COVID-19 Crisis Management Left Tacit Knowledge Behind

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As the COVID-19 pandemic raged throughout New York City and its surrounding suburbs, more than 500,000 positive cases and 30,000 deaths were recorded between early March and early May 2020. In response, built environment firms were forced to confront uncertainty, shift mindsets, and embrace new workflows to remain viable in the face of city and state mandatory stay-at-home orders and curfews. This required the creation of new internal processes for document dissemination. Firms focused on alleviating clients' concerns and boosting productivity by providing information, a hierarchy of business processes, and new codes of conduct. Utilizing case study methodology, this evolution at one architecture firm was tracked. Semi-structured interviews before and after the early wave of the pandemic clarified and verified findings. Participants were asked probing follow-up questions to better understand the impacts, especially regarding tacit knowledge. The firm's efforts were optimized, but tacit knowledge sharing disappeared. Once this form of knowledge sharing was highlighted, participants acknowledged the loss and speculated about how to address this critical activity moving forward.

Keywords: architecture, built environment, COVID-19, information management, knowledge management

INTRODUCTION

New York City's building boom spanned more than six years, leading to widespread optimism. The New York Building Congress — an inclusive, membership-based organization representing more than 250,000 professionals and tradespeople — forecasted an almost 10% increase in construction spending from 2018 to 2021 (New York Building Congress, 2019). Construction employment increased; 2019 was the eighth consecutive year of growth. At the end of 2019 more than 161,000 individuals were employed (New York Building Congress, 2019).

In January 2020 no one predicted this growth would come to an abrupt halt at the end of the first quarter and that by the end of June, the American Institute of Architects would report a record drop in billings (American Institute of Architects, 2020). Construction Dive's June 30th daily report noted that New York Metropolitan Transportation Authority work, including a $51.5 billion subway modernization plan, was halted. A 350,000-square-foot mixed-use development in Jersey City, New Jersey was canceled. Yet simultaneously, work resumed on a 975,000-square-foot Amazon warehouse after a 45-day shutdown (2020). Volitivity was the order of the day.

The impetus for this extreme plunge in billings was COVID-19, a global pandemic. The first U.S. confirmed cases were in mid-January in Washington State, quickly followed by Illinois. By March 1st it was in New York City (Axelson, 2020). After reaching 76 confirmed cases a week later, Governor Andrew

Cuomo declared a State of Emergency, but it was too late; New York City became the epicenter of the United States (House, 2020).

Drastic changes followed. By mid-March, New Yorkers were under “stay-at-home orders,” followed by enforced curfews, mandatory social distancing, and mask mandates. All non-essential businesses were closed, resulting in extreme levels of unemployment, lines at food banks, and mental health challenges (Axelson, 2020).

Whether construction was considered “essential” was not clear. On March 20th, Cuomo issued “New York State on PAUSE,” an executive order that defined “essential” infrastructure as public utilities, telecommunications, transportation, hotels, the skilled trades, and infrastructure that relates to healthcare, emergency repairs, and safety. The Empire State Development Corporation issued further guidance, adding affordable housing projects as well as projects that would be unsafe if left incomplete (Benarroche, 2020).

Architects and engineers immediately transitioned to remote work, including those working on “essential” projects. On March 23rd, Metropolis published interviews with principals from the hardest-hit cities. They were generally optimistic, noting the ease of transitioning to remote work, setting up Zoom or Microsoft Teams meetings, and attending “digital” lunches. One mentioned a uniform video “background” to bolster team cohesion. Another discussed the challenge of sending submittals to architects’ homes, especially the difficulty of storing large samples. Previously “workflow” was assumed, but workflow discussions became daily occurrences (Metropolis, 2020).

These changes were only the beginning. Firms continued to confront uncertainty, shifting mindsets, and new workflows. By mid-April, the city had reached the apex of the first wave; more than 700 people were dying every day. On June 24th, a 14-day quarantine became mandatory for those arriving from states with high infection rates. With each such shift in policy, organizations were forced to adapt (Parsnow, 2020).

Using case study methodology, the evolution of one architecture firm’s responses was tracked for six months; all firm emails were reviewed; internal and external announcements, procedural changes, business processes, particular events, and shifts in codes of conduct were saved and analyzed with respect to knowledge sharing. Then semi-structured interviews with firm leaders and staff probed perceptions of the effectiveness of these measures. Responses were compared to semi-structured interviews from the previous year with the same subjects; these earlier interviews provided a baseline for comparison. The study provided a glimpse into crisis behavior during and immediately following an uncontrolled, external incident of unprecedented magnitude. It also explored the efficacy of this firm’s actions and attempts to both control and share knowledge during an uncertain, ambiguous, and uncontrollable event that placed the firm in existential peril.

