SELECTING CONSTRUCTION TECHNOLOGY

Project Innovation & Delivery Committee

AGC of America

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WHO – Target is small to medium-sized companies.

WHAT – Selecting and vetting out construction technology

WHY – Cost of technology and time spent implementing resources.

WHERE – On the job (production) v. R&D department (sandbox) applications

WHEN – Immediate need vs. long term planning [company vs. project based]

HOW – Breakdown of approach from finding pain points to measuring implementation

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Background for the following whitepaper:

Large contractors can afford to implement advanced technology, while mid to small size contractors are much more limited. The ability of our industry to reap the benefits of technological innovation will not be fully realized until small to mid-size contractors can effectively select and implement technology. To help the entire industry move forward, the AGC of America needs to help make technology choice and implementation more accessible to small to mid-size contractors.

The goal is to position the AGC of America to be an accessible clearing house for technology and innovation solutions to better inform small and mid-sized contractors with selecting such solutions. We've started this process and plan to continue to move forward to accomplish this goal.

To execute this, the AGC PIDC (Project Innovation and Delivery Committee) has been having conversations with large and small contractors to get a better sense of the processes these contractors use to select technology investments, and which vendors/companies they may use to help make these selections. The frameworks shared below were identified through these conversations.

Through this paper, the AGC of America aims to provide tools that help small to mid-size AGC members to make more informed decisions about purchasing and implementing technological innovations that fit their business needs and capabilities.

ABSTRACT:

The construction industry continues to experience rapid evolution driven by technological advancements. From Building Information Modeling (BIM) to drones, Artificial Intelligence (AI), and Internet of Things (IoT), the spectrum of construction technologies has expanded exponentially. This paper aims to explore the current state of construction technology, highlighting its applications and the overall investment in the sector. Moreover, it delineates actionable steps for small to medium-sized firms to successfully consider, adopt, and integrate construction technology into their operations, emphasizing the fit for the organization, benefits, challenges, and strategies for effective implementation.

INTRODUCTION:

Construction technology has revolutionized the industry, reshaped traditional methodologies, and introduced innovative tools to enhance efficiency, safety, and cost-effectiveness. As of the latest data, the construction technology market surpassed $10 billion globally, with investments surging annually. Despite this, small to medium-sized construction firms often face challenges in adopting and harnessing the full potential of these technologies. This is due to constraints such as budget limitations, lack of expertise, and resistance to change, as well as the confusion due to the number of available solutions.

CURRENT STATE OF CONSTRUCTION TECHNOLOGY:

The construction technology landscape spans a myriad of applications. BIM software facilitates collaborative design and project planning, while drones offer aerial surveys and monitoring. IoT devices track equipment performance and enhance site safety. AI-powered analytics streamline project management, and modular construction methods optimize efficiency. These technologies collectively drive improvements in project timelines, cost management, quality control, and sustainability.

1. **ADOPTING CONSTRUCTION TECHNOLOGY FOR SMALL TO MEDIUM-SIZED FIRMS: Assessment and Planning:** Begin by conducting a comprehensive assessment of current processes, identifying pain points, and defining clear objectives for technology integration.
2. **Start Small, Scale Gradually:** Develop a strategic plan outlining short and long-term goals. Prioritize technologies aligned with immediate needs and scalability. Implement pilot projects to evaluate effectiveness before scaling up with resource allocation.
3. **Collaboration and Partnerships:** Engage with technology vendors, industry experts, and other firms to gain insights, access resources, and collaborate on implementing solutions that suit your business needs.
4. **Change Management and Education:** Address resistance to change by fostering a culture and champion that embraces innovation. Communicate the benefits of technology adoption transparently and involve employees in the decision-making process.
5. **Continuous Evaluation and Improvement:** Regularly assess the performance of adopted technologies and adjust strategies accordingly. Stay updated with industry trends and emerging technologies for sustained growth.

