Framing Clashes: Divergent Frames and Negative Emotions in Innovation Work

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This paper builds new theory on the challenges of innovation under conditions of extreme ambiguity. I conduct a longitudinal, qualitative study of two large-scale innovation projects in the nascent smart cities industry, involving hundreds of individuals from 19 organizations. By analyzing strategic decisions within the two projects, I develop a process model of framing clashes that reveals the connection between ambiguity, frames, and negative emotions. I find that ambiguity leads individuals from different professions and industries to evaluate strategic decisions by relying on multiple and sometimes incompatible frames about a project’s purpose. When frames diverge, or clash, around early strategic decisions, individuals experience strong negative emotions. Although transitory, negative emotions shape stable negative attitudes about others working on the project: individuals begin to view each other as fundamentally different and questionably competent. Early framing clashes can thus give rise to dangerous spirals of emotion and cognition that result in a pervasive atmosphere of mistrust and disillusionment, and set the stage for negative project outcomes. This paper suggests that the challenge of ambiguous contexts is not solely cognitive; instead, cognition and emotion can intertwine in ways that are fatal for innovation. This paper has implications for organizations innovating in settings that involve high levels of ambiguity. In these contexts, the very diversity that promotes creativity also puts individuals at risk of the destructive effects of divergent frames and negative emotions. By uncovering the process of framing clashes, this paper begins to suggest ways that leaders can manage this tension, and adds to literatures on innovation and behavioral strategy.
INTRODUCTION

To innovate, individuals working on projects with radically novel aims – those seeking to tackle an unprecedented social problem (Edmondson and Rashid, 2012), introduce a new product class (Tushman and O’Reilly, 1997), or help give rise to a nascent industry (Zuzul and Edmondson, 2013) – must navigate a context fraught with ambiguity. Individuals working on such projects lack proven models, templates, or well-known paths to success; the connections between causes and effects, actions and outcomes are unclear and open to interpretation (March, 1994; Weick, 1995). These projects can produce tremendous results: awe-inspiring rescue efforts (Edmondson and Rashid, 2012), new categories of products, novel methods for building sustainable communities. But to succeed, the actors developing them must make strategic decisions both without the benefit of shared models, and despite multiple and potentially conflicting interpretations of what success means (Weick, 1995). Doing so can be difficult.

In this study I build new theory on why innovation under conditions of extreme ambiguity can be so difficult. I find that, in ambiguous contexts, strategic disagreements about a project can evoke emotional processes that spiral downward to derail innovation. I elaborate the concept of framing clashes to show how, when frames or interpretations about a project’s purpose clash around a strategic decision, negative emotional, cognitive, and relational processes unfold. In doing so, I highlight the emotional underpinnings of strategic decision-making in innovation work. This paper suggests that the challenge of ambiguous contexts is not solely cognitive, as existing literature suggests; instead, cognition and emotion can intertwine in negative spirals that threaten innovation.

Theoretical Overview

Individuals make sense of ambiguity by relying on their frames: cognitive schemes formed from past experience that shape how they interpret new situations (Goffman, 1974; Benford and Snow, 2000). By “punctuating and encoding objects, situations, events, experiences, and sequences of action
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within one’s present or past environment,” frames help individuals filter, order, and make sense of new or ambiguous situations and contexts (Benford and Snow, 1992: 137). By affecting how individuals see the world, frames exert a powerful influence on preferences and choices (Kaplan, 2008).

Frames are shaped by individuals’ histories and prior experiences (Walsh, 1995; Weick, Sutcliffe, Obstfeld, 2005). Similar prior experiences tend to give rise to a shared set of worldviews (Huff, 1982), beliefs (Porac, Thomas, and Baden-Fuller, 1989; Spender, 1989; Porac, Thomas, Wilson, Paton, and Kanfer, 1995), thought-worlds (Dougherty, 1992), technological toolkits (Leonardi, 2011), and institutional logics (Thornton and Ocasio, 2008) that create similar frames among members of the same profession or industry. Conversely, individuals from different professions and industries sometimes bring divergent frames to an ambiguous situation, a new project, or a nascent industry (Collins and Pinch, 1982; Orlinowski and Gash, 1994; Kaplan, 2008; Benner and Tripsas, 2012). Innovation projects often rely on collaboration between actors from different disciplines, professions, and industries (Davis and Eisenhardt, 2011; Edmondson, 2012), who bring specialized – and often essential – knowledge to a task (Leonard-Barton, 1995; Edmondson, 2012). But in projects characterized by high ambiguity, these actors might rely on divergent or incompatible frames to guide decisions, setting the conditions for a clash of frames.

Existing research has not explored the emotional consequences of divergent or clashing frames. A stream of research in behavioral strategy has emphasized the importance of frames for organizational outcomes (e.g. Daft and Weick, 1984; Huff 1990; Fiol and Huff, 1992; Wash, 1995; Barr, 1998; Tripsas and Gavetti, 2000; Porac and Thomas, 2002; Kaplan, 2008; Benner and Tripsas, 2012). This research has suggested that, when frames diverge, managers engage in “framing contests,” each attempting to change the way that others think to win support for a particular frame (Kaplan, 2008; Kaplan and Orlinowski, 2012). But disagreements or clashes of any kind are likely to elicit negative emotions (e.g. Maitlis and Ozcelik, 2004). Furthermore, these emotions can be critically important in shaping
production tasks (Lawler and Thyne, 1999; Lawler, 2001; Metiu and Rothbard, 2013), strategic decisions (Maitlis and Ozcelik, 2004), and organizational outcomes (Huy, 1999; 2002; 2011; Elfenbein, 2007; Barsade and Gibson, 2007; Sanchez-Burks and Huy, 2009). Yet as Vornov and Vince (2012) recently wrote, frames and framing have been “conceptualized in cognitive terms, with little attention to emotional resonance” (74); the possible emotional impact of divergent frames has been under-theorized.

This paper explores innovation projects characterized by high ambiguity that involve individuals from multiple professions and industries. In doing so, I highlight the connection between ambiguity, divergent frames, and emotions. I conducted a longitudinal, qualitative study of the development of SusTech City and GreenMarket, two (disguised) projects in the nascent smart city industry, involving hundreds of individuals from 19 organizations and multiple professions and prior industries. The leaders of SusTech City and GreenMarket hoped to develop some of the world’s first smart cities and smart, low-carbon districts. Because leaders lacked stable categories or templates indicating what a smart city or district was, the purpose of each project was ambiguous; that is, its “intentions [could not] be specified clearly” (March, 1994: 178).

By analyzing strategic decisions within the two projects, I develop a process model of framing clashes that reveals the connection between this ambiguity, divergent frames, and negative emotions. I find that ambiguity leads individuals from different professions and industries to evaluate some strategic decisions by relying on multiple and incompatible frames about a project’s purpose. When frames diverge, or clash, around early strategic decisions, individuals experience strong negative emotions. Although transitory, these emotions begin to shape stable negative attitudes about others working on the project: individuals begin to view each other as fundamentally different and questionably competent. Early framing clashes can thus give rise to dangerous spirals; negative attitudes lead to increasingly frequent clashes, and to damaging spirals of negative emotions and attitudes that result in a
pervasive atmosphere of mistrust and disillusionment, setting the stage for damaging project outcomes. Ambiguity, divergent frames, and negative emotions can thus become fatal to innovation.

This view is a significant departure from the way frames have typically been conceptualized in the literature. Prior research has explored frames as cognitive phenomena that affect the way that actors think (e.g. Walsh, 1995), and that can be adjusted and reconstructed through practices aimed at changing the way that others see the world (e.g. Kaplan, 2008). This paper suggests that decision-making involving individuals with divergent frames can become an emotionally taxing process that gives rise to pervasive negative attitudes that threaten innovation. When frames clash, decisions that appear to be commonplace disagreements around strategic issues can become infused with emotional value, precluding the possibility of successful framing practices or frame integration.

This paper thus reveals a tension faced by organizations innovating in settings that involve high levels of ambiguity. In these settings, the very diversity that so often promotes creativity and enables innovation puts actors at risk of the destructive effects of divergent frames and spirals of negative emotions and attitudes. By examining how this occurs, this analysis begins to suggest ways that leaders can manage instances and consequences of divergent frames and negative emotions to build organizations and projects that can succeed and thrive in spite of ambiguity.

The remainder of this paper is organized in four sections. First, I briefly review perspectives on ambiguity and frames, and the impact of emotions in strategy and organizational outcomes. I then describe the two projects and outline the qualitative methods that gave rise to this analysis. In the results section, I focus on exploring ambiguity, frames, and emotions at SusTech City and GreenMarket. Finally, I discuss the implications of my findings for research on behavioral strategy and innovation.

**Ambiguity and Cognitive Frames**

Some innovation projects are characterized by high ambiguity: that is, a lack of clarity about the meanings of and connections between causes and outcomes (March, 1994; Weick, 1995). More extreme
than uncertainty (the inability to predict the probability of particular outcomes), ambiguity obscures cause-and-effect relationships so that possible end-states are themselves unknown (Weick, 1995). In ambiguous contexts, actors lack understanding of what a desirable outcome looks like, or how to best achieve it; multiple interpretations of the same phenomena are therefore possible (Weick, 1995). Inconsistencies in interpretations are not easily resolved: as Weick (1995) wrote, “the problem with ambiguity is not that the real world is imperfectly understood and that more information will remedy that. The problem is that information may not resolve misunderstandings” (92).

Ambiguity permeates the earliest stages of an industry’s or a product market’s development (Aldrich and Fiol, 1992; Porac et al., 1995; Kaplan and Tripsas, 2008; Santos and Eisenhardt, 2009; Benner and Tripsas, 2012). Individuals innovating in projects that introduce a new product class, open a new market, or help give rise to a nascent industry lack stable categories or templates (Rosa, Porac, Runser-Spanjol and Saxon, 1999); as Rao (1994) wrote in his analysis of the early automobile industry, “the only point of agreement about the automobile was that it could not be powered by animals” (33). They face unclear or murky goals and purposes; they might form vague or competing definitions of what success means; they might rely on different professional understandings and values to help them make sense of what can and should be done (McCaskey, 1982).

