

The Hurdles To Financing Modular Development



Author: Daniel Feutz

Daniel Feutz is a Master's candidate in the Baker Program in Real Estate. Prior to attending Cornell, Daniel graduated from the College of Wooster and afterwards spent five years working on commercial construction projects in San Francisco. Upon graduating from the Baker Program, Daniel intends to pursue a career in real estate development with a focus on multi-family and adaptive re-use projects.



INTRODUCTION

Revenues from the permanent modular construction (PMC) sector jumped 62% in one year to reach \$3.3 billion in 2016 and its quick growth has not gone unnoticed. The industry has attracted investment from sources such as Soft Bank's Vision Fund and Amazon's Alexa Fund, an indication of the perceived feasibility of modular building that is further illustrated in PMC's growing market share that increased 37% from 2014 to 2017 (Bousquin, 2019). Rising construction costs, tight labor markets, and an unprecedented demand for housing have pushed modular construction towards being one of the disruptors of an industry that has suffered a decline in productivity since the 1990's (Changlie, 2015). However, early adopters of modular still face hurdles, especially when searching for institutional sources of capital to finance their projects.

ROADBLOCKS OF FINANCING MODULAR DEVELOPMENT

Despite the growing momentum of the modular construction industry, institutional lenders have been slow to adapt to the needs of modular manufactures and developers. Three main financing hurdles have posed obstacles to developers looking to use modular construction. First, the traditional construction draw schedule, where funds are disbursed based on completion benchmarks, clashes with the off-site construction process where milestones are hard to gauge and do not necessarily translate into added collateral for a lender. Additionally, depending on the size, modular manufactures may require an up-front investment between \$16 to \$20 million to begin procurement and production (Stein, 2016).

The material and overhead costs associated with the procurement and production process can equal up to sixty percent of a module's cost and in many cases, manufacturers expect an upfront payment of fifty percent at the time the order is placed (Galant, 2017). To maximize the efficiency of factory assembly, manufacturers require almost all of the materials and parts within a very short period of time. Monitoring the progress and usage of materials when modules are simultaneously being assembled for different projects can be difficult especially when sixty to ninety percent of assembly occurs offsite. Furthermore, the large initial sum of capital required by manufacturers can strain bank reserves, and without any collateral or secured real estate would require an institutional lender to reserve a certain amount of money on their equity to avoid scrutiny from regulators (Mahr, 2018).

During production, modules are personal property of the manufacturer and do not become real property until they are delivered and set onsite. As a result, many banks will only release construction financing after the modules are delivered and installed to ensure their disbursement goes towards real property that they can perfect a lien on (Maher, 2018). Alternatively, manufacturers typically want payment prior to delivery to avoid the conversion from personal to private property that can lead to a significant legal complication to a manufacturer's recourse if there are future payment disputes (Cameron, Carlo 2007). These differences in expectations further complicate the disbursement of funds and overall financing structure.

The second financial hurdle facing modular construction developers arises from the immaturity of their industry, wherein a lack of precedent leads to uncertainty in pricing and scheduling, and results in inconsistencies in the burden and risks. While the use of modular construction continues to increase overall, there is an absence of completed projects which make determining the finished value of a project during the appraisal and underwriting process difficult. As a result, this can cause the bank's valuation of the project to be skewed unfavorably and in turn increases financing costs for developers.

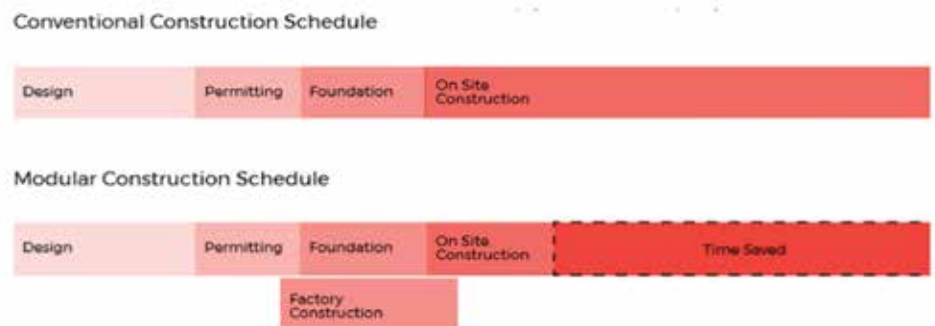


Figure 1. Comparative productivity between manufacturing and construction. Source: Changali, S., Mohammad, A., & Nieuwland, M. V. (2015, July). The Construction Productivity Imperative. Retrieved January 10, 2018, from <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/the-construction-productivity-imperative>.