CONCLUSION:

Small to medium-sized construction firms can thrive in a rapidly evolving industry by strategically integrating technology into their operations. The benefits of improved efficiency, reduced costs, enhanced safety, and competitive advantage outweigh the challenges of adoption. By following a structured approach encompassing assessment, education, strategic implementation, and continuous improvement, these firms can navigate the technology landscape effectively, unlocking new opportunities for growth and success.

This white paper serves as a guide to empower small to medium-sized construction firms in harnessing the transformative potential of construction technology, enabling them to thrive in a dynamic industry landscape.

1. ASSESSMENT AND PLANNING

Before spending time and money on a new technology, a firm needs to take the time to first self-assess the pain points and problems within the company. This will help prioritize what exactly might need to be tackled first with a new technology. At the same time, there is often a voicemail or email waiting from a persistent technology vendor that the firm might find interesting, but before adopting their solution, the fit for the existing pain point or problem should be assessed. The diagram below can be used as a starting point for both scenarios for leadership, as well as at the company and project level, to assess if the solution being considered is the right one, or the whether the problem being faced is a large enough problem to justify the time and expense needed for tech exploration, acquisition, and adoption:

Image 01 Source: How to decide if tech is worth trying [Steven Chiang, HammerTECH LLCIt's important that when assessing pain points in the chart above, that objective problem statement tools are utilized to identify the core issue through Root Cause Analysis (RCA), which encompasses a wide range of approaches, tools, and techniques used to uncover causes of problems. Any of the RCA options below may be used to pinpoint a core issue.