In the absence of clear information and causal relationships, individuals rely on their frames to guide action and decision-making (Walsh, 1995). Since the seminal work of scholars writing in the Carnegie tradition (Simon, 1947; March and Simon, 1958; Cyert and March, 1963), researchers have emphasized that individuals construct simplified interpretations about the meaning, causes, and effects of ambiguous situations (March, 1994; Weick, 1995; Weick et al., 2005). Borrowing from literature on social movements (Goffman, 1974; Benford and Snow, 2000), researchers in behavioral strategy have argued that frames – action-oriented filters that highlight certain aspects of situations while hiding others – shape individual decisions and organizational outcomes (Kaplan, 2008). Frames are both
diagnostic and prognostic (Benford and Snow, 2000): they represent individual answers to questions about *what is going on and what can or should I or we do about it?* Once constructed, frames guide attention and decision-making (Daft and Weick, 1984; Barr, Simpert, and Huff, 1992): they determine what information individuals pay attention to (Nisbett and Ross, 1980), limit the solutions that they consider (Cyert and March, 1963; Barr *et al*., 1992), and shape their interests and preferences (Kaplan, 2008). By ordering, simplifying, and constricting situations and contexts, frames can both encourage and inhibit strategic action (e.g. Tripsas and Gavetti, 2000; Marcel, Barr, and Duhaime, 2011).

In projects characterized by high ambiguity, including those in nascent industries, individuals from different professions and backgrounds might rely on divergent or incompatible frames to guide decisions. This is because new situations, contexts, and goals are typically recognized and interpreted in terms of familiar ones (Rosch, 1978; Lakoff, 1987; Gavetti, Levinthal, and Rivkin, 2005; Gavetti, 2012). Frames are thus shaped by historical experience; they can depend on dominant logics (Prahalad and Bettis, 1986), or individuals’ thought-worlds (Dougherty, 1992), and educational (Fiss and Zajac, 2004) and occupational (Orlikowski and Gash, 1994; Leonardi, 2011) backgrounds. Individuals from similar industries, with shared experiences, beliefs, and logics, thus often bring similar frames to the same ambiguous situation or project (Huff, 1982; Porac *et al*., 1989; Spender, 1989; Porac *et al*., 1995). Conversely, individuals from different professions and industries bring divergent and sometimes incompatible frames (Collins and Pinch, 1982; Orlikowski and Gash, 1994; Kaplan and Tripsas, 2008; Benner and Tripsas, 2012). For instance, lacking stable templates or categories around the nascent digital camera market, leaders of photography firms viewed digital cameras as analog camera substitutes; leaders of consumer electronics firms viewed them as video system components; and leaders of computing firms viewed them as mini-computers (Benner and Tripsas, 2012). These divergent frames shaped product choices and strategies in the new market (Benner and Tripsas, 2012).
When individual differences result in divergent frames, decision-making and collaboration can become complicated (Orlikowski and Gash, 1994; Kaplan, 2008). Differences in profession, background, and industry experience are often described as key ingredients to innovation. Diverse experts bring unique knowledge to a task, and the re-combination of this knowledge can result in new connections and outcomes (Schumpeter, 1934; Henderson and Clark, 1990; Brown and Duguid, 1991; Leonard-Barton, 1995; Hargadon, 2003; Hargadon and Bechky, 2006). Differences in backgrounds can increase diversity of viewpoints, thereby promising more effective decisions (Janis, 1982; Schweiger, Sandberg, and Ragan, 1986). But if differences result in divergent frames, individuals may not be able to agree on acceptable courses of action (Kaplan, 2008). To make progress, leaders and managers must therefore resolve incompatible frames; they can often do so by engaging in framing contests aimed at developing shared frames to help guide decisions (Kaplan, 2008; Kaplan and Orlikowski, 2012).

**Multiple Frames and Emotions**

Existing literature has not explored the emotional responses that might arise from divergent frames or framing contests. But emotions – internal, transitory, positive or negative responses to an object or event (Frijda, 1993; 2007) – can arise from social interactions, and can have profound effects on individuals’ perceptions. Emotions generate cognitive appraisal, whereby individuals attempt to interpret the connections between their feelings and external stimuli (Weiner, 1986; Loewenstein and Lerner, 2003). Transitory emotions shape an individual’s stable attitudes towards a stimulus: an individual’s answers to questions of, “What do I think about him/her/it/them?” depend partially on the emotional states the subject evokes (Weiner, 1986; Loewenstein and Lerner, 2003). An individual experiencing a negative emotion de-values objects, situations, or individuals he or she believes caused it; an individual experiencing a positive emotion develops favorable attitudes towards objects, situations, or individuals he or she believes caused it (Weiner, 1986; Loewenstein and Lerner, 2003).
Because emotions – and especially negative emotions – affect individuals’ attitudes and behaviors, they can shape organizational outcomes. For instance, individuals working on a joint task develop emotional responses to success or failure (Lawler, 2001). Those experiencing negative emotions attribute their emotions to others working on the task; these attributions lead to important social outcomes, including lowered cohesion and solidarity, and affects future performance (Lawler, 2001). Decisions around sensitive issues such as the unsatisfactory performance of an organizational member can evoke anxiety, fearfulness, and negative emotional cycles that result in a pervasive climate of mistrust and a lack of safety (Maitlis and Ozcelik, 2004) that, in turn, influences learning and thus performance (Edmondson, 1999). Organizational changes that give rise to identity threats can result in negative emotional responses that reverberate throughout an organization; these emotions can have a profound impact on the success or failure of strategic change initiatives (Huy, 1999; 2002; 2011; Sanchez-Burks and Huy, 2009). Research on alliances has hinted at the potentially destructive impact of negative emotions; Doz’s (1996) classic process study, for instance, names partners’ increasing frustration as having a negative impact on the alliance.

Despite the importance of emotions for individual perceptions and organizational outcomes, existing research has not explored the connection between frames and emotions. Yet frames are inextricably tied to processes that elicit strong emotions (Barsade and Gibson, 2007; Huy, 2012): understanding change, interpreting identity, making sense of highly contested decisions (Reger et al., 1994; Kaplan, 2008; Tripsas, 2009). The focus of this paper is thus on uncovering the relationship between ambiguity, divergent frames, and emotions. This analysis suggests that ambiguity can set the stage for divergent frames that lead to negative emotional and cognitive spirals. These spirals can preclude the possibility of successful integration or the development of shared frames, profoundly affecting innovation projects. Understanding and managing whether and how this occurs is critical in driving effective collaboration and innovation in projects characterized by high ambiguity.
METHOD

The analysis developed here is grounded in a longitudinal, qualitative study of two innovation projects in the nascent smart cities industry, involving collaboration between hundreds of individuals from 19 organizations. The initial purpose of the study was to generate theory on the mechanisms and processes that encourage or stifle innovation in a nascent industry; the qualitative approach was therefore most appropriate (Edmondson and McManus, 2007). In pooling data from the two projects, I hoped to uncover mechanisms and processes that were applicable in and generalizable to multiple contexts (e.g. Bechky and Okhuysen, 2011). This approach differs from that of planned multiple case-studies (Eisenhardt, 1989a). My purpose was not to compare the outcomes of the two projects, but rather to see whether and how patterns and processes replicated across them. My focus on frames and emotions was not determined a priori, but rather emerged through their importance in the data (Glaser and Strauss, 1967).

I develop theory by analyzing strategic decisions in the two projects in multiple steps, both accounting for variance in the data, and unearthing the process of framing clashes. An analysis focused on variance attempts to propose relationships between independent and dependent variables (Mohr, 1982). By comparing strategic decision points in the data, I discovered that actors evaluated some early strategic decisions by relying on divergent frames around a project’s purpose. When this occurred, decision-making became problematic: decisions were deferred or hotly contested, and were described in highly emotional terms. In contrast, decisions that did not involve divergent frames were resolved, and were not described emotionally. An analysis focused on process explains the sequences of events that lead to an outcome (Langley, 1999). By analyzing problematic decisions, I identify the patterns and sequences that arise from decisions involving divergent frames. I develop a model of framing clashes that explains the connection between ambiguity, divergent frames, and emotions, and that reveals the importance of negative emotions in shaping relational and innovation consequences. My aim is to
propose rather than test theory; the model developed here is tentative, and further research is needed to test and refine my claims.

**Research Context**

Over a period of three years (late 2009 – late 2012), I studied the development of SusTech City and GreenMarket (pseudonyms), two ambitious innovation projects in the nascent smart cities industry. The industry began to take shape in the latter half of the first decade of the 20th century, as several companies and governments announced efforts to make new and existing cities more intelligent: technologically-connected, low-carbon, and sustainable. These companies and governments planned to develop and deploy internet and information technology (IT) to improve the operational efficiency, environmental sustainability, and quality of life in the world’s cities. To learn more about this context, I gathered primary and secondary data on smart city initiatives. I conducted over a dozen interviews with relevant players and observers, including architects and engineers, leaders of several technology companies, and governmental officials working on smart city projects around the world. I gathered reports on smart cities from companies and think-tanks including McKinsey Consulting, IBM, Cisco, HP, Oracle, and Forrester.

SusTech City and GreenMarket were identified by industry observers as pioneers in the smart city industry. As Table 1 indicates, although the projects studied varied widely in their aims and their duration, each involved multiple individuals from different professions and industries who hoped to come together to share information, coordinate their work, and engage in joint problem-solving to develop a smart urban development. My research at SusTech was concurrent with the project’s launch; in contrast, when I began research, GreenMarket was in its later stages of development. Nonetheless, the process I capture generalized across both cases.

--Insert Table 1 About Here--
SusTech City. I studied the development of SusTech City over the course of three years. SusTech City was initiated by SusTech, a technology start-up hoping to develop and deploy technological solutions that made urban spaces more connected, efficient, and sustainable. As part of their business plan, SusTech leaders sought to develop a ‘smart’ community of 250,000 residents in a greenfield site. To do so, they worked with individuals and organizations from across industries, including members of the local government, a real-estate development firm, a global consulting firm, an engineering firm, an architecture firm, and several technology firms. These individuals hoped to plan and construct the city in a series of phases, starting with a smaller residential community and technology cluster. When I began research at SusTech City, the project was still in its earliest stages: the individuals working on it were trying to acquire land, develop a conceptual master-plan, and develop technologies to embed in the city.

