Escalation of Commitment and Bankruptcy: The Case of Katerra Industries

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Escalation of commitment has been defined as disregarding exit as a valid option thereby following a losing course of action even when the negative consequences are known. This paper incorporates escalation of commitment theory in the context of the failure of Katerra Industries. Katerra, backed with $3 Billion of venture capital, attempted to create a vertically integrated modular construction company based on its technological advantages. Instead, the firm expanded at a rate that made the complexity of its operations too difficult to manage properly leading to its Chapter 11 bankruptcy filing in June 2021. This paper employs qualitative empirical research, specifically through a case study utilizing U.S. federal court filings and testimony as the primary data source. The findings support previous escalation of commitment research, generally, and its theoretical underpinnings, namely (i) Subjective Expected Utility Theory and (ii) Self-Presentation Theory.

Keywords: managerial dysfunction, escalation of commitment, corporate bankruptcy

INTRODUCTION

Business history is riddled with stories of innovative firms unable to survive in the medium to long term. Much of the popular press and academic research that addresses business failure has focused on the external events (shocks) that upended the firm's or industry's business model. Still other published works have studied the opposite by focusing on the internal failings within management teams (Park, Lew and Park 2020). While both certainly have merit, this paper primarily utilizes the latter by exploring a specific managerial dysfunction—escalation of commitment—at a venture capital-funded, innovative firm (Katerra Industries) that was unable to succeed operationally despite an external environment that included plentiful capital and rising prices in its output market. In essence, the external environment in the setting of this case study was nearly optimal for a tech-based real estate firm and, therefore, the findings from the following qualitative evidence should best exemplify the internal failings more clearly than in a murkier external environment.

Following a series of acquisitions that led to a highly vertically integrated firm, Katerra filed for Chapter 11 Bankruptcy in 2020 as it could not turn its immense capital infusions into realizable products despite an incredibly strong real estate market. While Chapter 11 can produce a reorganized and more efficient firm, Katerra's was more akin to a liquidation event leading to the firm's demise. In just a few short years, the firm was founded, grew by orders of magnitude, and ceased operating. This paper incorporates a case study methodology to unlock the issues inherent in firms that expand at paces that deviate from normal, even compared to fast-paced technological industries. Empirically, the current research depends upon testimony from corporate officers at the defunct firm as part of the bankruptcy filing in addition to third party accounts

in the business press. As such, statements by the firm's top representatives were made under oath and with the threat of criminal perjury. This threat adds credence to the testimony and offers a different approach to qualitative, empirical evidence that has tended to rely upon interviews from corporate officers concerning events that happened in the distant past. Both because these officers may not want to admit to poor decision-making and/or due to memory issues inherent over time, the verisimilitude of interview data must be taken "with a grain of salt." In the testimony presented in this case study, the statements were made in real time (i.e. time of the bankruptcy petition) and under the threat of U.S. federal sanctions.

Theoretically, I offer escalation of commitment theory as the backdrop, as Katerra's top managers were unable or unwilling to backtrack from their expansionary activities even when the future outcomes looked quite dire. The inability to exit decisions the outcomes to which are not probabilistically feasible is the crux of escalation of commitment research and will serve as the underpinning in the current work. Section II includes this theoretical buildup followed by Section III, which includes the methodology. Section IV is the findings from the qualitative research. Section V is a Discussion and here the theory and evidence are reconciled for the present study and offered as a springboard for potential future research.

THEORY

Escalation of Commitment

The literature on managerial dysfunctions is robust and generally centers around inertia and complacency. The general premise in this line is that firms go into decline when management exudes dysfunctional behavior such as myopia (Miller 2002), strategic persistence (Canella and Grossman 2006), groupthink (Ahmadzadeh, Safari, and Teimouri 2022) and the like.[1] Another prevalent dysfunction, amongst others in the management literature is that of escalation of commitment (Staw 1976), which can be defined as actions that progress a negative situation even after decision-makers have realized this situational negativity.[2] In finance, escalation of commitment is likened to "Sunk Cost Theory" and the two terms have been generally interchangeable. There is a sequential difference between the two, albeit a subtle one. Sunk costs are any costs that have been borne which cannot be recaptured and, therefore, should be omitted from subsequent decision-making rounds. Escalation of commitment describes the actions that individuals take after the realization of sunk costs that ignore this requirement of omission.