- *5 Why's*

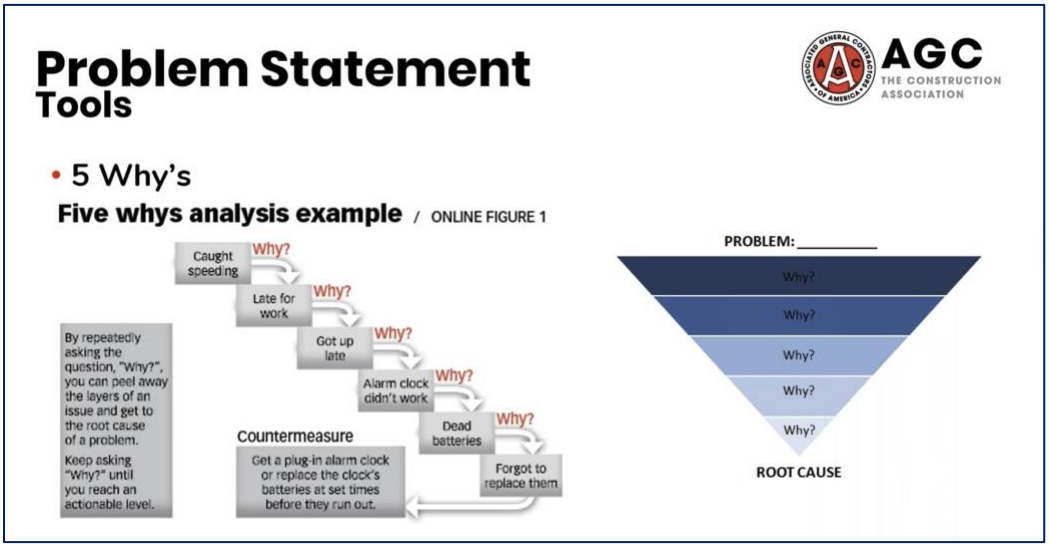

Image 02 Source: WebEd Series: Building A Resilient Future for Your Company

- *Fishbone Diagram*

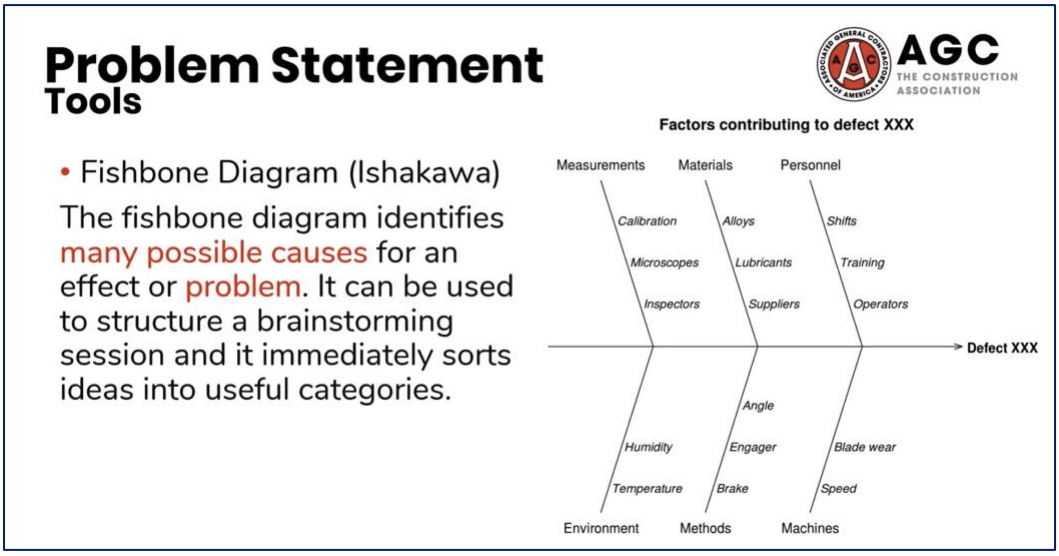

Image 03 Source: WebEd Series: Building A Resilient Future for Your Company

- *Lean Coffee*

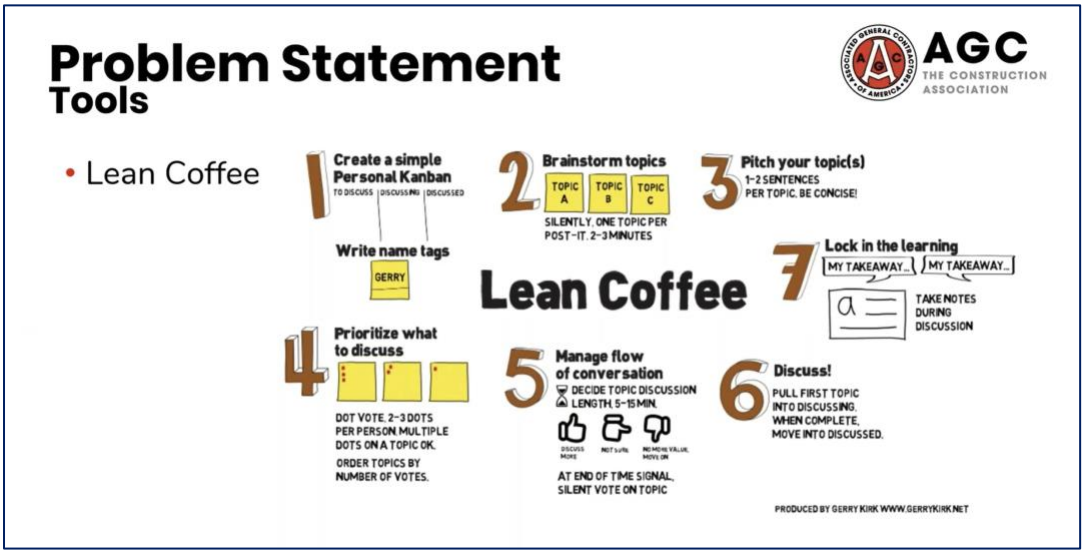

Image 04 Source: [WebEd Series: Building A Resilient Future for Your Company]