GreenMarket. I studied the development of GreenMarket over the course of 18 months. GreenMarket was initiated by the leaders of Telavera, an investment fund focused on catalyzing innovation in its home country. The leaders of Telavera’s Energy Department (engineers focused on sustainable energy solutions) and Design Team (architects, designers, and technologists) initially sought to plan and build one of the world’s first smart, low-carbon districts in a former industrial area about the size of a large city block. They engaged two local real-estate development companies, a local construction company, and an international engineering firm, architecture firm, and consumer behavior research firm. Individuals from the firms agreed to apply their capabilities and expertise – from engineering solutions to real-estate development capabilities – to jointly plan and deliver the block. When I began my research, they were finishing designs for the district and hoped to break ground within the year.

Data Sources

Interviews. My primary source of data was in-depth interviews with individuals working on the projects. Overall, I conducted 102 interviews with 59 individuals. These semi-structured interviews
ranged from 60 minutes to 3 hours, and were tape-recorded and transcribed. I questioned participants on how they thought about each project, their work, the challenges they faced, and how they resolved them. I also questioned them on notable strategic decision points within each project: what they were, how and what decisions were made, why they were important, and how they impacted the project. Whenever possible, I interviewed the same individuals at different points in time. By interviewing the same participants over a prolonged period, I began to develop an integrated understanding of decision points, the progress of each project, and interviewees’ evolving perspectives.

**Observation.** I visited each site multiple times, making six visits to SusTech City, and three to GreenMarket. During each visit, I spent a number days or weeks on-site, immersing myself in its culture. When on-site, I observed interactions and attended project meetings. I also sat in on several casual gatherings (including lunches and dinners), and conducted a number of informal interviews. I took extensive field notes during each visit, including detailed notes on what was said, descriptions of how individuals interacted, and ongoing personal reflections on unfolding events. My presence in the field allowed me to build the trust and familiarity necessary to investigate sensitive phenomena. I triangulated interview data with field notes, including notes from 40 SusTech City meetings and numerous informal engagements, and two GreenMarket meetings, one full-day project session, and two informal dinners.

**Document Review.** I collected and analyzed archival documents from each site. At SusTech City, these documents included successive business plans and presentations, and master-plans for the City’s development. I was also copied on a number of emails exchanged between the leadership team of multiple organizations: my data includes 105 emails. At GreenMarket, these documents included analyses and reports from multiple organizations involved in the project on its potential and performance. I also analyzed a project blog written in real-time by the leaders of Telavera. Together, I
analyzed close to 340 pages of documents across the two projects. Table 2 summarizes these data sources.

--Insert Table 2 About Here--

Data Analysis

I iterated between data collection, analysis, and literature review (Glaser and Strauss, 1967), and began by writing case studies about each project that attempted to capture its aims, its history, the people and organizations involved, and all notable decisions. This within-case analysis allowed me to gain familiarity with each project and formed the basis for subsequent analysis (Eisenhardt, 1989a). In constructing the case studies, I recognized that individuals in both projects brought different interpretations of the project’s purpose. Using QSR NVivo, the qualitative data analysis software, I coded instances in the data where individuals referred to a project’s goal, aim, purpose, mission, or objective. Comparing these instances, I recognized that two different interpretations were prevalent at SusTech City, and two at GreenMarket. I also recognized that these interpretations depended on each individual’s profession and industry background. Comparing the data with literature, I began to conceptualize these interpretations as frames.

As I brought the conceptual category of frames back to my analysis of the projects, I realized that frames were particularly salient to project participants during moments of strategic decision-making. Following this observation, in the next stage of analysis, I began to construct accounts of important strategic decision points within each project. For a decision point to qualify as ‘strategic,’ it had to allocate significant resources, set an important precedent, or have consequences for the project’s success or positioning (Eisenhardt, 1989b; Eisenhardt and Zabracki, 1992). To qualify as ‘important,’ it had to be referenced in multiple accounts across the data. 15 decision points met the criteria, and I wrote lengthy accounts of each. In these accounts, which ranged from five to 25 single-spaced pages, I included multiple narratives about what happened (noting all individuals and organizations mentioned).
and when it happened. In the context of each decision point, I also coded and wrote about each participant’s preferences (what s/he wanted to occur and why), attributions (why the decision unfolded in the way it did), his or her perceived consequences (what followed as a result), and his or her emotional response (including, among others, neutrality, disappointment, frustration, and excitement). Table 3 provides an overview of decision points analyzed. I noted that, whereas five decision points were successfully resolved (that is, actors managed to reach consensus on a choice), ten were problematic. In five of these ten cases, decisions were deferred; in five other cases, although a choice was made, actors continued to disagree about it. Of the five decisions at SusTech City, one was resolved and four problematic; of the ten decisions at GreenMarket, four were resolved and six problematic.

In the third stage of analysis, I brought together my frame analysis with my set of strategic decisions to look for patterned variation in decision-making across projects. My focus in this stage turned to generating propositions about variance within the data. In particular, I attempted to account for differences that could explain why some decisions were resolved whereas others were problematic. Because SusTech City was in early stages of development, most important strategic decisions were about its business model and future performance. Because GreenMarket was further along in its development, most strategic decisions revolved around specific design choices. Nonetheless, I recognized certain patterns replicated across both projects. Specifically, analysis of strategic decision points, summarized in Table 4, revealed that both resolved and problematic ones involved important choices and individuals from multiple industries, who were not always co-located at the time of the decision. Most were mediated by boundary-spanners who attempted to integrate multiple points of view. Many involved boundary objects – blueprints, project reports, physical models – that helped integrate diverse knowledge. Some, but not all, had stringent deadlines. Many involved political
activities by the proponents of a particular choice, who prepared studies and materials and held private meetings intended to convince others of their point of view.

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As Table 4 indicates, one pattern emerged: problematic decisions were those that made divergent frames about the project's purpose salient. In these decisions, each actor's preferences appeared to be shaped by his or her divergent interpretations of the project's purpose. Decision points that did not make divergent frames salient, on the other hand, were successfully resolved. In these decision points, actors' frames aligned; if they did not, actors did not explain their preferences with reference to their interpretation of the project's purpose.

In the next stage of analysis, I began analyzing the ten decision points marked by divergent frames to construct a parsimonious process theory that could capture prototypical patterns. This analysis involved looking across the cases of decisions that involved divergent frames to identify common sequences of action, cognition, and emotion. By stacking all decisions along two time-lines, illustrated in Figure 1, I recognized that divergent frames were often prevalent in early decisions, and that problematic decisions increased in frequency over time. Moreover, these decisions were usually described in emotional terms. Specifically, actors expressed frustration (a feeling of being annoyed or upset), disappointment (a feeling of dissatisfaction) and contempt (a feeling of scorn and disdain). I focused my analysis on understanding more about these emotional responses, and their antecedents and consequences. In so doing, I began to construct a process theory that could capture the patterns and sequences that occurred during and that followed the decisions. I required that an emotional, cognitive, or behavioral manifestation be present in multiple cases to be included in the process.

--Insert Figure 1 About Here--

As categories and concepts became more complete, I began to consider the literature on innovation, ambiguity, frames, and the impact of emotions. Comparison of the literature and my data
led me to recognize that the process I had uncovered had not been theorized in prior work. It was in this stage that I began to conceptualize the process as one of *framing clashes*. I terminated data collection and analysis once my account captured the variation across and the patterns within my data; that is, when I felt I had reached theoretical saturation.

**AMBIGUITY, FRAMING CLASHES, AND NEGATIVE EMOTIONS**

When SusTech City and GreenMarket were launched, the smart city industry was in its nascent stages. Although a number of smart city projects were announced around the world, they had not yet been developed. Project leaders and industry observers thus noted a lack of consensus on precisely what the term *smart city* meant. Announced projects varied widely in size: some were envisioned as new neighborhoods like GreenMarket, others as retrofits of existing cities, and others as entirely new cities like SusTech City. Emphasis on technology – the *smart* component – varied across projects: some intended to use existing technologies to make individual buildings more efficient; others intended to develop new technological solutions to connect entire projects. Emphasis on real-estate viability – the *city* component – also differed: some projects were envisioned as practical urban spaces where people would live and work; others were envisioned as demonstration projects whose primary purpose was the testing of new technologies. A smart city report stated that smart city projects “are quite diverse in their approaches and objectives…. Smart city is an umbrella concept for a variety of systems in a city.” An engineer from a global company who had worked on a number of smart city projects explained how these initiatives varied widely, and how there was no stable understanding of what a smart city was:

> The innovation ten years ago was around green buildings and things like dimmable lights. Now we have moved to talking about smart or zero-carbon cities. But nobody really knows what that means. These projects are all highly aspirational, but they are so different from each other…. Some are private, some are public initiatives…. Some are new cities, some are large suburban developments trying to masquerade as eco or smart cities…. The people who are leading these projects have never done anything like this before. And there is no real research on what a smart city is, or how cities should be developed.
The individuals developing SusTech City and GreenMarket thus faced ambiguity around what a smart city or smart, low-carbon district meant. “We’re working on something that doesn’t yet exist,” a governmental leader working on SusTech City explained; “We will be the first smart city.” A SusTech employee explained how even the word city failed to capture the novel nature of the project: “We might even want to change the word city. What we are building is something completely different.” Similarly, a Telavera technologist explained: “We are building the first genuinely 21st century block.” Individuals working on the project thus lacked shared templates or proven models for precisely how a smart city or a smart, low-carbon district should look, how it should perform, and what developing it entailed. “There is no template for building new cities,” a SusTech executive reflected during a meeting. Similarly, an architect working on GreenMarket reflected: “There is no precedent for this kind of project. There is no model that exists for it.” “When we launched the project,” a designer working on the project recalled, “We didn’t know what we were doing…. There is no template or precedent.”

**Ambiguity Gives Rise to Divergent Frames about Project Purpose**

In the absence of stable templates, individuals from different professions and industries brought different frames about each project’s purpose: their interpretations of what a smart city was – and what SusTech City or GreenMarket should aim to be – depended on their different backgrounds, prior experiences, and expertise. Two predominant frames emerged around SusTech City. Individuals with experience in the technology or software industry interpreted a smart city as technology venture with real-estate, a *technology* frame. This frame privileged the *smart*, or technological, aspect of a smart city. Individuals with the technology frame understood SusTech City as a way to test and validate new technologies that could make cities smarter and more sustainable. They viewed the City itself as a demonstration project: “a sandbox” where technological solutions could come together. “SusTech City is a means to an end,” John, SusTech’s CEO, explained in an interview, “and that end is the demonstration
and distribution of technology.” A SusTech executive reflected: “The genius of the idea behind SusTech City is that it is much more than just a real estate play; in fact, real estate is just a minor part of it.”

