AN OVERVIEW OF ANALYTICS

Christina Lu Jin | May 2021

Table of Content

CONSIDERATIONS FOR BUILDING AN ANALYTICS-DRIVEN CULTURE

Considerations for Building an Analytics-Driven Culture

During the three years of my previous work, as an architectural engineer, I first got exposed to big data, and first realized how data analytics are so close to us in real life, and also how powerful it is to help us solving tons of sophisticated problems. This had ultimately brought my determination to learn more about how data and data analytics works, and maybe potentially shift my career path to data analysis. Being able to better implement analytical techniques and data-driven culture into the architectural industry is one of my goals learning data.

Architecture has always been a profession built heavily on experience, and this idea haven't been developed or shifted in many decades, which resulted in many architectural firms and company or even the entire architectural field are still running under the traditional model. There is usually humongous amount of data being collected through the building design, develop and construction phases, as well as the post-tenancy stage. But since the industry haven't been fully understanding the benefits of data analysis, or haven't had a competent data analytical model building yet - often times companies in this field are just letting these valuable data been set aside or gone waste, without actually analyzing it and gaining any insights. This is in fact, in my opinion, the biggest obstacle for building such an analytics-driven culture in the architectural industry. Since the convention that even the highly educated and experienced professionals and experts still tend to rely on the solutions what were previously tried and proven to be optimized, had been carried through for years, it make it even harder for this particular industry to make such a big leap. But I believe that nowadays intuition and experiences are no longer enough in any business kind, and it is now essential for architectural industry to start a shift more than ever.

There are three major consideration, if not more, when applying analytical-driven culture in architectural field. The first being "collect" – make the collection of post-occupancy user feedback mandatory and regular. In common cases, post-occupancy surveys and checkups are usually not a required part of the architectural design service scope of work, for this reason, this is the component that clients or building owners may easily neglect or opt-out. But, unfortunately, not every architectural firm is aware of the importance of the post-tenancy evaluation, besides achieving the goals for clients and building owner, knowing what the building users feel and want is the most effective way for making improvements in design solutions and also the best way to provide environments that suit them most. Therefore, I think the post-occupancy data collection is rather an essential part of the architectural design service scope of work, large practice firms should start considering making this evaluation a mandatory part on the contract or the service agreement. In addition, this should not be a one-time thing, but rather should happen every now and then. Pioneer firms should also start considering construct web-based short surveys, so they can continuously collect building satisfaction data from building tenant and users on a yearly or semi-yearly base.

The second consideration is “data format” – the data collected should be more of those simple, cleaned, and formatted data, instead of long complicated strings or text entries. Considering the number of buildings, the number of tenant and users of each building, it should not be not hard to imagine how tremendous is the amount of data being collected each period. In order to not spend to much manpower on sorting and cleaning the data, those surveys that are going to sent out for collecting the data should be nicely organized and in a structured format in the first place. This means, the survey shouldn’t be just asking the user to write down how they feel about the building, what they liked or not liked, this will make the data processing extremely complicated for both of the inputs and the outputs. Instead, the structure and format of the surveys should be very thoroughly thought out, questions with multiple choices and rating scales are preferred formats; questions with similar functions of the investigation should be group together, for example surveys should be divide into a couple sections and each section has a main purpose of investigation, whether it’s for Heating Ventilation and Air Conditioning (HVAC), Day/artificial Lighting, space functions or for a particular design element, etc. This way can ensure the data being collected has the best consistency in type and format, and can be easily and quickly analyzed using the least amount of effort doing data cleaning and prepping. Although constructing such curated surveys might seem time consuming or a waste of effort in the beginning, in long term it will definitely benefit the firm or the industry in many ways, these carefully designed and formatted survey can be easily to populated across different projects or building type, as well as for future regular uses.

Lastly, the third major consideration is “implementation” – how to deliver the key findings and insights of the user satisfaction and well implement these into the improvement of current facilities and future designs. Assume that we have collected and analyzed all the data that we have received, how to apply all these findings became utterly important. Not everyone can read, understand and make implications of data like data analyst does, but data visualization tend to be a straightforward and informative for the general public. Consider making sets of “story telling” data visualizations for major key insights of how comfortable people feel using the building, and any particular part they are not very satisfied and requires attention or amend. Deliver these BI visuals and messages to the corresponding departments or design teams, to achieve data-driven design solutions.

