

## Visual Artifacts as Tools for Analysis and Theorizing

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## **Visual Artifacts as Tools for Analysis and Theorizing**

### **Abstract**

In this chapter, we discuss how visual artifacts may support the analysis and interpretation of qualitative data in organization studies. Our discussion draws on our own experience as well as other scholars' published work to explore the distinctive affordances of visual forms. In particular, we identify four roles – namely “mapping”, “analyzing”, “conceptualizing” and “communicating” – that visual artifacts play to help us move from raw qualitative data to a compelling conceptual product.

Specifically, the use of visuals for “mapping” involves directly coding data into visual forms such as cognitive maps, flow charts or relational diagrams, an approach that may offer a useful complement to traditional verbal coding. Using visuals for “analyzing” implies either comparing, aggregating or decomposing previously constructed visual maps, or drawing directly on verbal data to develop visuals such as analytical flow charts, process replication maps, and trend charts. Using visuals for “conceptualizing” involves rising above the data to develop more abstract representations of concepts and relationships, while maintaining recognizable connections to empirical phenomena. While conceptual models can take a wide variety of forms, we illustrate, in particular, the use of visuals to represent linear, dialectic and multi-level process theories. Finally, we consider the importance of visualizations for “communicating” insights as well as for developing them, and the inextricable linkages between the two.

We conclude by discussing some of the strengths and weaknesses of visualization and by considering how new technologies may offer further possibilities for useful and insightful visual representations of qualitative data that can enhance theory-building.

**Keywords:** Qualitative research; Visual mapping; Qualitative data analysis; Conceptualization; Theory building

This chapter is inspired by a common experience that the two of us share concerning the doing and writing of qualitative research in management, and that we have even written about in the past but in different ways (Langley, 1999; Ravasi, 2017): the generative role of visual artifacts – specifically drawings – as tools for analysis and theorizing. While published qualitative papers usually do include visuals in the form of box and arrow diagrams that are intended to represent distilled knowledge, we think that insufficient attention has been given to the generation of these displays, and also to the role that drawing may play not only in communicating findings and theoretical constructions but also in generating them.

It is usual to think of qualitative data analysis as essentially concerned with the massaging of words – a process of coding, categorizing, clustering, tabulating, and memoing in which respondents' words are transformed into researcher's words that are then assembled into theoretical narratives (Golden-Biddle & Locke, 2007; Strauss & Corbin, 1998). Yet, in discussing qualitative data with colleagues and students, both of us often find ourselves doodling. Our own experience suggests that visual forms can be complementary tools for understanding, serving as useful intermediaries in the process of analysis and interpretation. In this chapter we explore the potentialities of these alternate visual modes of thinking, coding and sense-making because we believe they are under-recognized in the literature, and could have important but rarely considered consequences for the nature of the theories that we as scholars produce.

We begin the chapter with a brief review of previous discussions of visual methods, before exploring and illustrating different approaches to mapping and conceptualizing from qualitative data, and their strengths and weaknesses. We conclude by reflecting more generally on the relative contributions of visual and verbal forms of theorizing in organization studies.

### Visual Methods in the Literature

The organizational literature has begun to pay increasing attention to visual methodologies (Bell & Davison, 2013; Meyer, Höllerer, Jancsary, & Van Leeuwen, 2013). However, the focus has been mainly on visual and material artifacts viewed as “data” (photographs, drawings, buildings, etc.) and their interpretation, rather than on visual artifacts as elements of analysis and theorizing of qualitative data presenting itself in verbal form (e.g., field notes, interviews, documents). This chapter focuses more on the latter situation.

Along these lines, the first edition of Miles et al.’s (2014) classic sourcebook of methods for qualitative data analysis published in 1984 (Miles & Huberman, 1984, p. 21) drew the attention of scholars to the importance of finding alternatives to more traditional narrative modes of data presentation and analysis:

“The most frequent form of display for qualitative data in the past has been *narrative text*. (...) Text (in the form of say 3600 pages of field notes) is terribly cumbersome. It is dispersed, sequential rather than simultaneous, poorly structured and extremely bulky. Under those circumstances, it is easy for a qualitative researcher to jump to hasty, partial, unfounded conclusions.”

Miles and Huberman (1984) go on to argue that other kinds of displays such as matrices, graphs, and charts enable the assemblage and organization of information in a more compact and accessible form than narrative, and can contribute to the quality of data analysis. While Miles and Huberman place most emphasis on tables as display techniques, they also propose a series of more graphic forms such as cognitive maps, event-state diagrams, and causal networks. Building on Miles and Huberman, Langley (1999) argued that this “visual mapping” approach could be particularly useful for analyzing data on organizational processes enabling the representation of precedence, parallel processes and the passage of time, as well as multiple

categorical dimensions using shapes and forms to code different kinds of activities or events. We will return to and elaborate on some of these ideas later in this chapter.

As well as a tool for representing and analyzing *data* however, visualizations are often used to represent *theoretical insights* intended to abstract beyond the data. The schematic process model is ubiquitous in published qualitative papers, as is the hierarchical tree-shaped data structure diagram that shows the process of code clustering and abstraction often used to establish theoretical categories (Gioia, Corley, & Hamilton, 2013). As one of us pointed out however, diagrams are not just finished products for communicating final insights (Ravasi, (2017); they can also be tools for sensemaking, and part of the theorizing process itself. Ravasi draws analogies with how designers develop new ideas to suggest that drawing and composing images help us think and crystallize our ideas. Similarly, in describing his own theorizing process, Mintzberg (2005, p. 363) comments, “My work is loaded with diagrams, seeking to express every which way the ideas I am trying to make come together. Aristotle said that, “The soul . . . never thinks without a picture [ . . .].” I try to help my soul think.” Finally, in their well-known article on “What theories are not,” Sutton and Staw (1995) come up with a list of things that are “not theory” including “diagrams.” Karl Weick’s (1995) response to this is titled, “What theories are not, theorizing is,” drawing attention in particular to diagrams as valuable elements in scholars’ interim struggles to develop theory.

In other words, as the scholars referenced above suggest, visual representations may be helpful in moving between data and theoretical contribution in qualitative research, playing a variety of different roles, although these roles and their articulation have not always received concerted attention. In this chapter, we identify four successive roles that shade into one another

as they move us across the bridge between data and compelling conceptual product. The first two are closer to the data end: we label them “mapping” and “analyzing.” The last two are closer to the theory end: we call them “conceptualizing” and “communicating.” In what follows, we will examine and illustrate each of these roles and how they are connected. We begin, however, with a brief introduction to some common conventions of visual representation.

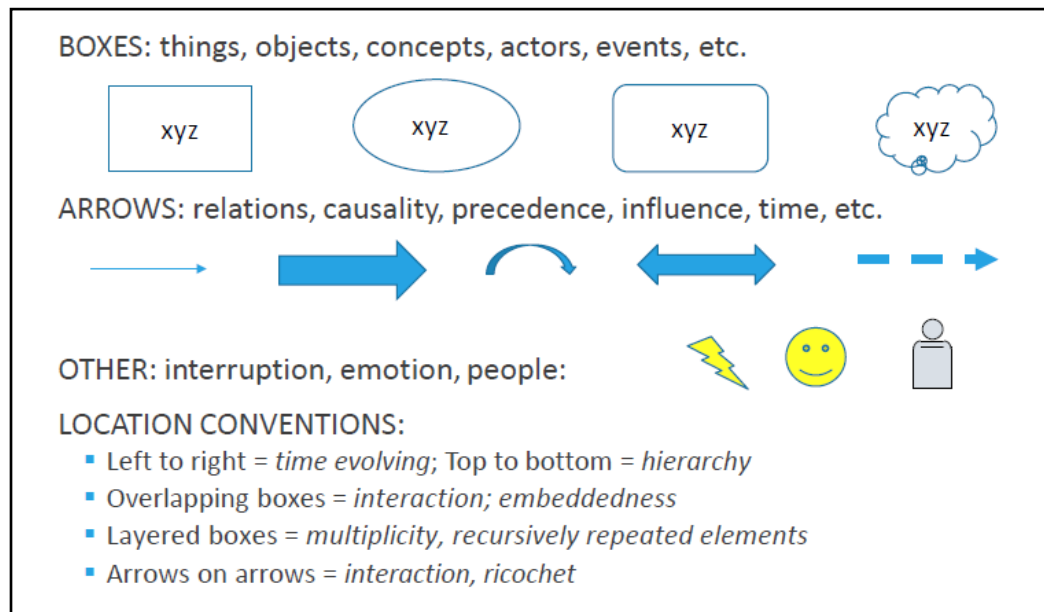
### **The Conventional Visual Repertoire: Boxes, Arrows and Other Forms**

Visual representations used for mapping, analyzing, conceptualizing and communicating in qualitative research are, of course, usually made up of conventional elements that convey certain familiar ideas (Kress & van Leeuwen, 1996/2006). It is no surprise that boxes and arrows are most common among these elements (see Figure 1). In variance-based research, boxes and arrows have quite narrow conventional meanings (boxes as variables or constructs, and arrows as causal relations). However, qualitative researchers may take greater liberties with these forms, though still conforming to some broadly shared understandings of what they can be used for.

Rather than representing variables for example, boxes can be used to represent objects such as actors, processes or events that are then linked to other actors, processes or events through arrows that may have different meanings depending on the nature of the boxes. For example, when boxes represent actors, arrows may represent interactions, interpersonal relations, or other kinds of influence. When boxes represent events, arrows may represent temporal ordering. Note that whatever their content, elements in boxes tend to acquire an “entitative” object-like meaning because of the boundedness of the shapes, even when boxes are labeled to signal processes. In contrast, arrows are inherently relational and processual. While conventionally, boxes contain labels that express their meaning, curiously, arrows often

do not. This has led Feldman (2017) to suggest that process researchers should focus more on the arrows, and to propose a variety of other representations that eschew as far as possible labeled boxes in favour of labeled arrows that express links and flows.

**Figure 1: The Conventional Repertoire of Visual Representations**



More complex conventions for boxes used in qualitative research include embeddedness (boxes within boxes), implying entities located within higher level entities (e.g., actors embedded in organizations), or layering where there is some implication of multiplicity. For example, in a study of “framing contests” Kaplan (2008) used a set of layered boxes as input to her conceptual model to signify the multiplicity of “individual actor’s frames” entering into organizational decision-making. Alternatively, layering may also signify iteration as in Bucher and Langley’s (2016) conceptual model of routine change that shows cyclical flows of activity through “reflective spaces” and “experimental spaces” represented in layered boxes. See also Rindova, Dalpiaz, and Ravasi (2011) for an example of similar usage, signifying the recurrent borrowing of

cultural resources from different domains, organizational identity redefinition, and formulation of unconventional strategies.

