Course: SKOM12
Term: Spring 2018
Supervisor: Asta Cepaite Nilsson
Examiner:

Narrative visualizations: using interactive data stories in strategic brand communication

TATIANA PROSKURINA

Lund University
Department of strategic communication
Master's thesis

Abstract

Narrative visualizations: using interactive data stories in strategic brand communication

Storytelling have long been used by media and communication professionals to hit an emotional chord with the audience. Nowadays, the development of digital technologies opens new possibilities for conveying messages, and visual storytelling becomes a 'lingua franca'. Narrative visualizations are an emerging class of visual stories, primarily used by data journalists to share complex information. They significantly differ from traditional forms of storytelling, as users can create their own paths of information consumption and by that, make sense of data. Although this type of storytelling is widely used by media outlets, it is not yet recognized by communication professionals. In this way, the purpose of the study is to provide a framework for the use of narrative visualizations in brand communications. To address this purpose, I conducted a comprehensive review of relevant theories from visual and communication studies and examined the current state of narrative visualization usage. Based on the analysis, I presented advantages and disadvantages of narrative visualizations and identified the most promising areas of use in brand communications.

Keywords: narrative visualization, infographics, data visualization, brand communication, visual communication, visual storytelling.

Table of contents

Introduction

"*A fetishistic fascination with data*" is a trait of our time (Harris, 2015). As the volume of available data continues to grow, business insights derived from data are becoming a vital part of corporate success. In 2017, 53% of companies reported that they adopt big data in decision making (Columbus, 2017). According to the Global top skills analysis, conducted by LinkedIn, there is a dramatically growing demand for professionals with statistical analysis, data mining and data visualization skills (Fisher, 2016). Besides that, the ability to deal with data is required for managers, frontline employees, and everybody in between. Development of more sophisticated algorithms, increase in storage capacities have led to the emergence of new professions, for example, data scientists or data journalists. Nowadays data-heavy whitepapers, reports, presentations are perceived as a universal standard.

However, nothing has fundamentally changed in how human brain process information. Firstly, people think visually. The fact of the matter is that the first written languages occurred only five thousand years ago, and most of them were pictorial. Even nowadays almost a half of the human brain is dealing with visual processing, and images are perceived significantly faster than letters (Merieb & Hoehn, 2007). Research shows that the use of visuals on the internet has increased about 100 times in the last 10 years, and the content with compelling images attract up to 94% more views than the same articles without visuals (Walter & Gioglio, 2014). From that, another significant consequence of an unprecedented rise of data capital is the rise of importance of information visualization. Secondly, human memory is story-based. "*Facts tell, stories sell.*" People think narratively, rather than paradigmatically, and emotional appeals, personal feelings and experiences play a more significant role in decision-making process than brand attributes, facts, and statistics (Murray, 2013). In other words, storytelling is still one of the most innate forms of communication.

Quite often, storytelling evokes comparison to data presentations. Proponents of storytelling claim that stories are much more convincing and effective means of communication, but yet there is no conclusive evidence. A meta-analysis conducted by M. Allen and R. Preiss (1997) revealed a moderate advantage of statistical data over storytelling, however, as it was

emphasized in the limitation part of the study, statistical evidences were used to prove superiority of statistics. In this way, the dispute is not resolved.

However, this comparison is not entirely correct, and experience shows that data-driven stories can become the next big thing how information is communicated. In this context, storytelling can be defined in terms of arranging facts and statistics in a certain sequence and setting up links between them. However, although advances in technology have made software to work with data pervasive, significant gaps in capabilities remain, as these tools do not help to effectively tell stories and persuade the audience. Cole Knaflic (2015) argues that the roots of the problem lie in the education sphere, as language and math are never paired with each other. Data storytelling professionals are required to have both qualitative and quantitative backgrounds and "*skills like those familiar to movie directors, beyond a technical expert's knowledge of computer engineering and science,"* and such a skillset is rare among media and communication professionals.

Static forms of data visualizations, such as diagrams and charts embedded in a larger body of text, have long been used in journalism and communication. This form assumes that the text conveys the story, and the image typically gives supporting evidence or related details. Infographics is one of the most widely used solution for presenting a story in a single image (Elliot et al., 2016). It features maximum information in minimal space and as a rule, are created for a generalized audience. While this type of visualization is the simplest and the cheapest to execute, it is also the most appropriate for general purposes. Although there are no standard dimensions for this type of visualization, about 80% of infographics are vertical, so they often follow a classic three-part story structure, with an introduction at the top of the picture, call-to-action as a conclusion and the main part in between (Krum. 2013).

In more complex data stories, several elements work together for the same goal of conveying the single message. So-called narrative visualization is an emerging type of data stories visualization, primarily used in stand-alone projects or by news organizations, such as Bloomberg and New York Times, politicians, activists (Segel & Heer, 2010). This concept is a step further than traditional infographics. The difference is that authors create a more engaging experience, inviting users to navigate through the data themselves, address specific needs, ask questions, compare data in real time (Figueiras, 2014). The distinguishing feature of narrative visualizations is an attempt to present the scale of the information in a more simple, visual way with a narrative structure and interactive elements. Such stories can exist in a variety of formats, including presentations, interactive infographics and interactive

webpages and websites, videos, white papers, and reports. Examples of the projects can include, but are not limited to, interactive maps and timelines, models, charts and diagrams with annotations, sequential graphics.

Narrative visualizations have several advantages over traditional infographics. First, thanks to intuitive navigation and fast exploration, interactive content makes it easier to work with a large amount of data (Segel & Heer, 2010). Second, narrative visualizations ensure higher recall and memorability than static infographics (Borkin et al., 2016). Third, if the content should be regularly updated, it is easier to make changes within interactive space (Lankow et al., 2012). Taking into account that even traditional infographics are liked and shared on social three times more than other any other type of content, and that users clearly express preferences for the interactive infographics (Locoro et al., 2017), it can be assumed that narrative visualization can become a powerful tool in communication strategies of organizations.

However, as Segel and Heer (2010) found out, four out of five narrative visualizations are created by media organizations. Even though the usage of interactive content grows, it is still low for mid-level companies and small businesses, who report a lack of staff, budget, and technical expertise (Rose, 2017). Besides, there is no agreement among content producers on how to measure success in narrative visualizations, as there are at least 20 quantitative and qualitative metrics (Rose, 2017). At the same time, 42% of non-users said that getting education on how to use interactive content can motivate them to implement data visualization into content marketing efforts, and 41% of respondents noted a lack of lists of the best practices (Rose, 2017).

In this way, narrative visualization is an emerging and growing field in digital journalism, but it is unclear how visual data storytelling can be used as a strategic communication tool. I argue that the lack of research is a problematic aspect preventing the development of new visualization technologies. There is also a lack of understanding of how organizations communicate their values through data visualizations, where organizations can use narrative visualizations to improve their brand promotion efforts and at which stage of the customer's journey they can be applied and what are the risks.

According to Barnhurst et al. (2004), visual dimension can be found in all strategic communication activities. However, as the concept of strategic communication is broad and eclectic, and refers to such diverse fields as organizational communication, public relations,

marketing, crisis communication, health communication, political communication, it appears to be unnecessarily challenging to address the above-mentioned issues in such a broad sense in the framework of this study. Instead, I will mostly focus on brand communications, as this domain of practice is characterized to the greatest extent by an increased presence of visual (Barnhurst et al., 2004).

1.1 Purpose

As the field is new, and there are limited theoretical frameworks and practical examples available, the purpose of this study is to provide a new framework for the use of narrative visualizations in brand-related communications. In order to achieve it, I will begin with explaining the rationale behind visuals in strategic communications and a complex analysis of relevant concepts in contiguous research fields. The term 'narrative visualization' will be further examined with an attempt to distinguish narrative visualizations from interactive infographics, data visualizations and digital stories. Attention will be paid the current state of narrative visualization usage in data journalism and strategic communications. Based on the theoretical materials and relevant real-life examples, primarily of General Electric visual data stories, conclusions will be made.

In this way, this study has the intention to provide new insights and identify implications for further research and practice by introducing a framework of how organizations can communicate their messages by implementing narrative visualizations. The following research questions were formulated:

How can narrative visualizations be used in brand communications?

- *Why narrative visualization implementation is beneficial for organizations?*

- *What are the strength and weaknesses of this solution?*

- *What are the potential areas of application of narrative visualizations? Under what circumstances do they bring the most value?*

1.2 Method

This is a conceptual paper, which may serve as a starting point for other ideas and frameworks. As there are a limited number of cases available, the study is mostly theoretical. I use relevant theories from other fields, conduct their critical assessment and holistic, in-

depth synthesis, and transfer them onto the field of narrative visualizations to construct the new framework. In other words, I aim to create a concept based on existing theories and reflecting existing practices, but I do not test it. In order to address the research questions, at the first step I defined the material for further analysis, retrieving relevant books and articles published in well-cited scientific journals. The paper of Segel and Heer (2010) served as a starting point for defining narrative visualizations and identifying research gaps. The further selection was followed by manual searches in databases, where the keywords were chosen to support the inner logic of the study, covering such topics as visual perception, visual communication, visual branding. Empirical materials were gathered by looking at visualization blogs, aggregators, and websites, such as visual.ly, visualisingdata.com, herokuapp.com.

At the beginning, I will turn to cognitive science for support on the role of visuals in perception and cognition and give a brief explanation of how the brain processes information and in what circumstances images work better than text. Second, narrative visualizations will be considered within visual communications. As this is an eclectic field, which takes its origins in arts, humanities, natural and social sciences, an interdisciplinary character resulted in a lack of a unified method and a variety of scattered concepts and approaches (Goransson et al., 2018, Moriarty, 2002), so relevant theories will be provided and summarized. After that, I will explore the concept of narrative visualizations from a storytelling perspective and explain how storytelling elements can be incorporated into data-heavy materials.

The next section will be devoted to the concepts of infographics and narrative visualizations, their current state in journalism and communications. Although the analysis is theoretical, real-life examples will be showed. A closer look will be taken at General Electric data stories. The company is known for its visualizations, which are strategically used as one of the key parts of its communications efforts. GE specializes in complex challenges and uses data visualization to explain technical solutions in simple visual language, tell the story of the company or a department or introduce global problems to a wider audience. By doing so, I examine the ways in which visual data storytelling is already used in media and brand communications and can potentially be used wider by organizations.

The visual strategic communication perspective will be applied. As it is said by Goransson et al. (2018), contrary to visual rhetoric, visual studies and visual communication approaches, the key characteristic of the visual strategy approach is its focus on purposeful use of visual an organization to advance its mission and to support the organization’s goals. As for the

epistemological and ontological standpoints, it worth to note that due to the complexity of the phenomenon of visual strategic communication, as well as the importance of communication in modern society, the research traditions and perspectives are widely disparate (Ihlen and Verhoeven, 2014). Therefore, although I reject the dichotomy between subjectivist approaches, which are aligned with qualitative methods, and objectivist approaches, which are aligned with quantitative methods, the study is mostly written from a constructionist viewpoint. To be more specific, my intention is not to create a theory that has predictive power but to conduct a context and time dependent research that can throw light on how narrative visualizations can be used in the modern communication environment.

An analysis will be continued by a comprehensive model of approaches to visual data storytelling usage in brand communication, including application areas, their advantages and disadvantages and ethical considerations. This model can serve as a basis of further discussions.

Visual perception and cognitive aspects

"I see what this is about" is a widely accepted expression that illustrates the deep-rooted belief that human vision is a straight path to in*sight,* which is, in its turn, another word that has a strong semantic connection with vision. Indeed, the visual cortex and the eyes act together to provide the highest-bandwidth channel into cognitive centers (Ware, 2002). Due to subtlety and enormous power of the human visual system, cognition and perception occur almost simultaneously, which is why the words *seeing* and *understanding* often act as synonyms.

Visual information processing can be studied from several perspectives, for example, within computer graphics, graphic design, or as a semiotics construct. These approaches have the right to exist, however, in this chapter, I want to turn to cognitive sciences. Following the argument of Ware (2002), I believe that such an approach promises rules and recommendations based not on the contemporary design fashion but rather on the relatively permanent structure of the human cognition, which is not dependent on time and culture.