Staw's 1976 the paper is the one most attributed to the formation of the escalation of commitment stream. Staw describes being "knee-deep in the big muddy" as a mental model of the dysfunctional behavior that managers may have while attempting to double down on a poor bet. This was followed by a series of scholarly papers that were either experimental or historic. Case studies included narratives on sewer and drainage systems, airplane brakes, the Vietnam War, Expo 86, and the Shoreham Nuclear Power Plant (Staw 1981; Ross and Staw 1986; Ross and Staw 1993). The focus of the cases was to pinpoint where in the commitment process did it escalate into a dysfunction. Early escalation experimental subjects were mainly undergraduate students studying iterative R&D allocation decisions (Garland 1990) or a series of tasks that were not business related but would become increasingly costly if the subject was inaccurate in previous rounds (Brockner et.al. 1986). Whyte (1991) extended the experimental stream with group decision making and found that escalation was reduced in groups versus as individuals.

Several theoretical causes help explain escalation of commitment. Subjective Expected Utility Theory (SEUT) increases the likelihood of commitment when decision-makers focus on positive outcomes to the detriment of the full matrix of risk probabilities. This "glass half full" approach may be more prevalent for managers with little previous experience in the evaluated situation. It is also present when management has had small amounts of success with respect to the situation being evaluated, but where the magnitude of inputs or outcomes is asymmetric relative to experience (Moon and Conlon 2002). For example, day traders that have success risking small amounts of their personal capital may become too optimistic by extrapolating their prior successes when committing a much larger, subsequent amount of capital. Since objectivity is lacking (hence, subjective), the losses on the larger outlay far exceed the gains on the smaller, previous outlay.

Along with SEUT, Self-presentation Theory (SPT) is present when decision-makers face outside evaluators and, as a result, attempt to make up for outcome deficiencies through escalation. Actors judging others and having a stake in the outcome can especially attenuate commitment as decision-makers face the added pressure of a self-interested evaluator. In addition, when decision-makers face future sanctions from such evaluators, Self-presentation Theory would predict an even higher probability of commitment as a present letdown may affect a future opportunity (Brockner, Rubin and Lang 1981).

Agency Theory (Jensen and Meckling 1976) can also help explain escalation of commitment as agency costs catalyze decision-makers to close the gap on goal incongruence and information asymmetries. Principals whose goals are quite narrow and who are not specialists in the arena of contention are at a disadvantage as the complexity of the agency problem increases. This is especially true when the agent has high technical knowledge specificity but low transactional experience (Brown 2014). The increase in longitudinal agency costs can incentivize commitment as agents begin to fall behind in their original stated goals. Along these lines, Schulz-Hardt, Thurow-Kroning and Frey (2009) posit that when initiators are the ones that have to decide to exit or commit further, agency costs may increase as commitment is increasing in level of initiation.

METHODS

Data and Case Study Methodology

Case studies are most appropriate when scholars either present new theory or when there has been inconsistent usage of older theory (Gibbert, Ruigrock and Wicki 2008). When matched with empirical data on corporate bankruptcy antecedent conditions, the current study warrants a case study approach because most business-related bankruptcy scholarship has concerned itself with modeling quantitative predictive models (Abidali and Harris 1995; Al-Sobiei, Arditi and Polat 2005; Lorca, Landajo and DeAndres 2014; Camacho-Minano, Seovia-Vargas and Pascual-Ezama 2015; Jones 2017; Lahmiri and Bekiros 2019). Quantitative modeling is important, but idiosyncrasies exist between different corporate bankruptcies whereby collection of similar variables in dissimilar filings precludes these types of linear and non-linear estimations. A common critique of the case study approach is generalizability. Gibbert et.al. (2008) have addressed this by requiring scholars to ensure that four criteria are met for rigorous cases. These include (i) internal validity, (ii) construct validity, (iii) external validity and reliability. The author was careful to ensure that these four criteria were met during the document sourcing and narrative construction.

