The Epistemological Basis for Constructing Data-Driven Narratives.

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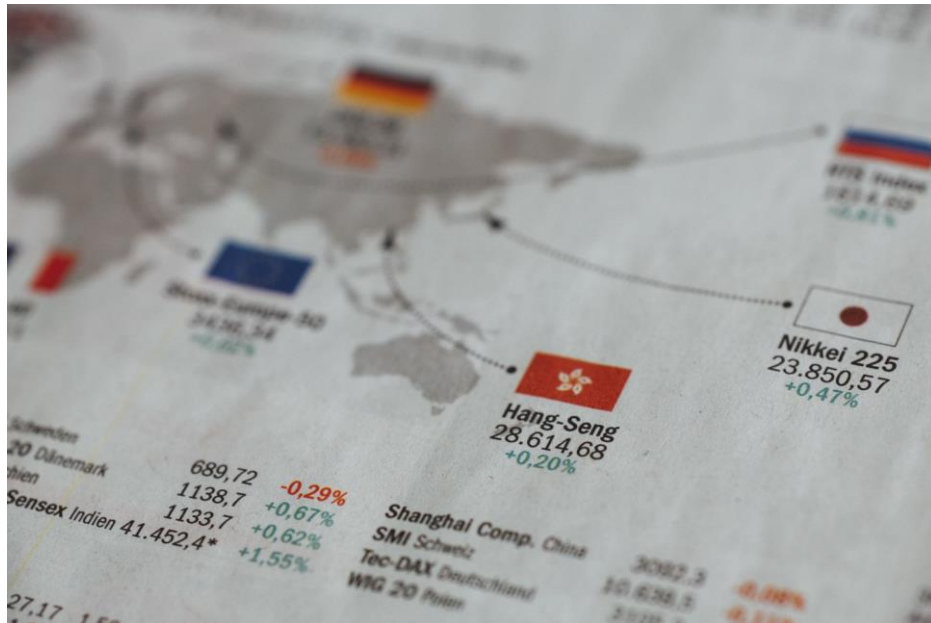

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Synopsis

A narrative is a storytelling technique that may be a practical and effective means of sharing knowledge within a community of interest. Narratives are philosophically aligned to both the case study and the grounded theory methods in that they allow a deep and focused analysis of a subject of interest and then using induction to draw support from data-driven, evidence-based reasoning. The typical sequence of narrative construction comprises three distinct phases: 1) identifying a purpose and an audience; 2) selecting observation or data points and analytic techniques such as visualization, modelling or benchmarking, from which to extract valuable knowledge or wisdom to share; 3) developing key messages incorporating good practices and lessons learnt, or re-constructing the narrative with new data or purpose.

Introduction

This article serves as a guide for conducting field studies in order to develop narratives on good practices and lessons learnt. For example, in the realm of Digital Inclusion for Sustainable Development (the authors' field of research), there is a vast collection of authoritative panel data (eg www.itu.int) and policy analysis (eg www.wef.org) which could be mined in order to make sense of what works (success stories) and what does not (mistakes made). While there is no standard set of procedures for developing best practices and lessons learnt, the narrative approach that we suggest interpolates contextual information in order to draw out stories of good practices and lessons learnt for a given objective. It is philosophically aligned to both the case study and the grounded theory methods in that it allows a deep and focused analysis of a subject of interest and then using abduction to draw support from or refute existing knowledge.

Since Vedic times, narratives in the form of story-telling have been one of the most intuitive and powerful modes of communication across cultures. However, in an organizational context, this tool has conventionally been overlooked as an effective means of communication and method of inquiry. This perception changed when at the beginning of the 1980s, studies of organizational culture began to focus on the interactional and social processes that take place within and between organizations, leading to an increased understanding of organizations as entities characterized by a given set of norms, beliefs, self-certainties and stories which become essential bases of their existence (Auvinen, Aaltio, & Blomqvist, 2013). The result was that, over the years, storytelling and narratives came to be used as a tool of communication and dissemination in various domains of inquiry (Kaufman, 2011).

Storytelling is said to often proceed through analyzing the key elements of people's stories (e.g., time, place, plot, and scene), ordering the meaning of people's

experiences chronologically, and rewriting those stories in terms of some analytical framework (Ollerenshaw and Creswell 2002; Creswell 2007). Additionally, narrative inquiry is cited as a form of research that seeks to involve readers in the events of a narrative (Kermode 1981 in Schreyogg, 2005). It is not, however, just about studying texts, whether written or visual. It is about finding meaning in the stories people use, tell, and even live" (Ospina & Dodge, 2005) and as such involves "sensemaking".