METHODOLOGY

Research Context and Rationale

Although there is some research on crisis management and uncertainty management in the built environment, there is limited research on their impact on knowledge sharing, especially within a crisis of the magnitude of a global pandemic (Walker, Davis & Stevenson, 2016). Even though numerous studies that focus on COVID-19’s impacts are emerging, they are neither concentrated on knowledge sharing within a design firm nor did they employ case study methods.

When the opportunity arose for access to significant quantities of data that would allow an in-depth analysis of one organization’s responses during the initial stages of the pandemic, the case study approach was selected. By focusing on one firm, and employing mixed methods, the research produced a detailed, more complete, and nuanced examination (Flyvbjerg, 2011; Saunders et al., 2016; Yin, 2018) concentrated on two questions: *How did knowledge sharing during the pandemic contribute to the firm’s survival?* and *What tactics were successful in sharing knowledge under these new circumstances?*

This was primarily accomplished by plotting the patterns of interactions between the firm and its employees, focusing specifically on statements from leaders to staff about specific circumstances, work and administrative processes, and changes in policies — before the start of the pandemic, at the start of the pandemic, and as the first wave crested and subsided. These communications became the framework for analyzing behavioral changes longitudinally.

Data Collection

The data collection process was multi-dimensional. Emails were the primary source of data; cataloging emails before the pandemic provided a baseline, which was compared to emails after the pandemic to identify and track changes that occurred because of the pandemic. Emails were chosen because they are timestamped, quantifiable, and provide examples of formal and informal messages associated with specific actions at defined moments.

After the emails were analyzed, retroactive semi-structured interviews with firm leadership and staff were conducted. The information collected in these interviews was then compared to earlier interviews exploring knowledge sharing with the same subjects conducted pre-COVID by the researcher. By comparing the two sets of interviews, evolving perceptions of the efficacy of policy changes, procedural changes, and other interventions were brought into stark relief.

Staffing Matrices

Additional data emerged. Starting years previously, firm management would populate a spreadsheet (a staffing matrix) of all billable employees' staffing assignments for the week in advance of a Monday morning coordination meeting between project managers (PMs). These staffing meetings are based in collective decision-making. After the transition to remote working, staffing matrices became more widely disseminated and consulted. Individual staff were to use them to guide their remote work — and at the end of the week, before the next staffing meeting, PMs would compare the staffing plan to timecards before initialing them to record review and approval. Major deviations would precipitate uncomfortable phone calls.

When such deviations began to impact project delivery and project quality, PMs instituted End-of-Day (EoD) reports. Staff was to outline their efforts each day and email it by the end of the day so PMs could monitor progress and identify roadblocks daily. Timely interventions with clients or consultants — or requests for additional resources in consultation with the Principal-in-Charge — were proactively pursued. Staffing matrices proved to be a treasure trove of information. Data included:

1. Number of projects billed to — on a weekly basis
2. Number of fully utilized employees (scheduled/authorized for 40 hours)
3. Number of employees with utilization rates less than 100%
4. Total number of staff (sum of numbers 2 and 3 above)
5. Total number of billable hours per week (aggregated)
6. Utilization percentage (number 5 divided by number 4, to two decimal places)
7. How non-billable hours were allocated

TABLE 1
STAFFING MATRICES SUMMARY DATA

Week Ending	Sum of Utilization	Average Percent Utilized	Fully Utilized	Less than 100%	Total Staff
01/03	4020	91.36	33	11	44
01/10	4210	95.68	38	6	44
01/17	4300	97.73	40	4	44
01/24	4275	97.16	38	6	44
01/31	4155	94.43	38	6	44
02/07	4180	95	39	5	44
02/14	4145	94.2	38	6	44