The data for the empirical section was compiled through archival research and court document submissions. Archival research included searching for the mention of Katerra Inc. in news sources such as the Wall Street Journal, New York Times, Business Insider and numerous trade journals. Court documents were crucial for the case study since firm in question filed for Chapter 11 bankruptcy protection in the U.S. Federal Court System. As such, I studied the full docket of Katerra Inc.'s Chapter 11 filing, downloaded any court filing that had either data related to the research question or had a narrative statement from the firm's management. While court testimony is a rare source for business scholars, it offers many benefits over other more-used sources, such as interviews of former firm employees (Brown 2017).

CASE STUDY FINDINGS

Modular Construction

Modular construction is an industry that has grown significantly in recent decades as the need to reduce labor costs and provide efficiencies to the construction industry has taken precedent for large residential and construction builders. Modular construction is the practice of pre-fabricating sections of a structure's components in factory settings and then shipping these sections to the final building site (Wuni, Shen and Osei-Kyei 2020). The American Institute for Architects defines it as "the process by which components of a building are prefabricated off-site in a controlled setting and then shipped to the project site and assembled." (www.aia.org) For example, modular single family residential dwellings can be delivered to a land plot in as little as two pieces with entire interiors already constructed (i.e. kitchens, plumbing, drywall).

The pieces are then combined and set atop the foundation, which must be constructed on site. While some finishing work is done post-delivery, this can often be accomplished in days or weeks leading to a much quicker completion time for the unit. In addition, the structure is not being built incrementally in potentially poor weather conditions and is especially beneficial to those in harsher climates.

Modular construction is not a new concept. Historians have argued that many Roman structures were built in a modular manner. More convincing evidence comes from the early 19th Century when migrants from Britain to Australia exported portable cottages that early settlers could build on site. Herbert (1972) cites many English documents and advertisements from the 1820s published by or about Henry Manning, the architect behind the portable cottages. Across the Atlantic at around the same time, companies in New York were building pre-fabricated structures for gold seekers in the San Francisco area. Since the gold rush of the 1830s and 1840s was so spontaneous, the ability to construct dwellings quickly was important to the new inhabitants (Chavez 2011). In the early 20th Century, Sears sold home kits to be delivered to residential land owners to construct their own dwellings. These kits came with architectural plans and with components that would fit together to make construction easier, a common notion in modern modular homes (www.searsarchives.com).

The industry quietly continued through the 20th Century, but without major technological innovations that one observes in other industries with such longevity. At the 1967 World's Fair in Montreal, architect Moshe Safdi's Habitat 67 displayed an apartment building made of modules, a project that remained unbuilt. The implicit reading of this modularly built apartment complex being displayed at such an important venue shows that in the 50 years from Sears to the World's Fair, or really the 140 years from the Gold Rush to the World's Fair, modular construction did not advance more than marginally (Marquit and LiMandri 2013). The 1980s and 1990s brought with it a push to move society's mentality of modular homes away from trailer homes. In the U.S. housing bubble of 2004 to 2007, the industry was propelled by the construction labor shortage available for on-site construction (Rehfeld 2006).

The fact remained, however, that into the early 21st Century, there was a dearth of technological advancements in the construction industry (Johnsson and Meiling 2009). Quoted in the publication Inman in May 2018, Katerra's Trevor Schick stated "The last craft industry, construction, has yet to enter the industrial or technology age…People are building homes today essentially the same way they did in the mid-1800s. Economies of scale just don't exist: most projects are designed, planned, quoted, bought out and built as one-off projects."[3] This is the void that Katerra Industries and some others sought to fill.

Katerra Industries

Katerra Industries was founded in 2015 by three entrepreneurs whose vision was to mix technology-driven innovation into an industry that was notoriously lacking such. Jim Davidson, Michael Marks and Fritz Wolff started the firm to further modular construction in commercial projects, a market segment that the industry had somewhat overlooked. Modular construction had become popular in the residential market in the decades that preceded the founding as quality improvements and completion efficiencies upped its reputation from a 1980s view of something slightly better than constructing trailers. With financial backing that would eventually capture the most innovative venture capital firms, such as Softbank, Katerra's growth rose precipitously.