Because only a small group of U.S. companies are capable of high-rise modular construction, lenders are concerned about project completion if a manufacturer becomes insolvent (Sri, 2012). The lack of proven manufacturers undermines completion guarantees and directs the focus of lenders on the quality and experience of the sponsor increasing the importance of quality social underwriting. Under this scenario lenders may require additional interest reserves and or contingency funds to satisfy any uncertainty in the project. Additionally, the immature market has made manufacture pricing notoriously unreliable. As a result, cost can be ambiguous, especially when suppliers underperform causing some developers to look overseas to source modules from more experienced manufacturers.

Lastly, during the modular assembly process, progress is hard to monitor in a factory setting where modules may be assembled for multiple projects simultaneously. This makes determining the allocation of materials especially difficult within the context of identifying collateral to securitize a loan. Typically, during the early stages of the manufacturing process, all collateral is owned by the manufacture leaving most modular projects to be unsecured. At this point the only secured collateral a developer has is a piece of raw land, the value of which does not increase until modules are set in place. From a lender's perspective the increased risk associated with this process is hard to stomach and can make securing funding of modular development much more difficult than would be the case in traditional development projects.

WHY FINANCING MODULAR PROJECTS IS IMPORTANT

ULI's "2019 Emerging Trends" publication cited construction technology as being the most important potential disruptor of the real estate development industry, with specific reference to offsite building (Kelly, Warren, Kramer, 2019). In a development environment where construction prices continue to increase along with demand for new housing, finding ways to lower costs and reduce project schedules is imperative. Furthermore, the real estate industry has become increasingly proactive on sustainability issues as the value of green building becomes more tangible. The U.S. housing shortage, rising construction costs and emphasis on green building act as the three main drivers of demand for the use of modular construction and underline the importance of improving the avenues of financing for such projects.

To meet the rising need for housing, an estimated 4.3 million apartment units will need to be constructed by 2030, although meeting the demand for low income and workforce housing will be especially difficult given the decline in building productivity coupled with rising acquisition costs in high demand locations (Bibby, 2017). Cities such as San Francisco are scrambling to house teachers, firefighters and police officers who no longer are able to afford local housing. Within this context, finding alternative building methods that lower project costs and shorten construction schedules has become imperative.

The speed, efficiency and cost saving qualities of modular construction make it one of the primary ways to address such issues. Containing the majority of assembly within a factory environment has proven to reduce waste and decrease building timelines and in turn reduces overall project costs. While the per unit material costs predominantly remain the



Figure 2. Real estate disruptors. Source: Emerging Trends in Real Estate 2019 Survey.

same in comparison to traditional construction, labor costs differ dramatically, especially in locations where union labor prevails (Stein, 2016). While it is important to note that, within the context of affordable housing, the Davis-Bacon Act only applies for on-site construction, even in instances where union labor is utilized by manufactures, wages are lower for manufacturing workers than on-site construction workers. On average, modular adopters have seen at least a sixteen percent decrease in building costs in part due to the lower cost of labor involved in modular construction compared to that of their on-site counterparts (Stein, 2016).

One of the greatest benefits of modular building is that it dramatically reduces the time required for construction. The Modular Building Institute estimates that modular projects have 30% to 50% time savings when compared to traditionally structured projects (Stein, 2016). Decreasing project schedules has become especially important, due to labor shortages the average multifamily project is delayed five months (Anderson, 2019), however the time-saving benefits of modular construction cannot be realized when the industry is relatively young and both investors and developers face uncertainty when taking on new projects. Therefore, for faster construction times and other benefits to be realized, modular construction must be utilized more frequently to capitalize on its economy of scale allowing precedent to be set and in turn, incentivize the expansion and growth of the industry.

The modular building process also greatly reduces the amount of waste produced in comparison to traditional building methods. Manufacturers, in most cases, have implemented lean manufacturing methods originally developed by Toyota that are automated with the assistance of Building Information Modeling. Over all, waste reduction is reduced to 10 to 15% on average with some manufactures accomplishing only 1% waste (Edmonds, Golden, Mckenna, 2018). In comparison, the American Institute of Architects attributes building-related material was make up anywhere between 25% to 40% of the U.S. solid-waste stream (Dillow, 2016). Increasing the number of modular projects will inherently reduce waste.