Narratives in the context of social research could be defined along the lines of Chase (2005) as "*a way of organizing events and objects into a meaningful whole, and of connecting and seeing the consequences of actions and events over time*" (Chase 2005, p.656). Identification and articulation of events and objects of interest, ordering and the piecing together of these with the intention of establishing connections and making sense of the context are evident in all of the above definitions.

For the purpose of illustrating the construction and deconstruction of data-driven narratives, consider the role of Winston Churchill in Britain's WWII effort. A Hollywood movie (Darkest Hour) takes liberties with data and evidence to construct a narrative that attributes to the person undue credit for the allies' victory [https://en.wikipedia.org/wiki/Darkest_Hour_(film)] and obtains for the actor multiple awards. Others have deconstructed such a narrative as fiction, including the former editor of the *Daily Telegraph* Charles Moore who criticized the movie as "propaganda" and Indian statesman Shashi Tharoor who, in his book *Inglorious Empire*, pointed to Churchill's culpability in the Bengal famine which took 20 million lives. The current narratives and counter-narratives around Covid19 is yet another instance [see, for example, https://www.foreignaffairs.com/articles/china/2020-03-18/coronavirus-could-reshape-global-order].

Which side of the story is "right"? That is not the point of a narrative and here lies its power as an effective knowledge-sharing tradition. A narrative — data-driven or faith-based — is not proof of a set of facts or arguments but an articulated point of view in search of an audience. The soundness of a narrative is that it could serve to counter another using Popper's falsification principle. To the receptive US & UK movie-going audiences, artistic license was entirely permissible in the making of the movie so that the message of securing victory and freedom could be constructed in its narrative. Whereas Tharoor addressed his book to an audience of pan-nationalists feeling empowered to rewrite the script of colonialism. History is replete with such contradictory instances (or contra-narratives) of the selective use and disuse of data in order to derive the credibility of a hypothetical message to its intended audience. Current contra-narratives exist on the question of global warming, the effectiveness of vaccines, the health and environmental merits of veganism, and so on. Narratives help shape the intellectual discourse and set up the battle for the minds of public acceptance that co-creates "collective intelligence".

Use and Objectives of Narrative Inquiry

Narrative inquiry has been described as a "*research orientation that directs attention to narratives as a way to study an aspect of society*" (Ospima & Dodge, 2005, p. 144). As such, the approach may well be ported over to study any other context that has a complex constitution and dynamics as a society. For example, in an organizational context, researchers in the domains of organizational strategy and leadership have used narratives as a powerful means of inquiry (Gergen & Gergen, 2006; Ospina & Dodge, 2005). Narratives as a method has also been applied to domain as diverse as social sciences (Presser, 2005; Waterhouse, 2007), nursing (McCance & McKenna, 2001; Wang & Geale, 2015), clinical practice (Overcash, 2003) accounting (Frazier, Ingram & Tennison, 1984; Beattie, 2014), business (Makkonen, Aarikka-Stenroos & Olkkonen, 2012) and teaching and learning (Webster & Mertova, 2007). A narrative approach has been found to be especially beneficial to enquiries within the domains of leadership for social change that seek to address the needs of the members of a public administration community of practice (Ospina & Dodge, 2005).

In reality, a narrative approach to analyze and interpret geo-spatial materials such as oral histories, life histories, and biographies tied to physical spaces goes beyond data analytics into contextual information (Kwan & Ding, 2007). Such narrative approaches for examining and understanding information systems implementation have been effectively applied (Brown 1998; Bartis & Mitev, 2008). These focus on either group narratives (Brown, 1998) or individual stories of user experiences and their interpretations of IS values throughout various project implementation phases (Bartis & Mitev, 2008) to gain an in-depth understanding of IS implementation success or failure as the case may be. Systems failure has also been investigated using a narrative approach (Dalcher & Drevin, 2003).

Narratives have also been used as a means of requirements analysis in systems research; for example, an ERP project (Alvarez & Urla, 2003). The research reveals

that narratives provide a pragmatic view of the information system, offering insight into the ways the system is actually used and the habitual practices of the work environment (Alvarez & Urla, 2003). It has also been used to evaluate ERP implementation projects (Headman & Borrell, 2004). Further, narrative inquiry has been used to study the key factors that influence the career paths of information systems (IS) professionals (Tan & Hunter, 2002).