2.1 Advantages of Visualizations

Up until 1970s, visualization was defined as the process of constructing a visual image in the mind. Nowadays, the word is mostly associated with a graphical representation of concepts or data, therefore, from being an internal construct, it has become an external artifact (Ware, 2002). The role of visualizations is expanding, and a growing number of scholars apply cognitive science of vision to real-life problems of data analysis (Ware, 2002). Understanding of how people get knowledge through visual means holds a special significance in the light of the Internet development. On the one hand, human visual system is a powerful pattern finder, running in a close conjunction with an adaptive decision-making system. On the other hand, modern digital devices have unprecedented computational resources, so improving cognitive connections between

human visual system and web-interfaces can significantly advance the interaction (Chen, 2017).

There are several advantages of visualization over raw data presentation. For example, visualizations are fitting for the modern multilingual environment (Malamed, 2009). They are international and universal and have no limits of grammar and vocabulary. Besides, visualizations can act as an analytic tool. Ware (2002) summarized four manifestations of this. First, visualization helps to understand and interpret vast amounts of data and compare indicators in a real-time. Second, it helps to find data mistakes, as proper visualization reveals information about the way data was collected. Third, it makes anomalies and exceptions clear, so researchers can find properties that were not expected. Finally, visualization eases real-time hypothesis formation, presents visual semantic relationships between indicators, and improves the overall comprehension.

Another advantage of visualizations is a wide range of application areas depending on communication purposes. Visual content can work for emotional and rational messaging, serve for a step-by-step process explanation, facilitate information recall and recognition (Chen, 2017; Malamed, 2009). This is not an exhaustive list of benefits that the visual system involvement brings. The next section is devoted to the question of how the brain processes visual information and how these insights can be used by designers.

2.2 Visual Perception

"Thinking" is something that occurs through interaction with environment and other individuals, but not entirely inside one's heads. Indeed, with eyes and ears closed, comparatively little intellectual work can be carried out (Hutchins, 1995). Since vision engages much of the human sensory system, it is reasonable to begin explanation of how humans acquire knowledge with explanation of how the human visual system works and interacts with the brain. The process starts when the retina, a sensitive eye neuron, detects a luminous stimulation. It transforms the stimulation into electric signals which hold initial characteristics of the object, such as color, shape, distance. These signals reach a primary processing area, where they act as a first and significant point for a detailed analysis (Ware, 2002).

According to Ware (2002), the further process can be divided into three main phases. First, the primary visual cortex and eye neurons take part in parallel processing information and extracting basic features from the visual field, such as movement patterns, color, and texture. This stage is rapid and pre-attentive. Second, the visual field is slowly and serially analyzed in search of patterns, such as areas with the same colors and contours. This stage is highly flexible and influenced by working memory, long term memory and information available from the earlier stage. Both bottom-up feature processing, driven by external stimulus, and top-down attentional mechanisms, driven by memories and expectations, are involved. At the third, highest level of perception, the brain constructs sequences of visual queries in the working memory in order to find patterns for analysis. For example, if a person looks for a road on a map, the visual cortex will start a search for two cities (visual symbols with text labels) and a line between them (standing for a road). In this way, the visual perception is not a simple, unidirectional process, but a result of interaction between previously acquired knowledge, acting as a reference system, and external information, gained by the human visual system (Rensink, 2002).

From that, there are several challenges for visual designers. Visual perception is driven by emotions and experiences, and therefore is influenced by cultural background, age and gender, cognitive abilities, motivation of a viewer (Ware, 2002). Quite often, this causes the difference between perceived and intended meanings of the visuals, as artists and designers have more enhanced skills of visual information recognition. Besides, complex tasks, such as problem solving and new knowledge acquiring, demand active involving of working memory, provoking *cognitive load* (Ware, 2002). It results in information miscomprehension and overlooking of significant facts. Already in 2011, Martin Hilbert from the University of Southern California estimated that everyone is exposed to the equivalent of 170+ newspapers of data per day (Hilbert, 2012), and results of eye-tracking studies prove that users read at most 28% of the words on an average website (Weinreich et al., 2008). Therefore, the primary goal of visual designers is to overcome the cognitive load by grouping and organizing information in a meaningful way to make it clearly and accurately interpreted (Malamed, 2009).

Malamed (2009) argues that one of the potential solutions is to strategically use primitive features of the visuals, which activate mechanisms of early vision and parallel processing. A person detects the presence of elementary visual stimuli, and primitive

features of objects, such as textures, color, orientation, size, and motion, are analyzed before a conscious choice. After the raw data is extracted, the viewer gets an overall perception and has a rough mental sketch of an environment. On this stage, a person unconsciously decides if more enhanced visual systems should be involved into analysis. Later, primitive features are merged into meaningful objects and forms. Therefore, design and a graphic's structure influence the way we recognize and interpret the surrounding reality.

Depending on a visual's informative purpose, designers can organize materials to involve the most relevant mental processes. For example, if a designer wants a viewer to be aware of a fact, and the only request is further recognition, the graphics should catch attention and be memorable, so that it can be encoded into the long-term memory. Using bold typefaces, bright colors and out of the ordinary visuals can be a decision for posters or outdoor advertising. At the same time, instructions, and other materials, created to advance knowledge and skills of viewers, should be simple and clear, well-organized and accommodate ease of reasoning. The best strategy is to use simple figures and forms, which can be understood and recognized pre-attentively (Malamed, 2009). By understanding these principles, designers can improve complex visual systems and significantly speed up visual processing in order to communicate with viewers more effectively, as well-structured visualizations reduce demands on memory, improve comprehension and facilitate interpretation of information (Ware, 2002).

2.3 Words vs. Images

According to Bertin (1983), all the signs that surround us can be divided into two major sign systems. Music, math symbols, and natural language make up the first group of signs, related to auditory information. Visual signs, primarily graphics and figurative imagery, constitute the second system. Four years after Paivio (1987) applied Bertin's theory to brain activity and presented the dual coding theory, claiming that the working memory operates with two fundamentally different types of data, namely *logogens* (for language information representation) and *imagens* (for visual information processing). In other words, visual text enters through the visual system but is processed by structures of logogens, together with sound information. The systems are strongly interlinked; however, they are separate. This theory is not indisputable, also it has been

known that visual and verbal information are processed in different neural centers. The most revolutionary idea was that humans can “think” visually. Nevertheless, when people are asked to compare sizes or colors of objects without images in front of them they use mental images to complete the task. Results of positron emission tomographic studies also show that this task is performed in visual processing centers (Ware, 2002).

As images and text are processed separately, their application areas significantly differ. Images are processed automatically and instantly, without relying on formal logic, and can be understood by regardless of one's language and culture. Research demonstrates that images work better for representing details and spatial structures (Ware, 2002). In particular, they are best for demonstrating structural relationships, for example in routes planners and time planners, such as Gantt charts. Besides, images are better than textual information in terms of recognition and recall, as they can be encoded imaginally and verbally, while abstract concepts can be remembered only verbally (Paivio, 1987). Pictured objects are more familiar for humans, due to their physical presence in real world, which is why it was concluded that people remember images better than text, especially over longer periods of time (Clark & Pavio, 1991), so schemes and charts are actively used in education. At the same time, spoken and written words are ubiquitous, and such systems of signs are the most widely shared, complete, rich, and familiar (Ware, 2002). For this reason, visuals are preferred only if there is a strong need in them and discrepancy is not crucial (Ware, 2002). As a rule, words provide the framework for communication and represent logical conditions, abstract concepts. These insights are used in education (Clark & Pavio, 1991), advertising (Hartnett et al, 2016), graphic and user interaction design (De Angeli et al., 2005).

However, and most importantly, text and visuals in combination are more effective than either in isolation and lead to better information comprehension (Faraday and Sutcliffe, 1999). In this scenario, visual and verbal memory structures form cross-links between each other, and *logogens* with *imagens* are processed simultaneously. Levie and Lentz (1982) conducted a meta-analysis of papers on the effects of text illustration and concluded that in 98% of the case-studies visuals improved understanding of textual content. Thus, programmers, teachers, communicators should use hybrids of visual and natural language codes in order to get most benefits from multimedia presentations, websites, infographics and educational content (Ware, 2002).

2.4 Making Better Visualizations

Considering that we live in the era of information overload, increased competition for an audience's attention needs proven solutions for creating visualizations understandable on an emotional and cognitive levels. In the book "*Visual language for designers*," Malamed (2009) summarized five principles for creating understandable visualizations based on how the brain processes information.

The first principle is closely related to the concept of pre-attentive vision. Visuals should be organized and grouped for rapid scanning, quick recognition, and response (Malamed, 2009). On the one hand, this can be achieved through making important parts of the visual prominent by color, size and orientation, animation, depth, and shape. Special attention should be paid on textures, as we unconsciously identify, and group objects based on how they are separated from background. By that, texture perception provides cues for space and depth perception, and it can be used for either stimulating surface qualities of an object or capturing its essence as a whole. On the other hand, objects themselves should be organized in a meaningful order based on Gestalt principles, such as similarity, proximity, and symmetry. In this way, the meaning of the graphic can be enhanced and facilitated.

Second, unlike books and movies, most of the visuals do not prescribe an order of content consumption, and the time spent looking at visuals is remarkably brief. Therefore, the eye movements control is of critical importance, as they mirror mental processes (Malamed, 2009). Visual designers can draw viewer's attention to the most critical information by establishing visual hierarchy, and, by that, improve content comprehension, promote speedy perception and even manage viewer's emotions. The list of techniques includes, but not limited by, signaling techniques such as size, color, numeration, arrows and caption, and compositional techniques, such as reinforcing the sense of movement or changing the position of the object.

Third, realistic qualities of graphics should be reduced if it does not affect overall comprehension and if the audience possess nominal knowledge (Malamed, 2009). Unlike nuanced photographs and sophisticated 3D renderings, low-fidelity visuals promote quick response and improve focus on details. This happens because high-fidelity graphics with extensive details distract viewers, overload working memory and require several encodings and transformations. In this way, cartoon-like, iconic, and

sketchy visuals with a limited number of elements are best suited for educational materials, wayfinding signs and explanatory graphics.

Fourth, visual communicators should seek for full graphical explanation while involving limited viewers' cognitive abilities, as visually complex visuals produce disordered eye-tracking paths (Malamed, 2009). In practice that does not mean simplifying information but organizing it into smaller units and explaining it gradually with chronological blocks, zoom-ins, or animated frames. This can be also achieved by giving coherent explanation and the context of the data. The former involves cause and effect explanations and meaningful structure of the overall content. The later refers to clear and extensive explanations which guide the viewer's attention and affect interpretations. Providing context in visualizations influence meanings that viewers assign to visuals, because taken out of context, visualizations often do not make any sense.

Fifth, the best visualizations create emotional response of the audience (Malamed, 2009). Emotive graphics arose interest, capture attention before the message is processed, influence decision-making and promote attitude change. Although cognition and emotions are opposites, it is their interplay that influence the way we perceive the world and act. Another advantage of visuals with emotional content is that they generate a so-called state of activation in moderate amounts, which reminds the sensations of newness and positive change. This can be achieved through incorporating visual metaphors and narratives, novelty, humor, and emotionally salient elements. Adherence to this principle leads to improved message recall and recognition.

2.5 Synthesis

Thanks to the visual cortex, humans think visually. Research demonstrates that visual information is processed significantly faster than text, and the role of visuals is growing with the development of information technologies. However, even though in the most cases presenting information in a visual form is beneficial and leads to improved comprehension, advantages of images are doubtful when abstract concepts should be explained, and when the meaning of the message should be conveyed univocally.

Although visuals are a native language for all the humans, a limited number of them can be considered visual communicators. Information visualization requires technical skills,

understanding the basic principles of how the brain works and how visuals can help to achieve communication goals. This knowledge is limited. Besides, as Richard Gregory wrote, “We are so familiar with seeing that it takes a leap of imagination to realize that there are problems to be solved.” Indeed, the number of papers on how organisation’s purposes can be expressed visually is not sufficient. In this way, the next chapters will be devoted to the question of visual communication from a strategic perspective, and the insights will be used in the further analysis.

Visual strategic communication

Visual data storytelling and narrative visualizations are eclectic concepts. Relevant literature could be found in papers and books on media and communication studies, visual studies, human – computer interaction, psychology, graphic design, etc., that is why a complex overview of previous studies is needed. The first section will introduce the field of visual strategic communications. In the second part I will describe the current state of strategic communication practice. After that, the concept of visual content marketing will be analyzed closer.