As opposed to previous companies in the modular space, Katerra was interested in building larger structures and, in order to realize this, introduced several building platforms. Building platforms are repeatable foundations for building larger structures, similar to a chassis for automobile manufacturing. These repeatable foundations enabled Katerra to attempt to mass produce large structures (i.e. apartments, dormitories, hotels, etc.). Katerra's K3 building platform, for example, allowed it to "…develop and build a predesigned, componentized, and manufacturable 24-unit walk-up apartment building on an expedited timetable…" (In Re Katerra Katerra Declaration, page 2). Additionally, Katerra began experimenting with cross-laminated timber as a replacement for steel or masonry beams and found that it was conducive to modular construction without sacrificing safety. This timber product was also environmentally friendly, a trait that made incorporating it into building design more attractive for vertical clients.

The incorporation of technological improvements in an industry that has not been known for high innovation set Katerra apart from both horizontal competitors (i.,e. other modular builders) and for its customers, many of whom used Katerra for this source of advantage. In addition to the aforementioned environmentally friendly timber products, Katerra was also proud of other environmental accolades. These included (i) Katerra's products inclusion in the first zero carbon building, the Catalyst and (ii) Katerra's use of solar power to operate its Tracy, California factory while offsetting much of its carbon use. The Tracy Plant was large enough to produce over 12,000 residential units per year while using both automation and solar power to offset the less environmentally friendly behaviors of the construction industry to date (In Re Katerra Inc. 2021).

The first several years of Katerra's corporate existence was in vertical relationships with developers and general contractors as a component manufacturer. As such, it was in the business of providing structures for others who lease or own land and construct apartments or other similar structures. Katerra, in fact, had raised over $3 Billion from 2015 through early 2020 based on its position as a real estate development industry supplier and relied on its funding and technological superiority to convince both the financial and operational marketplace to utilize its products.

Katerra Capital Raising

The appearance of technological success made raising capital quite efficient for Katerra, as the history of its fundraising displays. The initial capital raised in 2015 during the first two "angel" rounds totaled $14.48 million with the three founders contributing just under $625,000. Large equity investors in these initial raises included $2 million from Foxconn, known for its relationship with Apple Inc., and $4 million from Paxion Capital, a relative newcomer in the venture capital arena. In early 2016, another early-stage round was commenced with Foxconn again the lead investor. This time, however, the Apple supplier injected nearly $50 million of the total $77.35 million raised. Paxion Capital invested almost $5 Million and the firm now had a post-raise valuation of $577 million. A 2017 Series C capital raise was nearly double this amount as $141 million was injected by a slew of equity investors, once again led by Foxconn and Paxion. After this funding round, Katerra exceeded a $1 billion valuation for the first time. However, it was in 2018 that Katerra would catapult to real unicorn status.[4] In the Series D and E rounds that year, a total of $2.02 billion was raised, although Softbank was now the lead investor. Softbank invested $1.4 billion into Katerra in 2018, and the real estate firm ended the year with a $6 billion valuation.

Nonetheless, Katerra was far from profitable as cumulative losses from operations approached $3 billion from 2018 to 2020. According to the firm's representative, this was "…attributable, in part, to Katerra's difficulty in controlling project costs and completion delays (In Re Katerra Inc., Declaration, page 24)." While the firm blamed the COVID-19 pandemic as well, much of the losses occurred before the pandemic and related government mandated shutdowns.

Issues Surface at Katerra

While Katerra was considered a Unicorn through 2019, operational difficulties were accumulating as its TMT expanded haphazardly. This expansion took shape two ways vertically. First, the firm offered its products and services to multiple customers in differing geographic and product markets. Secondly, in order to control its value chain, Katerra began an acquisition spree that included both downstream and upstream contractors. These expansionary moves were exacerbated by a strong real estate market, both in the U.S. and globally, and by the extraordinary amount of capital that the firm raised relative to historic precedent in the industry. In the short term, these factors favored Katerra in that it masked operational difficulties. In the longer term, easy and plentiful capital, a rising real estate market and weak corporate governance helped exacerbate the firm's demise.