Narratives may be developed for a variety of purposes: For instance, they can help to construct or maintain an organizational identity (Coupland & Brown, 2004; Down & Warren, 2008); to establish a shared set of values or assumptions (Meyer, 1995); to solve problems and celebrate problem solvers (Jonassen & Hernandez-Serrano, 2002; Rowe, Shores, Mott, & Lester, 2011) as well as to highlight and reward role models (Smith, 2002). They are also particularly effective in articulating and preserving coherent and credible accounts of actions through stories of lessons learnt from past projects and for enabling change by overcoming resistance (Kaufman, 2003).

Many novel use-cases of narratives in research have also been documented. For instance, researchers use the metaphor of the story to articulate the learning from the research generally (Clandinin, 2006). Some use socio-linguistic analytical tools to analyze field notes and interviews with the intent to piece together a narrative of experience within a context. Conceptions from narratives such as a plot, theme, role, characterization or storyline can be the basis for understanding the experience. Yet others code narratives, convert them into numbers and use statistical analysis to analyze the factors involved in a storytelling event as a predictor of a phenomenon of interest (Pasupathi, 2003 cited in Clandinin, 2006).

Irrespective of the manner in which they are used, narratives can provide numerous benefits to leaders and researchers as tools that help reinforce lessons learnt through sharing of mistakes as well as success stories both of which enable the effective

transmission of valuable knowledge that empowers organizations and lead them towards innovation (Kaufman, 2003; Kaufman, 2011). In recent decades, scholars have used narratives to enhance their understanding of diverse experiences and their meanings in a variety of contexts. In the domain of social sciences and applied fields, for instance, narratives have been used to describe a "universalized, orderly social world which helps the researchers and their audience to get in touch with "local knowledge," or aspects of experience that are unique to specific contexts. In the field of systems research, this unique application of narratives may be especially helpful in a variety of contexts, including post-implementation reviews, technology transfer and adoption, use and dis-use as well as technological evolution through organizational learning and development.
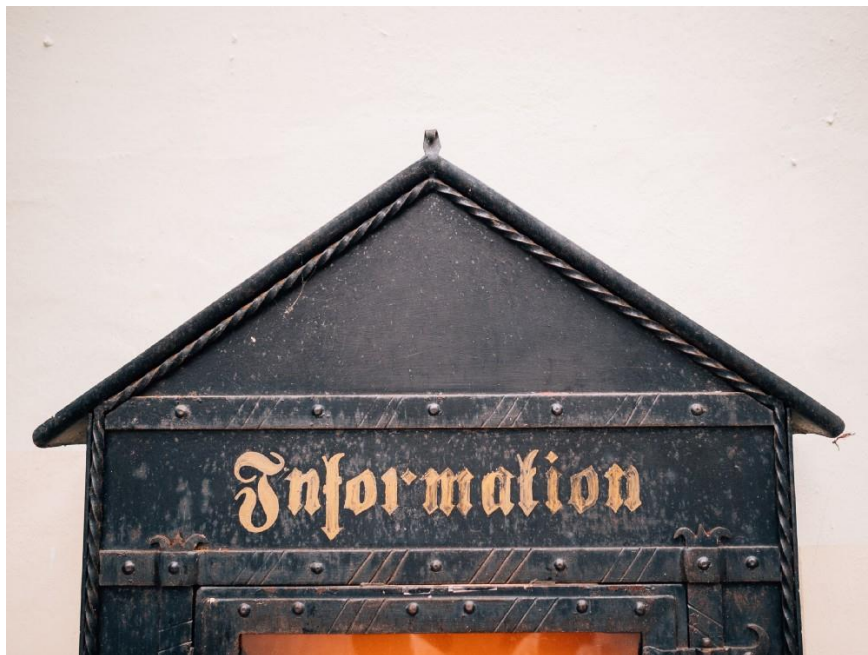
Characteristics of Narratives

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The unique strength of narratives as a means of enquiry comes from the characteristic that they contain within them *"knowledge that is different from what we might tap into when we do surveys, collect and analyze statistics, or even draw on interview*

data that do not explicitly elicit stories with characters, a plot, and development toward a resolution" (Ospina & Dodge, 2005). Several characteristics of narratives have therefore been identified in scholarly literature. Narratives are intrinsically persuasive (Kaufman, 2011; Dahlstrom, 2014). They are important learning aids that capture organizational history which in turn enable organizational learning (Brown & Duguid, 1991) as well as powerful facilitators of effective change management within organizations (Kolb,2003). Ospina & Dodge (2005) state five essential characteristics of narratives: 1) They are accounts of characters and selective events occurring over time, with a beginning, a middle, and an end. 2) They are retrospective interpretations of sequential events from a certain point of view. 3) They focus on human intention and action — those of the narrator and others. 4) They are part of the process of constructing identity (the self in relation to others). 5) They are co-authored by both the narrators and the audience.