3.1 Visual strategic communication as a research field

Our society is increasingly visual (Machin, 2014). In the era of information overload, visuals allow viewers to sort and clear information more quickly while steadily improving likelihood of message recall. Latest information technologies, primarily internet and social media, change culture, society, and people's relationship (Becker, 2004), and has a significant impact on how visuals are used in our daily life (Fahmy et al., 2014). The concept of visuals in organizational communication go beyond promotional and advertising materials, such as brochures and leaflets, organizational films and pictures, drawing, arts, and could be extended to strategic plans, diagrams, project management tables, graphs and diagrams, schedules as well as signs on the walls and place decoration (Davison et al., 2012).

This shift reflected in a growing body of studies on the visual aspects of communication. Barnhurst et al. (2004) noted that the field is expanding and there is a growing interest in the phenomenon of visual in other disciplines, primarily anthropology, sociology, and education. Goransson et al. (2018) conducted an analysis of scientific journals in the field of strategic communication and concluded that visual approaches in public relations, advertising and marketing research are increasing. More importantly, they claimed that visual aspects of communication are involved in all the aspects that Hallahan et al. (2007) addresses, such as marketing communication, social media management and public relations, management

communication, technical communication, or political communication. In this way, due to a growth of interest in visual communication, there can be seen a "visual turn" in research (Goransson et al., 2018; Mitchell, 1994; Becker, 2004).

However, when it comes to the studies of strategic aspects of communication planning, studies of how communication practitioners use visuals in their daily work, and how visuals can support organization's strategic efforts, the knowledge gap exists (Davison et al., 2012). Empirical insights into results application are still missing (Zerfass et al., 2017). Besides, the role of the visual has been systematically downgraded by scholars within organizational and management research, and visuals themselves are treated as *"trivial, constituting decoration, insubstantial rhetoric, illusion, or at best, partially reliable information"* (Davison et al., 2012). In other words, visual research in the organizational context requires more theoretical, conceptual and methodological development (Davison et al., 2012).

Among the reasons for the current state of visual communication research are historical roots of the disciplines (Goransson et al., 2018). Visual studies and strategic communication grow largely independently. Strategic communication as a discipline and as a field primarily originates from social sciences, social psychology, and sociology (Hallahan et al., 2007). At the same time, several fields influenced visual studies, including but limited by anthropology and sociology, graphic design, art, film studies, communication (Barnhurst et al., 2004). Visual studies appeared from humanities in the late 1950s, more precisely, from popular culture, film studies and the history of photography. Roland Barthes, Daniel Boorstin, Sol Worth saw an increasing visuality in culture and, to a large degree, used ethnography and semiotics (Barnhurst et al., 2004). Only by the late 1970s visual studies had entered the mass communication scene with the analysis of visual practices in advertising, but that research was limited and widely criticized for highly subjective methods of research. For example, an art historian James Elkins (2003), wrote that visual studies are no more than "*a set of overlapping concerns*" and "*an overconfident activism based on an under-interrogated discourse*." He also criticized the field for a lack of theory and a narrow object and called for more reflective discipline.

Nor visual communication, nor strategic communication have their own method, as well as central or several unifying theories (Moriarty, 2002; Elkins, 2003). However, an increased focus on the visual has opened a diversity of research approaches at the junction between art, art history, digital media, religion, medicine, politics, and law. Relationships between culture, visual and organizations often become a new empirical object. The most notable attempt to

synthesize the disciplines within the framework of strategic communication was made by Goransson et al. (2018). It worth to note that the research methodology was not without flaws but in overall terms the paper brings a completely new and innovative perspective on visual strategic communication research. The rationale behind the statement is that all communication has a visual dimension (Barnhurst et al., 2004), and therefore isolation of visual studies from other research approaches is often problematic, so by limiting the scope of the papers for analysis by such keywords as *visual* and *strategic communications,* a large number of relevant articles is expected to be ignored. However, what is more important is that he researchers proposed an innovative approach, *visual strategy*. Within this framework, Goransson et al. attempt to combine previously defined perspectives, namely visual rhetoric, visual studies and visual communication, with an emphasis on purposeful use of communication by an organization. The authors argue that a growing number of articles on the subject are focusing on how visual elements, symbols and identities guide and translate organization's strategic communication efforts into a visual language.

Visual strategy approach is not yet common among scholars. Even though the role of visuals in communication is considered important, comprehensive studies are yet to come, and the ways visuals can be used strategically by organizations are not classified and systematized.

3.2 Visual strategic communication as a practice

Worth to note that strategic communication practice goes ahead of research, mostly because of the rapid development of the Internet. Being thought of as an ordinary entertainment channel, it is now the main means of communication, especially for Millennials and Generation Z. Worldwide, more than 3.5 billion people have access to the Internet (ITU, 2018), with approximately 2.5 billion active daily users of social networks (eMarketer, 2018a). The impact of the Internet on organizations and consumers has led to an exceptional transformation of marketing and branding, as well as the rise of e-commerce.

Companies respond to these trends by shifting budgets to the digital channels. In 2017, global advertisers spent more on digital than traditional TV (Magna, 2017). These trend makes companies seek new ways of communicating and fundamentally reconsider their approaches to marketing (Christodoulides, 2009; Kim et al., 2010), branding (Scott, 2015, Christodoulides, 2009), and communication in general (Scott, 2015, Hutter et al., 2013).

Visual communications become a part of daily routines of communication practitioners. The rapid growth of social networks conditioned in a growing demand in visual support for messaging, and consequently 94.4 per cent of European communication practitioners feel certain that visual communication will grow in importance. Modern communicators are required to have more competences in visual communication, have a better understanding of new technologies, and professionally use publishing web tools (Zerfass et al., 2017). Compared to 2014, infographics, online videos, instant photos, and business graphics are the areas with the most considerable increase in demand (Zerfass et al., 2017).

Using visual forms in organizational communications pays off. Results of a recent Adobe study demonstrate that Facebook posts with images produce a 650% higher engagement rates than regular text posts (Adobe Systems, 2014). Visual social media tools, primarily Instagram and YouTube, become principal elements of organization's strategic positioning. Overall, there is an increasing presence of the visual in the communication professionals work (Meyer et al., 2013).

Organizations work with images on three levels, namely strategic, operational and design. The *strategic* level of corporate visual communication management focuses on the purposes an organization wants to achieve, the ways it presents and distinguish itself through corporate branding and corporate identity (van den Bosch et al., 2004). The process is two-fold. An organization translate a corporate identity into visuals, and such a self-presentation affects an organization's image in stakeholders' eyes (van den Bosch et al., 2004).

In the best-performing organizations, visuals are used strategically to enhance conceptual understanding of marketing materials, sales proposals, business reports, corporate presentations. However, in the social media era, their widest application area is organization's content marketing efforts, where visual and strategic aspects of communication are treated as a joint variable (Naylor et al., 2012).

3.3 Visual content marketing in strategic brand communications

The evolution of the Internet environment led to ubiquitous digitalization of information products and opened huge opportunities for content creation and dissemination (Varadarajan & Yadav, 2009). Nowadays consumers have more power to decide which content to follow, and this fact marketers to reconsider the idea of brand communications with consumer (Scott,

2015). Content marketing become a key element of modern brand strategies. According to Content Market Institute (2017a), 92% of marketers say their brands view content as a business asset, while 89% of B2B and 86% of B2C companies use content marketing in their online strategies.

Content marketing exist in a variety of forms and is not limited by social media activities, email marketing and blog posts. Other examples may include white papers, webinars, research reports, infographics, online presentations, livestreaming and prepaid video, virtual conferences, interactive tools (Content Marketing Institute, 2017). In a modern digital environment, an increasing number of communication professionals understand the role of digital content as a basis for competitive advantage in organizations. The shift towards publishing instead of paid advertising is a fixed phenomenon, and companies like Burger King, Red Bull, American Express are turning themselves into a "media houses" (Feng & Ots, 2015). Their communication teams focus on in-house production of high-quality content for owned websites, social media, and media partners.

Recent technologies, primarily social media, has changed the way consumers interact with product-related information and caused structural differences in message presentation. Visualizations ubiquitously replace text-based elements, as the users express their preference for visual content (Kim, Oh and Shin, 2010). In non-academic articles, image-based content is considered a driver of customer engagement (McCoy, 2017) with a power to communicate brand stories (Adekunbi, 2018) and enhance click-through rates (Steimle, 2017). The role of visuals in organizations' promotional efforts was demonstrated by PR Newswire. An internal analysis of more than 10 000 customer press releases showed steadily increases in response to the documents that had multimedia. Press releases with photos generated 14% more responses, adding both video and photo resulted in 102% more reactions, while adding other files (e.g. PowerPoint) led to 357% increase (PR Newswire, 2011).

One of the few examples of research that combines visual and business sides of content marketing was a paper of Kim, Oh and Shin (2010). They concluded that visual appeal and musicality of design is a pillar of solid content strategies, together with creativity and entertainment value of scenario, and conciseness and unity of structure. The researchers also stressed that these elements are directly linked to customer satisfaction. Naylor et al. (2012) worked in the same direction. They tracked consumer response on visual Facebook posts and concluded that mini-connections with consumers have positive effects on purchase intentions, word-of-mouth, satisfaction, and brand evaluations.

However, the research gap can be identified between the studies on strategic aspects of content marketing on the one hand and visual design aspects on the other hand. Fetscherin and Usunier (2012) conducted a cross-analysis of 264 relevant articles and concluded that a relatively small number of scholars relate corporate identity to visual identity, even though they agree on the fact that that these areas are interrelated. In particular, in 57% of cases design literature was not cited in business-focused articles.

In this way, visuals should not be considered exclusively from the graphic design perspective, and in this paper, I attempt to look on the visual content from a strategic point of view. Following the arguments above, I argue that visuals can be used successfully to support organization's values, create a mutual understanding among the stakeholders, manage corporate reputation, create a consistent and coherent brand image at all the stages of brand-to-consumer communication.

Storytelling

Stories appeared simultaneously with the emergence of humankind (Duarte, 2010; Fisher, 1985; Lowe, 2000). Back in the years, in the tribes of old, stories circulated around the campfire. Through them, people made sense of the current events, explained occurrences in nature, sunrises, and sunsets, created more overarching metanarratives. These stories transformed into myths and tales and were repeated so often that hundreds of illiterate generations passed them down through hundreds of years (Duarte, 2010). Storytelling is such a universal behavior that a communication professor Walter Fisher (1985) proposed to conceptualize humans as *Homo narrens*.

In many ways, practices of prehistoric storytelling could be found in today's organizations (Barker & Gower, 2010). The stories circulate and define organization's values, mission and goals, enemies, and heroes in the eyes of customers and employees. This section is devoted to storytelling aspects of narrative visualizations, and I try to synthesize the knowledge of why it is beneficial to add storytelling into brand communications.

4.1 Theoretical aspects of classical storytelling

Stories are extremely powerful. Research demonstrates that they have an enduring effect on a child's imagination, critical thinking and creativity (Fredericks, 1997). They also have a psychological impact on adults, as they are deeply rooted in culture and in social psyche (Duarte, 2010; Hyvärinen, 2008). Stories are the most powerful and enduring tool of information dissemination and telling them is a universal cultural activity (Turner, 1980). That is why storytelling is often used in branding. Both storytelling and branding have the same starting point: values and emotions (Fog, 2010). Through telling stories, brands define "who we are" and "what we stand for" in a clear and accessible language, create strong emotional ties to stakeholders on the subconscious level.

A brand story is not limited by visual attributes, brand names and taglines; instead, it needs a compelling story that convince potential consumers in a power of a product to make their

lives better (Fog, 2010). What is more important, storytellers address deep beliefs and desires of message recipients (Alexander, 2011), and reinforce facts with reflective personal, intimate experiences years (Duarte, 2010). Taking into account that emotions are the main driver of consumer behavior, and consumers rarely take decisions based on reason alone (Murray, 2013), storytelling can become an effective tool of communication practitioners.

There is a common confusion between stories and narratives. For example, Roland Barthes and Luc Herman did not differentiate the terms (Ramsdell, 2011). However, they are not entirely equal. Lowe (2000) wrote that the terms story refers to *Fabula*, meaning that the series of events have to happen in chronological, natural order. In contrast, in *Sjuzhet,* or narrative, the same events can be reshaped and reordered, with an aim to better reach the audience or reader and convey the message. Moezzi et al. (2017) notes that the term *Story* is an umbrella for *Narraive*, as the first refers to the series of events or actions themselves, when the second refers to the form those events as represented. Understanding this difference is useful for further discussion on the notion of narrative visualizations, and in further research I primarily refer to stories, as they were defined by Alexander (2011):

A story is a sequence of content, anchored on a problem, which engage the audience with emotion and meaning.

