
Level Summary

Outlined below is a description of each level of digital maturity.

Level One – Analog

Level one is characterized by being manual and largely paper based. Project information is shared, exchanged, and tracked manually. Information is shared or exchanged only on a limited basis between a few internal disciplines, functional groups, or external parties. If any project information systems do exist, they do not represent a source of truth, since the information is siloed and often incomplete. In a level one organization, consumption of digital information is limited. Modeling may be done by a few project stakeholders, but these models generally represent a point in time and are often simply used to generate 2D deliverables. Because there is little information exchanged between groups, there is little information reuse and because things are paper-based, digital workflows are rare. Project stakeholders do not have confidence in information, so re-surveying, re-entering, and rework are common. There is minimal ability to glean project insights for reuse and no revenue generation from digital technology.

Level Two – Efficiency

Level two organizations are using digital technology to improve business operations. This can help bridge the workforce gap, because things are starting to be done in a more automated, cost-effective manner, often requiring less effort. Project information is shared and exchanged through an electronic file portal or common data environment on a project-by-project basis, with information accessible and sharable with both internal and external parties. There likely is no connected modeling environment, but because project data is digital, there is some information mobility between the field and the office. Standards for identifying, classifying, and organizing information have been established and are in use. Model-based design is becoming the norm for new projects, and models are being used on existing projects, though not in all cases. Modeling simulations are undertaken in both design and construction (where applicable) to support some planning, progress measurement, estimating, and/or cost control activities. Supplier-based components can be used, but they are not connected to the overall organization's component library (should one exist). Reality-based context is captured, and LiDAR and photogrammetry is used on a project-by-project basis. Project performance is measured, but generally on a project-by-project basis, with limited automation. There could be the ambition to generate revenue through digital means, and there may be innovation teams scattered around the company, but there is no central organization focused on digital innovation. These organizations are driving efficiency through digitalization and some automation, but it is generally inconsistently applied throughout the business.

Level Three – Effectiveness

Level three organizations have identified and embedded automation and other digital workflows across their business as the norm. They garnered efficiencies and are now enhancing their services to provide more effective deliverables to their clients. Project information is routinely shared through a connected data environment (which brings together multiple data environments across projects, either for a single sector or the entire organization). Information exchanges such as transmittals and submittals are documented and tracked automatically. All parties, internal and external, can access the appropriate information when they need to. A connected modeling environment exists, and models are maintained throughout the design and construction process (if applicable). Information is interoperable with other project information management systems and is easily accessible through mobile devices. Model-based design and review are the norm for new projects and are integral to project delivery. Digital twins are reviewed and accepted by most project stakeholders. As with Level Two, design and construction modeling simulations (if applicable) are used, but on a routine basis to support all identified planning, progress, estimating, and cost control activities. Digital component libraries are in use and are interactively linked to design products, so that digital components can be shared across projects. LiDAR and photogrammetry are used regularly. Integrated project information management and the complete digitalization of deliverables means that project performance KPIs are a reality, and automated notifications can be used to notify project participants when something goes awry. Organizations can compare project performance across their organization and have formalized their digital innovation function with a strategy and roadmap, if not in active development.

Level Four – Transformation

Level four organizations are operating at a high level of digital maturity, having harnessed the power of going digital to drive efficiency and effectiveness in their organizations. They embedded standardization and automation consistently across the organization. All design, construction engineering, and work packages are maintained in the project's connected data environment. Information exchanges with any other project information systems are federated and automated. Stakeholders can access the information they need as appropriate in an automated way, and the integrated information model is the single source of truth for project decision-making as it is known to be current and accurate. Mobile devices are workflow integrated and provide real-time access with synchronization to the model. All matters related to the interoperability of data are in place and routinely reexamined to ensure consistency and potentially improvement. Modeling is an integral part of the entire project delivery lifecycle, and model-based design and review are the norm on all projects. Modeling simulation is used regularly to help optimize delivery, cost, schedule, and system outputs throughout the project delivery lifecycle. Component libraries have been made parametric to ensure the same component can be further leveraged in many different applications. Regular drone surveys are used, and digital components are regularly revisited for decommissioning, improvement, or replacement. Insights are provided relative to peer and industry norms and are sometimes sold to clients. Other digital revenue streams are now a reality, increasing the stickiness of the relationship between the organization and their clients.