Geographic and Product Market Expansion

The original concept behind Katerra was to construct residential buildings in pre-fabricated sections. This led to the 2019 announcement of the K3 Platform, which the firm thought would revolutionize a low-tech industry by allowing apartment buildings to be built using "building blocks." The K3 Platform was

introduced to enable apartment buildings up to 24 units to be constructed in a time condensed and efficient manner, conducive to Katerra's original mission. However, as more capital was injected into the firm, management began to expand from small apartment buildings to other product markets. These included single family homes, commercial space, and hotels, all of which are tangentially related to the construction of residential apartments yet different enough for the firm's resources and capabilities to be stretched (Putzier and Brown 2021) and potentially mismatched.

In addition to product market expansion, Katerra also expanded internationally. As part of its supply chain operations, it operated three factories in India that handled precast concrete construction. Katerra's operations in Saudi Arabia included factories and a contract to construct thousands of residential units. The firm, therefore, in a condensed time frame, was based in the United States yet had both upstream and downstream activities centered in two distant and quite distinct geographies. These dispersed operations would be difficult to manage for most firms and certainly for a company that could still be considered an advanced-stage startup.

Upstream and Downstream Acquisitions

Most real estate value chains, especially those catering to residential units, are relatively disintegrated. Large homebuilders, such as Pulte and Lennar, can be considered aggregators of activities rather than owners of activities. Put differently, a typical residential development consists of the homebuilder and then a multitude of smaller vertical contractors that are scheduled to complete units, which are then marketed and sold by the homebuilder. The homebuilder often does not directly employ any construction contractors (i.e., subcontractors) that physically construct dwellings. This has been the business model in the homebuilding industry for decades as central coordination became the core competence of larger builders. Figure 1 includes a simplified supply chain of a typical homebuilder.

While vertically integrating the differing subcontractors was always possible for well-capitalized, especially publicly traded, homebuilders, none adopted this approach. The phenomenon of contract manufacturing has also been absent in this industry. For example, contract manufacturing is relatively prevalent in the electronics industry as seen in the Foxconn-Apple relationship where one large vertical contractor assembles a product almost or actually to completion (i.e. iPhones, iPads). Contract manufacturing is possible in the residential real estate construction industry, and yet it has not taken hold to any non-trivial degree over time and by the largest and most successful firms.

It is the intersection of the homebuilder and the contract manufacturer that Katerra began to insert itself. In its infancy, it wished to build structures in its factories that incorporated many of the subcontracts seen in Table 1, thereby making it a *de facto* contract manufacturer and more vertically integrating the industry's supply chain than had been done to date. In addition to Katerra's wish to become a contract manufacturer, its acquisition strategy both enhanced this goal and made it more difficult. Instead of focusing on acquisitions that allowed it to control its supply chain to more effectively construct entire projects for outside firms, Katerra's M&A strategy expanded into downstream activities that worked against this goal insofar as it led to a complex structure that its management team was not able to constrain. Specific acquisitions are described below.