SOLUTIONS MOVING FORWARD

To help ameliorate the issues articulated above, lenders must become comfortable with deviating from the

traditional structure of their construction loans. In order to do so, new methods of tracking assembly progress and material usage must be implemented to mitigate concerns over the lack of collateral and ability to conduct oversight of the building process. This is especially important in factories with more than one PMC product line and the capacity to produce modules for multiple developments simultaneously making the allocation of project specific materials difficult to track. Additionally, developing relationships with sponsors and manufacturers is also important to improving lenders

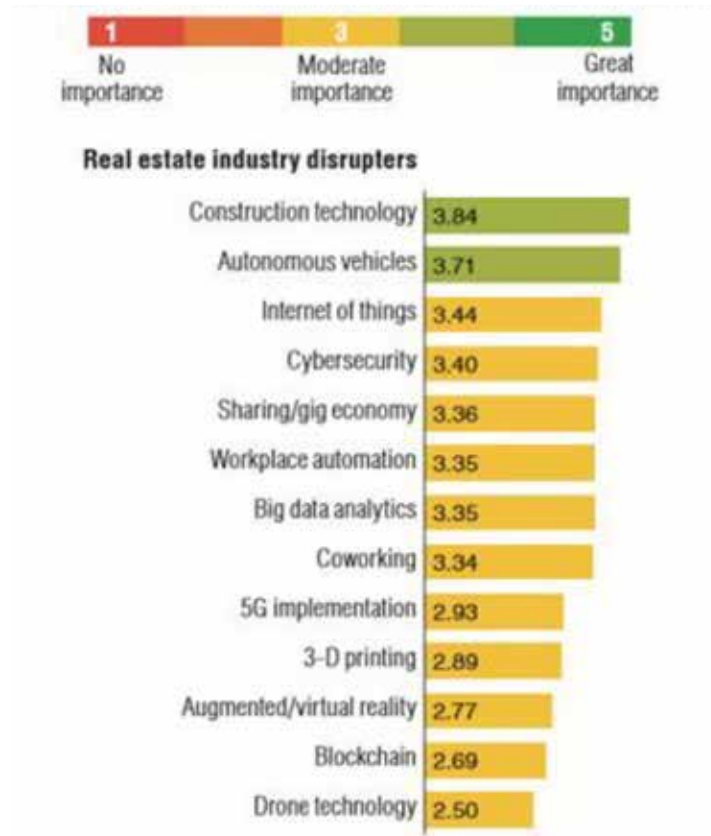


Figure 3. Modular construction schedule. Source: WSP, 2018 Modular Construction for Multifamily Affordable Housing.

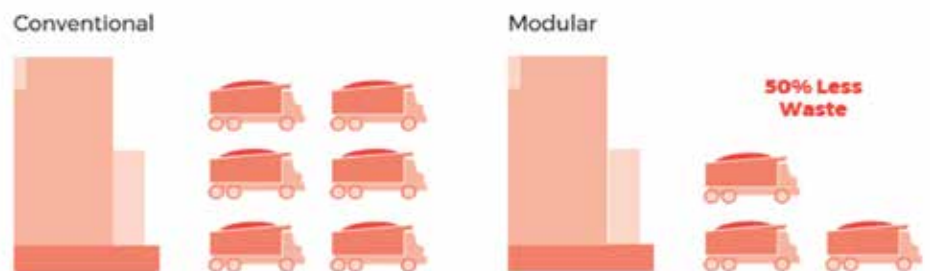


Figure 4. Reduction in Waste. Source: WSP, 2018 Modular Construction for Multifamily Affordable Housing.

social underwriting process and mitigate the risk associated with implementing new construction processes.

Lenders, have utilized a variety of methods in an effort to improve their oversight of material usage and assembly. Most notably, digital tracking systems such as RFID have been developed to monitor manufacturers' material flows and allocation. As a result, lenders are able to increase their exposure to the off-site building process while minimizing decreasing risk (Edmonds, Golden, McKenna, 2018). Identifying project specific materials in a factory also allows lenders to take a collateral or security interest in those materials (Galante, Draper-Zivetz, Stein, 2017).

Lenders have also utilized live video monitoring systems in addition to deploying site inspectors to assess work progress and determine percent completion. In doing so, lenders are able to better assess percent completion and a manufacturer's adherence to a project's schedule. This allows lenders to approve construction in process and provides greater control over administering construction loans.

Developing strong relationships with modular manufacturers to develop a better understanding of their manufacturing techniques and use of capital has also proved beneficial for lenders such as Avana Capital. Establishing such relationship allows lenders to better assess a factory's overall capitalization and financial stability. Furthermore, it provides a way to better determine if a manufacturer's business model is sustainable. This allows more informed social underwriting. Ideally, lenders receive a form of completion and repayment guarantee from manufacturers that are separate from the developer.