However, there are 3 important caveats to narrative construction: 1) Narratives are interpretative rather than explanatory or predictive and tend to address the limits of traditional explanatory social science (Boal & Schultz, 2007); 2) Narratives help scholars move beyond descriptions of a universalized, orderly world and connect with indigenous knowledge or experience that are unique to specific contexts — a process emerging as "fallism" (Ahmed 2017); 3) Narratives help build the required connectedness between the researchers and the practitioners which is revealing in insights about exceptions or counter-arguments.

The persuasive power of narratives has been acknowledged as its unique strength by Dahlstrom (2014) who cites its use for the purpose of communicating scientific knowledge to non-expert audiences through its ability to increase comprehension, interest and engagement. Additionally, it has been suggested that a narrative makes a topic much more real to the audience because it reframes the argument as a relatable message (Kaufman, 2011). Narratives have been deployed as an effective means of

understanding organizational failures and mistakes (Kaufman 2003; Schreyogg, 2005). Furthermore, the narratives can be so structured as to sort and package information in coherent patterns so that a chain of events or the causal order of an organizational event or phenomenon unfold naturally to the audience as they are shared (Boal & Schultz, 2007).

It follows therefore that the structure and format of the narrative emerge as crucial aspects that would determine its usefulness as a valuable source of knowledge to the researcher and the stakeholders involved. Dahlstrom (2014) maintains that narratives follow a particular structure as they describe the cause-and-effect relationships between events that take place over a particular time period that impact particular characters. The hallmark of narrative communication according to Dahlstrom (2014) is this "triumvirate of causality, temporality, and character".

In the context of field research, a narrative is of special utility as it examines evolving project history narratives with the intention of highlighting how events have been interpreted or misinterpreted and what has been learned, or should be "unlearned" about a project experience (Tan & Hunter, 2002). In comparison to other major qualitative methods such as grounded theory and case studies, narratives address the following gap — they support iterative theory building through the concurrence and interwoven nature of data and analysis.

In comparison, despite its strong emphasis on descriptions and causalities, the case study approach (Yin 1981) would meet with practical difficulties in certain contexts. One such instance is when the researcher ends up with large volumes of descriptions and data all of which need not in any way provide useful means of gleaming relevant knowledge to the audience (Sharma et al., 2007). Furthermore, one of the major limitations of the approach is the problem of comparability and wrong assumptions of

cause-effect relationship (Gerring, 2004) which are bound to confound the conclusions drawn in some instances.

The narrative method of enquiry has had its fair share of criticisms. Since they describe a particular experience rather than general truths, narratives often do not need to justify the accuracy of their claims to "truth" (Dahlstrom, 2014), which may cast doubts on its validity. Additionally, the structure of the narrative presents events as cause-and-effect relationships, making the conclusions drawn from the narrative seem inevitable, even when many possible explanations may exist (Curtis, 1994). Yet another criticism stems from the position of the narrator or the storyteller as she constructs the narrative. As such, questions have been raised over the subjectivity, authority and reflexivity of the narratives (Richardson & St. Pierre, 2008).

Other concerns include issues of completeness, measurement errors, as well as biases that enter into the narrative when conscious efforts to position it to capture the interest and expectations of the audience are made by the narrator (Schreyogg, 2005). Additionally, the lack of theory building from narrative inquiry has been brought under scrutiny (Sharma et al., 2016). However, critical linking of the narrative to data and evidence instead of assuming a style of construction that caters to popular interest has been known to address such concerns (Holstein, & Gubrium, 2012). Hence, the rationale for data-driven, evidence-based reasoning. Accordingly, three key dimensions emerge from the above discussions about the characteristics of narratives: structured articulation, unique dimensions of the story, and peculiarities of the context and the characteristics of the audience.

Although finer epistemological differentiation has been ascribed to the terms "stories" and narratives (Schreyogg, 2005; Boje, 2011), for the purpose of identifying a suitable prescriptive narrative-based qualitative approach in field research, such distinctions are unlikely to create any significant impact on the choices made. As such, narratives

and stories may be used interchangeably and are differentiated from storytelling which can be considered the process of sharing (Gergen & Gergen, 2006). Thus, narratives can be viewed as the key output of storytelling, articulated in a structured way aimed to capture the unique characteristics of the story the narrator has to share (Czarniawska, 1998); Boje, 2001) with the audience.

