problems and opportunities; the triangulation of the three dimensions is necessary to maintain the mindful attention required to process relevant stimuli at all levels of the organizational structure (Rerup & Levinthal, 2014; Vogus & Rerup, 2018).

2.2 Organizational mindfulness in the IS literature

Organizational mindfulness describes a collective alertness to unexpected events, supporting a high degree of organizational reliability (Gärtner, 2013; Sutcliffe, Vogus, & Dane, 2016). It is a collective ability to spot unexpected changes, counteract unrealistic expectations and remain focused on the events as they unfold, and be able to perform core business tasks even if faced with breakdowns or changes. Organizational mindfulness requires high levels of clear and consistent collective reasoning and action.

In mindful organizations, learning from failures and success is equally valued, open communication is promoted, supportive working relationships are nurtured and decision-making is a participative process. By understanding that the success of the organization depends on the detailed comprehension of situations, rapid identification of unknown issues, and prompt and effective response, formal and in-
formal communication is designed to achieve high levels of attentional engagement (Weick & Sutcliffe, 2006; Weick, Sutcliffe, & Obstfeld, 2008). Attentional engagement is the “the process of intentional, sustained allocation of cognitive resources to guide problem solving, planning, sensemaking, and decision making.” (Ocasio, 2011)

In (Dernbecher & Beck, 2017), the authors offer a general perspective on information systems (IS) research addressing the concept of mindfulness. According to these authors, the concept of mindfulness has been used as (1) prerequisite; (2) accelerator; and (3) implication of actions and outcomes. These authors also found that research has focused the organizational, group and individual levels of analysis, with mindfulness seen as an organizational characteristic, heedful interrelation of individual activities or a cognitive propensity of the individual.

The authors mention various knowledge gaps in the IS research that need to be addressed to gain a better understanding on how mindfulness at the various levels of analysis impacts and is impacted by the use of IT artefacts. Of special interest for the discussions in this paper is the need for research (1) addressing the reciprocal relationship between mindfulness shaping the adoption and use of IT artefacts and the way the latter impact mindfulness at the organizational level of analysis; and (2) providing an IS mindfulness theory. The authors also recommend that “IS research endeavours to extend the mindfulness concept by combining it with existing theories from the IS discipline as well as from other related disciplines.” (p. 138)

In the last two years, MIS Quarterly published three articles that specifically focus on mindfulness and its relationship to the adoption and use of IT artifacts. In the Curtis et al (2017) paper, the authors address collective mindfulness in virtual teams as the ability of team members to heedfully contribute to the team discussions and develop shared mental models. By studying teams using a set of tools designed to promote collective mindfulness showed improved decision quality (Curtis, Dennis, & McNamara, 2017). This stay falls under Dernbecher and Beck’s mindfulness as accelerator.

In Thatcher et al. (2018), the authors acknowledge that mindfulness is an important emerging topic in the area of information systems. The paper describes the concept of IT mindfulness at the individual level - "as a dynamic IT-specific trait, evident when working with IT, whereby the user focuses on the present, pays attention to detail, exhibits a willingness to consider, other uses, and expresses genuine interest in investigating IT features and failures" (pg. 833). The authors present three empirical studies of from which they develop a scale for IT mindfulness tested for its utility in the post-adoption IT artifact use context (Thatcher, Wright, Zagenczyk, & Klein, 2018). This study falls under the category of mindfulness as prerequisite described in the literature review done by Dernbecher and Beck (2017).

Addas and Pinsonneault (2018) studied the impact of incongruent and congruent e-mail interruptions on individual performance. The author conclude that congruent email-interruptions - interruptions containing information that is relevant to primary activities - have a direct positive effect on performance and an indirect positive effect through mindfulness. Individual mindfulness is conceptualized as a state of active processing of information. This state of mind implies searching for non-salient cues, alternatives and unexpected relationships in the received contents (Addas & Pinsonneault, 2018). The study falls under the category of mindfulness as accelerator described in the literature review done by Dernbecher and Beck (2017).