References:

1) The Top 5 Challenges of Creating a Data-Driven Culture (and How to Solve Them) (Jan. 4, 2019). Retrieved from https://see6.medium.com/the-top-5-challenges-of-creating-a-data-driven-culture-and-how-to-solve-them-9a2b9c1efa71
2) Vella, F. Building An Analytics Culture In Your Company (May 11, 2020). Retrieved from https://www.forbes.com/sites/forbestechcouncil/2020/05/11/building-an-analytics-culture-in-your-company/?sh=660392774424
3) Troxel, E. Using Data Analytics In Architecture to Embrace Communities In Design. Retrieved from https://hmcarchitects.com/news/using-data-analytics-in-architecture-to-embrace-communities-in-design-2019-01-09/#:~:text=Data%20analysis%20in%20architecture%20is,most%20efficiently%20use%20a%20building.
4) Cheng, A. Data-Driven Architecture (Dec. 1, 2019). Retrieved from https://towardsdatascience.com/data-driven-architecture-6b38ccd7d24e

PROJECT MANAGEMENT CONSIDERATIONS FOR ANALYTICS

Project Management Considerations for Analytics

The typical working procedure of building, reporting and using analytics share many similarities to the lifecycle phases of project management. Both involves bringing a project or a task from ideation through to completion, and some processes of analytics could be aligned and tied to some general phases of project management for easy interpretation. In common cases, constructing analytics in an organization usually involves 4 major steps, which can roughly align with the phases of project management considerations:

1) Proposing Business Questions
2) Exploratory and Analysis
3) Interpretation
4) Solution and Implementation

Firstly, in project management there is always a reason behind starting a project, also known by business case, which is usually the purpose or the goal that the organization or the firm is trying to achieve in starting such a project. To name a couple of widely known projects, Uber, a company that had its reputation in providing shared transportation for people, launched Uber Eats, a food delivery service, in 2014. The company wish to expand their business services and utilize its large base of drivers to transport and deliver more than just humans. To solve this business case, they have decided to start with fresh food, which was definitely not an early comer, but had now turned into a billion-dollar business; As TikTok starting to get popularized, Instagram (Facebook) decided to rollout a direct short video competitor, Reels, hoping to rival with TikTok and to attract more young users, influencers and content creators. Reels was launched in Brazil in late 2019, it has only been a year and half, it is now expanded available over 50 more countries and had gained much positive responses; Since the launch of Airbnb Experiences in 2016, it has became an essential and vital part of Airbnb. It started with the inventory of 150 experiences, it have grown 2500% after the first year of launching and expanded to 5000 experiences over 60 destinations, and to over 1000 destinations after the second year. Experiences was growing 13 times faster than their original short-term rental business since it has become able to operate in cities with restrictions or bans on Airbnb properties, and itself had made Airbnb over $1 billion in the second quarter of 2019. These are all great examples of business cases, corresponds to business cases as for project management, proposing a series of valuable business questions is also extremely important for building analytics for an organization or a business. This assigns purpose and meaning to all the following steps in processing analyzation, leads to the final success of an analytics project, and also plays an important role in translating the results of analyzation into viable and executable insights for the organization.

Secondly, once a business case has been determined, the next phase in project management is to conduct a benefit actualization analysis. The aim of this phase is to indicate all possible benefits and achievements of the organization upon initiation and completion of this project. In other words, it is to determine whether the completion of this project could be solving a particular question, extending business scope and services, increasing business growth, attract and retain more customers, branching globally, emphasis organization's identification and branding, or just simply increasing revenue. This phase of the project management can emerge to the "exploration and analysis" procedure of building analytics. Where in this step, particular data that are related to solving the business questions will be collected, cleansed, and prepped. Furthermore, exploratory and more complicated analysis on the datasets will be carried out, using various tools.

Thirdly, after analytics, project management will then move on to a phase which project managers along with team members will propose a series of recommendations for the realization of the determined business case in the first phase, with the current condition and available resources of the organization. Similarly, in building and reporting analytics, there is a corresponding procedure called interpretation. This step involves in interpret the data that we carried through from the second step, as it applies to the business questions that we and our stakeholders proposed and identified during the first step, and to find out more in-depth correlations or patterns in regard to solve those business questions. These two components of project management and analytics share a big resemblance, both requires an action of reflect back upon the initial objectives. It is crucial to build and expand the interpretation around the main purpose and align with the initial goals, so that we could most effectively leverage the data, interpretation and findings by translating them into enforceable actions for the organization.