Recommendations for Improvement

Below are some recommendations to move from one overall level of maturity to the next. However, we recognize that you may be more mature in one building block than in another or may be close to the next level and would be interested in finding out more.

Moving From “Level One – Analog” to “Level Two – Efficiency”

If you are still working in a paper-based, analog fashion, it is time to start thinking about your digital strategy. Getting started is the hardest part. Unless you orchestrated a digital transformation previously, it’s a good idea to get some help. Ensure you involve your leadership team and strategic partners. Be sure you are internally equipped with the right people, processes, and technology to adopt change and drive transformation projects. Identifying someone to lead the charge and figuring out what you want to do should be your highest priority. You will then pilot a few ideas and technologies, before eventually focusing on standardizing and embedding digital technology as your standard operating procedure. You might want to think about the following as places to start:

1. People

- a. **Executive Sponsorship** – Who will be leading the charge for digital transformation? Do you have a Chief Information Officer (CIO) or Chief Digital Officer (CDO)? If you have a CIO, perhaps task them with planning your digital transformation alongside help and input from a strategic partner. If you have a CDO, presumably they are already planning this transformation. If you do not have either of these colleagues at your company, it’s time to consider a role like this. Someone needs to be responsible for identifying and staging the changes you need to increase your digital maturity.
- b. **Project Management** – Do you have technology project managers who can help drive changes through your organization? If not, establishing this discipline with one or two technical project managers who understand the degree of change management (the people side of change) necessary to make these types of projects successful.
- c. **Delivery Partners** – To what degree can your strategic partners or even current vendors help you make this change? See what types of consultative services they offer to see if they can help you map out your digital strategy and develop a roadmap for you to follow.

2. Process

- a. Deciding to go digital is just the beginning. You will need to implement many process changes to improve your digital maturity. To begin, you will need a process to decide where you start, and which projects get priority. A governance process for your digital portfolio will be important.

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- b. Efficient organizations are characterized by the ability to automate and reuse information across the organization. This requires that information be in a format that it can be understood from one silo or application stack to the next. Establish standards for identifying, classifying, and organizing data. Embed these standards into all new data captured going forward.
 - c. Establish norms on the use of project-based, common data environments with standard practices so information is organized consistently across all (separate) environments. This will facilitate cross-project sharing later.
 - d. Determine and implement project performance metrics that could be applied across different types of projects.

3. Technology

- a. Begin establishing electronic file portals or common data environments on all projects. Start with new projects going forward, then retrofit any big, longer-term projects.
- b. Pilot model-based design.
- c. Implement model-based design on new projects as requested by clients.
- d. Conduct some modeling simulation.
- e. Investigate establishing a component center and see which suppliers have component libraries you can use.
- f. Implement a sector-wide component library tied to supplier-based component libraries if applicable.

Moving from “Level Two – Efficiency” to “Level Three – Effectiveness”

If you have already moved from “Level One – Analog” to “Level Two – Efficiency,” you have done a lot of heavy lifting. You have already identified the right people to lead the charge, have put some processes in place, and have standardized many of those processes. You are using digital technology to improve your business operations and are gaining efficiencies from standardization and automation. Key to moving from “Level Two – Efficiency” to “Level Three – Effectiveness” is widening the scope of your efforts to all strategically important segments, implementing model-based delivery all the time, and using digital twins to bring disparate sets of information together. You will want to focus on project insights for internal (or external) use, as well as developing and formalizing your digital innovation roadmap beyond efficiency activities and into external offerings if desired. In terms of people, process, and technology, specific next steps to consider include:

1. People

- a. **Head of QA** – Who is ensuring standards are met? Do you have a head of quality assurance, design delivery, or another function? Make sure this person’s responsibilities include auditing projects to ensure standards are being followed, components are being used, and information is organized appropriately.

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- b. **Components Librarian** – If you are using components, someone needs to be sure those components remain current, or are retired, or revamped. As your component library grows, this could become a full-time job.
 - c. **Project Controls** – As you gain more experience using project KPIs to measure performance, it may be time to establish a project controls function. This group looks across projects to proactively identify trouble areas, and to take lessons learned and best practices from projects to reapply to other projects.

2. Process

- a. Establish a mechanism to ensure information is logged appropriately.
- b. Determine how components are flagged for aging, revalidation, or retirement/replacement.
- c. Determine frequency and mechanism for examining project KPIs and ensure accountability.
- d. Determine whether outward-facing innovation or digital revenue is part of your strategy. If it is, establish a group or federation of individuals responsible for trying a few ideas out.