The shape and nature of the lines used to bound boxes can also be used to highlight distinctions. For example, dashed lines can be used to represent constructs discussed in the paper but not directly observed (e.g. Ravasi & Schultz, 2006), or constructs observed but not discussed (e.g. Stigliani & Ravasi, 2012). Star-shaped boxes can be used to highlight disruptive events, or differently shaped boxes (e.g. square vs. round) can be used to distinguish actions and outcomes (e.g. Ravasi & Schultz, 2006; Ravasi & Phillips, 2011), or to create other distinctions. Rounded corners and curved lines – as opposed to sharp edges and straight arrows that characterise traditional variance models – can be used to allude to the dynamic and processual nature of the phenomenon, and make the figure less clunky (e.g. Dalpiaz, Rindova, & Ravasi, 2016).

More complex conventions for arrows include the use of double headed arrows or circularity of arrows between boxes, where meanings may range from equivalence to mutual constitution to mutual influence and feedback. Arrows may sometimes emerge from or impact other arrows suggesting moderating effects, or ricochet. Arrows may also sometimes be thicker or thinner (or even dotted) suggesting stronger or weaker relations. Finally, arrows may contain zigzags to suggest interruptions or some kind of break in the flow of activity as in Mintzberg, Raisinghani and Théorêt's (1976) study of the structure of unstructured decisions.

These conventions for visual representation provide an initial starting point, but leave plenty of room for creativity. Boxes and arrows may take different shapes, they may be displayed in multiple forms of relationships and they may have more or less transparent meanings for others. Moreover, boxes and arrows are not the only forms possible (see for example, Figure 1).



Visual representations may also be hand-drawn or designed using software tools that extend their potentialities in one sense (clarity, cleanness), but also impose further constraints in another. The affordances and constraints of visual representations will be addressed further as we consider the four roles of visual representation in qualitative research introduced above.

### **Visual Artifacts as Tools for *Mapping* Data**

As Miles and Huberman (1984) indicated, visual displays can assist with the basic tasks of organizing and coding data for analysis, to some degree even replacing or at least accompanying verbal coding of textual extracts. This may seem controversial for those who are used to line-by-line open coding as the method of choice for mapping qualitative data. However, addressing qualitative data with visual representation in mind may bring to light different dimensions. We offer three examples here of specific ways in which visual displays can be used to map data (i.e., organize it visually), and prepare it for subsequent analysis. These approaches (cognitive mapping, flow charts, relational diagrams) are not exhaustive of the possibilities but illustrate different “visual templates” for thinking about what qualitative data might reveal. We offer an example of each in Figure 2.

*Insert Figure 2 here*

A first kind of visual template is the “cognitive” or “causal” map. Cognitive mapping has an honorable history as a tool for capturing individual and collective interpretations of phenomena (Barr, Stimpert, & Huff, 1992; Cossette, 2002; Huff & Jenkins, 2002). It involves using box and arrow diagrams to explicitly map expressions of causality or other construed relationships among concepts, either on the basis of interviews (Lyles & Reger, 1993; Winch & Maytorena, 2009) or from pre-existing textual data (Barr et al., 1992; Nadkarni & Barr, 2008).

While cognitive maps may be elicited using pre-determined concepts, a more inductive approach may be helpful to capture the natural structure of respondent's sensemaking. That said, the use of cognitive mapping seems to have gone out of fashion in recent decades, replaced by linguistic content analysis tools or grounded theory coding. It seems to us however, that plotting the argument structure of textual materials can offer a useful way for researchers to capture the concepts and relationships that underpin individual or collective sensemaking and sensegiving processes, perhaps more precisely and more holistically than through categorical coding.

A second kind of visual template for qualitative data mapping is the flow chart. Flow charts are designed to represent processes, and will generally include boxes to represent events and arrows to represent temporal and influence linkages between them. For example, in a study of technology adoption processes, Langley and Truax (1994) used linear flowcharts to capture the sequences of events, activities and decisions in different domains of the firm (e.g., external environment, products, finances, human resources, technology, and operations) and how they were interlinked (see also Langley, 1999). The maps were generated directly from verbal data contained in interviews collected from each firm. The boxes of the chart contained summary descriptions of particular incidents, with the shape of the boxes coded according to whether the incident was an uncontrollable event, an activity of the firm, or a decision. The arrows between events were labeled with symbols reflecting the nature of influence (positive, negative, other). Flow charts conventionally have left to right timelines (see Figure 1), but they may also be compressed according to the intensity of events. Flow charts may also show events occurring in parallel. Langley and Truax's (1994) descriptive flow charts for five technology adoption decision processes were drawn on excel spreadsheets, and each covered from 2 to 5 pages of A4 paper

when printed out. In Figure 2b, we illustrate part of a similar type of flow chart taken from a study by Gehman, Treviño and Garud (2013) which examined the processes involved in developing an honor code in a university business school, seen as a set of “values practices.”

A third kind of visual template, different again from cognitive maps and flow charts is the “relational diagram.” In their research on collective leadership dynamics in top management teams, Denis and colleagues (1996; 2001) developed a variety of such diagrams intended to describe relations among key leaders and how they evolved over time. These relational diagrams are superimposed on schematic organizational charts that express hierarchical authority relations while also indicating interpersonal and influence linkages. An example of another relational diagram is illustrated in Figure 2c based on work by Kisfalvi, Sergi and Langley (2016). Here the authors attempted to depict recursive interactive dynamics among members of a top management team (labeled the constellation, the bridge, the triangle, the umbrella, and the island). Relational diagrams enable the representation of interpersonal relations among organization members or among groups of actors, an important dimension of organizational life.

A final example of a relational diagram illustrated in Figure 2d comes from Compagni, Mele and Ravasi’s (2015) study of the diffusion of robotic surgical technology in Italy, showing specifically how skills were transferred from early to late adopters, in this case through exposure to operations. Compagni et al. (2015) developed four such relational diagrams, showing transfer of skills from one site to another through four different mechanisms. Note in this case how the relations among actors (in this case hospitals) are overlaid on a grid that also displays the cumulative number of adoptions over time. This illustrates again the capacity of visualizations to integrate multiple data dimensions simultaneously.

We have suggested three generic forms of visual maps, one based on causal relations, one based on flows of events, and one based on interpersonal relations, but other arrangements would of course be possible. One of us, for instance, is using visual maps in a yet unpublished manuscript to show how identity statements produced by the same organization at different points in time are linked to one another through intertextual patterns. Some aspects of verbal data, however, might be more easily captured in diagrammatic form than others. Causal attributions, flows of events, and interactions fit easily into the box and arrow form (broadly understood) because of their rather structured nature. Other concepts, (e.g., emotions) may be less easily expressed, although the diffusion of emoticons (see Figure 1) is now offering researchers an increasingly sophisticated visual vocabulary, and it may only take a little audacity for researchers to consider incorporating symbols associated with the mundane and frivolous world of social media into academic work.

Although the usefulness of visual artifacts for *mapping* data depends also on the research questions addressed, attempting to “draw” data freely to represent the phenomena studied as accurately as possible can be a valuable creative exercise as Smith (2002) indicates in her “confessional tale” of how she analyzed her data on the internationalization of the Baby Bell phone companies (RBOCs) for her doctoral thesis. She used an eclectic set of manually drawn visual maps on flipcharts, photographs of which are included in her article:

“On a flip chart sheet, I started drawing key events, making sure to be clear about the temporal ordering of events. RBOC1’s international expansion figure (...) shows how some events preceded others across time. Some general concepts (partners, projects, products, and people) are shown as circles, with events as squares, and arrows providing temporal ordering. In making these maps, I did not limit or constrain myself to one type of display. The RBOC1 display is very different from RBOC2’s map, which is developed around a time line with abrupt transitions. Yet both displays captured what I believed to be the best

representation of each RBOC's movement internationally over time." (Smith, 2002, p. 389)

Such displays, as well as the cognitive maps, flowcharts and relational diagrams described above can be seen as the equivalent of "first order" *in vivo* codes because the concepts in them are expressed in descriptive terms close to the original materials. Nevertheless, the visual representation of cognitions, processes or relations already imply (as in any first-order coding), a selection of key elements to be focused on, i.e., a form of data reduction (Miles et al., 2014).

We now consider how these visual forms may lead to higher level analytical insights.

### **Visual Artifacts as Tools for *Analyzing* Data**

The representations we described in the previous section enable data to be visualized but they do not in themselves offer much in the way of meaning. Indeed, faced with a complex cognitive map, relational diagram, or flow chart (especially one that spreads over five A4 pages), the immediate reaction of most readers (especially those who have not engaged in creating the maps or charts themselves) is, "Wow! But so what?" The mess of boxes, arrows and labeling (e.g., as shown in Figure 2) does not immediately convey understanding, and may initially look almost as confusing as the verbal data from which it originated. In order to move towards a deeper understanding, visual representations such as these need to be compared, aggregated, reshaped and interpreted so that patterns emerge from them. In other words, they need to be *analyzed*. In doing this, more synthetic visual forms may be created that combine elements from multiple first order mappings. The three main tools of analysis that are likely to be used here are comparison (looking for similarities and differences and trying to explain them), aggregation

(looking for commonalities and combining them into composite charts), and decomposition (examining in depth the content of a single map to draw out repeated categories and patterns).

For example, when cognitive maps are used, their analysis can include the *comparison* of features such as density, complexity, and centrality of certain concepts. Comparisons may be made between individuals (Clarke & Mackaness, 2001), or across time to assess and explain change (Barr et al., 1992). Alternatively, individual maps may be *aggregated* into composite maps to capture collective cognitions (Lyles & Reger, 1993). Finally, single maps may be *decomposed* to appreciate patterns of relationships among different concepts (e.g., Cossette, 2002).

Analytically-oriented visualizations may be generated from previously drawn descriptive visual maps, or from verbally coded materials as well. We illustrate here and in Figure 3 three additional ways in which visualization may be used for analysis: analytical flow charts, process replication maps, and trend charts.

*Insert Figure 3 here*

First, several researchers use flowchart forms analytically rather than or as well as descriptively. When this is done, the flow charts include events that have a more generic (second order) character than the visualizations described in the previous section. For examples, flows for particular cases are shown to meander between different generic event types in different orders with possible recycling. Classic illustrations of this include flowcharts of unstructured decision making processes (Mintzberg et al., 1976) moving through a limited array of event categories (such as diagnosis, screening, evaluation, etc.). Mintzberg et al. (1976) drew on such flowcharts to identify a set of seven types of decision processes, based on the mapping of twenty-five specific decisions.

Another example of analytical flowcharting is offered by Kaplan and Orlikowski's (2013) more recent study of temporal work in strategizing. They develop a model showing how strategic projects cycle repeatedly through four stages labeled breakdown, temporal work, provisional settlement and strategic decision. Kaplan and Orlikowski's (2013) "model of temporal work in strategy making" is reproduced in Figure 3a. The authors traced the pathway of five different projects through this framework which was distilled from the analysis of the project histories. By comparing the project pathways, they were able to show at the same time, the commonalities in processes followed across the projects, but also to derive explanations for the degree of radicalness of emergent strategic decisions. Note here the difference between the analytical type of flowchart of Figure 3a and the descriptive flowchart of Figure 2b.