Individuals with experience in more traditional real-estate development and project management – including members of Romo Development (RD), the real-estate developer, and Crawford Consulting (CC), the consulting company – interpreted smart cities as real-estate developments embedded with technology. This frame privileged the city, or real-estate, aspect of a smart city. Individuals with the real-estate frame understood SusTech City as an attempt to build a viable city: although it would include unusual technological solutions, it had to function effectively as a large-scale development where people would live, work, and interact. A member of RD explained the project’s purpose was, “To build some buildings.” Another elaborated: the aim of the project and “the simple set of circumstances that we can all understand…is the conversion of this fantastic set of ideas into reality on a piece of land.” He explained that this aim was, at its core, similar to other real-estate developments the company had been involved with: “That’s what we do all the time.”

Individuals developing GreenMarket also brought two different frames to the project. Individuals with prior experience in sustainable urban development – including members of Telavera, and the architecture, engineering, and consumer behavior firms – interpreted a smart, low-carbon district as a way to test and demonstrate new, replicable methods of smart, sustainable urban development, a catalyst frame. Tim, the head of Telavera’s Design Team, explained how the aim of the district was, “To come up with a low-carbon solution. The idea is two-part. We want to explore, what does it mean to be low-carbon, and how can we transition current cities to this model.” A member of Telavera’s Design Team described the district as “an alibi to address a broad set of issues around sustainable development.” An engineer working on the project elaborated:

If we just do this one project, we have failed. We need to be transforming the design process, the way different industries work together, the way buildings are designed and constructed and permitted…. [We are thinking about] how to make the design solutions applicable in many,
many projects in the built environment….It’s not just a one-off .... Telavera is really thinking about transformation. That, to me, are the project’s most important, most challenging goals.

Individuals with experience in more traditional forms of real-estate development – including members of Pence Development (Pence) and Casilla – interpreted a smart, low-carbon district as a special kind of a real-estate project, a development frame. This frame privileged the idea that smart city projects should function as viable, sellable urban spaces. Individuals with the development frame understood GreenMarket as an attempt to build a commercially feasible block that generated and used less carbon than typical projects, but at a cost-effective price point. The goal of the project, a Pence leader described:

Is, of course, the block.... We hope the project will differentiate itself the marketplace.... Quite a few have green logos and that’s it. Hopefully this will be different.... But of course, we don’t want to lose money.... Governmental organizations sometimes just spend money to create something new....Maybe it’s not the most profitable project in history – it doesn’t have to be – but we don’t want to lose money.

A Casilla executive echoed, “We build housing all the time. We want to get something new here.... But we have to be very cost-effective in our building.” As a real-estate project, she stressed, the development “has to be sellable in our market.” Table 5 provides additional evidence of these frames.

---Insert Table 5 About Here---

Framing Clashes: Divergent Frames and Early Strategic Decision Points

Actors’ divergent frames shaped their perspectives on a number of early strategic decisions. That is, each individual evaluated the decision by relying on his or her frame about the project’s purpose; that is, his or her preferences were shaped by his or her frame. In these situations, actors debated their preferences and options; although typically unacknowledged, these debates revolved around their divergent, clashing frames about each project’s purpose. I thus conceptualize these decisions as framing clashes. Some framing clashes revolved around each project’s business model: how it would be financed, how it would attract investment. For instance, an early clash at SusTech City revolved around developing a financial model for the City that could be presented to potential partners
and investors. Other framing clashes revolved around development features that would affect a project’s costs, performance, and the way it was positioned in the marketplace. For instance, one of the earliest clashes at GreenMarket revolved around the choice of construction materials for the block.

Decision-making around SusTech City’s financial model involved divergent frames about the project’s purpose. Individuals from SusTech with the technology frame believed that SusTech City would demonstrate the growth and time-lines typical of comparable technology projects (in line with their view of SusTech City as a technology project). John, SusTech’s CEO, proposed a financial model and explained how he arrived at SusTech City’s financial projections: “These numbers are pretty standard in the technology industry.” Individuals from CC with the real-estate frame believed SusTech City would follow a different pattern of growth: that typical of real-estate projects. “There is no real-estate project that can grow that quickly,” a CC consultant working on the project reflected of John’s proposed numbers.

These individuals engaged in heated debates about the financial model. “We’ve had a lot of arguments about the numbers,” a SusTech executive explained. During a visit to SusTech City, I observed an argument between John, supported by SusTech executives, and members of CC. Members of CC had developed a financial model that they hoped to begin presenting to potential investors. Although they had previously received John’s proposal, their model reflected their real-estate frame, and included numbers typical of real-estate projects. When John saw the model, he became visibly upset. He exclaimed:

This model is a joke! This doesn’t make sense in the technology industry, and this is not a consulting business!... You guys don’t understand the numbers of tech at all. You’re just going to have to believe me.... I’m not being disrespectful, but this is a property development plan.

A SusTech executive attempted to mediate and stated, “It’s a tech plan with a bit of a shift....” John interrupted: “That’s not a tech plan.”
Eventually, the leaders of SusTech City chose to abandon CC’s model, instead developing their financial projections by benchmarking patterns typical of technology projects, as John had initially proposed. But this decision remained controversial. Individuals with real-estate backgrounds continued to express doubts about the choice both in interviews, and by revisiting it in project discussions. “This choice is crazy,” a CC consultant reflected. Another consultant explained: “We can’t expect to get financing when presenting these numbers.”

An early strategic decision point at GreenMarket – the choice of construction materials for buildings in the district – also made divergent frames salient. The lead engineer working on the project, Sergio, suggested the use of timber. Individuals involved with the project quickly coalesced into a pro-timber and an anti-timber group. Individuals with the catalyst frame supported the use of timber, which they described as an under-utilized yet highly sustainable material. By developing the region’s first timber block, they believed they could inspire the use of timber in other developments throughout the country. A report written by a Telavera designer praised the sustainable performance of timber, and noted that, by using it, “Hopefully...we will be able to convince the local construction industry that there is something to multistory timber frame construction.” “Building with timber really isn’t done here,” an engineer explained. “It will be pretty transformational if we can work out how to do it.” Individuals with the development frame hesitated to commit to an unproven building material that carried a cost premium over traditional concrete construction, as indicated by project reports analyzing the use of timber. A Pence executive explained his thoughts on timber: “In this project, we don’t have money just to try out different things for the sake of the environment.”

Actors working on GreenMarket engaged in protracted discussions about whether to build with timber. Timber proponents – members of Telavera, and the engineering, architecture, and consumer behavior firm – argued for its adoption, while timber opponents resisted. An engineer explained: “We tried to show them...timber is just a far more sustainable approach. They were almost dismissive of the
analysis, and we had to keep coming back to them and saying, let’s talk through this.” Eventually, forced to choose a construction material in order to move forward with the project, individuals at GreenMarket reached an apparent compromise: Telavera’s new office building, part of the district, would be constructed with timber, and all other buildings would be constructed with concrete. A consumer behavior expert explained the outcome of the decision: “Telavera was very open to the idea, and pushed towards it. But Pence and Casilla weren’t interested. Those were the battle-lines in the end.” But this decision remained problematic: pro-timber actors continued to disagree with it, and described it as having negative effects for the project. An architect explained the timber decision: “The project doesn’t achieve at the level we were all aiming at…. There are technical aspects that are not as innovative as they could have been. That’s the pity…. And it has been quite a fight.”

**Framing Clashes Give Rise to Negative Emotions**

These early framing clashes gave rise to strong negative emotions. When frames clashed, the process of decision-making evoked frustration, or strong feelings of irritation or distress (van Dijk, 1999). Debates and protracted discussions around the decision were seen as a waste of time; moreover, participants reflected that discussions were only necessary because others did not or could not understand the project’s aim and potential. In cases when a framing clash resulted in a choice, these choices gave rise to disappointment and contempt. Undesirable choices threatened some actors’ frames and even their roles in the project, and that drove strong feelings of disappointment and contempt.

Actors involved in the clash around SusTech City’s financial model, for instance, displayed visible emotional responses during their arguments, and described their decision-making in highly emotional language. A SusTech executive explained how the discussion around SusTech City’s model was a result of CC members’ lack of understanding: “The CC guys just don’t understand and believe what we are trying to do. That’s why we’ve had the argument about numbers.” This discussion thus drove frustration, sometimes explicitly identified, sometimes audible in conversations and interviews. During
the aforementioned argument about numbers, that took place over the course of an hour, John appeared angry and irritated; CC consultants defensive and frustrated. Following the argument, John angrily left the room to smoke a cigarette outside. Passing me on his way out of the door, he commented that the argument frustrated him because it “represents a misunderstanding of the project by some people.”

When asked a general question about challenges he faced working on the project in an interview the following week, John immediately brought up the argument. He emphasized that he experienced frustration at having to explain the appropriate course of action around SusTech City’s financial model to CC members. “CC struggles a bit. They’ll sometimes come at a problem with either no context or they’ll make independent decisions on certain things that are strategically poor. That drives me crazy.” In talking about CC and the argument, he became audibly upset: his voice raised; his speaking pace quickened. “I’m really not here for their personal development!,” he exclaimed.

CC executives described the argument in equally emotional terms. In the weeks following the argument, they continued to reflect on it amongst each other. In discussing it, they often mentioned their frustration and disappointment with SusTech; their tone was often one of incredulity. Reflecting on the biggest challenges he faced in the project in an interview, a CC consultant explained how the clash was one of the most frustrating experiences of the project. “We had been working on this model for weeks and weeks on end,” he recalled. “And John basically completely flipped when he looked through the numbers.... It was really heated.”

Actors involved in GreenMarket’s decision of construction materials explained the decision in equally emotional terms. Pro-timber actors felt frustrated by the need to convince others of their points of view. “We pushed for timber on a variety of levels,” a pro-timber consumer behavior specialist explained. “We met with regulators and suppliers, and tested the ideas with residents and future owners.” He sighed and lowered his gaze: “In the end [sigh], they didn’t accept it.”
An engineer described how the process of arguing for timber was a frustrating one: “We had to just keep coming back to it and keep coming back to it, and Sergio just had to be a complete pain in the ass.” This frustration was deepened by a sense that others did understand how timber advanced the project’s aim. Asked to reflect on project challenges, a pro-timber architect began explaining the timber decision. His frustration was apparent throughout the interview; in a field note jotted immediately following the interview, I emphasized that “he was filled with frustrations he seemed eager to share.” As we spoke, he grew increasingly heated. “What I am telling you is not politically correct!,” he exclaimed. But he went on, with audible annoyance:

Pence Development and Casilla expressed two fears with regards to timber…and they were unsound…. I think their excuses were just a camouflage for the real reason, which is a skepticism and ignorance of the medium. They claim the timber construction would not have been taken well by the market… I think it’s just a camouflage for the fear of getting involved in technical construction that is unknown to them… It has been really frustrating. We sense, also, the frustration Telavera has had with the whole process.