It is not our intention to update the literature review done by Dernbecher and Beck (2017). The studies published in MIS Quarterly were mentioned here to position the study described in this paper. Our study falls under the category of mindfulness as implication and focuses the organizational level of analysis. It aims to be a first contribution to reduce the identified knowledge gaps in Dernbecher and Beck (2017) by providing empirical evidence on how IT artefacts impact organizational mindfulness.
3 Impact of using IT artefacts on organizational attention: a case study

The research question guiding our study is:

How the use of IT artefacts impact organizational attention?

Our research assumes the organizational level of analysis and focuses the impact of technology on organizational mindfulness, aspects that Dernbecher and Beck (2017) consider to be further researched.

The exploratory study was carried out in the City Planning Division of Porto Municipality, the second largest municipality in Portugal. It focused the attentional dynamics of the City Planning Division (CPD) in instructing the processes associated with citizens’ applications for urban interventions and with the planning of projects to improve the city. The case study lasted for 8 months (May 2015 to Dec 2015).

We used the case study method (Yin, 2017) since our goal was to gain an in-depth understanding of the phenomenon unfolding within the context it was being studied. We intended to develop a holistic explanation for the attention dynamics within and between the governance communication channels that were influencing strategic choices in CPD. Our study was performed according to the principles of qualitative research (Cavaye, 1996).

3.1 Ensuring rigor

Our research design was guided by the principles of interpretative rigor stated by Klein and Myers (Klein & Myers, 1999; Myers & Klein, 2011). All research information gathered during the first stage of the study (meetings, observations, documents) was interpreted according to the principle of the hermeneutic circle that posits that the meaning of a text must be found within its cultural, historical and literary context. Therefore, transcriptions, notes and documents were analyzed by (i) relating individual parts within the same text and across texts, whenever they referred to the same events, constraints, insights; (ii) relating the individual parts with the insights in the whole text or related texts; (iii) verifying emerging interpretations in documents against the procedural, legal and historical contexts of urban planning and management.

The communication promoted by the use of IT artefacts was contextualized in the Division’s strategy and local government policy guidelines. Gathered information about discussions and internal perspectives on the best way to serve the city was framed within the political discourse and internal meaning structures. This allowed the implementation of the contextualization of the emerging explanations.

All moments of interaction with the participants were carefully planned and recorded, to ensure the gathering of information rich in detail and diversity of local meanings. After each meeting, or a small set of consecutive meetings, the research team met to discuss the interactions, to identify moments in which communication was not the most effective one and define ways to improve communication with the participants. This procedure implemented the principle of interaction between the researchers and participants.

The ABV theory and Rerup’s theoretical perspective on the triangulation of attention provided the interpretive framework to analyze transcriptions and documents. This allowed for the emergence of abstractions and generalizations as proposed by Klein and Myers (1999). These insights where then discussed with the participants in order to elicit feedback that could inform the researchers about theoretical bias shaping the interpretation of gathered information. This procedure implements the principle of dialogical reasoning.

The principle of multiple interpretations was applied by involving different sensitivities and experiences in the CPD, including managers, technical and administrative staff, and the staff of the Information Systems department that interact more frequently with the Division.
4 THE STUDY OF THE INFORMATION SYSTEM SUPPORTING THE URBAN PLANNING AND MANAGEMENT OF A PORTUGUESE CITY

An initial contact was made by the senior CPD manager. He was concerned with the widespread use of spreadsheets in the Division. The use of these spreadsheets was becoming so generalized that the quality of the information in the central system was threatened. This information was essential to provide proper answers to citizens' requests and to design changes to the city that could promote their well-being. The expressed concerns pointed to problems in collective attention.

The next step to further understand the attention problems in the CPD was the selection of key participants. The group of participants included the CPD’s manager, the managers of the two studied departments, Urban Planning (DUP) and Urban Management (DUM), some of the processes’ managers (3) and staff from the information systems department (2). The research team integrated two senior researchers and two junior researchers who were awarded scholarships to full-time dedication to the project tasks.