A second way in which visualizations may be used analytically is to show temporal replication of a conceptual model over time in a "process replication map." This approach fits naturally with a temporal bracketing analytical strategy in which the data are subdivided into phases corresponding to iterations of a process (Langley, 1999). For example, Denis, Dompierre, Langley and Rouleau (2011) examined the process of "escalating indecision" where organizations become trapped in cycles of perpetual decision-making without producing decisions. They analyzed their case in three phases, and diagrammed the phases according to the concepts of an overall conceptual model in which practices of strategic ambiguity and practices of reification generated the conditions for unproductive decision making. Similarly, Howard-Grenville, Metzger and Meyer (2013) examined identity resurrection within the city of Oregon as a process of pooling tangible resources and matching them with symbolic resources that, if sufficient, would allow authentication of those efforts. Figure 3b illustrates both the abstract conceptual model,

and below it, the analytical comparison of three empirically observed iterations of the model, showing how and why the first and third iteration were successful, while the second was not. Note how the sizes of boxes and text are used here to code for the intensity of phenomena illustrated in the model. This leads directly to the next form of analytical visualization.

The third kind of analytical visualization is based on what we label “trend mapping,” actually a form of pseudo-quantification. Qualitative researchers usually wish to avoid placing precise numbers on their data. And yet, it may be useful to have a way of signifying intensity or trends, without expressing precise levels. Figure 3c shows a representation used by Stensaker and Langley (2010) to trace the progress of change in two divisions of a multidivisional company according to three dimensions labeled “goal attainment,” “quality of relations with employees,” and “credibility with corporate level” (called substantive, relational and political trajectories). The purpose was to show how different change strategies played out differently over time but generated similar outcomes in terms of goal attainment. In the figure, the top graph illustrates the trajectory of a division that coercively implemented change without attention to employees but was forced to pull back later, while the bottom graph illustrates the trajectory of another division that more collaboratively negotiated change with employees at the start. The authors used these graphs to theorize about the consequences of different change strategies.

Note how these trend mapping diagrams do not have precisely anchored scales, something which might make some readers uncomfortable. However, as the authors mention, the exact levels expressed in the graph are indicative only, and adding numbers would artificially convey precision where this is not possible. However, the general shapes shown are both revealing and well documented with the data. Similar graphs expressing broad trends in focal



phenomena (though not precise numbers) are illustrated in other studies as well (Denis et al., 1996; Howard-Grenville et al., 2013, see for example the trendline at the bottom of Figure 3b). We argue that the capacity to make sense of data is enhanced by this form of visual comparison, and that it would be more difficult to express the same ideas through verbal means.

As we move from descriptive visualizations towards analytical ones, the conceptual content is clearly enriched, and we shade into the next category where visual artifacts are clearly used for conceptualizing, as we describe next.

### **Visual Artifacts as Tools for *Conceptualizing***

The trick required for moving from analytical visualizations to conceptual ones involves further abstraction, in which precise empirical elements are stripped away, to be replaced by generic conceptual elements that could conceivably be transferred to other contexts. Indeed, as editors and reviewers of qualitative articles, we have both observed that one of the most frequent errors made by authors is to offer so-called “conceptual models” that are in fact nothing more than descriptive summaries of idiosyncratic data too grounded in a specific context to constitute a theoretical contribution. This risk may be particularly strong when the analysis is based on a single holistic case, because it then becomes rather easy to mistake local findings for general insights. There is a fine line between a grounded description and a theoretical model. To make any visualization theoretical, the author has to be able to explain it using arguments that do not require constant reference to specific elements of the case, a tough requirement to sustain. Doing this may require thinking through the theoretical mechanisms that explain the findings as well as the elements that might make them different. It requires detaching (though never too much) from the data, so that one can see both how the data led to the model, but also

how the model stands up without the data and might be applicable beyond it. Note, for instance, how Figures 4a, 4b and 4c – discussed below – make no reference at all to empirical observations, but describe the processes they visualize in general terms. The images in Figures 3a and 3b, where generic conceptual models and their empirical applications are simultaneously displayed offer another interesting way to accomplish this feat.

*Insert Figure 4 here*

Conceptualizing from qualitative data requires thinking through different kinds of relationships that might exist between concepts and processes. Some qualitative studies lead to linear conceptual models where a set of independent variables are shown to causally explain a dependent variable, or where a set of process stages leads deterministically to an outcome. An example of this is shown in Figure 4a from a study by Martin and Eisenhardt (2010) where pathways leading to successful and unsuccessful business unit collaborations are theorized.

However, the types of relationships emerging from many qualitative studies are often more complex, and visual forms then become particularly useful for representing them. Few researchers have classified theoretical forms in a systematic way although Van de Ven and Poole (1995) developed a four-way typology of conceptual models explaining change and development. We have noticed a few recurring forms in qualitative studies in management and we identify and illustrate two of them here, in addition to the linear deterministic form illustrated in Figure 4a.

A first form often appearing in published studies is the “dialectical model.” Dialectical conceptual models consider phenomena in terms of confrontation between opposing forces, and attempt to understand the effects emerging from these confrontations. Visual conceptual models to capture such confrontations usually show the oppositional forces in two parallel boxes

or streams (either vertically or horizontally displayed), and then show the way in which the confrontation may generate consequences in either or both of the two elements over time. Figures 4b and 4c illustrate two conceptualizations of this form. The first is from a study by Canato, Ravasi and Phillips (2013) of conflict between a new management practice and an existing organizational culture where cultural fit is poor, analyzing the transformations that this conflict engenders, as well as the elements that may contribute to enhancing or dampening it. The second example is from the study of escalating indecision described earlier (Denis et al., 2011) in which stakeholders are constrained to make a collective decision but have deeply conflicting goals. Note how these conceptual models themselves contain no explicit reference to the specific contexts of the studies (implementing Six Sigma at 3M in the first case, and configuring a hospital merger in the second). However, both show in different ways how conflict between opposing forces may play out.

A second interesting form of conceptual visualization we call the “recursive multi-level model” that focuses on dynamic influences among multiple levels of organizing over time. Here, we see how processes at micro levels aggregate to achieve change at more macro levels in turn influencing micro-level processes. A classic example is Barley and Tolbert’s (1997) sawtooth-shaped visualization relating action scripts at lower levels of analysis to institutionalized structures in a recursive fashion over time, as shown in Figure 4c. This sawtooth form has inspired multiple other applications. For example, Rerup and Feldman (2011) used it to show how the performances of routines lead to evolution in organization schemas, and Wright and Zammuto (2013) used it to show how societal trends and organizational actions combine to generate change in field level rules (in this case, the rules of cricket).

Though not using this sawtooth form, Stigliani and Ravasi (2012) also developed a multi-level conceptualization (see Figure 4c). Their paper examines interactions among individual, group and wider levels in processes of future-oriented sensemaking in a context of creative design, focusing on the interactions between material artifacts and verbalizations during this process. The figure illustrates unfolding over time (from left-to-right) and across multiple levels (diagonal layering of phases from top to bottom), with curved arrows connecting phases and practices within each phase, alluding to the dynamic, iterative nature of this process.

The variety of conceptual forms available is of course far from limited to these canonical ideas. One of the advantages of visualization is that it stimulates the creative juices, allowing researchers to see new relations between phenomena that are not bound by convention or preconceived notions of linear cause and effect. Figure 4d illustrates two rather unusual conceptual diagrams from recent studies. For example, Figure 4d (i) from a study by Lok and De Rond (2013) illustrates how institutional rules are maintained through two distinct mechanisms: one that operates for small discrepancies, and one that is precipitated by larger violations. The study's empirical context of preparations for the Oxford-Cambridge boat-race is again entirely absent from the figure, expressing generic relations among concepts.

Another unusual visual representation comes from Gehman et al.'s (2013) study of values practices and how they emerge. The empirical context here is the emergence of honors code practices in a business school setting. Their conceptual model (Figure 5c) shows the evolution of practices developing from isolated pockets of activity to "knotted" practices as actors see that their work is connected, to "performative" values practices as knotted practices become institutionalized, and then finally to circulating practices, as the values practices in one domain

come to contaminate other sectors of activity. It is worth comparing the visual representations in Figures 2b and 4d (ii) from the same article. There are worlds of difference, (at least here) between the original descriptive visual map and the emerging conceptual model.

These examples reveal the potential for visualization to enrich conceptual repertoires beyond the formulaic. We cannot know how the authors came up with these models, but based on our own experience, we suspect that the very act of drawing may have something to do with the capacity to think theoretically in novel ways. In fact, looking back at old versions of figures produced before a paper was accepted, we see how emerging models more or less consciously reflected (or, perhaps, inspired) subtle changes in our interpretations. A comparison of visual representations for different versions of Ravasi and Phillips (2011) produced between 1998 and 2009, for instance, shows how the emphasis shifted from identity-related constructs to underlying identity work processes (see Figure 4e).

### **Visual Artifacts as Tools for *Communicating***

This brings us to the final category of uses of visual artifacts in qualitative research: for communication. This section is shorter than the other three, as the communicative aspect has underpinned to a degree everything we have said so far. The different representations described above contribute to sensemaking and theorizing in themselves (Ravasi, 2017; Weick, 1995), and each successive form of use moves thinking forward, starting deeply embedded in data, then gradually rising above it and moving towards conceptual synthesis. However, these representations are clearly tools for sensegiving as well. Indeed, in the authors' experience, it is often the need to communicate findings to others (whether co-authors or audience members at conferences) that gets the creative juices flowing. Playing with visualizations with others often

constitutes some of the most productive and pleasurable parts of doing research. For example, when working with co-authors, we often sketch ideas together on a white board or – when working at distance – iterate through multiple rounds of adjustments to an emerging visualization of emerging ideas. These practices are invaluable to ensure interpretations are aligned before writing them up verbally. Striving to produce a visual representation that all authors find compelling is an important first step to ensuring the effectiveness of figures and diagrams as communication devices. After all, if these figures are not entirely clear to some of those deeply involved in the study, how can we expect the average reader to understand them?

To optimize the chances of effective communication, at the very least, one should be mindful of the conventions we introduced at the beginning of the paper. For example, timelines that move from right to left or from bottom to top may be harder to grasp. In addition, figures need to be accompanied by accurate legends, and be properly explained in the text – especially if using unconventional symbolism. Also, given the practice of putting figures and tables at the ends of papers during the review process, leaving repeated references to figures in the text ensures that they receive attention, and do their important job of communicating insight.