Pro-timber actors also expressed deep disappointment due to the choice to develop the block partially in concrete. The decision was described as a deeply-felt loss: rather than a choice between materials, the decision was seen as representing a choice about the purpose of the project. Pro-timber actors felt that they failed to effectively deliver on their tasks, because they could not convince others about the potential for the project as a catalyst. An architect explained:

Pence and Casilla reverted to business as usual in many cases, and that was a problem. And the fact that our design team didn’t manage to sell their part convincingly was also at fault... On the one hand, we were a bit misguided and misled about what they would want. We thought they would want 100%, and they just wanted 30%.... In the end, we lacked the punch. Obviously we were not in position of dealing the last punch for them to make the right decision.

A pro-timber Telavera designer described with audible disappointment how the outcome of the timber decision was the result of Pence and Casilla’s misunderstanding of the project’s purpose:

We had a bunch of different decisions that we had to make...that required Pence Development and Casilla to think a little bit differently than their normal practice is, especially around timber construction rather than concrete. And unfortunately the people that were at the table at that time...didn’t have the view to see the long-term or strategic impact these decisions could have.
“What we have seen,” he explained with audible disappointment, “[sighs] is a complete erosion of ambition.”

**Negative Emotions Lead to Problematic Decisions**

Negative emotions led to problematic decisions. When possible, frustrated individuals deferred decisions; when choices were made, disappointed and contemptuous individuals continued to disagree with and contest the decision. For instance, RD developers and SusTech technology experts faced an early decision around whether or not to develop a detailed master-plan for the project. This decision made divergent frames salient: RD members with the real-estate frame believed investors would want to see a complete master-plan, as they did for typical developments; SusTech members with the technology frame disagreed, because they believed the development’s technological solutions would form the basis for securing investment. An RD developer explained, “This is where us, as RD, versus some of the SusTech team, have a difference of opinion. We feel that we need to move to the next stage of the project and develop a more detailed master-plan that will allow financing to come forward.” RD developers repeatedly expressed their views to SusTech’s technology experts, but felt like the technologists did not take these views into account. Frustrated by the on-going process, RD developers stopped insisting on a master-plan, and the decision was deferred; ignoring the decision was seen as easier than continuing the frustrating process of convincing SusTech members of their point of view. “The frustration for me,” another developer explained, “is that [SusTech City] could be so good.” But, he went on, “there have been these hiccups with moving forward” that made deferral an attractive option.

When actors were forced to choose a path forward despite their divergent frames, their disappointment and contempt led to continued disagreement around decisions. Because these decisions evoked such strong disappointment and contempt, individuals were unable to accept them as necessary or even adequate solutions. At GreenMarket, pro-timber actors, for instance, continued to disagree about the outcome of the timber decision. In interviews, they fixated on the decision as having a
profoundly negative outcome for the project. “It was an enormous missed opportunity,” an architect explained.

**Negative Emotions Give Rise to Cognitive Narrowing**

The negative emotions that resulted from framing clashes set the stage for negative project outcomes beyond each strategic decision point. Although transitory, emotions can lead to the formation of long-lasting attitudes (Weiner, 1986; Loewenstein and Lerner, 2003). That is, individuals who experience an emotion due to a particular entity begin to evaluate it with favor or disfavor: individuals like the objects and entities that evoke pleasant emotions; they fear or dislike those that evoke unpleasant ones. Emotions also result in narrowed attention (Loewenstein and Lerner, 2003): individuals focus on the positive qualities of entities that evoke pleasant emotions, and on the negative qualities of entities that evoke unpleasant ones. Frustration, disappointment, and contempt led individuals working on SusTech City and GreenMarket to develop unfavorable attitudes about others. Specifically, these negative emotions led to a cognitive narrowing: individuals began believing that groups with different frames were fundamentally different from each other (an ossification of differences); they developed unfavorable attitudes about others’ experience and ability to understand and pursue the project (judgments of competence). Importantly, individuals did not simply recognize that others held different visions of or frames about a project’s purpose; instead, their negative emotions led to a generalized sense that others were both inherently different and even incompetent.

Following their arguments on the financial model, for instance, individuals from both SusTech and CC emphasized the differences between the two groups, and made derogatory comments about the expertise and knowledge levels of the others. John explained that CC members held inappropriate preferences because:

They lack commercial experience. They don’t have enough operational experience, and they are often theoretical.... If the business model that we had was more generally shared in the industry – if it was something that was more common – they would have it down like they do other
models…. It’s new, it’s got lots of moving parts to it…. It’s a fast-moving project with fast-moving situations so it’s tough for them to understand.

Similarly, reflecting on the discussions regarding SusTech City’s master-plan, two RD developers explained how SusTech technology experts were fundamentally different and naïve about the project’s requirements:

Developer 1: With the greatest respect to these guys, we’re dealing with IT-based people, which is a very different world. At the end of the day, in the IT world, all they’ve got to do to make their good idea marketable, normally, is rent some service space, and that’s pretty cheap. What these guys would like to do is go and build some buildings, and that ain’t cheap.
Developer 2: I used the word “denial” earlier, and I think I’ll repeat it. I think they think that their ideas and systems are so fantastic that everything else will fall in line. But, it won’t.

At GreenMarket, actors involved in the timber clash also began to emphasize that individuals with different frames were both fundamentally different and of questionable competence. A Telavera designer explained how individuals from Pence and Casilla were simply different: “The fundamental challenge that we had was cultural: our disposition, our mental references were different. We realized quite late with our partners we were saying the same words but meaning different things.” A Telavera engineer pointed out insurmountable differences between groups, and questioned Pence and Casilla members’ competence and understanding of the project:

This has been and will be quite challenging because there are teams from different cultures and different countries. Telavera is an innovation organization and we are keen to develop new things and demonstrate them. Then we have partners that are in a totally different business like construction companies which seem to be quite hesitant to test new things and invest in development…. I must say that our partners in construction business have certain ways of doing things and they believe these are the right ways. So accepting new things has been a challenge.

Similarly, a Casilla executive explained how Telavera members did not understand the true nature of the project because “of course, Telavera is not a professional developer. We and Pence are professional developers. So in Telavera, they were expecting it would be so easy. Well, it’s not. It took lots and lots of work.” Moreover, she described how Telavera designers and the project’s engineers and architects were not capable of delivering an innovative project:
It was really hard to imagine what they understood from our local perspective and what they didn’t. There were many things we took for granted – that these things we don’t have to explain. Basic, basic, basic. Then it turned out they didn’t understand them.

Table 6 provides additional examples of negative emotions and cognitive narrowing in the two projects.

**Negative Emotions and Cognitive Narrowing Give Rise to Damaging Spirals**

Early framing clashes thus had a long-lasting effect on collaboration and innovation in each project; they resulted in self-sealing spirals of increasingly negative emotions and attitudes. As Figure 1 indicates, instances of framing clashes escalated over time. Individuals who experienced negative emotions due to early framing clashes began to focus on information that confirmed their narrow view of others. This narrowing gave rise to further framing clashes, and cycles of even more profoundly negative emotions and, in turn, more extreme cognitive narrowing.

**Escalating Clashes.** For instance, a later strategic decision point at GreenMarket revolved around whether the development should produce its own solar energy through the deployment of photo-voltaic (PV), or solar, technologies. Solar energy production was not well-developed in the region where GreenMarket was located because of its specific weather conditions. Actors with the catalyst frame saw the project as an opportunity to develop new, low-light solar technologies that could be replicated in other developments in the region. An engineer explained:

> What I think is most novel about the project is the potential for developing building-integrated PVs and low-light options that are at the brink of being commercially viable. We could develop solutions that really work appropriately for this place... and we could ensure that other projects are able to use them.

Actors with the development frame worried that solar solutions were inappropriate for the local market. As with timber, they hesitated to deploy untested, costly technologies. “To do a project like this, you just have to know the local conditions,” a Casilla executive explained, and solar solutions did not seem feasible locally. “‘Oh, it’s possible in in other countries’ – that just doesn’t help here.... Plus, these things are really, really expensive.” Actors engaged in a number of discussions about the feasibility of
solar solutions. “We have had discussions about this issue and that issue,” a Pence developer explained: “should we have PVs on the roof, how many PVs, who should own them... It’s all being discussed.”

Convinced by their earlier framing clashes that others were fundamentally different and incompetent, the individuals involved in these discussions became entrenched in their points of view, and emphasized the differences that separated them. This narrowing led to an even more profound framing clash, even deeper negative emotions, and even more cognitive narrowing. “Progress has been hard-fought,” a Telavera report about the solar decision stated, “because, as we get ever closer to a real set of buildings, with real dimensions, real systems and real costs, we become more distant philosophically.” A Pence executive reflected that the discussions round solar were “challenging... We have different opinions and it is difficult. We’ve had to discuss everything,” because “Telavera members are too idealistic. It is frustrating for all of us.”

Eventually, actors involved in the solar discussions agreed to deploy solar technologies. Individuals from Pence and Casilla reflected that they accepted the solar decision because they sensed that pro-solar actors would not back down from their point of view, and because they sought to make progress on the project. “It seems like solar is really important for Telavera,” a Casilla executive explained; “We just had to decide,” a Pence executive echoed. But anti-solar actors experienced contempt due to this choice. Because they saw solar solutions as fundamentally detracting from the project’s viability as a cost-effective block – and because they perceived the choice as threatening their own role in the project – anti-solar actors reflected on the decision negatively. “We will have solar,” a Casilla executive explained, because of Telavera:

But for us – our task is to take care that the housing is affordable. So putting these outrageously expensive things just for the show of it is a little bit – [sarcastically] yeah.... From our part, it’s not really the right message.
The Casilla executive’s contempt for Telavera members who she believed imposed the decision was apparent: “Telavera wants to have a show, but we’re realistic. Yes, of course we want to be more energy efficient. But we want to put resources to the places where they will bring about benefit.”