- *A3 Reporting (PDCA = Process Improvement / Toyota Way)*

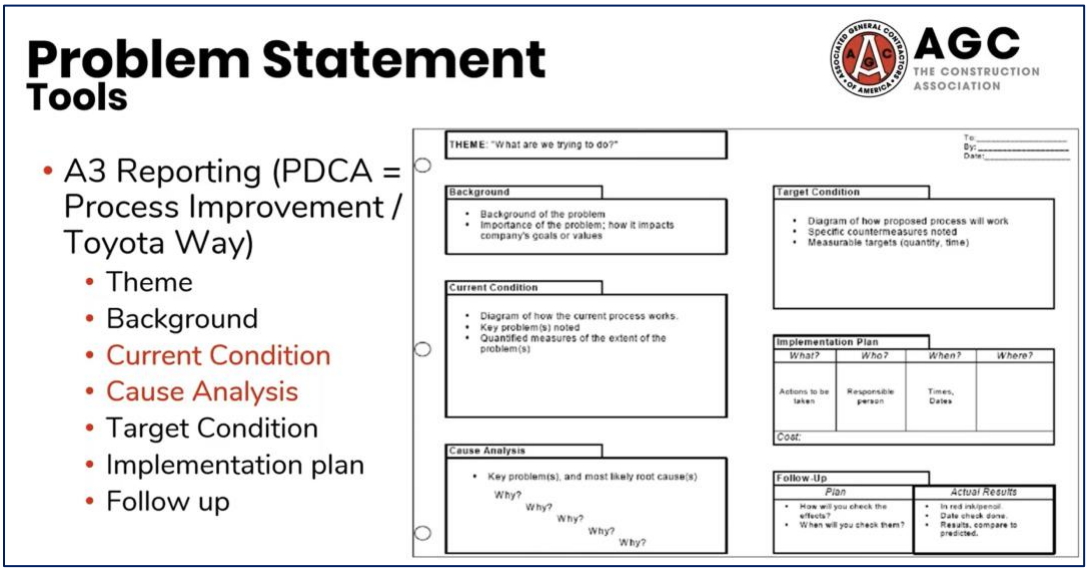

Image 05 Source [WebEd Series: Building A Resilient Future for Your Company]

Ultimately, it's important that these decisions are not made in silos. For the best outcomes, a company must ensure that the right stakeholders are in the room while decisions are being made. This should include stakeholders from safety, field management and supervision, management, accounting, HR, legal, risk, and technology departments, so there is a holistic approach to identifying how a tool or pain point might affect their domain. Often, selection of technology is done in silos, and that can create issues with implementation. Intentional inclusion of differing viewpoints adds perspective and empathy on how it could affect other departments or groups in the company and can help in finding the best solution for a given challenge.

2. START SMART, SCALE GRADUALLY

Once a pain point or technology to solve a pain point is identified, it is important to have some structure on the approach for implementation.

For example, let's say your team has decided they want to implement a manpower tracking technology across the company and/or specific projects. Below are questions you might want to be asking yourself and the team before getting too deep down the rabbit hole:

- Will it be piloted on a real, active project, or will it be better to test in a sandbox (test version) before implementing?
- Who is going to take the lead within the company to manage, track, and implement?
- What resources will they need (time and money) to carry this out?
- What is the data we want to be able to use with this technology?
- What integration(s) do we want this technology to have to our existing system(s), if any?
- What is our road map (steps to test & implement) and how do we measure success and/or ROI?
- How will we collect and measure feedback of implementation?
- What is our budget and what is the cost of this technology?
- Will this cost be covered by the project or internally? Do we need to budget for this in our bid?

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3. COLLABORATION AND PARTNERSHIPS

In the onslaught of technology vendors that most construction companies are meeting with, there is a silver-lining in that these vendors have collaborated with many companies and can offer insights waiting to be tapped. When engaging vendors in the vetting process, remind yourself that it is a two-way process where they can save you time and money. It's important your team is asking questions before selection on how it will serve your needs and what you need to know to be as useful and effective as possible. Asking some of the questions below can help drive a successful implementation or avoid a bad investment.

- What is the cost?
  - Ask upfront, since it can give perspective for the decisions that follow.
  - Pricing structures vary from company to company and can be project-based, monthly/quarterly/yearly subscriptions, one-time use cost, enterprise agreement, etc., so having this transparency in the beginning can help contextualize the demos you are going to see and clarify what you are getting for the cost.
- What companies are currently using this software, and can you provide contacts?
  - Being able to reach out to other industry members and ask for their honest feedback can give your company more perspective on how the technology is being used in the real world already.
- Do we own our data after a project(s) is completed?
  - In the Information Age, knowing that the client and your team own the data in the end is critical. It is important to ask what exactly the deliverable is that is being provided and how it will be accessed once the project is complete, if the company ceases to exist, and how exactly offline deliverables can be accessed by owners and facilities.
- What can we expect as Support going forward?
  - What are the expectations of the Customer Success Manager (CSM) and how have other successful implementations been completed in the past at other companies? What are common issues that need to be addressed internally in the company that could affect effective implementation that you have seen hinder other companies before?