Aside from this practical advice, however, we suspect that what makes a particular figure more or less effective is something that we really discover by showing our tentative representations to co-authors, colleagues, and – ultimately – reviewers, and modifying them according to their feedback. As we do so, we almost always realise how one's wonderful figures often make more sense to those who created them than to readers. Despite our best efforts, visual representation of complex theories, characterised by multiple elements and relationships are rarely self-explanatory. This is where a paradoxical trade-off may occur. Researchers would

prefer their figures to be as precise as possible, and therefore tend to include long labels and more arrows than strictly necessary. And yet, precision implies verbosity with the result that figures may come across as overly busy and inelegant. This was an issue Stigliani and Ravasi (2012) encountered with their study of sensemaking in a design firm. Figure 5 shows the first version of their conceptual model, which was radically transformed through the review process into the diagram shown in Figure 4c ii. We are not sure whether the second figure is better, but it is definitely more “elegant.” It is also perhaps more independent of the data. Accuracy and precision may bring with them greater attachment to empirical detail, at the cost of parsimony and generality.

*Insert Figure 5 here*

Nevertheless, while reviewers appreciate simplicity, they also tend to be wary of models that are too simple, too linear, too deterministic. Especially where process is concerned, visual representations that openly recognize tensions, contradictions, iterations, recursive relationships, etc. may be more persuasive than those that gloss over these complexities.

### **Discussion and Conclusion**

In this paper, we argued for the value of visual representations at all stages of qualitative research, from coding data, to analyzing, to theorizing to communicating one’s insights. In qualitative research, it is the rich quotes and detailed narratives that make empirical stories come alive, conveying authenticity (Golden-Biddle & Locke, 2007). However, diagrams and figures can improve quality and credibility in at least three ways. First, they can help communicate and synthesize empirical stories, offering analytical overlays that draw out key elements, accompanying verbal detail (e.g., Figure 2). Second, they can give life to theoretical stories that

may be arid and hard to grasp without visual representation (see Figure 4). Third, if well done, visual representations may assist in the all-important task of showing the linkages between empirical and theoretical stories. Figure 3 shows some ways by which this may be done. Other ways include Gioia et al.'s (2013) "data structure" diagram, which shows how key constructs emerge from data through the gradual clustering of lower-order codes into higher-order ones. These constructs are then mobilized within conceptual models, embedding the link with the data; the potential role of data tables to further boost the credibility of linkages between data and conceptual models – expressed or not in visual form – should not be underestimated here.

It is important however to also consider some of the potential limitations of visual representations. One limitation lies in what can and cannot be expressed with them. We have already mentioned how diagrams may be more compatible with structured data elements than with narrative elements such as expressions of emotion, or subtleties in discursive constructions. This can be particularly critical if the researcher engages in visually mapping the original data as the main form of first order coding. In this case, diagrams may conceivably cut the analyst off from certain elements. All forms of coding are of course selective, but there is no reason why multiple approaches cannot be used to avoid these limitations.

Another concern might be how drawing software can orient conceptualizations. For example, Microsoft Word SmartArt tools offer a repertoire of ways of constructing diagrams that seem highly generative at first. However, as we have noticed when reviewing student presentations full of cogs and jigsaw puzzles, they can sometimes lead to stereotypical results, that have more to do with the tools available than with theoretical understanding.



Also, not everything can be easily drawn in two dimensions on a flat plane. Representing space and time through vertical and horizontal dimensions can sometimes be grossly simplifying. While attempts at articulating a 3-dimensional space exist (e.g. Boisot & Cox, 1989), such figures are not easy to interpret. Moreover, conventions such as feedback loops that imply time going back on itself create other simplifications, suggesting that one can “step in the same river twice,” when we know this is not so. All in all, visual artifacts are metaphorical tools. They enable us to map ideas and elements of data, but a map is never the territory, and maps can sometimes be misleading. More generally, the tools of visualization are inevitably “performative.” They offer certain affordances that orient, to a degree, the theoretical ideas that can and are represented (Quattrone et al., 2013). It is therefore important that researchers remain reflexive about what might be left out or reified through the use of certain visual forms.

That said, we think that the potential of visualization for organizational theorizing deserves to be investigated further. With the increasing availability of drawing tools, most qualitative studies now include some form of diagrammatic representations. There would be value in understanding how scholars use them, and what kinds of theoretical mechanisms they reflect or favour. Our intuition is that visualization enables us to reach beyond simple cause-effect linear thinking. However, that needs to be verified, and the limitations of visual representations also need to be better understood. In addition, one might ask how analytical and theoretical capabilities might be further developed. For example, how might video methods, and photography contribute to theorizing? How might data mining techniques be used to extract valid and insightful visualizations of organizational phenomena? With the increasing use of devices that can read documents in digital form, is it conceivable that, in the near future, visual

representations will include some forms of animation to better illustrate process, dynamism, iteration, etc.? The current chapter has only scratched the surface in terms of understanding the role that the visualization of verbal data can play in organizational research. We hope that others will find this topic worth pursuing. In the meantime, we'll keep on doodling!

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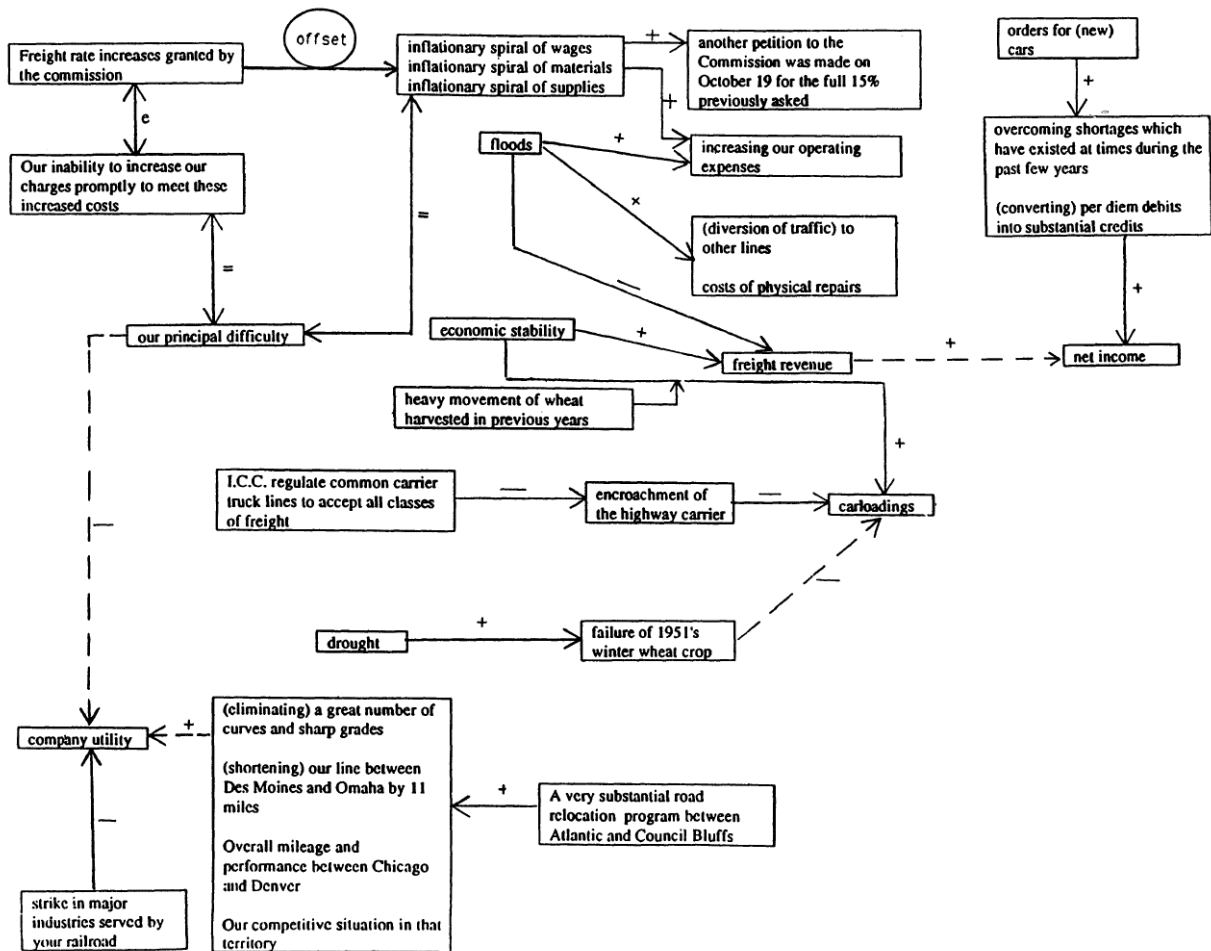
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Figure 2: Illustrations of Visual Artifacts for *Mapping Qualitative Data*

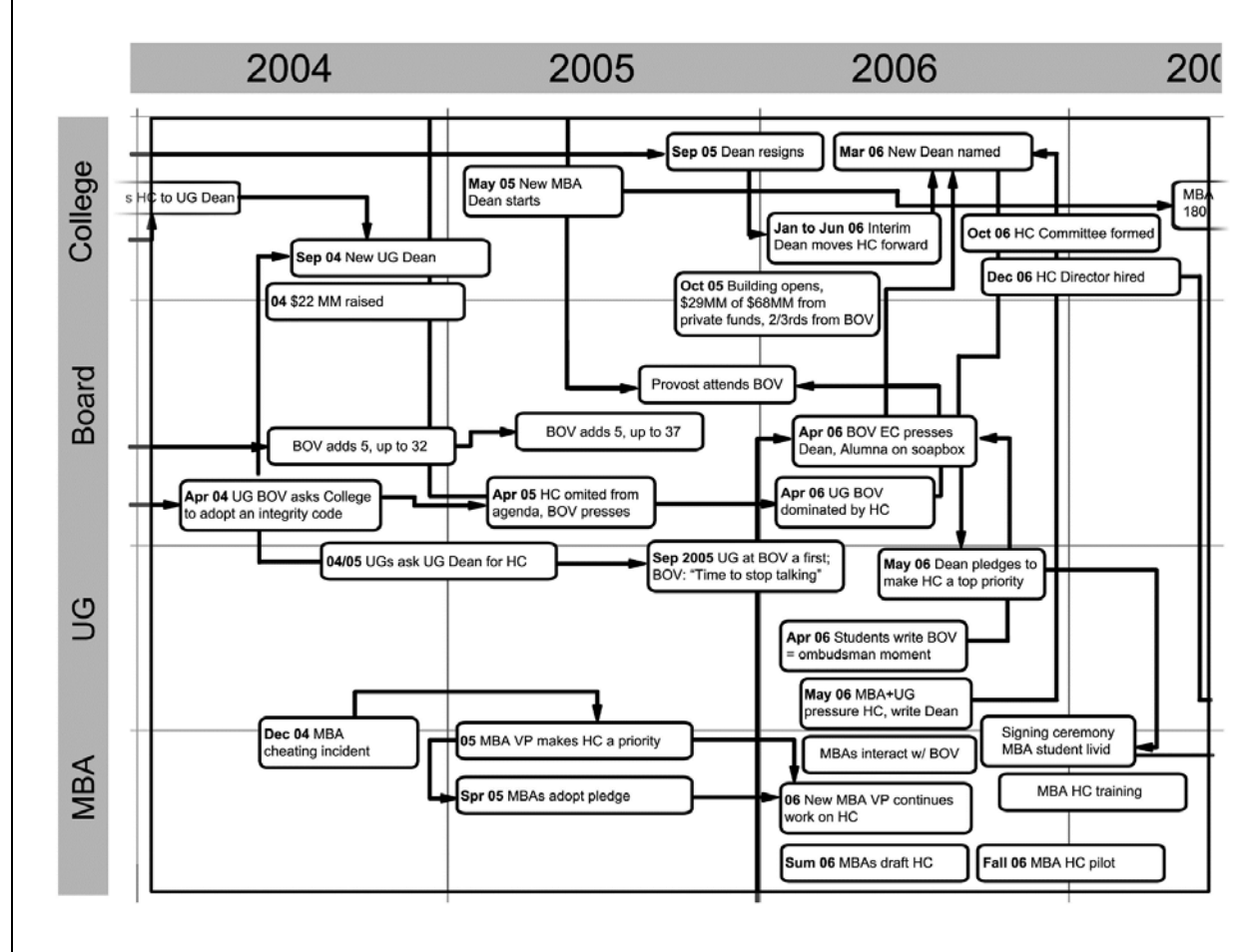
2a. Example of a cognitive map: Representing the mental map of managers of a railroad