**An Atmosphere of Mistrust.** As framing clashes accrued, these spirals of negative emotions and narrowed attitudes led to a pervasive atmosphere of mistrust. At SusTech City, RD developers began to feel incapable of affecting the project. “This is going to sound really demeaning to SusTech,” a developer stated, but the company has no experience in “the property development industry. We do…. But they think their systems are so great that everything will just fall in line.” In informal interviews, CC consultants frequently remarked on the frustration and disappointment they felt through working with SusTech technologists. A CC consultant remarked that working on the project was “frustrating” because John and SusTech technologists “drew too much on models from the technology industry” and did not understand the difficulties of building a city. SusTech technologists, on the other hand, expressed their belief that RD developers and CC consultants were too focused on traditional models from real-estate, and did not understand how innovative the City would be. “The RD engagement has been humorous at best,” John stated in a conversation with other SusTech employees.

At GreenMarket, narrowed attitudes led to the development of what a Telavera designer described as “an “us and them” culture.” Mistrust and seemingly insurmountable differences colored actors’ perspectives even in cases where everyone agreed on a course of action. In the late stages of GreenMarket’s development, for instance, executives from Pence put forward the idea that the district’s outdoor balconies should be developed as indoor greenhouses, and brought this idea to individuals involved with the solar and timber decisions. In the early stages of the project, Telavera leaders’ first idea, Tim recalled, “Was to have individual greenhouses.” Pence leaders initially rejected this idea in favor of outdoor balconies, but eventually changed their minds. Although the change was in line with his original preferences, frustrated and disappointed by previous decisions, Tim attributed it to Pence
developers’ inability to understand the project. He described how Pence members only cared about generating profit from the project:

[The greenhouses] are nice from a gardening, food production perspective, if they actually get used for that. But... we haven’t really figured out why they [Pence Development leaders] want this. My theory is they can sell apartments with greater number of square meters.... Somebody could just knock the greenhouse partition off and they could have a bigger apartment.... It’s a way for them to maximize the developed floor, and their profit.

When asked if Pence leaders gave their reasoning for the revision, Tim responded that the Pence project manager “said, “well, this would be very in-line with our ecological approach.”” Nonetheless, he held onto a narrow view of his interests: the initial idea “was discarded because it was an extra cost, so Pence was against it, until probably they realized that they could flip it around and actually make this a kind of sales asset.” Tim’s cognitive narrowing thus led to an unfavorable interpretation of Pence and Casilla’s choices – even when those choices aligned with his own preferences.

These spirals also led to mistrust about prior decisions where everyone had agreed. One of the early innovations all individuals working on GreenMarket emphasized was that project executives had managed to convince the leaders of V-Energy, a local energy producer, to provide a clean-energy product for the development. Prior to their framing clashes, this outcome was viewed as innovative and important. Following the clashes, different actors attributed the innovation to their own efforts, and emphasized that others with a different frame could not understand it. Individuals with the catalyst frame noted that the product would eventually be made available in the producer’s entire region, catalyzing the uptake of low-carbon solutions. A Telavera designer therefore explained that the innovation was a result of Telavera’s focus on catalyzing change. Asked whether Pence and Casilla members had a point of view on the issue, he replied:

Probably, but it wasn’t evident to me.... In my conversations with them, they agreed it was an important decision, but I don’t know what their position on it was. A lot of these kinds of decisions...they left to us. Even though they could make the decision and do the engineering also...that’s not part of their business. They just deliver buildings.....But it was self-evident to us because our mission is systemic change. If your mission is to deliver housing, that kind of thing won’t be self-evident.
Individuals with the *development* frame emphasized that this decision drew on an established solution that could be used for the benefit of the block. A Casilla executive therefore attributed this step to Casilla’s understanding of the local market and push for proven solutions:

[The idea] was not on the short-list when we were doing the energy strategy – not on Telavera’s short list. We called V-Energy.... It was really difficult for [Telavera and other partners] to get [that we could do this]. To me, it seemed that they were suspicious – it can’t be true! ...It’s too simple I guess.

**Withdrawal.** As excitement about each project gave way to negative emotions, ossification of differences, and judgments of competence, actors even began to question the viability of the projects. Importantly, individuals involved in framing clashes became de-motivated to move forward with the project. An RD developer explained how he became de-motivated from working on SusTech City: “It has been stop-start. So I am focusing on my day job.” A developer from Casilla explained the progression of her thinking on GreenMarket:

Developer: Initially, the scope was...phew...we want it all... We basically wanted to change the world and the country.
Researcher: And what’s your goal now?
Developer: [Laughs]. Just get it done.

As a result, in a number of instances, individuals began to limit their interactions and even withdraw from the project. In GreenMarket, members of Pence and Casilla began asking for the design team to leave the project. Tim explained: “Things had gotten so extreme that Pence just started proposing, why don’t we just get rid of the architects, engineers, and consumer design specialists.” In the case of SusTech City, individuals experiencing frequent clashes (including members of CC and RD) left the project entirely.

**A Cognitive Perspective?**

An alternative perspective might suggest that framing clashes simply revealed cognitive differences in the ways that individuals thought about each project. Once these differences were revealed, individuals began to believe (perhaps correctly) that they could not collaborate on the project,
and decided to withdraw from it. Negative emotions were perhaps simply a by-product of this process, rather than a critical driver of relational and innovation outcomes.

The data, however, are not consistent with a purely cognitive story. If early framing clashes simply revealed differences (and if negative emotions were nothing more than a by-product), actors could have used tools and processes to help overcome differences and build shared frames in future decisions. Indeed, individuals working on SusTech City and GreenMarket did attempt to leverage tools and practices – boundary-spanners, political and framing practices aimed at changing the way others thought, co-location – to resolve differences. But because their interactions had begun to take on an emotional tenor, and had led to generalized beliefs about one another’s abilities and competence, these tools proved ineffective. Negative spirals of emotion and cognition ensured differences could not be resolved by attempting to change the way that others thought.

For instance, following their early clashes, RD developers prepared reports aimed at persuading SusTech technologists to think about the development as a real-estate project. “I’ve spent a number of hours with [SusTech’s chief technologist] to try and help him understand what we would normally do,” a developer explained. But these practices did not yield the hoped-for results. “I feel that [the technologists] haven’t really been listening to us for the last three or four months,” he continued. He believed that SusTech technologists were not listening because of their inability to understand the project (a perspective that emphasized differences and judged their competence): “There’s no really reality that’s supporting their ideas.” A SusTech executive, in contrast, explained that RD developers could not propose effective solutions for SusTech City because “they are like any other developer,” conservative and incapable of thinking innovatively. In a company-wide meeting, John explained: “The characteristics of the individuals from RD didn’t help us. It hasn’t translated into a positive relationship for us – in fact, quite the opposite.”
At GreenMarket, awareness of project difficulties led project leaders to institute a co-location policy, whereby individuals making decisions and working on joint tasks began to share a physical location. Tim explained his reasoning for this decision, and emphasized the negative emotions that had begun to build around the project: “You have to understand that everybody has been very frustrated for a variety of reasons with the way things have been…. We have been rubbing each other the wrong way.” He explained how he believed the answer would lie in co-locating in order to increase communication, build understanding of one another, and develop shared knowledge:

We realized that we’re actually not understanding each other, and that’s the problem. We got together and we talked about it. And in that conversation we were able to shift the focus from competence to communication. And in that conversation, the idea of co-location was born.

Had differences between actors at GreenMarket been purely cognitive, they could, perhaps, have been resolved through co-location. However, the data suggest that co-location did not produce fewer framing clashes; early framing clashes had led to spirals of negative emotions and unfavorable attributions that co-location could not resolve. A Casilla developer explained her thoughts on co-location with audible frustration:

Developer: The engineers and architects didn’t like to listen to us. They wanted to work on their own – don’t come here, don’t tell us, we know how to do it. They should have been more willing and more open to collaborating. Normally, when we are doing projects, it’s really co-planning and co-creation. We are sitting at the same side of the table with our planners and designers. We’re really working together – so these architects and engineers, they really know us, and what we want, and what is the situation, and what are the constraints. But they weren’t open to that.
Researcher: Has co-location helped?
Developer: [hesitates] Sure, it helped.
Researcher: Do you feel that this is now an effective collaboration?
Developer: No. We have gotten the message quite strongly from their side that this wasn’t a real collaboration.

Similarly, an architect described the co-location as, “In a way, an emergency.” He explained:

“The way it was practiced was a crook for other things which did not work very well in the project…. And by the time we got that going, it was too late for me. It was really about trying to minimize the damage.”
He went on to describe his disappointment with GreenMarket, and explained how the project’s shortcomings could be blamed on others:

> There were some aspects which we considered true to the GreenMarket project that could not be implemented at the end of the day, because they were against some goals the other clients had. It was a slow process – it was not this way from day one. But very, very slowly – it went and went.

> Had framing clashes simply revealed differences in the ways individuals thought about each project, they might have been overcome through framing practices or tools aimed at changing the way particular groups viewed the project and one another. But because negative emotions led to strong, generalized attitudes about others’ identity and competence, and because emotions and attitudes resulted in pervasive feelings of mistrust, collaboration became impossible. “The apt title for what we just went through,” a Telavera designer explained, “is systemic failure.”

**DISCUSSION**

This paper builds new theory on why innovation under conditions of extreme ambiguity can be so difficult. I develop a process model of *framing clashes* that reveals the connection between ambiguity, frames, and negative emotions. In doing so, I show how divergent frames around a project’s purpose can give rise to emotional processes that spiral downward to derail innovative projects.

Although transitory, negative emotions can shape stable negative attitudes about others working on the project: individuals begin to view each other as fundamentally different and questionably competent. Early framing clashes can thus give rise to dangerous spirals that result in a pervasive atmosphere of mistrust and disillusionment, and set the stage for damaging project outcomes. These spirals are illustrated in Figure 2.

---Insert Figure 2 About Here---

Frames are typically conceptualized as cognitive structures, with little attention paid to their emotional importance or resonance (e.g. Huff 1990; Fiol and Huff, 1992; Wash, 1995; Barr, 1998; Porac and Thomas, 2002; Kaplan, 2008). This research indicates that the experience of decision-making
between individuals with divergent frames is highly emotional. When frames clash, individuals become frustrated by having to work with others who do not understand the true meaning of the project; they become disappointed and contemptuous when decisions threaten their views of the project or their own role in it. Over time, as negative emotions build, they give rise to cognitive narrowing and negative attitudes. Cognition and emotion become intertwined in dangerous spirals that can threaten innovation.