CPD integrates two main departments: Municipal Department of Urban Planning (DUP) and Municipal Department of Urban Management (DUM). DUP is responsible for activities aimed at providing improvements on the life quality of the communities living in current or planned urban areas by creating and developing programs and services. In a sustained and stable manner, the various public policies, at national and local levels, are integrated into the city's development plans. These plans provide guidelines for the distribution of resources and services within the urban territory. DUM ensures that citizens’ requests for urban interventions in private or public real estate obey what is defined in the urban plans. Additionally, DUM responsibilities include the regulation and monitoring of private and public projects, which often are carried out in a context of conflicting interests between different stakeholders. The department acts to minimize problems such as degradation of the urban environment, housing deprivation, broken neighborhoods, and the separation of social groups resulting from the increase in population coupled with shortages of equipment and basic infrastructure.

Besides these two departments, the study included the participation of 2 members of the Information Systems Department (cross-cut department to the City Council). Interviews were performed to obtain information about the systems used in CPD.

4.1 Synopsis of the study

Our study was then structured in two phases: collection and analysis of research information. We collected documents in physical and electronic format to understand the organizational processes associated with the management of urban projects and the citizens' requests. We also collected forms used in the interaction with citizens as well as internal documents used to inform the technical and political decisions made in the course of the workflows. We collected maps and other visual information used in urban planning as well as legal information that the planning should obey. All these documents were categorized regarding their contribution for shaping discourse and practice.

Simple observation scripts were prepared to guide the researchers in the various visits to the Division. The use of IT artefacts was given particular attention in order to understand the discursive and communicative practices these systems promote. Observations and interactions were recorded immediately after researchers left the observation sites.

For the interviews, guides were prepared to collect information on aspects of communication that, having been identified as important in the analyzed documents or in the observations, were still not clear. These interview guides integrated open questions that facilitated the identification of elements of communication not yet included in the information collected. Interviews were recorded and transcribed to allow for content analysis.
During the content analysis process, the materials prepared as described above were coded and emerging categories were associated into theoretical themes (explanations of specific aspects of the phenomenon being studied), forming the various elements of the final situated theory. Whenever this analysis resulted in the need to clarify concepts, their interrelations or emerging themes, the researchers identified new texts to be collected, observations to be made or participants to interview.

Thus, these two phases of information collection and analysis were implemented in an iterative way until the collected texts no longer held new categories and the theory displayed a consistent answer to the research question. The description of the research results was then presented to the participants that were also informed of the emerging situated theory. The goal was to gather the participants’ feedback on this external perspective about the difficulties stated at the beginning of the research.

4.2 Research Findings

The first result of our study was the map of issues selected as relevant. This map allowed to delimit the focus of attention in CPD. Figure 1 presents a simplification of these issues.

![Figure 1- Main elements of the two departments’ discourse](image)

There was also a strong emphasis on maintaining all the documentation produced during the preparation of the response to the requests and in the execution of projects. All proposals to change the city must be subject to public scrutiny and the authorizations given by the City Council can be challenged at any time. When projects (public or private) are poorly executed or have unanticipated consequences, it is necessary to establish responsibilities to know who should compensate those affected. Settlement of conflicting interests can become extremely complex and it has been historically where urban planning has invested more cognitive resources to develop rigorous plans and solutions.

The management of documents (requests, technical opinions, decisions, authorizations, reports) is a common focus of attention to the two departments. This focus is reinforced by a central system that is a document management system. By trying to manage workflows to answer requests and manage projects in the central system, the two departments are faced with common electronic forms and reports designed to document internal processes. However, entered information undergo different procedures
in the departments, many of which requiring the use of various information systems. The results of this processing must then be correctly entered in the forms of the central system.