Procedures for Narrative (De-)Construction

In empirical research, scholars attempt to first formulate hypotheses and then design procedures and instruments that would generate data for analyses that either reject or accept the theory. In the construction or deconstruction of narratives, the following procedure is suggested as a systematic method of communicating a purpose to an intended audience. Inspiration is drawn from the CLOSAT model proposed by Rabiger (2000) comprising: a description of 'characters' in the story, interesting visual 'location', curious 'object'(s), revealing 'situation'(s), unusual or revealing 'act' and the 'theme' that intrigues the narrator, or the moral of the story, to derive a prescriptive means of narrative construction. The objective is to ensure that all key components of the environment of interest as well as their unique interrelationships which would render the narrative useful as a source of knowledge, are articulated in a structured and systematic way. Special emphasis is given to identifying unusual events and inter-relationships which constitute valuable insights encapsulated in success stories, good practices, mistakes made, lessons learnt and benchmarking indicators that define the afore-mentioned. Pointers provided by Dahlstrom (2014), Kaufman (2011) and Ospina & Dodge (2005) in the scholarly literature reviewed have contributed to this purpose of highlighting the richness of the environment. Additionally, steps to address and pre-empt the methodological concerns discussed previously have also been incorporated.
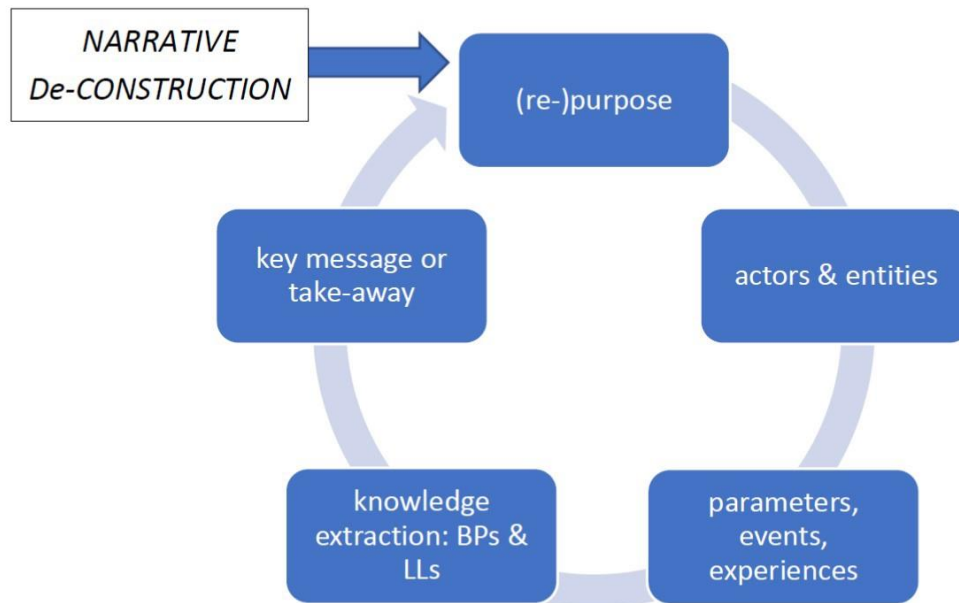
Narratives as cyclic, iterative knowledge diffusion

We propose the following epistemological approach to constructing narratives in the domain of field enquiry.

1. Organizational or System Purpose — A description of the context is an important first step that sets the geographic context of the narrative. This should enable a high-level overview and appreciation of the environment within which the narrative is to be constructed including any peculiarities in terms of the political, cultural, social and economic climate and standing as well as its interdependencies with other entities in the eco-system. This step should result in a clear statement of the purpose of the narrative.

2. Actors / Entities — Rabiger (2000) proposes that a description of the characters be done as an initial step towards building a narrative. In this instance, identification and specification of each of the entities, objects (e.g. systems put in place), the stakeholders involved, and their respective roles and responsibilities as well as the nature of interactions are to be captured. A rich narrative has to delve deeper into

actors and entities which are of interest within the selected context, further explaining the reasons for their special consideration.