CONCLUSION

Modular construction is an antidote to many of the prevailing issues that plague the current development environment in the U.S. With building costs increasing and a scarcity of skilled labor, construction has become one of the leading frontiers for innovation (Mahr, 2018). The large sums of capital being invested in vertically integrated firms such as Katerra and RadUrban make the future of modular look promising. Now, one of the last pieces of the puzzle to the success of modular construction is for institutional lenders to become comfortable with deviating from their traditional lending habits. By doing so, everyone benefits? And the risks are minimized . . .

WORKS CITED

- Anderson, B. (2018, March 20). Modular Construction Going Mainstream? Retrieved January 10, 2018, from <https://www.nreionline.com/multifamily/modular-construction-going-mainstream>
- Bizwit Research & Consulting LLP. (2018, August 13). Global Modular Construction Market 2018 Size, Development Status, Type and Application, Segmentation, Forecast by 2025 [Press release]. Retrieved January 10, 2019, from <https://www.marketwatch.com/press-release/global-modular-construction-market-2018-size-development-status-type-and-application-segmentation-forecast-by-2025-2018-08-13>
- Changali, S., Mohammad, A., & Nieuwland, M. V. (2015, July). The Construction Productivity Imperative. Retrieved January 10, 2018, from <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/the-construction-productivity-imperative>
- Anderson, B. (2017, October 16). Housing Shortage Stalls Economic Growth, Prices Out Workers. Retrieved January 10, 2019, from https://www.multifamilyexecutive.com/design-development/housing-shortage-stalls-economic-growth-prices-out-workers_o
- Bibby, D. (2017, July 21). How Can We Meet Future Apartment Demand? Retrieved January 11, 2019, from https://www.multifamilyexecutive.com/design-development/how-can-we-meet-future-apartment-demand_o
- Bousquin, J. (2019, January 22). Special Report: Modular Construction and Design Demand Evolved Business Models. Retrieved January 25, 2019, from https://www.builderonline.com/building-forward/special-report-modular-construction-and-design-demand-evolved-business-models_o?bwts=1548637008
- Anderson, B. (2019, January 22). Labor Shortages Delay New Apartment Openings. Retrieved January 25, 2019, from <https://www.nreionline.com/multifamily/labor-shortages-delay-new-apartment-openings>
- Dillow, C. (2016, September 13). The Construction Industry Is in Love with Drones. Retrieved January 9, 2019, from <http://fortune.com/2016/09/13/commercial-drone-construction-industry/>
- Velamati, Sri. "Feasibility, Benefits and Challenges of Modular Construction in High Rise Development in the United States: A Developer's Perspective." University of Pennsylvania, 2012.

- Edmonds, Chris, and Narada Golden. "Modular Construction for Multifamily Affordable Housing." [https://cdn.ymaws.com/WSP, Feb. 2018, cdn.ymaws.com/www.nibs.org/resource/resmgr/oscc/epa-modular-construction-for.pdf](https://cdn.ymaws.com/WSP/Feb.2018/cdn.ymaws.com/www.nibs.org/resource/resmgr/oscc/epa-modular-construction-for.pdf).
- Cameron, Peter, and Nadia Carlo. "Piecing Together Modular: Understanding the Benefits and Limitations of Modular Construction Methods for Multifamily Development." Massachusetts Institute of Technology, MIT, 2007.
- Maher, Amanda. *Breaking With Tradition: A Look at the Unique Challenges Hotel Developers Face When Building with Modular Construction, and How Private Lenders Can Help Overcome Those Obstacles*. AVANA Capital, 2018, *Breaking With Tradition: A Look at the Unique Challenges Hotel Developers Face When Building with Modular Construction, and How Private Lenders Can Help Overcome Those Obstacles*.
- Stein, Alexandra. "Disruptive Development: Modular Manufacturing in Multifamily Housing." University of California, Berkeley, 2016.
- Galante, Carol, and Sara Draper-Zivetz. *Building Affordability by Building Affordably: Exploring the Benefits, Barriers, and Breakthroughs Needed to Scale Off-Site Multifamily Construction*. Turner Center, 2017, *Building Affordability by Building Affordably: Exploring the Benefits, Barriers, and Breakthroughs Needed to Scale Off-Site Multifamily Construction*.
- Jones, Kelli. 2018-2019: Vertical Markets Series, Construction. Equipment and Leasing & Financing Foundation, 2018, 2018-2019: Vertical Markets Series, Construction.
- Barbosa, Filipe, and Jonathan Woetzel. *Reinventing Construction Through a Productivity Revolution*. McKinsey Global Institute, 2017, *Reinventing Construction Through a Productivity Revolution*.