These outcomes are not consistent with a purely cognitive perspective on divergent frames. An analysis focused solely on cognition might emphasize that certain decision points make divergent frames visible; when this occurs, individuals begin to believe – perhaps rationally – that others think about the project in different ways that cannot be easily overcome, and thus begin to disengage from the project. But the data indicate that it was precisely the emotionality of decision points that led to dangerous spirals. Similarly, research has typically described the challenge of working with people from different disciplines and industries in cognitive terms: to work together, individuals have to exchange and build shared knowledge (e.g. Carlile, 2002; 2004; Bechky, 2003; Leonadri, 2011); to build agreement on decisions, they have to engage in practices aimed at changing the ways that others think (Kaplan, 2008). This research indicates that the challenge of working in ambiguous settings with diverse individuals is also emotional. Because the attitudes resulting from framing clashes and negative emotions were both so negative and so general, individuals began to believe that any efforts to change minds, integrate points of view, or build shared knowledge would be impossible. Negative spirals thus precluded the possibility of successful framing practices or frame integration. Instead, they led to a pervasive negative atmosphere, growing mistrust, and ultimately set the stage for negative project outcomes.

This analysis thus sheds light on a critical difficulty of innovation and strategic decision-making under ambiguity, where differences intended to promote innovation can become entrenched as barriers that hamper it. When frames clash, decision points that appear, on the surface, like simple strategic choices – projections around financial figures, a choice of building materials – become infused with such
emotional value that they begin to shape actors’ attitudes about each other and the project itself. The very expertise needed to innovate effectively can result in divergent frames and thus negative emotional responses. Unpacking the process by which this occurs is perhaps a first step in building understanding of how to lead and manage resilient, effective projects and ventures in ambiguous settings.

Of course, like any qualitative study, this paper is limited in its scope. Its purpose is to generate rather than test theory; the relationships and constructs I propose can be tested in future work. Nonetheless, the model I propose has implications for both literature and practice.

**Implications for Theory**

First, this paper extends research on behavioral strategy by offering a systemic, consequential view of emotions in strategic decision-making and innovation (Huy, 2012). This analysis suggests that emotions arise through patterned causes and have important, observable effects. It thus falls squarely in the stream of research that emphasizes the importance of emotion for managerial and strategic outcomes (Huy, 1999; 2002; 2011; Maitlis and Ozcelik, 2004; Sanchez-Burks and Huy, 2009). The idea that managerial cognition has deep implications for performance is well-accepted in behavioral strategy (e.g. Daft and Weick, 1984; Huff, 1990; Walsh, 1995; Barr, 1998; Tripsas and Gavetti, 2000; Kaplan, 2008; Tripsas, 2009; Gavetti, 2012). Yet, as Huy (2012) argued, the idea that emotions matter remains “in the periphery of the strategic management literature” (240). By suggesting that, in certain contexts, cognition and emotion are intertwined, and that emotions play a central role in shaping outcomes, this paper can perhaps help motivate a move from the periphery to the mainstream.

The analysis also underscores the connection between frames, emotions, and identity (Huy, 2011). When frames clashed, decisions evoked important questions about the identity of each project and the individuals collaborating on it. Both the process and outcome of decision-making were experienced as identity threats (Reger et al., 1994): individuals felt that their views of themselves, their
work, and their projects were under attack. This threat contributed to and amplified feelings of frustration, disappointment, and contempt. The paper suggests the need for further research on the impact of identity threat, emotion, and strategic or social outcomes.

Finally, this paper adds to the literature on innovation and strategic decision-making under ambiguity. A growing stream of literature has focused on organizations and managers in rapidly changing or highly uncertain contexts (e.g. Gavetti et al., 2005; Kaplan, 2008; Tripsas, 2009; Kaplan and Orlikowski, 2012); less work has focused on opening up the black box of dynamics in ambiguous contexts. This analysis suggests that one of the challenges of ambiguous contexts is managing negative emotions. Scholars have indicated that launching ventures is nascent industries is extremely difficult (Aldrich and Fiol, 1994; Aldrich and Ruef, 2006; Santos and Eisenhardt, 2009), but few studies have explored the internal dynamics of projects or firms in this ambiguous context. This paper suggests an internal reason this context might be particularly challenging.

**Implications for Practice**

This paper also has significant implications for practice. Even within a single organization, individuals can hold different frames based on their backgrounds or professions (Simon, 1947; March and Simon, 1958; Kaplan, 2008; Leonardi, 2011). During periods marked by high ambiguity, when interpretations about the purpose of the organization are up for grabs – including, for instance, periods of profound organizational change, or post-merger integrations (Gioia and Chittipeddi, 1991; Reger et al., 1994) – decision points might unearth divergent frames, and thus lead to negative emotions. Decisions that should be unproblematic are likely to take on emotional significance. Understanding how this might occur is critical in preventing break-downs in decision-making and collaboration.

By elucidating the mechanisms that connect divergent frames, emotions, and outcomes, the paper suggests potential interventions. Because of a lack of successful interventions in the data, these propositions are merely suggestive; nonetheless, they can be tested and refined in future research. First,
this paper implies that diversity of background and expertise might be beneficial insofar as actors clarify and discuss their frames about a project or a venture’s aim and meaning. Importantly, individuals at SusTech City and GreenMarket did not explicitly acknowledge their divergent frames or different visions of the project’s aims; instead, frames were taken for granted. This analysis suggests that leaders of innovation projects should take great care to make explicit each individual’s frames about the project. In doing so, they can prevent differences in frames from manifesting in emotional processes that lead to self-sealing, negative attitudes. Moreover, through early efforts to share frames, leaders can also attempt to integrate across them by establishing a joint frame or interpretation that can guide future decisions. These efforts might lead to collective re-conceptualizations of the project, and perhaps even to new and better ideas about the project itself (Hargadon and Bechky, 2006).

Moreover, this paper suggests that, once the emotional and cognitive dynamics of framing clashes begin to unfold, processes and tools often used to clarify differences and build shared understandings – boundary-spanners, framing practices, co-location – may no longer be sufficient. This suggests that efforts to build shared frames are necessary in the earliest stages of a project.

This paper also implies that leaders can attempt to avoid the destructive effects of divergent frames by taking care that negative emotions do not result in the formation of stable attitudes. Psychological research has shown that regulation processes, such as individual and group norms, can override automatic processing of emotion (e.g., Frijda, 1986; Grandey, 2000; Gross, 2001); this implies that negative emotions need not always result in negative attitudes. At the same time, suppressing or ignoring negative emotions within organizations can have disastrous, explosive effects, whereby negative emotions and dysfunctional behaviors are only amplified (Gross, 1998; 2001; Maitlis and Ozcelik, 2004; Elfenbein, 2007). Together, this suggests that leaders should pay attention to the emotional experiences of individuals developing innovative projects characterized by high ambiguity. If and when negative emotions begin to manifest, leaders can attempt to manage their effects on
attitudes. This can be done through re-appraisal (Ashforth and Humphrey, 1995; Gross, 1998): leaders could, for instance, take care to address emotional concerns, and emphasize that the emotionality of a project is due to high ambiguity, and not due to the involvement of diverse individuals. By doing this, leaders could model emotional reactions (Pescosolido, 2002) by letting others know that “we are upset because we are working on a difficult project” – rather than “we are upset because we are working with others who are fundamentally different and incompetent.” Future work can test – through qualitative explorations, lab studies, or even interventions and action research – whether and how leaders can intervene to prevent damaging emotional spirals and the formation of negative attitudes.

CONCLUSION

Innovation projects in ambiguous contexts can give rise to transformative outcomes: new categories of products, entirely new industries. In these contexts, the most effective solutions might come from collaboration between individuals from diverse professions and industries. To succeed, these individuals must learn to work with diverse others despite facing significant ambiguity. This requires managing divergent frames and therefore confronting negative emotions. By unearthing the process by which divergent frames shape emotions, attitudes, and thus innovation, this paper opens the possibility for future work that can further explore these important challenges.
REFERENCES


Table 1: Overview of Projects

<table>
<thead>
<tr>
<th>Aim</th>
<th>SusTech City</th>
<th>GreenMarket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected time-scale</td>
<td>15+ years</td>
<td>3-5 years</td>
</tr>
<tr>
<td>Number of organizations involved</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Types of organizations involved</td>
<td>Technology (software)</td>
<td>Innovation fund</td>
</tr>
<tr>
<td></td>
<td>Technology (hardware)</td>
<td>Construction</td>
</tr>
<tr>
<td></td>
<td>Real-estate development</td>
<td>Real-estate development</td>
</tr>
<tr>
<td></td>
<td>Engineering</td>
<td>Engineering</td>
</tr>
<tr>
<td></td>
<td>Architecture</td>
<td>Architecture</td>
</tr>
<tr>
<td></td>
<td>Consulting</td>
<td>Consulting</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>Government</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consumer behavior</td>
</tr>
<tr>
<td>Leading organization</td>
<td>SusTech: technology</td>
<td>Telavera: innovation fund</td>
</tr>
<tr>
<td>Start of project</td>
<td>2009</td>
<td>2008</td>
</tr>
<tr>
<td>Start of research</td>
<td>2009</td>
<td>2011</td>
</tr>
<tr>
<td>End of research</td>
<td>2012</td>
<td>2012</td>
</tr>
</tbody>
</table>
Table 2: Data Sources