FIGURE 1
REAL ESTATE DEVELOPMENT SUPPLY CHAIN

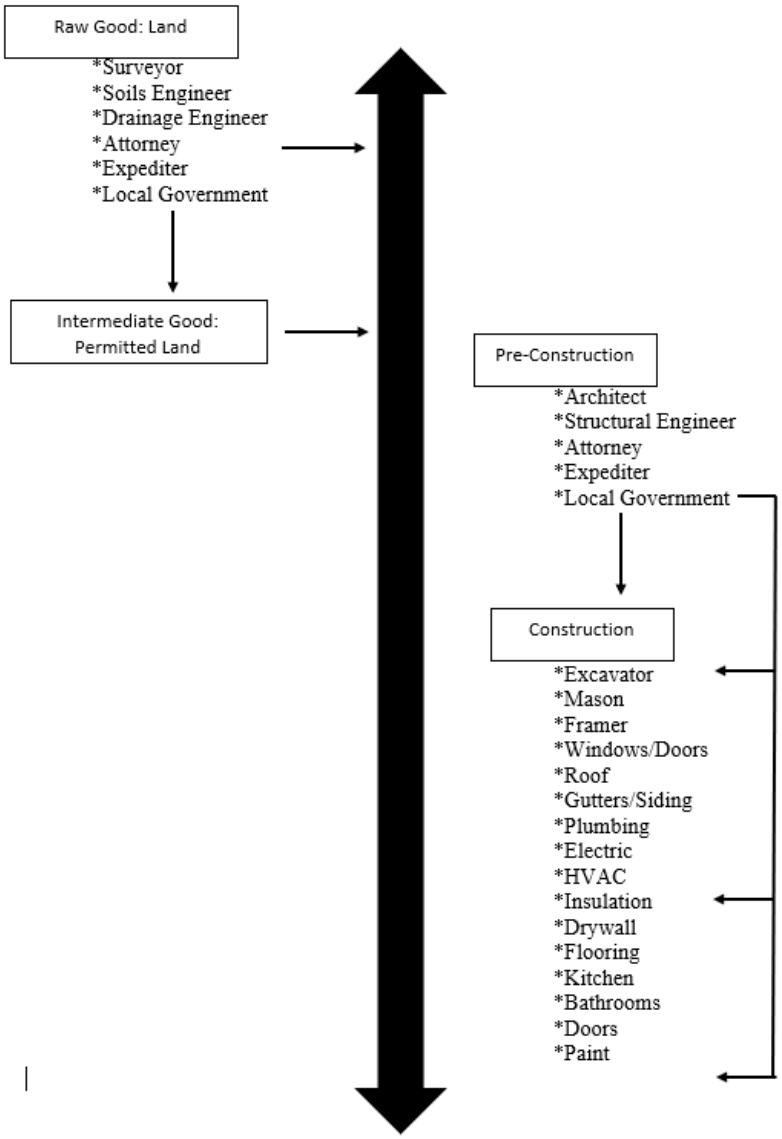

TABLE 1
KATERRA'S VERTICAL ACQUISITIONS 2018-2019

Year	Target Firm	Vertical Nature	Target Location
2018	Michael Greens Architecture	Upstream	U.S.
2018	Fields Construction	Downstream	U.S.
2018	Lord, Aeck and Sargent	Upstream	U.S.
2018	KEF Infrastructure India	Downstream	India
2018	Equilibrium	Upstream	Canada
2018	Bristelcone Construction Corp.	Downstream	U.S.
2019	KGD	Upstream	India
2019	UEB Builders	Downstream	U.S.
2019	Fortune Johnson	Downstream	U.S.

Acquisitions 2018

Katerra acquired Michael Green Architecture in 2018, which had previously been part of Katerra's supply chain. Known for its mass timber construction and design, Michael Green Architecture was most likely acquired for supply chain control as Katerra grew exponentially considering the firms had an ongoing relationship prior to acquisition (Keane and Lau 2018). This was followed by the acquisition of Fields Construction in the same month. Fields Construction was a construction management firm based in New Jersey that was integrated into Katerra in 2018 (Bondarenko 2018). The next month, June 2018, saw Katerra's purchase of Lord, Aeck & Sargent an older firm that specialized in design (Hilburg 2018). Lord, Aeck & Sargent had expertise in a wide array of construction areas including residential, commercial, and mixed-use, in addition to some idiosyncratic specialties such as landscape design and master planning.

In the second half of 2018, Katerra continued to expand through domestic and international acquisitions. In July 2018, the firm acquired KEF Infrastructure India, a firm based in India but that was similar in operations to Katerra. However, KEF had capabilities in the areas of robotics and pre-fabricated concrete construction (Beeton 2018). Following this, Katerra acquired Equilibrium in August 2018, a company known for timber engineering but specialized in more idiosyncratic structures such as museums and wineries. Finally, in October of the same year, Katerra purchased Bristlecone Construction Corporation based out of Denver. Bristlecone was a general contractor with specialties in concrete construction, similar to that of KEF but domestically based. It had approximately $40 million in revenue and 150 employees in 2018 (Dodson 2018).

Acquisitions 2019

Following the intense capital raising and acquisition spree of 2018, Katerra continued with its expansion. In early 2019, the firm purchased another Indian firm—KGD—which specialized in design and engineering for healthcare, aviation and hospitality industries. It had a significant presence in major Indian population centers such as Bangalore and Hyderabad (www.dublai.com). In September 2019, Katerra acquired two firms known for their specialty in general contracting—UEB Builders and Fortune Johnson. UEB Builders was a former vertical partner to Katerra and was known for multifamily and student housing. Fortune-Johnson's general contracting specialty included garden style apartments and senior housing facilities (Caulfield 2019).