This definition includes the key aspects of an effective problem-based story core, which is often used in fairy tales (Alexander, 2011). An obstacle, a goal or a challenge should be presented. This creates a conflict that involves a reader or a listener. Characters try to overcome the difficulties, and “a new you” appears in problem solving. Finally, the mystery is solved, the goal is reached, and the new knowledge was created (Alexander, 2011).

Several aspects should be mentioned. First, every aspect of this story definition can be applied to nonfiction narratives, even though the term *storytelling* is commonly used for myths and fiction stories (Alexander, 2011; Fog, 2010). White (1973) told that all our experiences can be transformed into stories, and "*the absence of narrative capacity or a refusal of narrative indicates an absence or refusal of meaning itself*". Second, the story’s narrative structure can include flashbacks and flash-forwards, as well as be presented in a non-chronological order. The key point here is extension in time, which lets researchers distinguish stories from anecdotes and data points (Alexander, 2011). Third, the notion of meaning can be placed at the roots of storytelling. Story is a summary of experiences, through which humans make sense of the world and find explanations for everyday conflicts. For example, Nick Montfort

(as cited in Alexander, 2011) argues that a story must have a point, which is the reason for bringing it up.

A classical three-act story structure, proposed by Aristotle, was further expanded into five, six, seven, and even twenty-two steps models. The most recognizable model was developed by McKee (1997). He suggested that compelling stories include five elements which can be found on all the levels of narrative, from beats and scenes to subplots and the global story. The five stages are the inciting incident (either intentional or accidental), progressive compilations, the crisis with a choice between at least two alternatives, the climax choice, and the resolution (McKee, 1997). Overall, "*a story expresses how and why life changes*" (McKee, 1997).

4.2 Storytelling in the system of brand communication

Because people think narratively rather than paradigmatically, the top advertisers use storytelling in their promotional efforts. As Roisin Donnelly, former Mars and P&G corporate marketing director said, "*The brands that are really succeeding today are the ones that differentiate themselves through storytelling*" (Bacon, 2013). The reason behind this statement is that storytelling is important for customers to make sense of their own consumption experience and feeling. Besides, corporate stories are easier to relate as they appear to universal values. Portraying real-life situations, stories inspire more trust than any other communication method (Fog, 2010).

Storytelling got wide acceptance among marketing and corporate communication practitioners because of its power to evoke emotions. As a corporate management tool, storytelling is used for establishing employer-employee relationships and in brand co-creation (Gill, 2011). In the best performing organizations, it goes beyond informing employees about safety issues or entertaining; it rather serves for inspiring people through conveying values, results and visions for the future (Barnes, 2003; Gill, 2011).

On the corporate and campaign levels, stories act as "*the central nervous system*" that ties all the organization's communication together (Fog, 2010). As a rule, the core story gives an answer to the question what the organization is, and all the other stories circulating around products and solutions create and support the organization's image (Fog, 2010). In other

words, brands use these stories to hold conversations between them and consumers, on both unconscious and conscious levels (Woodside et al., 2008).

Storytelling appear in the form of narrative commercials, narrative social media content and blog novels, podcasts, video clips, virtual reality simulations, online games. The toolbox is constantly growing, and in the digital era, storytelling application possibilities became almost unlimited (Miller, 2004).

4.3 Interactive (digital) storytelling

Narrative visualizations are interactive stories placed into the digital environment. However, there is a small number of papers contributing to the field of digital storytelling with communication and media perspectives, since in the most of cases publications are devoted to storytelling usage for educational purposes (de Jager et al., 2017). This results in a lack of a digital story definition, as well as a lack of understanding, what constitutes the scope of digital storytelling examples. For example, Lambert (2009), one of the founders of the Center for Digital Storytelling, wrote exclusively about short audio-visual clips, in which text, music, pictures, animations are combined with voice-over. He also pointed out that such stories are supposed to evoke emotions and add meaning to events (Lambert, 2009).

De Jager et al. (2017) took this approach and referred to digital storytelling as an art genre, along with theater, poetry, and dance. However, this definition appears to be too narrow, as it is not applicable for non-video content and equates storytelling with participatory arts-based research strategies. On the contrary, Nilsson (2010) defined digital stories as those situated and created in online environment, regardless of their format. This understanding of storytelling is quite common, but it is not without flaws. For example, it stays unclear if traditional media stories placed into digital environment can be considered purely digital.

Miller (2004) used a much narrower definition and often referred to digital stories as narrative entertainments. He argued that there are two main distinguishing features of digital storytelling. First, thanks to convergence tendencies, digital stories take many forms. It is not always possible to classify digital content based on the dominant type of media. For example, narratives can be featured simultaneously in the text and graphic formats, combined with music and gamification elements. From that, text materials cannot be considered digital stories. (Miller, 2004).

Second, digital stories should be interactive, since older analog media did not support back-and-forth communications between the material and the user. From that, there are no passive participants in interactive digital storytelling, as the word itself imply active experience and active relationship. Users can influence the material, explore it, and the content reacts on the influence in exchange. Miller repeatedly stressed the revolutionary nature of interactivity because it challenges the very foundations of storytelling theories. He wrote that in digital stories, the core material and the user experience are not placed around a fictional character's journey. Without a fixed sequence of events, it becomes difficult to create complex characters, reveal their needs, and give them arcs. Instead, in digital stories, users become the main heroes and the main actors. Even though the notion of digital storytelling seems to be close to the notion of online games, Miller found a significant difference. Story creators construct artifacts that users consume, while game developers let users explore the content independently and construct artifacts in the process of entertainment (Miller, 2004).

Considering the role of interactivity, this understanding of digital storytelling can be attributed to the concept of *interactive* storytelling, appeared in 1999 at the AAAI Fall Symposium on Interactive Narrative and mostly used in game development industry. This new discipline lies at the intersection of arts, humanities, and computer science, and has close ties with graphic design, game theory, artificial intelligence, and human-media interaction in general. Spierling (2005) defined interactive digital storytelling as "*a hybrid form of game design and cinematic storytelling for the understanding and creation of future learning and entertainment applications*".

The power of users to take meaningful action and see the effects of decisions and choices was defined as *Agency* (Murray, 1998). Knoller (2010) argues that this is the primary feature of interactive storytelling and a key part differentiating interactivity, as high-agency projects are what users want and expect. Besides, having agency within a story increase the psychological connection participants feel with the plot. Stern (2008) even proposed to replace the term "digital storytelling" by "digital storymaking", since the word "telling" cannot be correctly applied to high-agency stories with open endings.

Application areas of interactive storytelling can be categorized into three major groups, namely how-to instructions, narratives about historical events and personal stories that reveal events of one's life, experiences, and emotions (Robin, 2008). The main advantages of interactive narratives are higher attention and interest among target audience, as well as higher memorability rates. Besides, as a rule, they enhance the educational value. Being

involved in so-called edutainment and infotainment stories, users explore real-life situations and get helpful information in a less formal way (de Jager et al., 2017). In this way, interactive digital storytelling a huge step forward in education, as well as potentially in branding, promotion, communication, advertising.

4.4 Synthesis

Most of the research about storytelling concludes that using stories by organizations is beneficial. If stories are accompanied with interactive or visual elements, they better evoke emotions, improve message recall and recognition, as well as the overall perception of communication. In this way, visual stories can become strategic assets of the companies. The interest in studying visuals and storytelling is constantly growing, so in this study, I try to synthetize the concepts and add the dimension of quantitative facts that are supposed to be communicated. Considering that visual data stories, which are in the center of my research, are mostly used among media professionals, I will have a closer look on how data can be transformed into shared interactive stories based on the examples from data journalism and relevant research.

Narrative visualizations

In the previous chapters, the visual and narrative aspects of strategic brand communications were discussed. However, as narrative visualizations are a focus point of the study, the dimension of data should be added. In the next section, I will discuss the concept of data visualizations, which will be later integrated into the proposed framework.

5.1 Data Visualizations

Contrary to widespread belief, visual representation of quantitative information is not a modern development in statistics. Rooted in 15-16th centuries, visual thinking and data visualization have strong ties with cartography, astronomy, economics, and probability theory (Friendly, 2008). However, the discipline of data visualization in its vibrant, hybrid sense, was formed in the last quarter of the 20th century. It owes its origin to the development of interactive statistical computing systems, new methods for visual data analysis and re-invention of visualization techniques for data structures (Friendly, 2008). Nowadays, data visualization is mainly used by those who routinely work with datasets and communicate findings to stakeholders (Bryan et al., 2016), by media professionals, in promotional materials and reports, as well as in educational and training resources.

There is no unified typology of visualizations, so the list includes but limited by charts, graphs, diagrams, big picture views, maps and timelines, data displays. Regardless of whether visualizations are human-generated or computer-based, they can be defined as a cognitive tool that enhances our ability to process, understand and interpret data that is too complicated to be managed by the working memory, such as how phenomena change over space and time or with rotation (Malamed, 2009). The main purpose of data visualizations is to concretize abstract concepts and ideas and to force the audience to instantly comprehend the message (Malamed, 2009).

As it was said before, the human brain process visualizations more easily than long text fragments and lines of numbers, because humans perceive the spatial relationships between the graphic's components to be representative to physical space. These

relationships are metaphorical in charts and graphs and tangible in geographical maps. The message can be communicated by the order of objects and the sequence between them. For example, if event labels are placed close to each other on the timeline, we assume that these events happened one after another. In this way, if designers strategically use the rule of proximity, viewers spend less time and effort on acquiring and processing information. Another important consideration is the role of experience. Humans get visual codes to process abstract graphic through education. For example, unlike children, adults can recognize countries by their contours and get insights from line graphs that compare variables. This means that designers should ensure that the viewers are familiar with a notational system and adapt the visual code if it is not understood by the audience. Contextual notes, captions, labels, and call-outs make abstract graphics more appropriate for a generalized audience, so text can work as an additional channel for transmitting information.

The choice of visualization format depends on communicative goals. For example, timelines are used to help the viewer to make sense of the past events and to anticipate the course of events through series of causes and effects. Organizations can use timelines to explain the company's story and present accomplishments in a more structured and concrete way. Time is a dimension of much stories, and timelines can be used for explaining how a sequence of events led to the current result, how events are connected. However, time can be conceptualized in many ways, not only as a metaphor of a line going from left to right forward into the future. For example, seasons and other natural occurrences can be visualized as a cycle, and reoccurring events can be presented as a spiral. Designers can also present facts in a non-chronological order by placing the most important scenes first (Malamed, 2009). Diagrams are suitable for demonstrating structural and functional relationships between parts of complex systems. In this type of data visualizations, each element stands for the object to which it refers. Hierarchical diagrams illustrate hidden structures, for example, organizational levels; tree diagrams disclose and structure the content; flow and cyclical diagrams explain either linear or recurring processes. Lines, dashed lines, and arrows also communicate meanings and relationships between elements. Data displays and graphs communicate quantitative information. These types of visualization are used for detecting and demonstrating comparisons, trends, and patterns, as they simplify phenomena recognition, provide a shortcut to the message, and promote visual processing.

In this way, data visualizations improve overall content comprehension and ease information recall and recognition. They can be used by communication professionals for visual explanation of complex phenomena, both on the organizational level (e.g. maps and timelines) and the level of campaigns (e.g. visual content marketing efforts).

5.2 Infographics

In many cases, researchers mean the same things using the terms *data visualizations* and *infographics* (Krum, 2013). However, the words are not exact synonyms. *Data visualizations* are pictures created from big sets of numerical values. Above all, they are used by data analysts and data administrators and they are not final products that can be used in organization's communication. The term *infographics* implies more than data visualization. According to Krum (2013) infographics combine data visualizations, text, and illustrations, and they are more similar to articles than charts. Unlike data visualizations, infographics are created with the aim of persuading the audience but not for data presentation or analysis by itself. In other words, infographic designers do not illustrate given information but interpret the content in order to communicate the meaning to the viewer in the most accessible way.

Infographics became mainstream with the raise of the high-speed Internet. The relative number of queries of the term grew more than 25 times over the last eight years. Infographics often serve as marketing tools, solving the challenge of communicating directly to the consumer and grabbing their attention. Krum (2013) gave examples of popular topics for infographics. For example, companies explain how products work and what problems users can solve, what unique features or value propositions there are and how the company deal with environmental issues. Besides, infographics are used in resumes, internal data visualizations, in advertising and PR purposes, e.g. as visual press-releases (Krum, 2013).