Source: "Figure 2: Cause Map of the Rock Island, 1951" from Barr et al. (1992, p. 26), *Strategic Management Journal*, reproduced with the permission of JOHN WILEY & SONS.



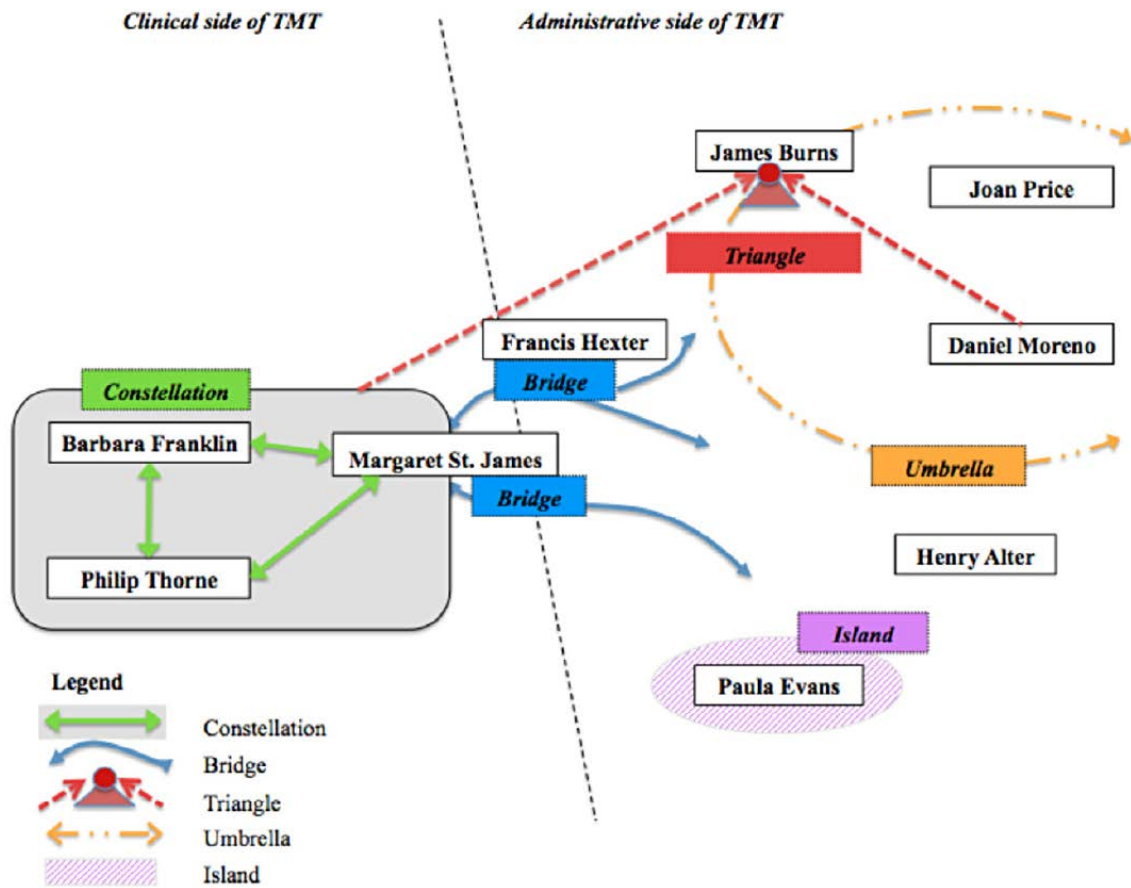
**2b. Example of a flow chart: Representing the events leading to the development of an honor code in a university business school**

Source: “**Figure 1: Visual Map Excerpt**” from Gehman et al. (2013, p. 90), *Academy of Management Journal*, reproduced with the permission of the ACADEMY OF MANAGEMENT



## 2c. Example of a relational diagram: Representing relations among members of a top management team

Source: “**Figure 1: Microdynamics in Mercy’s TMT**” from Kisfalvi et al. (2016, p. 438), *Long Range Planning*, reproduced with the permission of ELSEVIER.



**2d. Example of a relational diagram: Representing knowledge transfer patterns between adopters of robotic surgery**

Source: “**FIGURE 2: Dissemination mechanisms: Exposure to operations**” from Compagni et al. (2015, p. 258), *Academy of Management Journal*, reproduced with the permission of ACADEMY OF MANAGEMENT

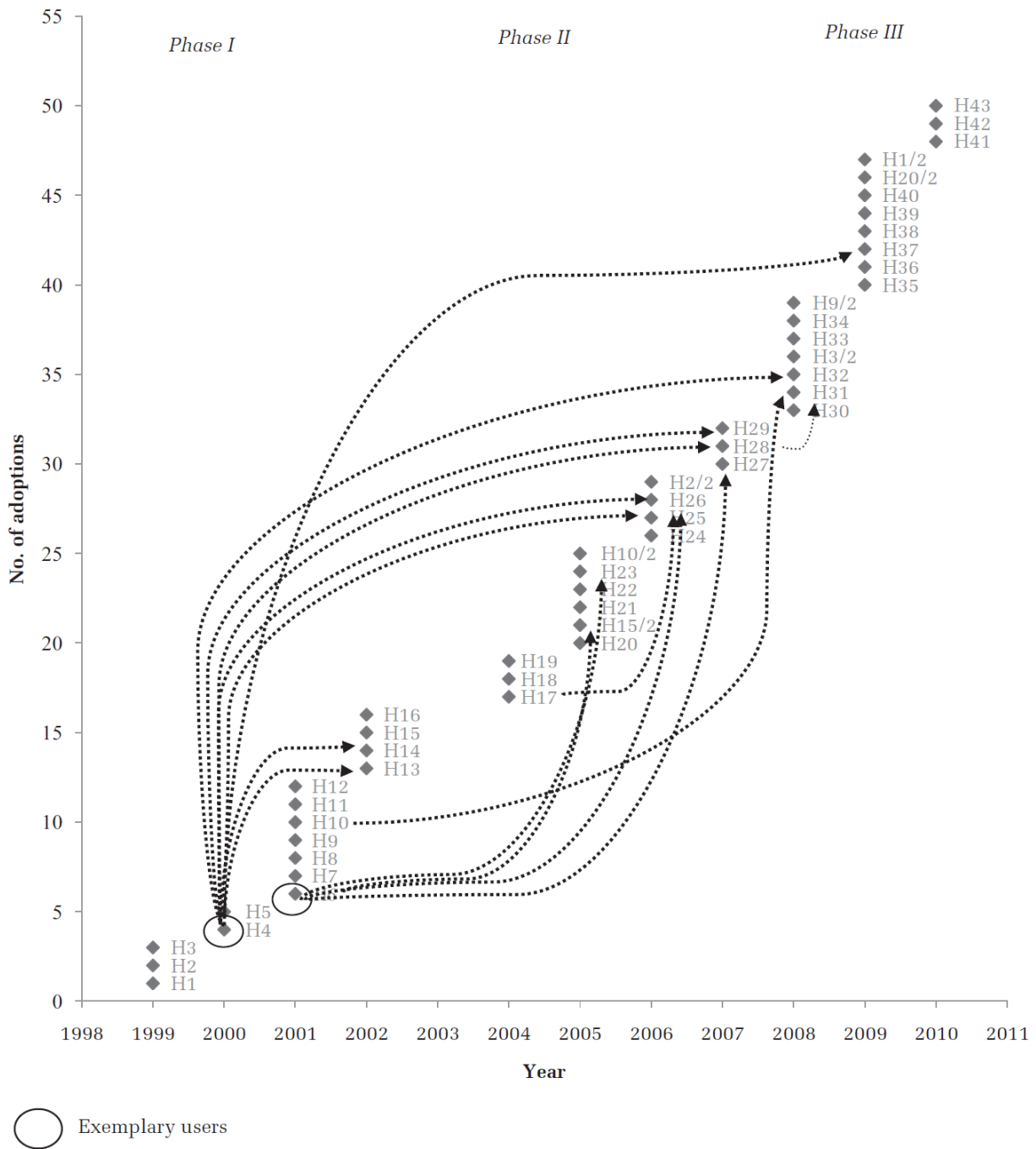
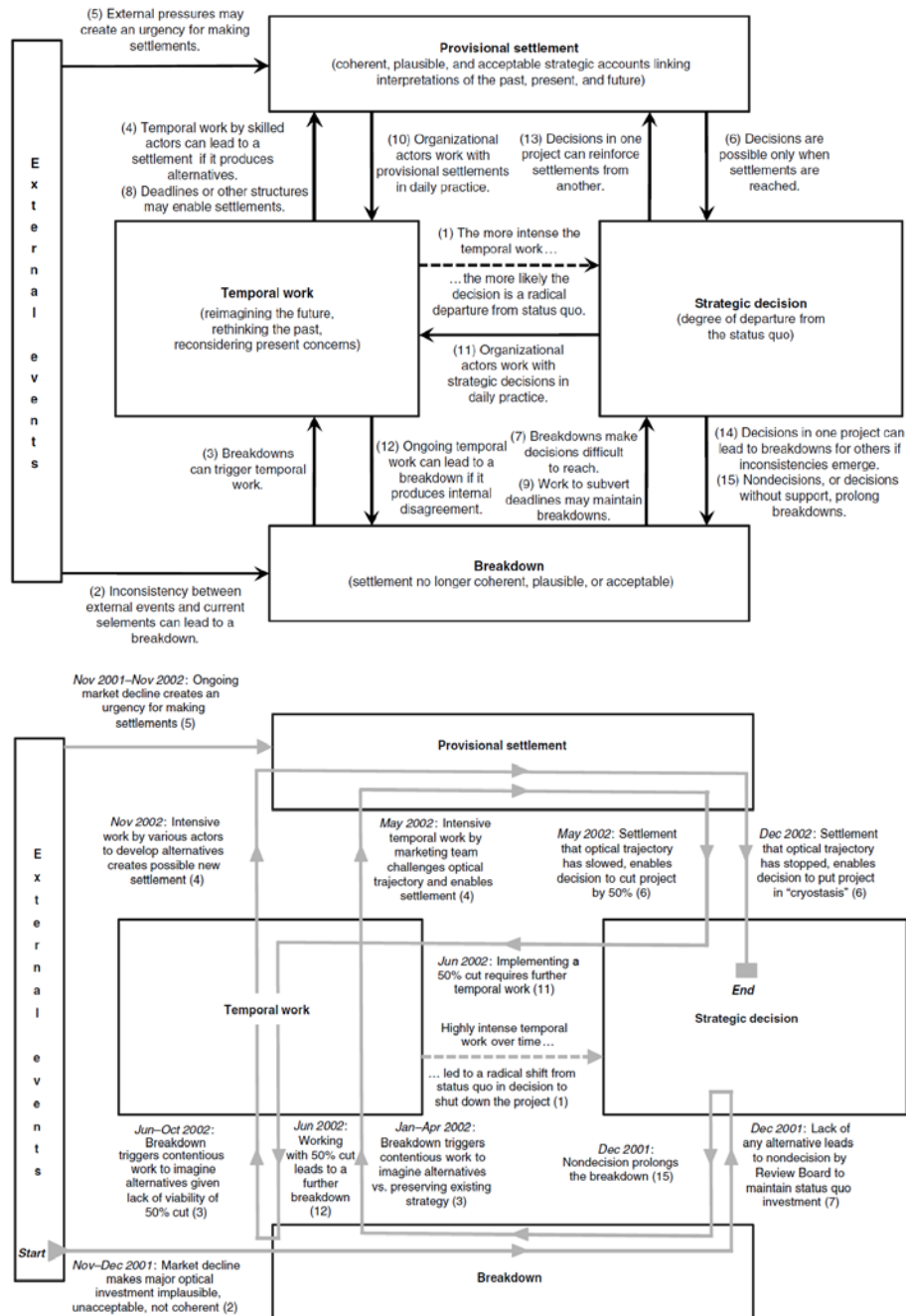