Lastly, after recommendation, the final phase of project management will be execution and monitoring. This final phase involves in selecting the best option among the recommendations that advocated through the previous phase, and monitoring how well the project goes and whether it stayed on track as it supposed to or not. This corresponds perfectly with the "solution and implementation" phase of reporting and using analytics. After the interpretation has been done for the analytics, and findings had been translated into enforceable actions for the organization, the next step will be to identify the best solution among all possible viable actions, and implement it for the final step of solving the business question. This step of the analytics usually includes a tracking and monitoring of how well the implementation of the analytics model solves the business question.

References:

5) Stobierski, T. Data Analysis & Project Management: Benefits of Management Techniques (June 8, 2018). Retrieved from https://www.northeastern.edu/graduate/blog/data-analyst-and-project-management/
6) Carson, B. Uber's GrubHub killer is finally in the US — here's the inside story on its big bet on food (Mar. 2, 2016). Retrieved from https://www.businessinsider.com/why-uber-launched-uber-eats-2016-3
7) What are Airbnb Experiences and Can They Increase Your ROI? (Nov. 30, 2020). Retrieved from https://www.igms.com/airbnb-experiences/

KEY ETHICAL CONSIDERATIONS FOR ANALYTICS

Key Ethical Considerations for Analytics

As much as data analytics benefits us for the innovation of the technologies and the improving in our daily lives, it detriments our privacies and rights by data leakage and miss use. An report that KPMG released in early years states that only 10% of the organizations are confident with their management of the quality of data and analytics, and only 13% are confident in their appropriate use of data and analytics in both privacy and ethical considerations. The rest 60% and more did not show with confidence. The managing director of KPMG's decision science department pointed out that: these lacks of trust might be the result of not fully understanding how the company uses analytics. This had brought building analytics trust and adhering to an ethical framework in an urge of action.

It is suggested, by the TED talk presenter Susan Elinger, following a series of principles to incorporate ethical considerations in all phases of the data and analytics' life cycle, which includes 7 total phases: collection, progressing, analytics, storage and security, governance, usage, and communication. This ethical principal consists of 5 aspects of considerations, which are beneficial, progressive, sustainable, transparency, and fair.

The first ethical principle being "Beneficial", it is the consideration which will be used to evaluate whether the use of data and analytics benefits their customers as much as it benefits the organization itself. Most ideally, the evaluation result should declare that it delivers equal value and benefits for all parties involved, which includes the organizations that collected and analyzed these data, as well as the people who actually generated them. Therefore, it is crucial for organizations to prove similar benefits will be brought to the customer before actually building the analytics and collecting the data.

Progressive basically involves two aspects – improving and minimizing. The improving aspect means, as the organization comprehends and learns from building, reporting and using analytics, it should be continuously delivering better and more innovated solutions and results. The minimizing aspect means, utilizing the least amount of data to the necessity of fulfilling the initial analytical objectives or appropriate organization operations, and simplifying the analytical model, so it can maintain a healthy and sustainable usage of data and avoids the complexity and risky analysis.

Sustainable is the consideration which will be used to evaluate whether the insights that the organization had acquired are identified though high sustainable analytical models and date over time. This consideration somewhat corresponds with the previous "Progressive" one but with some distinct aspects. Besides the amount and usage of data, other aspects of measuring the sustainability and integrity are sourcing, sample size, sample methodologies the life span of the data, etc. Lifespan is also a measurement for determine the sustainability of analytical

models, how the data had been collected and analyzed, as well as how the algorithm had been constructed, all have an impact on the longevity and sustainability.

Transparency is the consideration which will be used to examine whether the analytics deployed for the organization had been transparent and inclusive. Inclusive is subjected to make sure that the data collected are free of distortion and biases, whether intentional or not, in order to avoid any negative impact on the result of analytics and actual practices. Transparency is a particular problem especially in the era of big data and automatic data capture, there are higher chances for data to be shared, leaked, or sold, and ended up being used in places and ways that was not initially intended or approved by the original source. In order to increase the accuracy and legitimation of both the collected data and the analytics results, it is extremely important to collect data from official sources and always keep things transparent.