What made the 2018 and 2019 acquisitions potentially problematic was the complexity of integrating so many companies within Katerra's corporate organization in such a short period of time. For a firm that had only existed for three years and had very little acquisition experience, the geographic breadth of the target firms raised issues. Two of the acquisition targets were based in India, while one was based in Vancouver, British Columbia. These, in addition to the domestic acquisitions, created a potentially vertically integrated firm that was geographically dispersed yet not structured in a manner to manager this dispersion. Couple the geographic element with the wide variety of value chain location of existing Katerra operations (non-acquired) with the newly absorbed entities (acquired) and the complexities involved must have added up quite rapidly.

Revenue Recognition and Greensill Capital

In 2021, as Katerra was facing myriad operational challenges stemming from the expanded operations it was ill-equipped to handle, it became ensnared in one of the year's largest financial failures. Greensill Capital was a supply chain finance company that specialized in being the middleman between suppliers, who wanted quick payment, and buyers, who wished to extend the supplier's payment window. The firm, which grew rapidly to a valuation exceeding $4 Billion in just a few years, deflated even faster ending in a London bankruptcy filing in early 2021. Greensill's downfall was tied to the obscure accounting benefits that its products offered to companies who used its supply finance program and booked the money they owed Greensill not as debt, but as a trade payable.

The finance program funds were then securitized by Credit Suisse and insured by several global insurance companies in the case of a default. In 2020, the main insurer, Bond and Credit Co., rescinded Greensill's insurance coverage due to risk mismanagement. This led Credit Suisse to freeze Greensill's assets, which led to insolvency proceedings in both the United Kingdom and Australia (Nelson, Ewing and Alderman 2021). As part of funding rounds in 2019, Katerra's main venture backer—Softbank—also funded Greensill with $1.5 billion. Due to Softbank's high-profile status at Greensill, other Softbank-backed firms were given lending facilities at Greensill Capital with Katerra borrowing $438 million in 2019. As Katerra's financial issues became more pronounced, and in order to stem a default on its loans, Greensill swapped Katerra's debt for five percent equity in the builder. As this news came to light at major news publications, Softbank then paid Greensill $400 million in exchange for the return of Katerra's equity (Steinberg, Duvet, Maven and Farrell 2021).

The more damaging consequence of the published news articles was that "…certain of Katerra's contract counterparties stopped doing business with Katerra, expressing concerns that Katerra was still burdened with the Greensill Receivables Facility and that Katerra was going to be implicated in the Greensill proceedings (In Re Katerra page 30)." Katerra lost several customers immediately and others that would have continued with the firm required bonding or secured funds at the exact time that bonding firms and banks were reading the same reports. The complex operations that the firm grew into through organic and acquired vertical integration now became more complex as Katerra was seen as a risky contract partner with corrupted financial ties.

The Bankruptcy Filing

Construction and other real estate-related firms are prone to bankruptcy due to the cyclical nature of the industry and its reliance on external factors such as national demographics, labor scarcity, and interest rate policy (Brown 2023). Katerra Inc.'s bankruptcy, however, was caused by internal failures more than these external issues. On June 7, 2021 the company filed for Chapter 11 bankruptcy protection in the United States Bankruptcy Court, Southern District of Texas. It claimed to have between 10,000 and 25,000 creditors with assets under $1 Billion but liabilities up to $10 Billion. Among its top creditors were vertical trades payable led by Stiles Machinery Inc. ($5.92 Million), Haddad Plumbing and Heating ($5.43 Million), Thyssenkrup Elevator Corp. ($4.14 Million), Concrete Systems ($3.93 Million) and FM Construction Group LLC ($3.95 Million). While the firm filed for Chapter 11, primarily focused on corporate reorganizations, Katerra Inc. was liquidated piecemeal as part of the court process (more akin to a Chapter 7 liquidation process).

DISCUSSION

Escalation of Commitment at Katerra Industries

Katerra Industries grew at an alarming rate and with the velocity of its venture capital infusions, this was no surprise. Being funded with $6 Billion in short order, the firm's founders allocated it just as quickly. Escalation of commitment is a decision-making dysfunction that discounts exit as a strategy in the face of losing projects. Theoretically, commitment results from decision-makers (i) focusing on positive outcomes instead of a reasonable mix of more risky consequences, (ii) attempting to "save face" with evaluators for deficiencies in outcomes, and (iii) reducing agency costs in technical settings.