Even though a significant role of infographics in marketing, communication, media, education is increasingly recognized by researchers and practitioners, high-quality infographics are still rare. Cairo (2013) argues that the root of the problem concerns the system within which visualizations are created and perceived. To begin with, infographics are evaluated from the aesthetic point of view. For example, in media outlets, they have traditionally been created within art departments and treated as decoration, which makes articles look more attractive for potential readers. However, the main goal of an infographic is to be understandable first, and beautiful after that. Cairo (2013) concluded that the primary function of infographics is to

improve cognition and perception of the content and proposed a concept of *"the Functional Art"*. The concept explains what unifies the best visualizations and how complex information can be simplified.

First, infographic designers should not exclusively present variables and values in an artistic way, but also organize data (e.g. from biggest to smallest indicators), allow viewers to compare data at once and make relationships and correlations evident with color coding, size and other visual accents (Cairo, 2013). As Ben Shneiderman emphasized, "*The purpose of visualization is insight, not pictures*," meaning that information graphics should primarily fulfill information needs. Second, visual projects are good if they communicate a lot with little in the smallest space (Cairo, 2013). Third, the complexity of content and visualization should correlate with audience familiarity with the topic and audience age (Cairo, 2013). In this way, infographics can become one of the best tools for explaining copious amounts of data and unfamiliar concepts in a simple and accessible language.

Among all the typologies of information graphics, the most relevant in the context of the study is that proposed by Lankow et al. (2012). According to them, *explorative* visualizations show the information in a neutral way, and encourage viewers to analyze it on one's own. On the contrary, *narrative* infographics appeal to the audience, and openly or covertly communicate desirable judgments. It worth noting that there are no universal approaches, and the choice of communication style depends on goals at the first place (Lankow et al., 2012).

Interactive infographic is the most sophisticated type of data visualization (Krum, 2013). Their primary advantage is higher engagement rates and longer time spends on the webpage, as users can control and manipulate data in real-time. This creates a personalized, unique experience. Interactive infographics are most commonly used in forms of timelines, maps, and diagrams, so that users can navigate through the categories over time and space and make sense them (Krum, 2013).

5.3 Narrative visualizations

At the intersection of interactive infographics (Krum, 2013) and narrative infographics (Lankow et al., 2012) is the concept of *narrative visualizations*, which was introduced and further developed by Segel and Heer (2010). Narrative visualizations are data stories that differ significantly from written stories and films. While traditional stories present events in a predetermined order, narrative visualizations are interactive; they raise new questions and

propose alternative explanations. The emphasis here is on communicating value and leaving users with specific messages. In this way, narrative visualizations present difficulties for storytellers, as narrative control over the story flow is given to the reader.

Segel and Heer (2010) identified two polar types of narrative visualizations. A strongly *author-driven* type has an almost linear story structure. Interactivity is limited, and, in a greater degree, it serves for information explanation but not examination. This type of data stories relies on messaging and is used by data journalists instead of traditional written stories, in interactive business presentations and educational materials. On a contrary, *reader-driven* stories are highly interactive, and they do not have prearranged ordering of messages or images. These stories are more convenient for hypothesis formation and data diagnostics and are traditionally used in addition to research projects and integrated statistical research.

There is an ongoing discussion on whether reader-driven narrative visualizations can be considered as examples of storytelling. For example, Lee et al. (2015) proposed to redefine the concept of visual data story to exclude reader-driven web-based visualizations that provide completely free exploration of data. There were two reasons behind. First, according to Lee et al. (2015), narration should emphasize the univocal message, and all the story pieces should work for avoiding ambiguity. Second, they stated that all the story pieces should stay in a meaningful order with clear connections between them to support the author's communication goals.

Based on these remarks, I am not intended to completely exclude reader-driven stories from the scope of narrative visualizations. However, I consider that reader-driven stories should provide introduction to the problem, written explanations and messaging that help users to come to the intendent conclusion. Regardless of the approach, narrative visualizations are data stories that help users to work with the data and make insights out of it, and the role of author is to find the balance between readers' possibilities for story discovery through interactive exploration and the intended narrative flow through the interface features (Segel and Heer, 2010).

Based on this classification, Segel and Heer (2010) identified three typical structures of narrative visualizations. So-called *the Martini Glass* structure is the most common across the scope of visualizations. It employs author-driven approach, where the key message is placed in the beginning of the story, and after the key idea is introduced, readers are free to interact with the data. The stem of the glass stands for the path of the author-driven narrative, and

mouth shapes correspond to varying degrees of reader-driven interactivity. In some cases, author-driven elements can be found in the data interaction part, taking the form of observations, cross-links, and additional questions. *The Interactive Slideshow* structure resembles classical presentations, with the difference that interactive elements are added to each slide. Quite often, individual slides follow the martini glass structure, communicating intended messages prior to interactivity. This approach to the structure gives a balanced mix of reader-driven and author-driven strategies. The typical *Drill-down Structure* is reader-driven. Users interact with data without prescribed scenarios, by choosing points of the theme and revealing backstories. The author role is to choose stories in a meaningful way, making users to come to an intendent conclusion without direct messaging.

5.4 Current state of narrative visualization practice

The most widespread use of narrative visualizations is in the field of data journalism. The term *data journalism* got wider acceptance in 2010, when media organizations, primarily the New York Times and Guardian, presented the results of the analysis of the data released by Julian Assange and Wikileaks (Dick, 2014). The term describes the way journalists conduct in-depth investigations into a given topic to draw attention to the problem and to increase the coverage.

The growing status of narrative visualizations on the news websites and on the profession is recognized by both researchers and practitioners (Gray et al., 2012; Van Es & Schäfer, 2017). Several data driven journalism conferences, summits and master classes have been taking place on an annual basis for the last ten years. Examples include but are not limited by the Global Investigative Journalism Conference, the Nordic Data Journalism Conference, the Digital Media Europe conference, IEEE sponsored conferences and symposiums (Data Driven Journalism, 2018). The best practices in this field receive recognition in the form of grants and awards, such as the Data Journalism Awards, launched by the Global Editors Network and Google in 2012, the Digital Award of the British Press Awards, or Digital Innovation of the Amnesty International Media Awards. In other words, data journalism is becoming the industry standard for media organizations (Dick, 2014).

The similar trend can be seen in journalistic practices and in news rooms structures. Engebretsen et al. (2018) conducted a series of interviews with journalists in 10 major news organizations of Scandinavia and in all the media organizations there were groups of

employees responsible for data visualizations and digital storytelling. Specialists had backgrounds in web-design and in graphic design, data analysis and programming. Howe et al. (2017) analyzed the best practices in digital journalism across 32 major digital newsrooms, including Wall Street Journal, The Guardian, Financial Times, Bloomberg News, New York Times, BuzzFeed, Vox. Based on 72 interviews with employees, they concluded that the newsrooms characterized by collaborative atmosphere and distributed workflow, as the key element of successful organizations is a teamwork of gifted web developers, data journalists, graphics editors, and project managers.

Data journalists reinvent the whole news industry, setting up new standards of how stories should be told. There are several reasons for industry development. Traditional journalism is going through tough times (Wellbrock, 2016). Newspapers lose readers and advertising revenues. In the USA revenues from newspaper advertising have dropped from $47.4 billion in 2005 to $14.97 billion in 2015 and this trend is expected to continue (US Census Bureau, 2016). Back in the years, media organizations were exclusive providers of news content. Today can news materials can be gathered from a countless number of websites, eye-witnesses and civil journalists, blogs, and social media accounts. Besides, the information is ranked, filtered through social connections, and feed algorithms, commented, liked and more often, ignored. On the contrary, data journalists make a much better, more accurate job than ordinal news editors, by creating materials fast and direct to the point on an unattainable level for a layman. Such materials tell richer stories, have stronger arguments and have a growing value (Wellbrock, 2016).

Data is a tool, no different from other tools used in journalism, like quotes, videos, and photos. It has long been used by practitioners, but today it can be used for new purposes. For example, journalists can aim to give independent interpretations of official information and to give the whole picture, reveal how abstract threats affect everyday lives of the readers, demonstrate invisible connection between events. In this way, data journalists describe reality in a reasoned way, give people information that allows society to function better and that allows people to live better lives (Gray et al., 2012).

Crisis tendentious in journalism lead to the decrease of positions available, as well as closures of media outlets. For example, in the United States, the information industry saw a decrease of 27 percent in employment between 2001 and 2011, and the number of people working in

the industry was projected to decrease (Bureau of Labor Statistics, 2013). This stays in contrast to the rising demand for communication professionals. Considering common roots of journalism and PR, as well as the increasing blurring of lines between two professions, there is no surprise that quite a few media professionals change their occupation. To place this trend in perspective, it can be beneficial for both sides. Former journalists can bring their knowledge and expertise into the field of strategic communications, causing positive changes in daily practices.

As it was said before, narrative visualizations are perceived by researchers as an exclusively journalistic genre. However, practice shows that it can be used successfully in strategic communications. For example, the most famous aggregator of visual content visual.ly has a section devoted to interactive microsites, and there are examples of projects created for such companies as Nike, Nissan, McAfee, Toyota. In research literature, data-driven PR is also not an entirely new concept. For example, it was mentioned in the context of journalism and narrative visualizations by Gray et al. (2012). However, no real-life examples were given. Hullman et al. (2013) discussed advantages of implementing narrative visualizations into communication practices, but again, spheres of application were not systematized. Segel and Heer (2010), Lee et al. (2015) used some examples of corporate narrative visualizations but discussed them exclusively from a design perspective. In the next section, narrative visualizations will be considered as strategic tools, and the synthesis of the concepts will be conducted.

Synthesis

Organization's corporate identity is a strategic issue. It is influenced by the corporate personality and reflects company's philosophy, goals, style of communication with internal and external stakeholders (Schultz, Hatch and Larsen, 2000). At the same time, it helps to differentiate the organization from competitors and affects corporate values. A strong identity motivates employees, creates a "we-feeling", attracts partners and customers. Corporate visual identity is an integral part of organization's positioning (Schultz, Hatch and Larsen, 2000). It contributes to its image and reputation and makes an organization recognizable. Contrary to a widespread opinion, it is not limited by a company's logo. Instead, it includes all the visual elements that convey the symbolic meanings (Schultz, Hatch and Larsen, 2000). In this way, narrative visualizations can be considered a part of organization's brand communications, and in this way, a holistic view on how and when narrative visualizations can be used, there advantages and disadvantages is needed.

6.1 Narrative visualization advantages

1. Narrative visualizations increase user engagement. Engagement is one of the key metrics in digital marketing. Unlike the number of visits or time on a site, it shows the level of customer involvement, and in its turn, it results in a deeper brand-consumer relationship and brand affinity (Fernandes & Esteves, 2016). Research demonstrates that the better relationships consumers have with brands, the more likely they are to be loyal and to make repeat orders (Srivastava & Kaul, 2016). Being interactive in nature, narrative visualizations can generate up to 70% more conversions than passive content and positively affect other digital metrics, such as CTR and average time spent (Demand Metric, 2014). Besides, it positively affects websites' positions in search engines.

2. Narrative visualizations improve content understanding. The simultaneous usage of visual and textual materials activates two separate processing structures of the working memory (Paivio, 1987). This means that the content is processed faster and with fewer mistakes. Due to the possibility of implementing contextual notes, remarks and crosslinks,

viewers can answer their questions without leaving the web page (Segel & Heer, 2010). In their turn, visuals, diagrams, and charts concretize abstract concepts and ideas, which entails better comprehension (Ware, 2002). Eventually, this means that the best strategy to make appealing and persuasive content is to support theses with relevant explanatory visuals. For example, General Electric Canada used an interactive graph to explain the topic of heat recycling in energy production (GE Reports Canada, 2016). The complex process was presented in a simple cartoon-like form, accompanied with relevant notes and interesting facts. This visualization is noticeably more accessible for a general user than a text block.

3. Narrative visualizations impart memorable knowledge. This becomes possible due to the combination of narrative and visual elements. On the one hand, story-based content intertwine emotion into meaningful experience, convey values and beliefs, and is better remembered than figures and facts (Duarte, 2010). On the other hand, picture-based materials activate visual memory and visual attention, which are more powerful than verbal and auditory memory in terms of recognition and recall (Ware, 2002). In other words, interactive visual stories engage with users and make both the content and the brand more memorable and attractive.