Figure 3: Illustrations of Visual Artifacts for *Analyzing Qualitative Data*

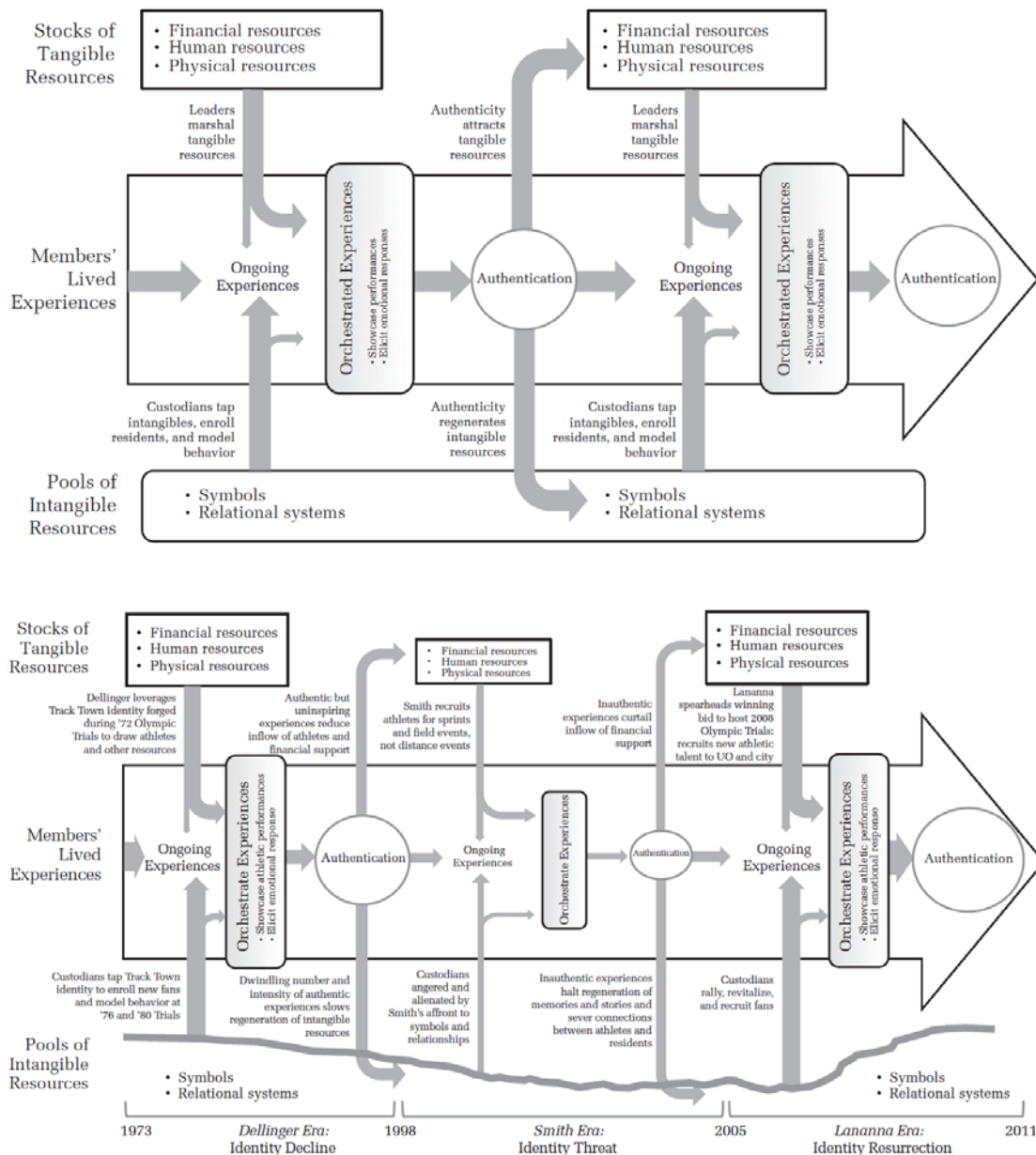
3a: Example of an analytical flow chart: A generic model of temporal work in strategizing with an application to a specific case

Source: “Figure 1: A Model of Temporal Work in Strategy Making” (p. 974) and “Figure 3: Summary of Temporal Work in Lightwave,” (p. 984) from Kaplan and Orlikowski (2013), reproduced with the permission of INFORMS, INSTITUTE FOR OPERATIONS RESEARCH AND MANAGEMENT SCIENCE.



**3b: Example of a process replication map: A generic process model of identity reproduction and its empirical instantiation across three iterations**

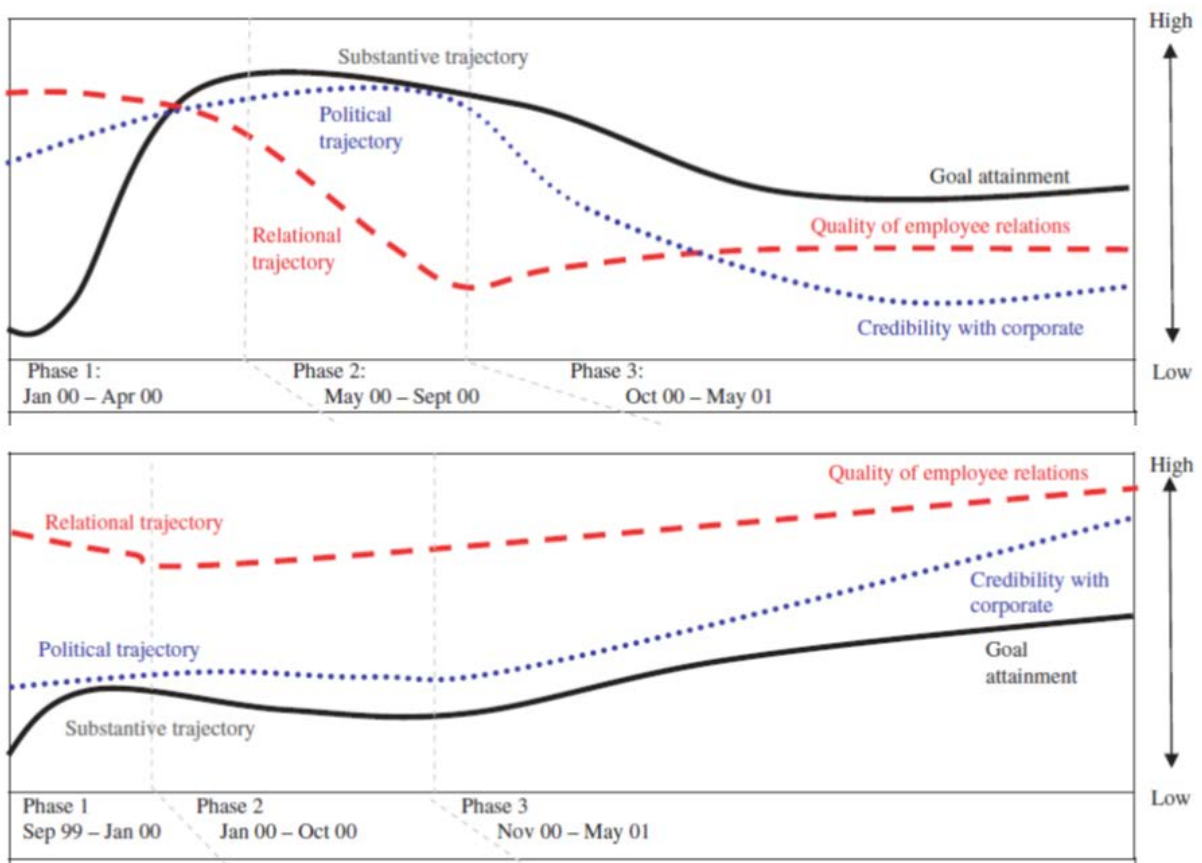
Source: “Figure 1: Process Model of Identity Reproduction” (p. 121) and “Figure 2: Identity Decline, Threat and Resurrection” (p. 123) from Howard-Grenville et al. (2013), *Academy of Management Journal*, reproduced with the permission of ACADEMY OF MANAGEMENT.