Week Ending	Sum of Utilization	Average Percent Utilized	Fully Utilized	Less than 100%	Total Staff
02/21	4150	94.32	38	6	44
02/28	4220	95.45	39	5	44
03/06	4200	93.33	38	6	44
03/13	4320	98.18	41	3	44
03/20	4300	97.73	41	3	44
03/27	4540	98.7	44	2	46
04/03	4635	98.62	45	2	47
04/10	4293	93.33	42	4	46
04/17	4400	95.65	42	4	46
04/24	4460	96.96	43	3	46
05/01	4555	96.91	44	3	47
05/08	4150	88.3	41	6	47
05/15	4250	90.43	42	5	47
05/22	4050	86.17	40	7	47
05/29	4110	87.45	40	7	47
06/05	4170	88.72	40	7	47
06/12	4215	89.68	40	7	47
06/19	4230	90	37	10	47
06/26	4330	92.13	42	5	47
07/03	4290	91.28	42	5	47

Table 1 'Week Ending' dates fall on Fridays but cover the Sunday previous until the Saturday following. The office was closed between Christmas Eve and New Year's Day, thus such poor utilization during week 1. The firm strove to, and managed to maintain, 96% average utilization through week 18. Starting week 19, utilization dropped more rapidly than the levers available to firm leadership to reign in utilization rates.

The Management Response

In response, firm leadership instituted a salary deferral program for employees earning $100K+ per annum to address cash flow. 50% furloughs (one week on, one week off), which allowed unemployment claims during "off" weeks, were next. Delays in receiving a 2020 CARES Act PPP loan contributed to both partial salary deferrals and partial furloughs. Eventually, layoffs were necessary, as they were the only way the firm could survive.

A special all-office virtual meeting was held on 7/15/2020 to announce the measures taken, and that the layoffs would allow the firm to remain viable since the PPP loan had finally been approved and the funds would shortly be received. A significant number of accounts receivable that were in arrears were also collected. The principals deferred 100% of their salaries until all consultants were paid. The PPP loan allowed the deferred salaries to be repaid between 7/9 and 9/3 in five equal increments.

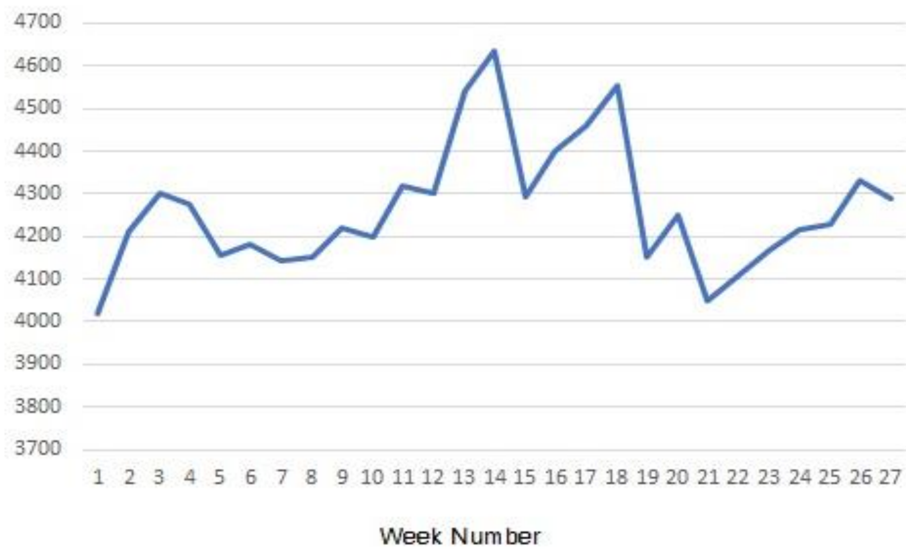
50% furloughs remained in effect for those the firm especially valued but whose projects had still not restarted. A feature of the PPP program — keeping people employed in the short term until cash flow improved — is also a condition for PPP loan forgiveness, meaning that staff paid through PPP could not be laid off without the firm forgoing the possibility of loan forgiveness. This is a very strong incentive structure. Please note that the study period ended July 4th, so the events above do not fall within, and will not be included, in the data analysis.

RESULTS

Quantitative Data Analysis

Table 1 data generated three graphs, which will be described in turn.