4. Narrative visualizations allow users to create personalized paths. Interactive elements create unique experience for each user. The users can decide which scenario to follow depending on personal interests and goals, and by that, get deeper insights into topics of interest (Miller, 2004). For example, those who visit GE Transformation webpage, can learn how the company developed its practices over 140 years in 8 areas, namely leadership, light, energy, transportation, aviation, healthcare, capital, appliances, and broadcast (General Electric, 2016). This creates memorable experiences and deeper engagement, as well as higher comprehension scores. In this way, users can focus on the aspects that are relevant for them and get deeper, more detailed knowledge.

5. Narrative visualizations are something of a novelty. Although traditional infographic is one of the most powerful tool of content marketing, it becomes difficult for organizations to stand out of competitors by using them. The fact of the matter is that about 67 percent of B2B organizations use infographics and this number is about to grow (Content Marketing Institute, 2015). While static visualizations are becoming easier to make because of the development of graphic design software, interactive visualization creators are required to have more enhanced and diverse skills (Rose, 2017). In this way, narrative visualizations create a positive novelty effect, which enhances memory and bring overall satisfaction.

6. Perceived trustworthiness increases. In the era of information overload, data-rich stories are more reliable than statements without proofs and testimonies (Gray et al., 2012). With the help of narrative visualizations, communication professionals can build a strong position supported by data and by that, make a brand an object of trust. Besides, when a comprehensive analysis is carried out and persuasive facts are presented, users feel less like something is consciously hidden from view (Gray et al., 2012). An iPad app "GE Annual Reports" is a vivid example of this principle integration (Fathom, 2011). Users can explore 5480 pages of GE reports 1892-2011, seeing how certain keywords were used over time. This app reveals a history of GE as a company and a history of the USA, demonstrating how economic depressions, world wars, and energy crises were discussed and portrayed. In this way, users can see the whole picture and get valuable, personal insights.

To sum up, well-made interactive narrative visualizations transform bullet points into engaging experience, where a user has a private conversation with an expert on the data. This provides a rather limited opportunity for modern organizations to stand out of competitors, so narrative visualizations can serve as a source of competitive advantage.

6.2 Narrative visualization disadvantages

Although advantages of narrative visualizations are clear, there are important disadvantages that need to be considered. They can be conditionally divided into three major groups.

First, sophisticated narrative visualizations require rare technical expertise, specific skills and knowledge from creators (Lankow, 2012). Therefore, most of data journalism professionals work in project groups, and this practice must be adopted in data-driven communications. This can be expensive for small and middle businesses, where a lack of sufficient budget and technical expertise are observed. Narrative visualization production is also time-consuming, as processes, such as scenario writing, data analysis, design, web development, and tests cannot run at the same time (Gray et al., 2012). However, the development of software tools makes it easier to create visual stories for those who do not have relevant hard skills. For example, a software company Tableau provides intuitive solutions for interactive data visualization. Narrative visualizations with limited interactivity can also be created with PowerPoint and Adobe CC tools. In this way, companies with limited resources available can still take advantage of narrative visualization implementation, but not as a permanent part of a content marketing plan.

Second, unlike image and text-based articles, interactive visualizations may be incomparable with certain devices. Besides, some web-based formats, such as Flash, become obsolete and not compatible with modern web-browsers, so the content cannot be displayed. For example, most of the visualizations on the GE Visualization webpage were created in 2009 – 2010, and they cannot be accessed without an embedded Adobe Flash Player. Even though the visualization 'Measuring Hospital Quality' can be accessed, it does not work correctly as some blocks are displayed on top of each other (General Electric, 2009). Another technical restriction is the load time, because technically complex visualizations can slow down the website and be annoying. However, this does not mean that narrative visualizations should be abandoned at all. Instead, I argue that they should be repeatedly tested over time, reasonably simplified and posted on subpages, so that they are available by click and for interested users.

Third, and most important, only 10–15% of users interact with visualizations (Baur, 2017). This number was estimated by Gregor Aisch, a former graphics editor at The New York Times, and it worth noting that The New York Times has one of the best content creators team in the field. This means that the vast majority of users prefer to consume the content passively, and information placed as tooltips or rollovers will not necessarily be read (Baur, 2017). This is an important fact, but it rather refers to how the design space should be organized. The basic framework of the story and messaging should be presented on basic layers when interaction can be used for entertainment and content clarification. In other words, visualization designers should focus on the audience and use the power of primitive features to show desirable paths of interaction, but the narration itself should be placed on the top.

In this way, although narrative visualizations are an excellent source of competitive advantage, their practical application is quite limited for objective reasons. However, they can be used by organizations for strategic problem solving, and it can be assumed that in future their usage will expand.

6.3 Application areas

Narrative visualizations can be used in all the strategic communication sub-disciplines, such as marketing communications, public relations, organizational communications, and corporate communications. More precisely, I argue that their application areas are wider than for

traditional infographics and digital stories, and almost every organizational narrative can be transformed into interactive, viral experience. To begin with narrowing down the focus, I will consider infographics application areas and suggest how they can be expanded to narrative visualizations. Lankow et al. (2014) defined two types of infographics, namely brand-centric and editorial. The former communicates ideas that are directly related to the organization, its mission, and its goals. The later refers to visualizations that do not promote the brand directly. This dichotomy has the right to exist, however, I argue that there are hybrid forms of visualizations when it comes to interactive data stories.

Brand-centric narrative visualizations

1. 'About Us' webpages. According to Miller (2004), digital narratives are typically used in three situations, namely how-to instructions, personal stories, and stories about historical events. For further usage, I will combine historical and personal stories into the concept of organizational interactive narratives. With this tool, organizations can communicate to a general audience who they are, what they stand for, how and where they work. As it was said before, General Electric uses such interactive data stories in their promotional efforts instead of textual, bullet point explanations. For example, GE Transformation timeline (General Electric, 2016) shows how the company employed innovations over its history, and GE World in Motion interactive map (General Electric, 2018) allows users to explore how the organization invents the new industrial era. Users can navigate through data and learn more about aspect that they are interested in, so they get deeper and more personal insights. In this way, organizational stories can be presented in the forms of charts, complex graphs, maps and timelines, data displays, and be used in communication with both internal and external stakeholders.

2. Instructions. How-to instructions (Miller, 2004) can also be presented in a digital story form. On the one hand, with this type of narrative visualizations, companies can demonstrate how they operate on a corporate level, for example, how goods are produced and how information is transformed into valuable assets. Google used such narrative visualizations to explain how search works (the link is now unavailable), while the Engine Alliance (2016) used how-to stories to explains the way the company uses big data in aviation. On the other hand, narrative visualizations can be used on a product level. In particular, if the company produces technically complicated goods or works with digital products, visual data stories can

be used to explain the product or a service in a more accessible form. As a rule, companies create traditional infographics for these purposes. However, considering narrative visualization advantages, it can be expected that interactive stories will be used more widely.

3. Corporate documents. Another area, in which narrative visualizations can be used, is corporate documents for public usage, such as white papers and annual reports. Unlike static web sites produced by taking an organization's brochure without consideration of new medium possibilities, interactive documents are engaging and attract more attention. This becomes possible because consumers are provided with targeted and personalized information, placed in a smaller space. GE 2015 Annual Report (General Electric, 2015) is not an enhanced but still a representative example. Users can choose a subtopic they are interested in and learn about company's reasons for pride and plans through videos, animated pictures, text blocks and simple infographics. There is also a possibility to learn more about a topic of interest with hyperlinks embedded into captions and notes. Unlike other types of narrative visualizations, such stories are more author-driven and are close to interactive magazine format.

Editorial narrative visualizations

One of the most important application areas of narrative visualizations is content marketing. By content marketing here I mostly mean comprehensive interactive projects and blog posts similar to data journalism publications that are affiliated with concrete brands but do not have an aim to promote it directly. In other words, following the argument of Lankow et al. (2012) I argue that such editorial infographics should not have references to the company except for the logo at the bottom of the page. Instead, it should cover an interesting topic and be related to the general industry of an organization.

Even though such editorial stories are the most common among the scope of interactive data visualizations, only a few of them can be attributed to the best practices due to a lack of narrative elements or excessive direct promotion of goods or services. One of the good examples of interactive data stories is the Viacom Fan theory website (2017). It presents results of the analysis of how culture affects the cinematic and TV stories and how such stories affect culture. This is an exemplary example of both content marketing and narrative visualizations, as the authors provide users with surprising and statistically proved facts that are interconnected into a story. As users can freely navigate through the data, they can focus

on what they are interested in, but thanks to clear structure, captures and messaging their attention is guided. As visual data stories are still rare, they attract increased audience attention and have a potential to become viral. In this way, the brand can gain awareness and improve SEO positions, while the user gains entertaining and memorable visual experience.

Hybrid formats

In exceptional cases, narrative visualizations can be used for showing the features and characteristics of the digital product itself. For example, this tactic is used by Google. Google News Labs created a website, devoted to how the presidents of the USA covered the main themes of internal and external politics in their inauguration speeches (Inaugurate, 2016). In addition to the historical outlook, users are invited to explore, how popular these topics are in today's search. In their turn, Google Chrome team created a website named 'A Spacecraft for All', where the data of ISEE-3 is accumulated and visualized (Chrome Experiment, 2014). As it is written in the beginning, users gain the most sophisticated experience if they surf in the internet with Google Chrome, as WebGL and WebAudio help create an immersive experience of the story.

Although I did not find any existing examples, I argue that narrative visualizations can act as a final product, and this applies not only to the portfolio infographics of digital designers. Narrative visualizations can replace market reports as we know them, transforming numbers into visual stories, and such interactive reports can become the new medium. For example, Montclare SaaS 250 webpage presents results of an internal study conducted by Montclare (Montclare, 2017). It has nine major sections, and each of them contains interactive tables, maps and diagrams, which simplify the perception of content.

Delimitations

Although the areas where narrative visualization can be used mostly overlap with the areas of infographic application, I want to highlight that in two cases visual data stories implementation can be disadvantageous in terms of contribution/result ratio. First, this refers to infographic resumes, suggested by Krum (2013). Although such resumes will stand out and be memorable, their execution is generally too expensive, especially considering the fact that their audience is severely limited. In this way, static visualization usage is beneficial and sufficient. Second, I argue that interactive data storytelling is irrelevant for press releases, as

was suggested by Lankow et al. (2012). Without doubt, such stories are interesting and appealing for both readers and journalists, however, due to technological limitations, they are inconvenient for distribution, quoting and reprinting.

6.4 Ethical considerations

Visualizations allow for an ambiguous interpretation in a greater degree than texts, offering controversial emphasis and misunderstanding of data (Ware, 2002). Therefore, content creators must be more pay more attention to ethics than ever before during all steps of the process, including planning, data gathering and data analysis, publication, and further dissemination. This is extremely important considering that narrative visualizations are a part of the knowledge and truth construction process, and the tool by which users make sense of the world (Cairo, 2013).

The first group of issues can arise during data collection. In the one hand, the Internet has made massive amounts of data available, however, that does not mean that it can be freely used by researchers and creators due to privacy and security of people involved (Schäfer, & Van Es, 2017). In other words, data should be collected with copyright and authorship consideration. On the other hand, sources should be verifiable and reliable. Data should be recent and supported by attribution of the original source whenever possible (Schäfer, & Van Es, 2017). Privacy, harm, and informed concern issues must also be taken into account. If the research can affect human subjects, ethical decision-making guidelines, articulated in the UN Declaration of Human Rights, the Declaration of Helsinki and the Nuremberg Code should to be adopted. Researchers must find a balance between the social benefits and the rights of people involved (Schäfer, & Van Es, 2017).

At the stage of data gathering and analysis, it is desirable for creators to share underlying data to increase the credibility and transparency of data stories. Ideally, stories should be constructed on the full data that was not manipulated in any way (Duarte, 2010). Creators should also refuse to include elements designed to make the story more ‘spectacular’ and do not exclude facts that do not stick to available evidence (Cairo, 2013). Finally, as it was said before, narrative visualizations are originally a form of visual journalism, so it is desirable for them to be created under the same ethical standards as other journalistic texts (Gray et al., 2012).

Ethical concerns may also arise at the design stage. For example, it is a common situation when a designer must decide whether to change the scale of the chart so that it starts from a number different from zero to make the trend clearer (Huff, 1954). There are also other ways to manipulate data representation, such as usage of bubble charts instead of line graphs and exclusion of time intervals (Huff, 1954). These are not an unethical choice but a risky one, and it can further affect credibility of the whole visualization. In this way, designers should avoid visualization tricks that distort the perception of information, even if the data itself is not manipulated directly.