<table>
<thead>
<tr>
<th>Context</th>
<th>Data source</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smart city industry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interviews</td>
<td>14 individuals and interviews ~20 recorded hours</td>
</tr>
<tr>
<td></td>
<td>Architects, engineers, developers, government officials, CEOs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Observation</td>
<td>~10 recorded hours</td>
</tr>
<tr>
<td></td>
<td>Presentations of smart city projects, smart city symposia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Documents</td>
<td>~200 pages of documents</td>
</tr>
<tr>
<td></td>
<td>Articles, analyst reports</td>
<td></td>
</tr>
<tr>
<td><strong>SusTech City</strong></td>
<td>Interviews</td>
<td>41 individuals 69 interviews ~120 recorded hours</td>
</tr>
<tr>
<td></td>
<td>Observation</td>
<td>40 meetings 10 presentations ~800 hours in the field</td>
</tr>
<tr>
<td></td>
<td>6 field visits: observation, employee shadowing, informal interviews</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Documents</td>
<td>~200 pages of documents</td>
</tr>
<tr>
<td></td>
<td>Business plans Project reports Emails</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>~44 pages of emails</td>
</tr>
<tr>
<td><strong>GreenMarket</strong></td>
<td>Interviews</td>
<td>18 individuals 33 interviews ~40 recorded hours</td>
</tr>
<tr>
<td></td>
<td>Observation</td>
<td>2 meetings 1 presentation ~100 hours in the field</td>
</tr>
<tr>
<td></td>
<td>3 field visits: observation, informal interviews</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Documents</td>
<td>~50 pages of documents</td>
</tr>
<tr>
<td></td>
<td>Project reports Project blog</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>~40 pages of blog</td>
</tr>
</tbody>
</table>
Table 3: Strategic Decision Points at SusTech and GreenMarket

<table>
<thead>
<tr>
<th>Strategic decision point</th>
<th>Partners involved (pseudonyms)</th>
<th>Industry backgrounds</th>
<th>Evidence of Divergent Frames</th>
<th>Outcome</th>
</tr>
</thead>
</table>
| **SusTech: financial projections**  
Should we rely on models from technology industry? | SusTech; CC                      | Technology; real-estate; consulting       | Strong                       | Problematic: continued disagreement |
| **SusTech: phased development**  
Should we prioritize the development of SusTech City, or the development of Wave 1 of SusTech City? | SusTech; RD; EngCo; ArchCo; Government | Technology; real-estate; engineering; architecture; government | Medium                       | Problematic: decision deferred |
| **SusTech: new project**  
Should we develop a smaller version of the project in another country? | SusTech; RD                      | Technology; real-estate                   | Weak                         | Resolved: agree to pursue project |
| **SusTech: demonstration of technologies**  
Should we invest in an at-scale demonstration of technologies for the City? | SusTech; RD                      | Technology; real-estate                   | Strong                       | Problematic: decision deferred |
| **SusTech: master-plan**  
Should we invest in a detailed master-plan for the City? | SusTech; RD                      | Technology; real-estate                   | Strong                       | Problematic: decision deferred |
| **GreenMarket: contract costs**  
What should we demand of, and how much should we pay our design team? | Telavera; Pence; Casilla         | Design; real-estate                       | Strong                       | Problematic: continued disagreement |
| **GreenMarket: certification**  
Should we apply for external certification (e.g. LEED standards) for sustainability? | Telavera; SFG                     | Design; engineering                       | Weak                         | Resolved: agree not to pursue certification |
| **GreenMarket: mixed-use**  
Should we develop a residential-only or a mixed-use project? | Telavera; Pence; Casilla; SFG; Arkitektura; DesignCo | Design; real-estate; engineering; architecture | Weak                         | Resolved: agree to develop mixed-use project |
| **GreenMarket: massing**  
What should the building lay-out look like? | Telavera; Pence; Casilla; SFG; Arkitektura | Design; real-estate; engineering; architecture | Strong                       | Problematic: decision deferred |
| **GreenMarket: indoor air quality**  
What kind of standards should we use? | Telavera                         | Design; engineering                       | Strong                       | Problematic: continued disagreement |
| **GreenMarket: common sauna**  
Should we build individual or common saunas? | Telavera; Pence; Casilla; SFG; Arkitektura; DesignCo | Design; real-estate; engineering; architecture | Weak                         | Resolved: agree to develop common sauna |
| **GreenMarket: solar energy**  
Should we generate energy from solar (PV technologies)? | Telavera; Pence; Casilla; SFG; Arkitektura; DesignCo | Design; real-estate; engineering; architecture | Strong                       | Problematic: continued disagreement |
| **GreenMarket: construction materials**  
Should we construct in timber? | Telavera; Pence; Casilla; SFG; Arkitektura; DesignCo | Design; real-estate; engineering; architecture | Strong                       | Problematic: continued disagreement |
| **GreenMarket: management company**  
Should we invest in a shared management company? | Telavera; Pence; Casilla         | Design; real-estate                       | Weak                         | Resolved: agree to invest |
| **GreenMarket: pro-forma**  
Should we share financial figures of organizations working on the project? | Telavera; Pence; Casilla         | Design; real-estate                       | Strong                       | Problematic: decision deferred |
Table 4. Comparison of Resolved and Problematic Decisions

<table>
<thead>
<tr>
<th></th>
<th>Partners involved (average number)</th>
<th>Industries (average number)</th>
<th>Co-located at time of decision (% yes)</th>
<th>Boundary spanners (% yes)</th>
<th>Boundary objects (% yes)</th>
<th>Presence of deadline (% yes)</th>
<th>Political activities (% yes)</th>
<th>Strong presence of divergent frames (% yes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolved</td>
<td>3.8</td>
<td>2.8</td>
<td>80%</td>
<td>100%</td>
<td>40%</td>
<td>40%</td>
<td>60%</td>
<td>0%</td>
</tr>
<tr>
<td>Problematic</td>
<td>3.5</td>
<td>2.9</td>
<td>60%</td>
<td>100%</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
<td>90%</td>
</tr>
</tbody>
</table>
### Table 5: Examples of Frames

<table>
<thead>
<tr>
<th></th>
<th>What are we building?</th>
<th>What is our goal?</th>
<th>What is important?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SusTech City: Technology Frame</strong></td>
<td>A technology project</td>
<td>Developing technology</td>
<td>Technology</td>
</tr>
<tr>
<td></td>
<td>“We are not a real-estate project, we are a technology project with real-estate.” (SusTech executive, field notes)</td>
<td>“The vision for SusTech City is about innovation and technology.” (architect, field notes)</td>
<td>“I don’t want to sit down with the master-plan. I want to think about technology, innovation - with the rest of it, I just turn off. It really just shows where the focus of the project is.” (technologist, interview)</td>
</tr>
<tr>
<td><strong>SusTech City: Real-Estate Frame</strong></td>
<td>A city</td>
<td>Breaking ground on the city</td>
<td>Real-estate</td>
</tr>
<tr>
<td></td>
<td>“This is a city rather than a building or a few buildings…. The fact is that we know this because we’re in the development industry.” (developer, interview)</td>
<td>“Our aim is to get those first spades in the ground.” (developer, interview)</td>
<td>“Why doesn’t the model look like real estate in the middle? Does the tech have to be central?” (consultant, field notes)</td>
</tr>
<tr>
<td><strong>GreenMarket: Catalyst Frame</strong></td>
<td>A test case</td>
<td>Catalyzing change</td>
<td>Catalyzing change</td>
</tr>
<tr>
<td></td>
<td>“GreenMarket is a test case… it will help push forward the important work of aligning regulatory intent with building performance.” (designer, interview)</td>
<td>“The goals are how can we create a development model that gets us to a low-to-no trajectory and that is replicable…. We are not interested in a one-off….In 20 years, our success will have been if the insights from this project have spread. If we’ve only done this block, we’ve failed.” (designer, interview)</td>
<td>“The most important thing in the project is a focus on building a sustainable block rather than the block itself – just going through this process will result in changed building permits, proving of financing model…. That’s what gives the project the ability to engender systemic change….. If the project is not copied, we are a failure.” (designer, interview)</td>
</tr>
<tr>
<td><strong>GreenMarket: Development Frame</strong></td>
<td>A development</td>
<td>Viable, sellable block</td>
<td>Being accepted in market</td>
</tr>
<tr>
<td></td>
<td>“The big question at the moment is if it will be really, really costly. Then it won’t serve us very well. Because we have to be very cost-effective in this development.” (developer, interview)</td>
<td>“The goal is to make this project sellable in the local environment and market.” (developer, interview)</td>
<td>“The most important thing is…how well the project is performing in the market. But if the stakeholders are happy, I am sure it will be performing well.” (developer, interview)</td>
</tr>
</tbody>
</table>
### Table 6: Examples of Emotions and Cognitive Narrowing

<table>
<thead>
<tr>
<th>Emotions: frustration</th>
<th>SusTech City</th>
<th>GreenMarket</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Obviously, it’s frustrating that we haven’t been able to achieve what we’ve wanted to achieve.” (interview, developer; master-plan decision)</td>
<td>[Arkitektura architect contacted by Pence developer about making a change in massing of building. He tells Telavera designer about it]. Architect: “I’m really upset about that.” Designer: “I don’t know why he’s approaching you – we’ve locked in the design in that regard. To make that kind of a sudden change doesn’t make sense.” Architect: “It’s just very irritating, trying to get everything to work and then you get such an email.” Designer: “It’s beyond me – I’m as frustrated as you are.” (field notes; massing decision)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Emotions: disappointment and contempt</th>
<th>SusTech City</th>
<th>GreenMarket</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I am really disappointed I keep having to waste my time on this.” (field notes, technologist; financial model decision)</td>
<td>“I am very not pleased. Because I think that was one of the great innovations in the project – how do you enable new patterns of consumption and behavior that are more aligned to sustainable things. Sometimes a purely market approach, unfortunately, doesn’t work.” (interview, designer; timber decision)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cognitive narrowing: ossification of differences</th>
<th>SusTech City</th>
<th>GreenMarket</th>
</tr>
</thead>
<tbody>
<tr>
<td>“We are a small company, and that’s what’s hard. <strong>We are very open – and [the engineers] are not</strong>…. They were adding very regular concepts to SusTech City. <strong>They are delivering their products rather than thinking outside the box.</strong>” (interview, architect; wave 1 decision)</td>
<td>“It’s very good to talk about these things, and think about these things, but when you have solutions brought up by these international consultants who don’t know our situation here – it just doesn’t work.” (interview, developer)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cognitive narrowing: judgments of competence</th>
<th>SusTech City</th>
<th>GreenMarket</th>
</tr>
</thead>
<tbody>
<tr>
<td>“John is great and makes us laugh, and if he were here now I’d laugh with him. But he sends us little clips—“Look, they built this hotel in China in six days.” All right. Okay. But what they’ve had is 18 months of planning offset in order to get there. And guess what? Lots of hotels fall down as well.” (interview, developer)</td>
<td>“I think it’s just a camouflage for the real reason, which is that Pence and Castilla have a fear of getting involved in technical construction that is unknown to them, with a certain amount of risk.” (interview, architect)</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1: Decision Time-Lines at SusTech City and GreenMarket
Figure 2: A Process Model of Framing Clashes