<sup>a</sup> The sizes of boxes, circles, and fonts reflect the quantities of tangible resources; orchestrated experiences' success in showcasing athletic performances and eliciting emotional responses, and the extent of authentication generated. The width of arrows in the figure depicts flows of resources, and the thick horizontal line near the bottom of the figure depicts the changing depth of pools of intangible resources.

### 3c: Example of a trend chart: Comparing trajectories of change in two divisions of a multi-divisional company

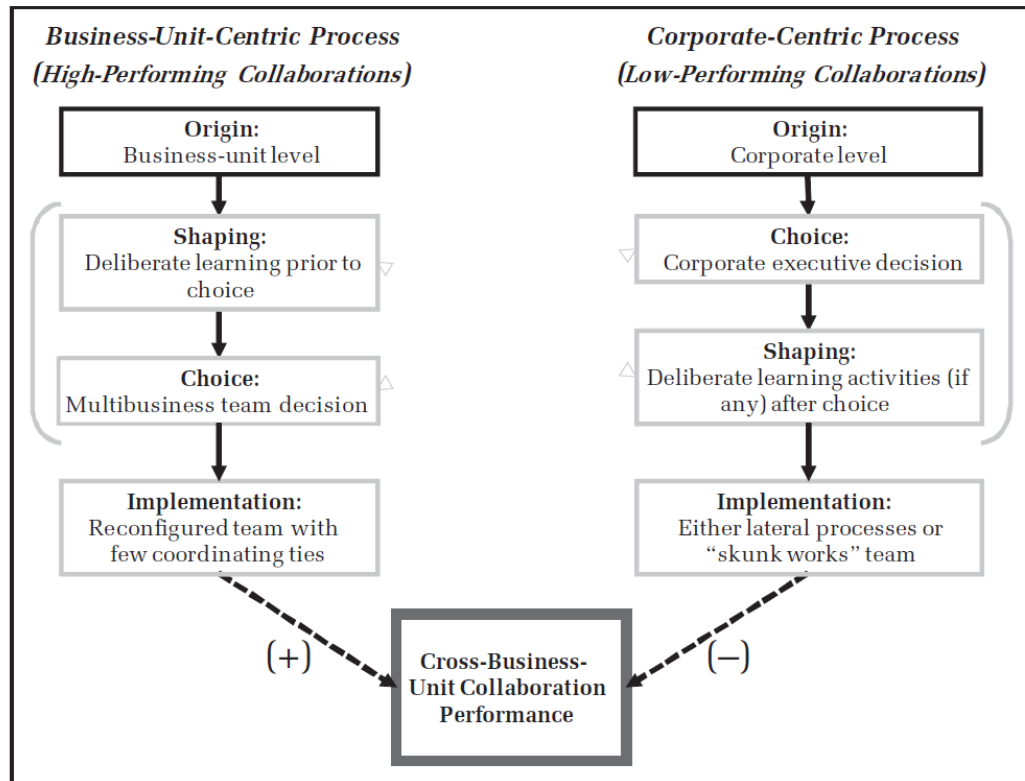
Source: Visual map sections of “**Figure 2: Divergent change trajectory in Division 2**” (p. 13) and “**Figure 3: Convergent change trajectory in Division 3**” (p. 14), from Stensaker and Langley (2010), *British Journal of Management*, reproduced with the permission of JOHN WILEY & SONS.



**Figure 4: Illustrations of Visual Artifacts for *Conceptualizing* Phenomena**

**4a: Example of a linear conceptualization: Model of how different process patterns lead to success and failure in business unit collaborations**

Source: “**Figure 1: Rewiring versus Corporate-Centric Collaboration Processes**” from Martin and Eisenhardt (2010, p. 295), *Academy of Management Journal*, reproduced with the permission of ACADEMY OF MANAGEMENT.

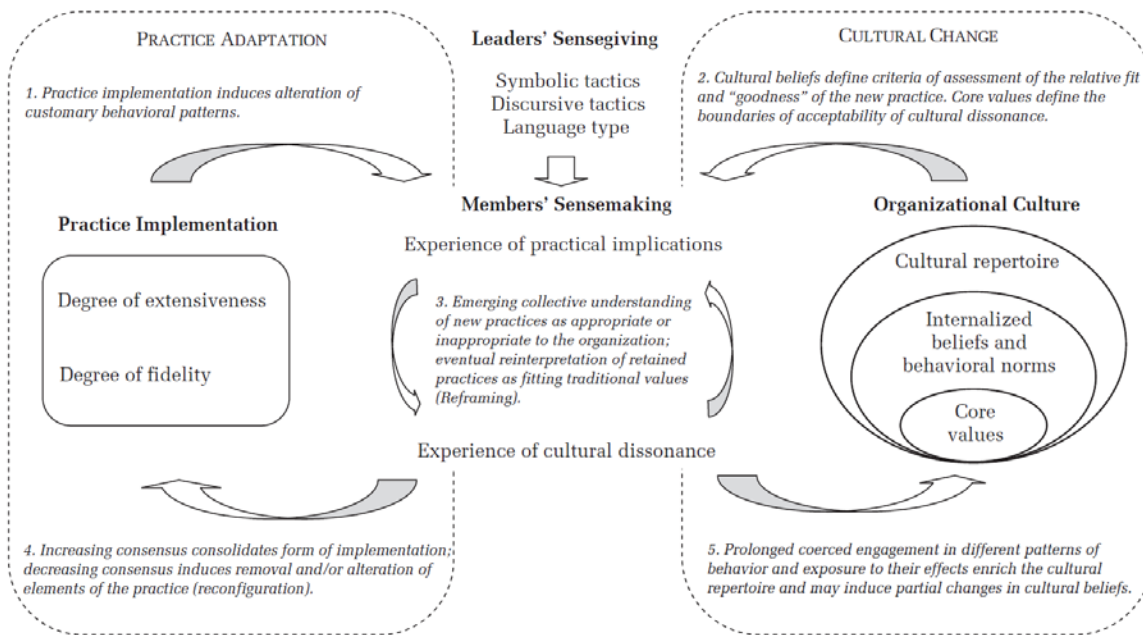


<sup>a</sup> The sequence of the shaping and choice steps is reversed.

#### 4b: Examples of dialectic conceptualizations

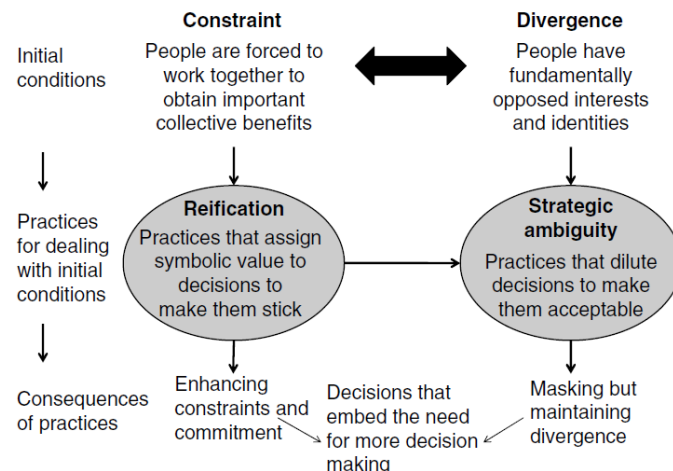
##### (i) A dialectic conceptualization of interaction between a management technique and an incompatible organizational culture

Source: “Figure 2: A Process Model of Practice Implementation in Cases of Low Cultural Fit” from Canato et al. (2013, p. 1744), *Academy of Management*, reproduced with the permission of ACADEMY OF MANAGEMENT



##### (ii) A dialectic model of the dynamics of escalating indecision

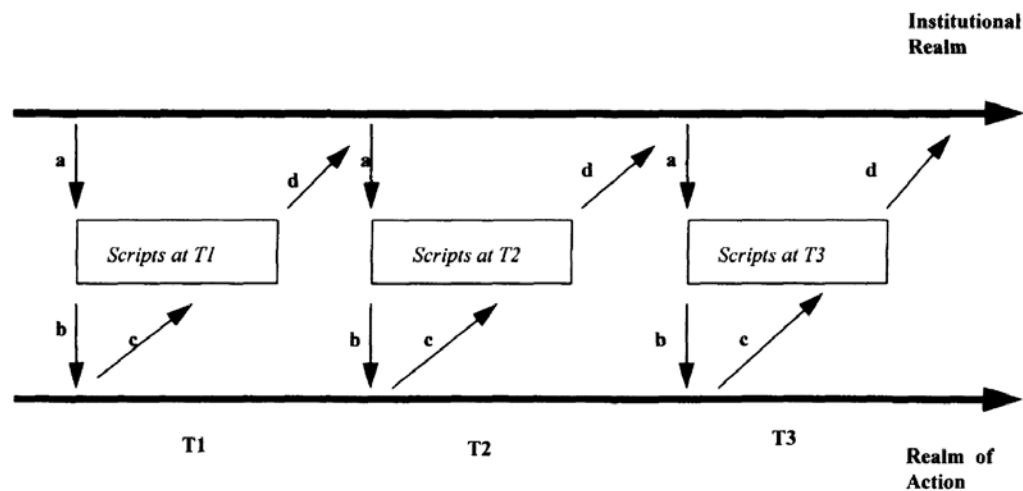
Source: “Figure 1: The Dynamics of Escalating Indecision: A Generic Model” from Denis et al. (2011, p. 236), *Organization Science*, reproduced with the permission of INFORMS, INSTITUTE FOR OPERATIONS RESEARCH AND MANAGEMENT SCIENCE



#### 4c. Examples of recursive multi-level conceptualizations

##### i) A generic recursive multi-level conceptualization relating actions and institutions

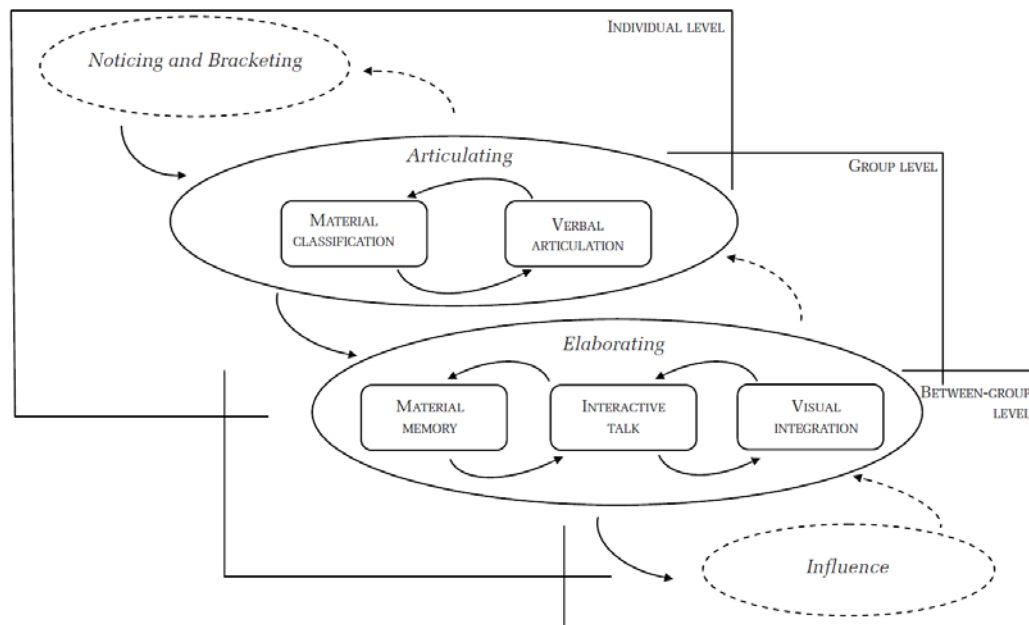
Source: “Figure 2: A sequential model of institutionalization” from Barley and Tolbert (1997, p. 101) *Organization Studies*, reproduced with the permission of SAGE Publications.