"There are DUM processes that we do not even understand. They are not part of our concern. Identifying our information in the system is not always easy, the terms are confusing and it is possible that there is information wrongly entered." (DUP Participant)

Participants of both departments told the researchers that in order to carry out the various activities, in addition to the central system, they had to use 14 other information systems, on a regular basis or occasionally. These systems give access to toponymical and geographical information, fees to be applied, national statistics, reports assessing the life quality in the city, among other information. Often they need to access archived dossiers stored in yet another specific application. There is an application to control the deadlines of the various tasks being executed and another to ensure transparency about the decisions to accept or reject the submitted requests.

"There is a great deal of difficulty in keeping a broad perspective on everything that is going on in the CPD, and integrating what is being or has been processed in the DUM with what is being or has been processed in the DUP. I can only do it at some extent because I created this EXCEL sheet that allows me to monitor the flow of information and produce relevant statistics. In meetings I always take my EXCEL sheets to justify my contributions to plans and decisions." (DUM Participant)

The study of these EXCEL sheets showed they were fundamental tools supporting the discussion and negotiation of attentional perspectives; they enacted attentional engagement to the problems and meanings that could be understood by all regardless of the department in which they worked.

The big diversity of information systems resulted from an accumulation of successive efforts to automate routines and communicative practices. Over the years urban planning has been under pressure to shift its attention from avoiding litigations to promoting well-being in the city to those who live there and also to the growing number of tourists who visit it. This evolution has brought new needs for information access and processing. National entities are opening their information to citizens and to various policy makers. Much of this information is important to forward-looking urban planning aimed at preparing the city for the future needs of those who live and visit it.

The vast amount of information available in various formats produces (i) a superficial attention to the aspects considered relevant to realize the mission of the Division (low attentional stability); (ii) difficulty in monitoring problems and opportunities in the periphery of the collective attention (low attentional vividness); and (iii) visible duplications of time and effort in the analysis of issues and alternatives of action (low attentional coherence).

Participants from both departments were very apprehensive about the impact of the new local government's innovative drive to invest in technology to implement the concepts of open government and smart city. These participants felt that the path to the future would necessarily be in this direction although they could not see how it could be achieve with the technological infrastructure available, which engaged their attention to the administrative aspects and legal procedures associated with requests and projects.

5 Discussion and Conclusions

Our study found two departments attempting to adjust to a strategic shift towards a more citizen-centred approach. Instead of a main focus on document management, the city government was encouraging a focus on the well-being of citizens and tourists. The domain ontologies and information flows still in place forced the materialization of the previous strategy. The IT artefacts used were defined to manage documents rather than workflows. These workflows had to be reconstructed through the documents that were being produced and entered into the central system. This caused a kind of blindness about what was being done in the Division at each moment and how the work of the two departments was interconnected. In order to circumvent this blindness, several spreadsheets served the purpose of
interconnecting information from the two departments, monitoring the performance of the various work processes, controlling the workflows and ensuring the best response to the citizen and the city.

Figure 2 provides a theoretical consolidation for the understandings obtained with the performed study.

![Figure 2 - impact of the use of IT artefacts on organizational mindfulness](image)

We theorize that the use of IT artefacts is impacted by the stability, vividness and coherence of collective attention, triangulating attention, engaging users’ attention towards certain issues and blinding them to others. The used IT-artefacts constrain the intentional allocation of cognitive resources to problem solving, planning, sense making and decision making thus helping to shape the degree of collective mindfulness to events as they unfold and to non-salient cues which may prove to be important to achieve organizational goals.

The study described is a first exploratory study aimed at contributing to understand the role IT use plays in shaping organizational attention, integrating the IS literature in the area by providing insights on how the attentional engagement promoted by IT use impacts organizational mindfulness.

The team is already deepening these insights with the results of two other case studies carried out in large companies in Portugal – Corticeira Amorim (cork sector) and Bosch Portugal (car sector). These sectors are allowing to detail the model in figure 2 thus making it actionable, i.e., a good theoretical basis for a survey to validate the implied hypotheses.

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