To sum up, I argue that narrative visualization creators should strive for visual and narrative excellence based on the material they have, without information manipulation or any legitimate but unethical solutions. Such an attitude towards information visualization pays off in terms of both reputation and, potentially, organization's core performance.

Conclusion

Nowadays, due to the changes in media culture and significantly increased competition from globalization, it becomes more difficult for organizations to reach their target audience with traditional business communication tools. In the pursuit of audience attention, an increased number of communication professionals turn to visual content, as according to research results, it improves content understanding and memorability. The concept of visual content is not limited by social media pictures and images that go with links and text materials. Instead, researchers and practitioners apply a wider perspective, noting an increased presence of visual materials in daily work. This study was focused on how narrative visualizations, an emerging form of infographics, can be used strategically by organizations in their communication efforts. The results indicated that although this tool is not without its drawbacks, it can be used in both short- and long-term communication activities.

7.1 Contributions of this study

Taken together, the results of the study demonstrate several implications for practitioners and researchers. First, narrative visualization implementation is beneficial for organizations because such content brings benefits of narrative, visual and data-oriented campaigns. In particular, visual aspect has a special importance if an organization's goal is to show structural relationships between objects, moments and places, or present complex information in a more comprehensive manner. However, as pictures do not set up the unequivocal interpretation, the best results can be reached if visual information is accompanied by relevant notes and captures. In its turn, storytelling, either visual or textual, makes content more appealing, improving message likelihood and recall. As for data stories, they are generally more reliable and engaging. In this way, narrative visualizations can be used by organizations if a complex topic should be communicated in an accessible manner or it wants to involve stakeholders in an innovative and inspiring way.

Second, application areas of narrative visualizations are wider than application areas of traditional infographics. On the one hand, they can be used by organizations to explain what the company stands for, how and where it operates, and how certain solutions work. Such a type pf information representation allows users to create their own paths and make their own insights based on data presented. On the other hand, narrative visualizations can be used in content marketing efforts, as such data-heavy interactive stories are engaging, educative and sharable. Besides, as narrative visualizations are complicated digital products, they can be used to demonstrate the possibilities of technological products and services themselves, and even be on the market as independent services and studies. However, as narrative visualizations are both money and time consuming for content creators, their usage is expected to be limited among small and middle businesses. Therefore, I argue that this solution should be mostly used in the strategically important areas, such as to tell the organization's story, as in this case, narrative visualization will have a long-lasting effect on organization's image and a website's performance metrics.

The number of advantages of narrative visualization overweight the number of disadvantages. Being a new and innovative tool of content creators, narrative visualizations create memorable and powerful experience for website users, improving SEO positions and engagement rankings. Upon the whole, well-made narrative visualizations work better than texts and images alone. However, this is still an underappreciated tool among communication professionals, mostly because the role of visuals in strategic positioning had been downgraded for many years. Technical limitations and production issues, as well as a lack of best practices, prevents the spread of narrative visualizations. However, I argue that there are all prerequisites for a more active usage of interactive data stories by organizations, and therefore, as an answer of the market, development of technical capabilities can be expected.

In sum, the study indicates that narrative visualizations have a potential to be used more widely in brand communications and related spheres, as well as in education. In line with Goransson et al. (2018), I argue that visual content, and narrative visualizations in particular, can and should be used strategically by organizations, and there is a need in a better theoretical development of the topic.

7.2 Directions for further research

This paper had a conceptual nature, as a role of narrative visualizations in brand communications was not problematized. The topic itself is new and underdeveloped, therefore

it opens up ample opportunities for researchers. To begin with, I considered narrative visualizations exclusively from organizational perspective, and I used secondary data to prove the superiority of narrative visualizations. However, actual data on user response was not gathered, so I suppose that a study of how narrative visualization is perceived from a client perspective can be beneficial for both practitioners and researchers. It can shed light on other advantages and disadvantages of narrative visualizations, as well as improve the quality and efficiency of interactive data stories soon. A promising direction for future research is also to focus on the gap between intendent and perceived meanings in narrative visualizations.

Another research direction is the study on how storytelling elements can be incorporated into data stories. Although there are papers that are indirectly related to the topic, it is still not clear how the story should be structured and how interactivity influences users. Besides, it can be interesting to look on how leading visualization designers employ three- or five-steps narrative structure in stories that are partly driven by users. From design perspective, eye-tracking studies and experiments could provide insights on how elements should be placed to make viewers understand content faster and with fewer mistakes. Besides, it can be interesting to investigate in what way interactive data stories should differ in communication campaigns and in journalism, and what rhetorical figures can be used in both cases for amplification of the effect. Finally, a comprehensive study of visualization ethics is needed, as current guidelines mostly take their origins in medical and psychological research of 1950s, being obsolete and not entirely relevant.

In conclusion, this paper lay the groundwork for future work on narrative visualization usage, primarily in strategic communications but also in data-journalism, education, and other related spheres. Based on the analysis, I argue that narrative visualizations should be used wider by communication professionals, and more in-depth research is required for further development of the tool.

References

Adekunbi A. (2018). Three Ways to Make Visual Content Marketing Work for You In 2018. Retrieved from https://www.entrepreneur.com/article/308166.

Adobe Systems. (2014). Social Intelligence Report, Adobe Digital Index, Q4 2013. Retrieved from http://www.cmo.com/content/dam/CMO_Other/ADI/SocialIntelligenceReport_Q42013/ADI_SocialIntelReport_Q413.pdf.

Alexander, B. (2011). *The new digital storytelling: Creating narratives with new media.* Santa Barbara, California.

Allen, M., & Preiss, R. W. (1997). Comparing the persuasiveness of narrative and statistical evidence using meta-analysis. *Communication Research Reports*, 14(2), 125-131.

Bacon J. (2013). Brand storytelling: Narrative theory. Retrieved from https://www.marketingweek.com/2013/07/17/brand-storytelling-narrative-theory/.

Barker, R.T., Gower, K. (2010). Strategic application of storytelling in organizations toward effective communication in a diverse world. *Journal of Business Communication*, 47 (3), 295-312.

Barnes, E. (2003). *What's Your Story? Harvard Management Communication Letter July 2003*. Boston: Harvard Business School Publishing Corporation.

Barnhurst, K.G., Vari, M. and Rodríguez, Í. (2004), Mapping visual studies in communication, *Journal of Communication*, 54(4), 616-644.

Baur D. (2017). The death of interactive infographics? Retrieved from https://medium.com/@dominikus/the-end-of-interactive-visualizations-52c585dcafcb.

Becker, K. (2004). Where is visual culture in contemporary theories of media and communication, *Nordicom Review*, 25(1/2), 149-158.

Bertin, J. (1983). *Semiology of Graphics*. University of Wisconsin Press, Madison.

Borkin, M. A., Bylinskii, Z., Kim, N.W., Bainbridge, C. M., Yeh, C. S., Borkin, D., Pfister, H., & Oliva, A. (2016). Beyond memorability: Visualization recognition and recall. *IEEE Transactions on Visualization and Computer Graphics*, 22(1), 519–528.

Bryan, C.; Ma, K-Liu.; Woodring, J. (2016) Temporal Summary Images: An Approach to Narrative Visualization via Interactive Annotation Generation and Placement. *IEEE Transactions on Visualization and Computer Graphics* 23(1): 511-520.

Bureau of Labor Statistics (2013). Employment in the Information Industry and its components, 1990-2011. Retrieved from https://www.bls.gov/spotlight/2013/media/.

Cairo, A. (2013). *The functional art: An introduction to information graphics and visualization.* Berkeley, CA: New Riders.

Chen, H. M. (2017). An Overview of Information Visualization. *Library Technology Reports*, 53(3), 21-25.

Christodoulides, G. & de Chernatony, L. (2004). Dimensionalising on- and offline brands' composite equity, *Journal of Product & Brand Management*, vol. 13 no. 3, 168-179.

Chrome Experiment (2014). A Spacecraft for All: The Journey of the ISEE-3. Retrieved from http://spacecraftforall.com.

Clark J.M., Paivio A. (1991). Dual coding theory and education. *Educational Psychology Review.* 3, 149-210.

Columbus, L. (2017, December 24). 53% of companies are adopting big data analytics. Retrieved from https://www.forbes.com/sites/louiscolumbus/2017/12/24/53-of-companies-are-adopting-big-data-analytics/#433d6b739a19.

Content Marketing Institute, (2015). 2016 Benchmarks, Budgets, and Trends—North America. Retrieved from http://contentmarketinginstitute.com/wp-content/uploads/2015/09/2016_B2B_Report_Final.pdf.

Content Marketing Institute (2017). Cover All the Bases With 21 Winning Content Marketing Tactics. Retrieved from http://contentmarketinginstitute.com/2017/05/winning-content-marketing-tactics/.

Data Driven Journalism (2018). Upcoming Events. Retrieved from http://datadrivenjournalism.net/events.

Davison, J., McLean, C. and Warren, S. (2012), Exploring the visual in organisations and management. *Qualitative Research in Organisations and Management: An International Journal*, 7(1), 5-15.

De Angeli, A., Coventry, L., Johnson, G., & Renaud, K. (2005). Is a picture really worth a thousand words? exploring the feasibility of graphical authentication systems. *International Journal of Human - Computer Studies*, 63, 128-152.

De Jager, A., Fogarty, A., Tewson, A., Lene e, C., & Boydell, K. M. (2017). Digital Storytelling in Research: A Systematic Review. *Qualitative Report*, 22(10), 2548-2582.

Demand Metric (2014). Content & Buyer's Journey Benchmark Report. Retrieved from https://www.demandmetric.com/content/content-buyers-journey-benchmark-report.

Dick M. (2014) Interactive Infographics and News Values. *Digital Journalism*, 2(4), 490-506.

Duarte, N. (2010). *Resonate: Present visual stories that transform audiences*. Hoboken, NJ: John Wiley & Sons.

Elkins, J. (2003). *Visual studies: A skeptical introduction*. New York: Routledge.

Elliot, M., Fairweather, I., Olsen, W. and Pampaka, M. (2016). *A dictionary of social research methods.* 1st ed.

Engine Alliance (2016). Big data in aviation. Retrieved from http://ernestoolivares.com/interactivity/samples/aci/.

eMarketer. (2018). Number of social media users worldwide from 2010 to 2021 (in billions). In *Statista - The Statistics Portal*. Retrieved from https://www-statista-com.ludwig.lub.lu.se/statistics/278414/number-of-worldwide-social-network-users/.

Engebretsen, Martin, Kennedy, Helen & Weber, Wibke (2018). Data Visualization in Scandinavian Newsrooms. Emerging Trends in Journalistic Visualization Practices. *Nordicom Review* (ahead of print).

Fahmy, S., Bock, M.A. and Wanta, W. (2014), *Visual Communication Theory and Research: A Mass Communication Perspective*, Palgrave Macmillan, Basingstoke.

Faraday, P. and Sutcliffe, A. (1999). Authoring animated Web pages using "contact points." *Proceedings of CHI '99*, ACM, 458–465.

Fathom (2011). Annual Reports 1892 – 2011. Retrieved from https://fathom.info/reports/.

Feng, S. and Ots, M. (2015). Content marketing: A review of academic literature and future research directions. *Presented at EMMA conference 2015*, Hamburg, 2015.

Fernandes, T., & Esteves, F. (2016). Customer engagement and loyalty: A comparative study between service contexts. *Services Marketing Quarterly*, 37(2), 125-139.

Fetscherin, M., Usunier, J. (2012) Corporate branding: an interdisciplinary literature review. *European Journal of Marketing* 46(5), 733-753

Figueiras, A. (2014), How to tell stories using visualization. *Information Visualisation (IV), 2014 18th International Conference on*, 18 – 26.

Fisher, C. (2016, October 20). *LinkedIn unveils the top skills that can get you hired in 2017*. Retrieved from https://blog.linkedin.com/2016/10/20/top-skills-2016-week-of-learning-linkedin.

Fisher, W. R. (1985). The narrative paradigm: An elaboration. *Communication Monographs*, 52, 347–367.

Fog, K. (2010). *Storytelling: Branding in practice.* Berlin: Springer.

Fredericks, L. (1997). Developing literacy skills through storytelling. *The Resource Connection* (Spring) 2(4).

Friendly M. (2008) A Brief History of Data Visualization. In: *Handbook of Data Visualization.* Springer Handbooks Comp. Statistics. Springer, Berlin, Heidelberg.