FIGURE 1
AGGREGATE BILLABLE HOURS DURING THE FIRST 6 MONTHS OF 2020



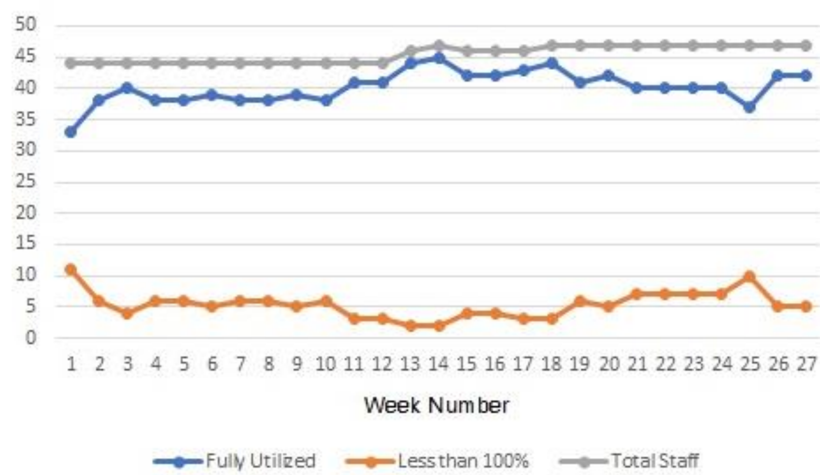
The Y-axis represents the aggregate number of authorized/billable hours for the week, based on staffing matrices (assignments) not actual time billed on timecards.

FIGURE 2
AVERAGE PERCENT UTILIZED DURING THE FIRST 6 MONTHS OF 2020

When the aggregate number of billable/authorized hours is divided by the total number of employees, the Average Percent Utilized results. The divisors vary and the results correspondingly vary from Figure 1.

This *Stacked 100% Line Graph* depicts the number of employees not fully utilized (in orange,) fully utilized (in blue,) and the total number of employees (in gray). The novel information that can be gleaned from this data is that in the face of the pandemic, the firm did not decrease staffing during the first 27 weeks. Not cutting staff represented a heroic effort to mitigate the impacts of the pandemic upon employees; layoffs were avoided until after week 27. Also notable is that the number of underutilized employees hovered around five or fewer until week 19, which correlates with projects being placed on hold or canceled earlier in the year by the NYC School Construction Authority (SCA) and the NYC Department of Citywide Administrative Services (DCAS), among others. Existing contract provisions and delays inherent within demobilization caused these staffing impacts to be delayed.

FIGURE 3
STAFFING DURING THE FIRST 6 MONTHS OF 2020



DISCUSSION

Exceptions to the Drive for Maximum Utilization

Town Halls were introduced by firm leadership in 2017. They were initially to be quarterly events (every 90 - 92 days), but best intentions did not prevail, and the number of days between Town Halls, pre-COVID-19, was 229. During the study timeframe, the time between Town Halls dropped to 121 days. The urgency of communication and cultural challenges related to the pandemic contravened the pressure for maximum utilization, even as the firm struggled to survive the emergency. When a firm of close to fifty professionals (not counting non-billable staff) attend such events, it represents between 45-68 billable hours at an average billable rate of $120/hr. The opportunity cost of such events, therefore, equals between $5,400 and $8,160 of unearned fees. For a firm seeking week-over-week average utilization of 96%, a Town Hall week takes a -2.2% to -3.2% hit. In the face of this, the mean time between these meetings decreased during COVID. This evinces their perceived importance to firm leadership.

Town Halls follow a specific agenda: 1) An Introduction, 2) Project Highlights, 3) Firm Financial Status, 4) Projects Booked / Status of Current Project Pursuits, and 5) an anecdote about The History of the Firm. The implicit messaging during each of these agenda items was: 1,2) firm projects are substantial and make a difference in the world, 2) you could be presenting your project in the future, 3) firm leadership is actively dealing with financial pressures to ensure firm survival and everyone's continued employment, 4) projects are being won even in the face of increased competition and even more are being pursued, since business development is a high priority, and 5) the firm advances talent from within, as evidenced by anecdotes about scrappy young architects performing mundane and sometimes ridiculous tasks who eventually became principals in the firm. In-person Town Hall meetings lasted about 1.5 hours, but once they went virtual dropped to about an hour long.

On a much more regular basis, the firm would host "Friday Lunches" where lunch was sponsored by vendors giving presentations or employees would present projects. Before COVID-19, these events were held an average of three times a month but did not represent the same level of investment as Town Halls, since lunch hours were not billable time. Post-COVID, they were as much for morale as they were for ongoing professional development, and the formula flipped; employees had to ‘invest’ their time without the reward of “free” food or the real camaraderie of a shared meal around a large conference table.

Friday Lunch frequency dropped off exponentially to the point where Friday Lunches “…began to feel pointless.” They still occurred when there was real interest, such as the April 24th session on Construction Documents, a topic that all architects are interested in and have an opinion about. But by June, Friday Lunches had dwindled to one per month or fewer.