Asking the questions above can uncover more questions or concerns with implementation potentially not considered beforehand. NOTE: it's important that when vetting companies, to be sensitive to "coming-soon" and "future feature" elements. If these are not fully implemented and finished features being used in production, it's important not to let those potential features motivate the decision. They may or may not come to fruition.

The diagram below offers a visual for stakeholders within the company on how a tech adoption process could take place through phases. Once Phase 1 is complete and a foundational approach is established internally, the team can move into sitting in on vendor presentations with prepared questions and expectations that can be used to set up what the testing (pilot) will look like. Once the team moves into Phase 3 of adoption, it can focus further on evaluating what is working and not working, and what can be done better to help.

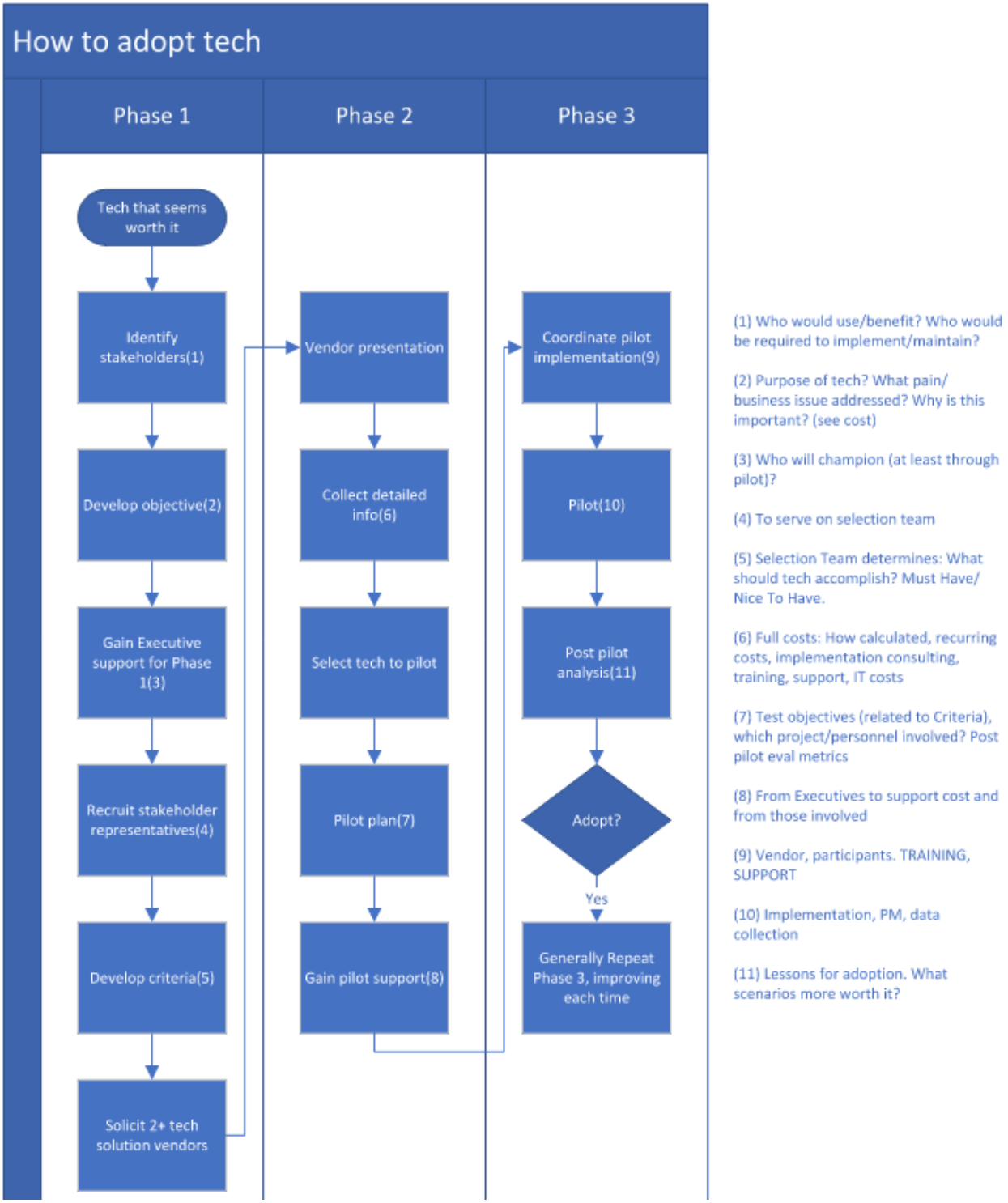

Image 06 Source: How to adopt tech [Steven Chiang, HammerTECH LLC*]*

4. CHANGE MANAGEMENT

For a small to medium-sized company, it's unrealistic to expect everyone within the firm to adopt technology, let alone be open to it. What may prove more practical is finding a champion within the firm that understands the processes and is enthusiastic about implementing construction technology. It's important this individual is willing to listen to the field needs and practicality of implementation(s), and even better if they sit on the team that will be involved in the implementation.

Having someone that has field and/or project management experience move into this role, with the understanding of the pressures and method of how a site operates, has been shown to be effective. Having multiple projects under this person's belt before adding or transitioning to a technology role is important, since projects vary tremendously, and a range of experiences fosters better understanding across the spectrum. Experience will also help as the technology champion seeks trust and buy-in from others.