Lastly, fair is the consideration which will be used to determine whether the organization had thought through all the potential impacts of the data and analytics use on all interested parties. The impact could be positive or negative, and once a harm or negative impact has been made, it is nearly impossible to unwind or fix. Make sure to consider and evaluate all possible consequences, and ensure there is no gray area that cannot be discussed openly or publicly, before taking an action of building and using analytics.

References:

8) Five Data Ethics Considerations for 2020 (Jan. 30, 2020). Retrieved from https://www.eweek.com/it-management/five-data-ethics-considerations-for-2020/
9) Rayome, A. Infographic: 7 ways to build trust in data and analytics at your company (Nov. 2, 2016). Retrieved from https://www.techrepublic.com/article/infographic-7-ways-to-build-trust-in-data-and-analytics-at-your-company/
10) Kassner, M. 5 ethics principles big data analysts must follow (Jan. 2, 2017). Retrieved from https://www.techrepublic.com/article/5-ethics-principles-big-data-analysts-must-follow/

STRATEGIC PLANNING FOR CONSTRUCTING A SUCCESSFUL ANALYTICS ORGANIZATION

Strategic Planning for Constructing a Successful Analytics Organization

McKinsey had once published an article, Building an Effective Analytical Organization, in which the author discussed the outcome and insights of a quantitative research, they have performed in 2017, of the analytics capabilities for about 1000 various organizations, as well as analytics designing, implementing and developing. It is a great way of visualizing and quantifying each key component that leads to the success of an analytical organization. After reading the article, I had concluded with some key components and activities that need to take place in making a strategic plan for constructing a successful analytics organization.

'**Commitment and Trust**' is the first step. The organization has to had faith in adopting analytics, and have the analytics designed with end to end approach and integrate with full connection to the business and the data requited for solving problems. Also, the executor has to trust the analytical model more than his/her own practice and experience.

While for the '**Determination of the Best Model**', three questions could be asked in general to help the process of identifying. First question being determine whether the organization want whether a centralized or decentralized analytics organization, or it could be a combination of both. It is a choice of how you want the analytics to serve the organization, whether isolated for the center of excellence while supporting other units, or embedded in each individual units. None of any single of these format superiors than others, it is all about tailoring it to best fit the organization you work with. But always prepare for the possible changes in format in later stages. Second question is whether to outsource or not. This could be interpreted as how much or how little outsourcing are desired when it comes to the analytics of the organization. It could be as much as the organization is outsourcing the entire analytical team from the external partnership vendor, or as little as not outsourcing at all by absorbing all analytical talents internally, or anything in between. Third question being the locating analytics unit. It is best located at a level that the entire organization can have access to, usually a sub-unit of the BI (business intelligence) team.

Another key component in the planning is '**Staffing Allocation**', especially the manpower for the center of excellence (COE). COE usually include professional and experts with specific skill sets or capabilities, these typically includes, but not limited to, data architects, data engineers, data scientist, visualization analyst, and very importantly, the translator. Translator is a role that could be easily overlooked, but this role is just as important as all other technician if not more, since not every staff in the organization are trained to understand the data or the language data analyst and scientist use when interpreting data. It could be, occasionally, as hard as understanding a new language for these people who are not familiar with the terminologies and algorithms. Therefore, translator plays a crucial role in bridging between the COEs and

other business units, clients, even the executive boards or the stakeholders. These should be talents with knowledge and experience of a combination of analytics, business and technology skills. The team of COE can be built in increments by starting with 5-10 data professionals and end up with a bigger group of talents in about a year ad half, typically speaking. This step is usually cooperated with the **development of a clear career path** and partnership for these professionals, in order to create incentive and retain the loyalty of these COE talents.

Last but not least, '**Training the Rest**', it is a quite transformation for changing a conventional organization to be analytics driven. It might ultimately change how the organization or firm operates and profits. Therefore, this transformation should be always taken in small increments, giving the employee and the entire enterprise to this culture change. This action should be taken both passively and actively, employees should also perform self-training in committing to the change and trusting the analytics way of solving things.

References:

1) Breaking away: The secrets to scaling analytics (May 22, 2018). Retrieved from https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/breaking-away-the-secrets-to-scaling-analytics
2) Miranda, G. Building an Effective Analytics Organization (Oct. 18, 2018). Retrieved from https://www.mckinsey.com/industries/financial-services/our-insights/building-an-effective-analytics-organization