Key: a = encode, b = enact, c = replicate or revise, d = externalize and objectify

##### 4c. ii) A multi-level conceptualization of collective sensemaking

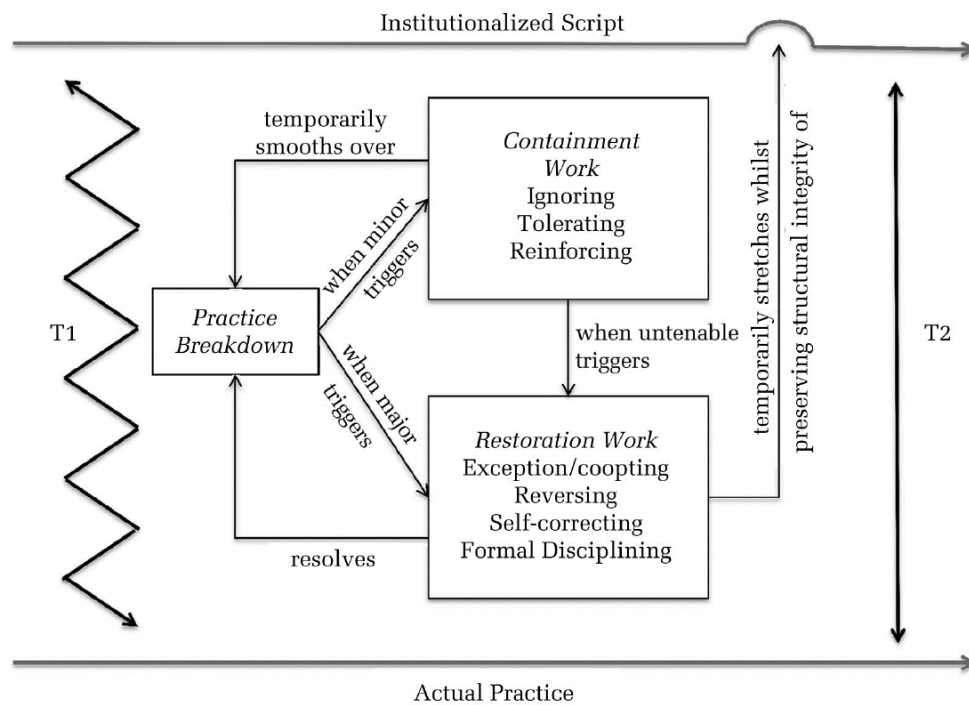
Source: “Figure 3: A Process Model of Collective Future-Oriented Sensemaking” from Stigliani and Ravasi (2012, p. 1250), *Academy of Management Journal*, reproduced with the permission of ACADEMY OF MANAGEMENT.



#### 4d: Two unusual conceptual models from recently published articles

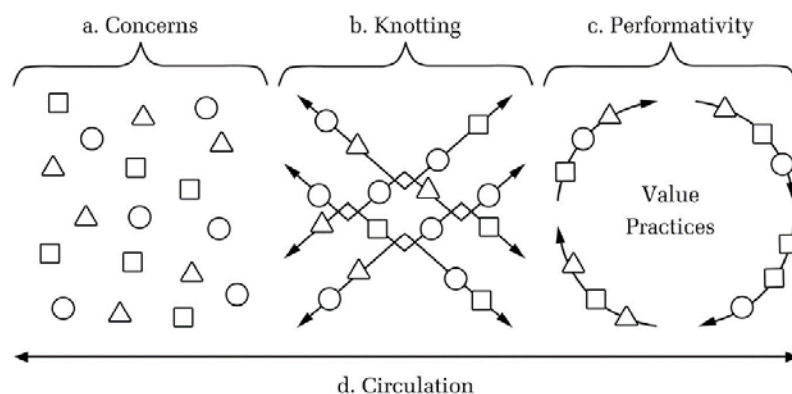
##### i) Conceptual model of institutional maintenance through practice breakdowns

Source: “**Figure 3: The Process of Accomplishing Institutional Stability through Practice Breakdowns**” from Lok and De Rond (2013, p. 203), *Academy of Management Journal*, reproduced with the permission of ACADEMY OF MANAGEMENT



##### ii) Conceptual model of the development of values practices

Source: “**Figure 2: Values Work Theoretical Model**” from Gehman et al. (2013, p. 102), *Academy of Management Journal*, reproduced with the permission of ACADEMY OF MANAGEMENT

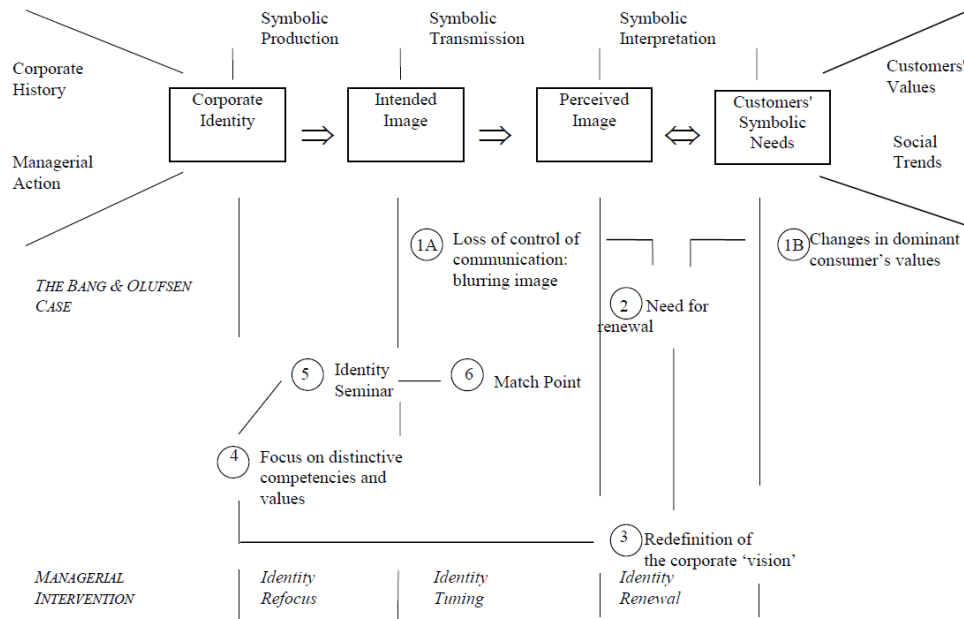




#### 4e: Evolving conceptualizations of identity change at Bang & Olufsen (Ravasi & Phillips, 2011)

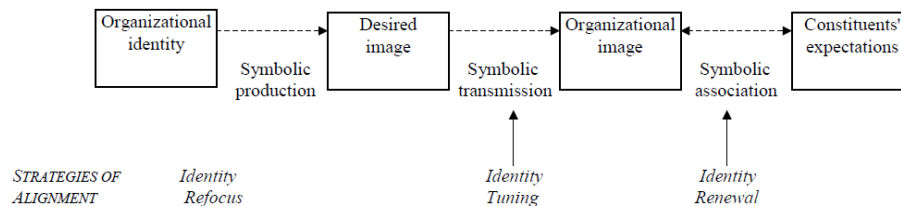
##### i) 1998 version

Figure 1. Managing corporate identity in Bang & Olufsen (Submission to CMR, 1998)



##### (ii) 2004 version

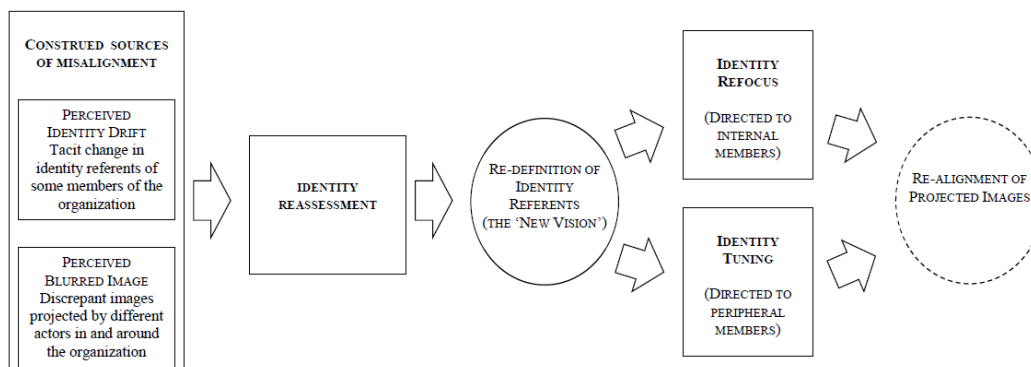
Figure 1. Interrelationships between organizational identity, image and external values (Submission to SMJ, 2004)



##### (iii) 2009 version

Figure 2. (submitted to SO, 2009)

Responding to a construed misalignment between organizational identity and image at Bang & Olufsen





**Figure 5: The Challenges of Visualization for *Communicating*: An Early Version of Figure 4c (ii) (Stigliani & Ravasi, 2012) (see also, the evolving representations in Figure 4e)**

Reviewer comment: “I am frustrated by figure 3. I’m not quite sure why, but I think it is because it is not elegant. It is complex. It doesn’t give an “ah ha” this is the hallmark of a beautiful, insightful theory. I’m not at all sure it is testable or generalizable. But, most of all, I’m not sure what I’ve learn that is new and useful about how designers use artifacts that I don’t get from the thick description and the quotes. I do like the moving between levels, and I do like the three key “functions” of “boundarization”, “situation”, and materialization, and think you might be able to press further in your thinking to provide a more a useful theoretical model. Since this is the core of your potential contribution, this is my biggest concern.”