Beer Fridays on the company tab were regular occurrences before COVID-19. To compensate, the principals staged ‘social events’ or ‘happy hours’ via Zoom where they requested everyone be on camera and share an alcoholic or non-alcoholic drink at 4:30 pm on a Friday. The invitations for the virtual simulacrums were simultaneously touching and ridiculous (but quite revealing): One noted that “It’s a poor excuse for a social event, but it’s the best we can do under the circumstances” while another said, “I hope you all remember who I am.” There is a kernel of truth in such asides.

Eventually, these events, which never quite jelled as social events, likewise petered out. They may have exacerbated remote workers’ feelings of isolation; more and more staff sent their regrets in advance or did not even acknowledge receipt of the invitation. It is possible that everyone realized that when not talking business they no longer had anything to say to each other.

Interviews revealed that unplanned moments such as before and after meetings, conversations in the kitchenette, or walking around the office and dropping by someone’s desk — that previously had been opportunities to get to know fellow employees on a more personal level — had disappeared, yet few took the time to pick up the phone to chat. Those that acknowledged making or receiving such calls even expressed guilt about talking about things other than work — or how to be more effective or productive — given the circumstances. Yet such “in-between” moments have value beyond the social. They are opportunities for the exchange of the most valuable long-term resource for professional service firms: tacit knowledge.

Tacit Knowledge

Tacit knowledge is context-specific and often involves heuristics (Koen, 2003). Informal, it is often drawn from personal experience, thus it is hard to communicate or manage, (Chen et al., 2019). It is important to those in the built environment because much of the industry’s knowledge is experiential, is based on lessons learned, and is grounded in intuition. This is primarily due to the project-based nature of the industry. When teams change with each project, tacit knowledge fragments and becomes decentralized, (Yang et al., 2020).

As work became remote during the pandemic, communication and documentation trended towards being centralized and formalized; its frequency increased, increasing everyone’s workload. As workload increased, and opportunities for “in-between moments” decreased, tacit knowledge sharing evaporated. This was not evident in the documents reviewed. Participants were not even cognizant of the opportunities missed. Only when answering probing, follow-up questions such as “were there opportunities to share lessons learned” did it become evident that opportunities were being missed. Participants’ reactions ranged from acknowledgment to regret, with one subject speculating about ways to increase informal interactions with staff.

FINDINGS

The documents analyzed fostered information exchange and established alternative business processes. Project-focused, quantifiable knowledge sharing (Staffing Matrices and EoD Reports) resulted in improved management and productivity. Implicit messaging reassured employees whose worlds had been turned upside down. Tacit knowledge-sharing deficits were not evident to the subjects interviewed. Management tactics were considered largely successful — and they were successful in the short term — but the competitive advantage of an architecture firm is its people and without tacit knowledge exchange a firm cannot sustain competitive advantage. Since tacit knowledge exchange deficits were not recognized until the researcher’s probing questions prompted it during the second round of interviews, this speaks to the ‘stealth’ qualities of tacit knowledge exchange, and how it was not dealt with in any systematic way by this firm.

This may be the case because those sharing tacit knowledge have difficulty explaining how or what they do. Even if Town Halls and Friday Lunches provide increased opportunities for conventional knowledge exchange, the loss of in-between moments during the pandemic eliminated an ecosystem for the exchange of tacit knowledge and did not foster deeper personal relationships between more experienced and less experienced staff that eventually promote tacit knowledge sharing. Participants acknowledged the loss and speculated that integrating new processes to address the shortfall moving forward should be a goal. Unfortunately, no one had a clue what form such processes might take.

CONCLUSION

Outstanding employee-centric crisis management of professional service firms can soften the blow of the worst of externalities. COVID-19 changed the playing field completely and required immediate and heroic efforts to shore up the firm. In the end, managerial interventions cannot change the harsh reality of clients who do not pay, place projects on hold, or cancel them. Given that the worst case (laying off staff) eventually becomes inevitable, the firm's fostering of a robust culture and implicit messaging must emphasize belonging, caring, stewardship, and hope, otherwise it will become less likely employees will elect to ‘ride out the storm’ with a firm. Fostering opportunities for one-on-one interactions could go a long way toward mitigating tacit knowledge exchange deficits that threaten the long-term competitive advantage of any professional service firm — its people.

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