Subjective Expected Utility (SEUT)

According to SEUT, managers may become over optimistic based on limited experience in certain contexts. As previous SEUT research has shown, extrapolating small and early successes into the future where the magnitude of activities grows exponentially may become problematic and lead to escalation of commitment. Katerra had early success in its ability to upend an industry that had been technologically inertial for decades. Much of this success came through positive press and venture capital attraction, which are quite different from true commercial or operational success as seen through profitability. Additionally, SEUT posits, and the evidence in the current case aligns, that management teams that focus on these positive instances may exclude more risky (yet realistic) outcomes leading to excess risk-taking.

Self-Presentation (SPT)

On the other hand, SPT is concerned with the effect that credible evaluators have on management's propensity to "save face" often through escalation of commitment. In situations where a firm's near-term potential depends on the positive evaluation of a more powerful source, then theory predicts that the firm is more prone to commit to a sub-optimal course of action. The venture capital-startup relationship is perhaps the most appropriate example of such a relationship since the startup is often unprofitable, will remain unprofitable, and must stabilize its cash flows with financing activities (i.e. subsequent capital infusion). As Katerra become increasingly capitalized, it needed to show its VCs that it was deploying this capital. The sheer volume of dollars infused into Katerra made this difficult and induced its management team to engage in a flurry of complex transactions, both geographic and vertical. Geographically, evidence shows that Katerra was spreading operations and managerial attention to wide swaths of the globe (British Columbia to India, for example). Vertically, Katerra began to integrate its value chain in ways that were difficult to accomplish in a short amount of time. This integration came about through greenfield activities and acquisition activities, neither of which were in the purview of management's experience, especially considering their sheer magnitude.

Agency Theory (AT)

An AT angle supposes that as agency costs increase, escalation of commitment becomes more probable because agents will be more prone to act in self-interest to the detriment of the principal's position. Katerra's management team (agent) possessed superior information not only about the operational condition of the startup, but also about the ability for it to be able to vertically integrate its greenfield projects and acquired firms successfully. While the principals (VCs) in this case had a diversified portfolio of investments, they were not privy to all of the inside information at Katerra. Therefore, this risk-reduction strategy (diversified portfolio) was offset from the agency costs inherent in the lack of knowledge of the true abilities of the firm to accomplish its complex list of integration tasks.

Future Research

The current study offers scholars a platform for several derivatives in future works. First, since this is a case study of one firm, future scholarship can incorporate multiple firms in the same industry to discern differences in outcomes based on differences in levels of commitment escalation. Or, as opposed to the same industry, the cases could be grouped by funding similarities. In this paper, I focus on the unicorn status

of Katerra and how the large capital infusions may have been an actual hurdle to success. By empirically studying several firms with similar funding sources or magnitudes but that differed in outcomes (i.e. bankrupted vs. survived), future scholarship could help to qualitatively explain more effective decision-making frameworks for startup management.

Secondly, the theoretical model herein coupled with the evidence provided from the Katerra bankruptcy could be a model for a quantitative escalation of commitment paper. This future scholarship could model management's decisions around the three theoretical constructs behind escalation of commitment relied upon with different outcome measures in a larger sample of firms and over time. While it would be challenging to measure aspects of Subjective Expected Utility Theory, Self-Presentation Theory and Agency Theory in this context, findings would help advance the link between common managerial dysfunctions and a distribution of outcomes in a more generalizable way.

ENDNOTES

[1] Similar issues include rigidity analysis and free-rider problems (Brown 2015, Brown 2017) and entrepreneurial cognitive biases (Zane and Kline 2017).

[2] There are also scholars, such as Drummond (2014), that argue that giving up too early when projects may provide generous returns may be considered a dysfunction.

[3] Quotes taken from Bondarenko (2013) in Inman Real Estate News.

[4] The term "unicorn" was termed by Ailen Lee to describe startups with $1 Billion or more in market value. See Lee (2013).

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