General Electric (2009). Measuring Hospital Quality. Retrieved from https://www.ge.com/visualization/hospital_quality/.

GE Reports Canada (2016). GE Cogeneration – the More Power for You. Retrieved from https://gereports.ca/cogen/.

General Electric (2015). GE Annual Report 2015 Retrieved from https://www.ge.com/ar2015/.

General Electric (2016). Transformation timeline. Retrieved from https://www.ge.com/transformation/.

General Electric (2018). World in Motion. Retrieved from https://www.ge.com/world-motion.

Gill, R. (2011). Corporate Storytelling as an Effective Internal Public Relations Strategy. *International Business and Management*, 3(1), 17-25.

Goransson, K., Fagerholm, A.S. (2018) Towards visual strategic communications: An innovative interdisciplinary perspective on visual dimensions within the strategic communications field. *Journal of Communication Management*, 22(1), 46-66

Gray, J., Bounegru, L., & Chambers, L. (Eds.) (2012). *The Data Journalism Handbook.* Sebastopol, CA: O'Reilly Media.

Hallahan, K., Holtzhausen, D., Ruler Van, B., Vercic, D. and Sriramesh, K. (2007), Defining strategic communication. *International Journal of Strategic Communication*, 1(1), 3-35.

Harris, J. (2015). Beauty in Data. In: Bihanic D. (eds) *New Challenges for Data Design*. Springer, London.

Hartnett, N., Romaniuk, J., & Kennedy, R. (2016). Comparing direct and indirect branding in advertising. *Australasian Marketing Journal*, 24, 20-28.

Hilbert, M. (2012). How much information is there in the "information society." *Significance*, 9(4), 8–12.

Howe, J., Bajak, A., Kraft, D., Wihbey, J. (2017). *Collaborative, Open, Mobile: A Thematic Exploration of Best Practices at the Forefront of Digital Journalism* (May 26, 2017). Retrieved from http://www.storybench.org/learned-three-years-interviews-data-journalists-web-developers-interactive-editors-leading-digital-newsrooms/.

Huff, D. (1954). *How to Lie with Statistics.* Norton, New York.

Hullman, J., Diakopoulos, N. (2011). Visualization rhetoric: Framing effects in narrative visualization. *Visualization and Computer Graphics, IEEE Transactions*, 17(12), 2231–2240.

Hutchins, E. (1995). *Distributed Cognition*. MIT Press, Cambridge, MA.

Hutter, K., Hautz, J., Dennhardt, S. & Füller, J. (2013). The impact of user interactions in social media on brand awareness and purchase intention: the case of MINI on Facebook. *Journal of Product & Brand Management*, 22(5/6), 342-351.

Hyvärinen, M. (2008). Analyzing narratives and story-telling. In: *Alasuutari P, Bickman L. & Brannen J (eds) The SAGE Handbook of social research methods.* Los Angeles, Sage publications: 447–460.

Inaugurate (2016). Beginning of a presidency: inauguration speeches in search. Retrieved from http://inauguratespeeches.com.

ITU (2018). Number of internet users worldwide from 2005 to 2017 (in millions). In *Statista - The Statistics Portal*. Retrieved from https://www-statista-com.ludwig.lub.lu.se/statistics/273018/number-of-internet-users-worldwide/.

Kim, C., Oh, E., & Shin, N. (2010). An empirical investigation of digital content characteristics, value, and flow. *Journal of Computer Information Systems*, 50(4), 79-87.

Knaflic C.N. (2015). *Storytelling with data: a data visualization guide for business professionals*., Hoboken, NJ: John Wiley & Sons

Knoller N. (2010) Agency and the Art of Interactive Digital Storytelling. In: *Aylett R., Lim M.Y., Louchart S., Petta P., Riedl M. (eds) Interactive Storytelling. ICIDS 2010. Lecture Notes in Computer Science*. Springer, Berlin, Heidelberg.

Krum, R. (2013). *Cool Infographics: Effective Communication with Data Visualization and Design.* Indianapolis, IN: John Wiley & Sons.

Lambert, J. (2009). *Digital Storytelling, capturing lives, creating community* (Third ed.). Berkeley, California: Digital Diner Press.

Lankow, J., Ritchie, J. and Crooks, R. (2012). *Infographics: The Power of Visual Storytelling*. Hoboken, N.J.: John Wiley & Sons.

Lee, B., Riche, N.H., Isenberg, P., Carpendale, S. (2015). More Than Telling a Story: Transforming Data into Visually Shared Stories. *IEEE Computer Graphics and Applications*, 35, 84-90.

Levi, W.H., &Lentz, R. (1982). Effects of text illustrations: a review of research. *Educational Communication and Technology Journal* 30(4), 195-232.

Locoro, A., Cabitza, F., Actis-Grosso, R., Batini, C. (2017). Static and interactive infographics in daily tasks: A value-in-use and quality of interaction user study. *Computers in Human Behavior*. 71, 240 – 257.

Lowe, N.J. *The Classical Plot and the Invention of Western Narrative*. Cambridge UP: New York, 2000.

Machin, D. (Ed.) (2014), *Visual Communication: Handbooks of Communication Science*, Vol. 4, De Gruyter, Boston, MA.

MAGNA (2017). Global Advertising Forecasts – December 2017. Retrieved from https://www.magnaglobal.com/wp-content/uploads/2017/12/MAGNA-Global-Forecast_Winter-Update_Final.pdf.

Malamed, C. (2009). *Visual Language for Designers: Principles for Creating Graphics That People Understand.* Beverly: Rockport Publishers.

Merieb, E. N. & Hoehn, K. (2007). *Human Anatomy & Physiology 7th Edition*, Pearson International Edition.

Meyer, R.E., Höllerer, M.A., Jancsary, D. and van Leeuwen, T. (2013), The visual dimension in organizing, organisation', and organisation research: core ideas, current developments, and promising avenues. *The Academy of Management Annals*, 7(1), 489-555.

Mitchell, W.J.T. (1994), *Picture Theory*, University of Chicago Press, Chicago, IL.

McCoy, E. (2017). Visual Communication Is Transforming Marketing -- Are You up to Speed? Retrieved from https://www.forbes.com/sites/forbescommunicationscouncil/2017/05/12/visual-communication-is-transforming-marketing-are-you-up-to-speed/#4ddfd8886f7c.

McKee, R. (1997). *Story: Substance, Structure, Style and The Principles of Screenwriting*. New York: HarperCollins.

Miller, K.H. (2004). *Digital Storytelling: A Creator's Guide to Interactive Entertainment.* Oxford: Elsevier.

Moezzi, M., Janda, K.B., Rotmann, S. (2017). Using stories, narratives, and storytelling in energy and climate change research. *Energy Research & Social Science*, 31, 1-10

Montclare (2017). *Montclare SaaS 250.* Retrieved from http://ernestoolivares.com/interactivity/samples/montclare/montclare.html.

Moriarty, S. (2002), *The symbiotics of semiotics and visual communication,* Journal of Visual Literacy, 22(1), 19-28.

Murray, J. (1998). *Hamlet on the holodeck: The future of narrative in cyberspace*. Cambridge, MA: MIT.

Murray, P.N. (2013, February 26). *How emotions influence what we buy. The emotional core of consumer decision-making.* Retrieved from https://www.psychologytoday.com/blog/inside-the-consumer-mind/201302/how-emotions-influence-what-we-buy.

Naylor, R.W., Cait, P.L., and West, P. (2012), Beyond the 'Like' Button: Exploring the Effects of Mere Virtual Presence on Brand Evaluation. *Journal of Marketing*, 76 (November), 105-120.

Nilsson, M. (2010). Developing Voice in Digital Storytelling Through Creativity, Narrative, and Multimodality. *Seminar.net - International journal of media, technology and lifelong learning* 6(2), 148-160.

Paivio, A. (1987). *Mental Representations: A Dual Coding Approach*. Oxford Psychology Series. Oxford University Press, Oxford.

PR Newswire (2011). *Press releases as lead generators.* Retrieved from http://www.itrainingexpert.com/pdf/user/content/99201493850AM06.-press_releases_as_lead_generators.pdf

Ramsdell, C. (2011). Storytelling, narration, and the "who I am" story. *Writing Spaces: Readings on Writing*, 2, 270–285.

Rensink, R.A. (2002). Change detection. *Annual Review of Psychology*, 53, 245–277.

Robin, B. R. (2008). Digital storytelling: A powerful technology tool for the 21st century classroom. *Theory Into Practice*, 47, 220–228.

Rose, R. (2017). The symphony of connected interactive content marketing. Retrieved from http://assets.ioninteractive.com/storage/content/literature/CMI-Interactive-Content-Study_2017.pdf

Scott, D. M. (2015). *The new rules of marketing & PR.*: Hoboken: Wiley, cop. 2015; 5. ed. Retrieved from http://onlinelibrary.wiley.com/book/10.1002/9781119172499.

Schäfer, M.T. and Van Es, K . (2017). *The Datafied Society. Studying Culture through Data.* Amsterdam: Amsterdam University Press.

Schultz, M., Hatch, M.J., & Larsen, M., (2000). *The expressive organisation: linking identity, reputation and the corporate brand.* Oxford: Oxford University Press.

Segel, E. and Heer, J. (2010). *Narrative visualization: Telling stories with data*. TVCG: Transactions on Visualization and Computer Graphics, 16(6),1139 – 1148. http://vis.stanford.edu/files/2010-Narrative-InfoVis.pdf

Speirling, U. (2005). Interactive digital storytelling: towards a hybrid conceptual approach. In: *2nd International Conference "Changing Views : Worlds in Play."* Vancouver: Digital Games Research Association DiGRA.

Steimle, J. (2017). *Five digital marketing trends that will die in 2017*. Retrieved from https://mashable.com/2017/01/12/5-digital-marketing-trends-that-will-die-in-2017/#NbpSqlhCHOq9.

Stern, A. (2008). Embracing the Combinatorial Explosion: A Brief Prescription for Interactive Story R&D. In: *Spierling, U., Szilas, N. (eds.) ICIDS 2008. LNCS*, 5334, 1–5. Springer, Heidelberg.

Srivastava, M., & Kaul, D. (2016). Exploring the link between customer experience–loyalty–consumer spend. *Journal Of Retailing And Consumer Services*, 31, 277-286.

Turner, V. (1980). Social dramas and stories about them. *Critical Inquiry*, 7(1), 141-168.

US Census Bureau. (2016). Estimated revenue of newspaper publishers in the United States from 2010 to 2015, by source (in billion U.S. dollars). *In Statista - The Statistics Portal.*

van den Bosch, A. L. M., de Jong, M. D. T., & Elving, W. J. L. (2004). Managing corporate visual identity: Use and effects of organizational measures to support a consistent self-presentation. *Public relations review*, 30(2), 225-344.

Varadarajan, R. & Yadav, M. S. (2009). Marketing Strategy in an Internet-Enabled Environment: A Retrospective on the First Ten Years of JIM and a Prospective on the Next Ten Years, *Journal of Interactive Marketing*, 23(1), 11-22.

Viacom (2017). Intersection of Stories and Culture: 50 Years of TV, Film, and Culture. Retrieved from http://fantheory.viacom.com.

Walter, E. & Gioglio, J. (2014). *The power of visual storytelling*. Chicago: McGraw-Hill Education.

Ware, C. (2002). *Information visualization: perception for design*. San Francisco: Morgan Kaufmann Publishers.

Weinreich, H., Eelco Herder, H.O. and Mayer, M. (2008). Not Quite the Average: An Empirical Study of Web Use, *the ACM Transactions on the Web*, 2(1), February 2008.

Wellbrock C.M. (2016) The Internet's Impact on Journalistic Quality. *In: Lugmayr A., Dal Zotto C. (eds) Media Convergence Handbook - Vol. 1. Media Business and Innovation.* Springer, Berlin, Heidelberg.

White, H. (1973). *Metahistory: The historical imagination in nineteenth-century Europe*. Baltimore, MD: Johns Hopkins University Press.

Woodside, A. G., Sood, S., & Miller, K. E. (2008). When consumers and brands talk: Storytelling theory and research in psychology and marketing. Psychology and Marketing, 25(2), 97–145.

Zerfass, A., Moreno, Á., Tench, R., Vercic, D., & Verhoeven, P. (2017). European *Communication Monitor 2017. How strategic communication deals with the challenges of visualisation, social bots and hypermodernity. Results of a survey in 50 countries*. Brussels: EACD/EUPRERA, Quadriga Media Berlin.