3. Parameters / Constructs / Indicators — This is to be followed up with labelled descriptions of the indicators of interest as well as an account of how these indicators result in intended outcomes. In other words, this aspect of narratives explains how and where the numbers have come from. This communicates an understanding of their utility for assessing what is being measured. Indicators and their interdependencies that unravel through the data collection are of special interest and should be highlighted.

4. Unusual events and challenges faced — Special sections should highlight and describe any unusual events or specific challenges faced by the organization or system, which may be unique to the context under study. For example, outliers, missing values, categorical variables and data shaping reveal a certain context or uniqueness and must be understood and communicated to an informed audience. This would help to contextualize the understanding of the problem domain within the special circumstances which may help in explaining cause-effect relationships otherwise unexplainable.

5. Individual / Collective experiences — From data and information, patterns emerge and such knowledge is key to sustaining the credibility of a narrative. For instance, experiences of the key stakeholders have to be considered either individually or collectively with a view to providing a useful lens for the analyses that would follow. Decisions on whether the experiences are meaningful collectively or individually would depend on the specific purpose of the narrative and the data-driven analysis that follows.

6. Success stories and mistakes made — Otherwise known as best practices (BP) and lessons learnt (LL), these describe the success stories as well as the mistakes made while confronting the challenges described. This may require active inductive reasoning and sense-making as well as peripheral vision or the ability to see things that may not directly fall in the line of vision or are obvious (Kaufman, 2003). The description should conclude with an enumeration of the mistakes made or the critical success factors, as the case may be, with substantiation of why these factors may have been critical in determining the outcomes.

7. Key message — This section should list and explain the key take-aways that yielded tangible benefits as well as those accepted practices that were not as effective in the context, with a view to summarizing the key learning that can be distilled from the constructed or deconstructed narrative. If and when it becomes necessary to re-purpose this message, in light of new data-points, contradictory evidence or social context, the above six steps may be iterated.

Bear in mind that there are caveats to the effectiveness of the narrative approach, be it in the construction or deconstruction cycle. 1) No narrative has a monopoly across diverse audiences. 2) Narratives are inherently subjective and value-driven; therefore active avoidance of narrator bias should be practiced. 3) A consensus-based construction of narratives (iterative refinement) through collective intelligence would abduce greater acceptance. In other words, a narrative that is a one-sided interpretation of events that has low believability would not hold water over time. The extent to which the caveats are considered in the seven steps listed above results in a more credible and useable narrative.

Concluding Remarks

In closing, qualitative methods such as case studies, constructivist grounded theory and developing narratives with story-telling are attempts to probe deeper when quantitative methods fail to tell us where the data comes from. And whereas case studies may unearth useful hypotheses, and grounded theory studies connect field observations back to prior literature to produce new theory, narratives use the structure of provisional or existing knowledge to point out exceptions in the form of success stories as well as lessons learnt (Sharma, Iqbal & Victoriano, 2013). In drawing a rich set of good practices and lessons learnt, constructing and de-constructing narratives as storytelling techniques may be the practical and effective means of sharing knowledge within a complex socio-technical context.

To recap: 1) Data-Driven Narratives are interpretative rather than explanatory or predictive and have hence been used in the social sciences to address the limits of traditional explanatory theories; 2) Data-Driven Narratives help researchers to move beyond universal models and into specific contexts with valuable insights; 3) Data-Driven Narratives help to build the required connectedness between theory and practice, indicators and outcomes by way of rich examples; 4) Data-Driven Narratives draw from the rich traditions of Data Science, Grounded Theory, Action Research, Case Study and Storytelling.

Such an evidence-based approach goes beyond "what numbers tell us" with descriptive visualization or predictive machine learning. At its core is the notion of sense-making and understanding physical or social phenomena. Narratives are in essence means to codify and transfer such tacit knowledge. They serve as a platform for discourse in the form of internalizing thought, externalizing discussion, and socializing collective intelligence. Such data-driven, evidence-based reasoning should be the basis of scientific inquiry rather than decrees and dictums. Effectively applied,

they have a strategic pride of place, along with design science research, in the analysis of organizational or industry transformation. Again, referring to the current Covid-19 pandemic, narratives that contextualise the morass of data visuals and models help educate and nudge politicians and the public into informed action. Similarly, we would hope that use-cases of the narrative approach in debating current socio-economic challenges such as sustainable development, the 4th industrial revolution, or the merits of holistic medicine will serve as intellectual platforms for the diffusing of knowledgeable action. In a follow-up article, we shall share such a use-case by questioning the ethics of unsupervised AI in healthcare.

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