Leadership plays a critical role in supporting this construction technology role. Leaders must help present the vision as important to the firm's future, and will need to be a champion of this individual when, not if, things do not go as planned. Leadership is also crucial in establishing an understanding that sometimes things don't work out, and this is a part of the process. Failure of technology will happen, it's inevitable, and when it does, it should be used as a learning opportunity to build upon as implementation takes place. It can be easy to get discouraged when things do not go as planned, for both the champion and the users downstream: leadership will need to be there as a foundation of support.

5. CONTINUOUS EVALUATION AND IMPROVEMENT

As a pilot or technology is being implemented, it's important to be consistent in listening to users in the company and understanding if the product is working as planned or not. Creating surveys that can be sent out automatically to the team and having scheduled site visits is critical to making sure the investment of time and money is bringing the intended value to the firm. Establishing these touchpoints and getting them on a calendar at the beginning of the process can help take stress of the lead champion of the implementation.

As a company begins to adopt more technology, having a matrix that compiles all the technology for the different departments or needs becomes increasingly important. When a strong tech matrix is maintained well, less time is spent thinking about products and renewals, and more time is spent evaluating their effectiveness. Budgeting for technology that becomes a staple to the business is important and tracking the cost, renewals, and negotiations are key in the event a change needs to be made.

Below is a sample technology matrix a company could use to organize their technology stack from the beginning of the vetting process by technology type. This can be used to visually see where a company is investing, if there is an overlap of services, and if there is a pain point that might be better addressed using a different vendor.

Construction Company Technology Stack | Summary Comparison Company/Project-Wide							
Vendor & Sections	**Safety & Tracking**	**ERP**	**Project Mgmt.**	**Estimating**	**Reality Capture**	**Training & HR**	**Payroll**
Vendor Name							
Vendor Contact							
Cost & renewal?							
User limit?							
Integrations?							
User feedback?							
Vendor Name							
Vendor Contact							
Cost & renewal?							
User limit?							
Integrations?							
User feedback?							
Vendor Name							
Vendor Contact							
Cost & renewal?							
User limit?							
Integrations?							
User feedback?							

Image 07 Source: Construction Company Technology Stack Summary | Felipe Serrano