3. Technology

- a. Connect multiple project information exchanges or common data environments into a connected data environment so that information can be shared across projects.
- b. Establish a connected modeling environment for the persistent sharing and exchange of model information to all stakeholders.
- c. Ensure field staff have full mobility of information and can take what they need with them.
- d. Implement model-based delivery and digital twin usage as the de facto way of doing business.
- e. Leverage design and construction (if applicable) simulations on all projects to support planning, progress, estimating and cost control activities.
- f. Ensure regular use of LiDAR and photogrammetry to consider status, sequence, and safety of planned work.
- g. Implement dashboards to display KPIs across all projects.
- h. Build analytics and alerts for proactive notification of slippage, overruns, etc.

Moving from “Level Three – Effectiveness” to “Level Four – Transformation”

The degree to which you adopt “Level Four – Transformation” activities depends to some degree on whether your goal is to generate revenue from digital streams or not. Other major activities in moving from “Level Three – Effectiveness” to “Level Four – Transformation” require involving your clients even more deeply in the work you do. Consider the following:

1. People:

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- a. **Head of Digital Ventures** – If you plan to sell digital services to your clients, you should establish this as a line of business with someone in charge. Also consider calling it a “Client Innovation” function and housing it in R&D for a time. In any event, someone needs to oversee it as a distinct function.

2. Process:

- a. Establish a connected data environment to link up project common data environments so that all design, construction (if applicable), engineering and work packages are maintained in a connected data environment.
- b. Make sure digital twins are used on all projects all the time so that the integrated information model (or digital twin) is the single source of truth for all project decision-making throughout the lifecycle. This may require training.
- c. Identify those insights you wish to share with clients. Determine the tools being used, the frequency, and the mechanism for sharing.

3. Technology:

- a. Maintain digital twins for ALL projects and keep them evergreen.
- b. Integrate digital twins with the client’s asset management system.
- c. Set up notification events to trigger design updates rather than scheduled events.
- d. Make components parametric in nature so they can be used in a variety of situations.
- e. Start sharing insights with clients.
- f. Find strategic partner to co-develop digital products with.
- g. Bring new digital offerings to market.

Remaining at “Level Four – Transformation”

A [2021 report](#) from Accenture stated that “future-ready” (or digitally mature) organizations are around twice as efficient and three times as profitable as their peers. Three times the profitability is certainly something to strive for! However, once you have achieved digital maturity, staying at that high level is a challenge. At this point the technology and processes are all in place, and it can be quite easy to rest on your win. After all, you’ve made it!

Remember, the environment around you is constantly changing and the competition is likely catching up to you. Yesterday’s advantage may just be tomorrow’s table stakes. As technology changes, you must change with it. Make sure you have the following in place if you want to stay competitive and keep your digital maturity edge:

1. People:

- a. You have likely already named someone to be the Head of Digital Ventures (or a similar title). It is important to publicly support this person and the work they do. Make sure the rest of the company understands that this is an important line of business for the future of your company.

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- b. Constantly challenge this person to identify new markets, find adjacent opportunities, and expand what they are doing.
 - c. Give this person and their team the bandwidth and space to research and learn innovative technologies so you can be sure they are staying current.
 - d. Fund their attendance at conferences and industry forums so they know what the competition is up to and what technology is available.

2. Process:

- a. It's easy for processes to atrophy over time. Usage of the common modelling environment or connected data environment you worked so hard to put in place may drop off if people are not reminded of common working practices. Component centers may cease being used. Keep an eye on the processes you have implemented to ensure the old ways of doing things do not resurface.
- b. Ensure there are robust processes in place for surfacing new ideas and suggesting innovations and improvements.

3. Technology:

- a. Just as process atrophy is a very real phenomenon, so too is technology atrophy. It is sometimes easier to go back to the old tools. Make sure to keep an eye on technologies being used so you can ensure your company is continuing to use the tools you recommended.
- b. Personally stay current on technology and ensure your team does too. You want to be a digital leader. There are so many resources available to help CIOs and other IT professionals stay on top of technology trends. The hardest part is setting aside time for continuous learning and education. It must be intentional and part of your job. Once you have made that commitment to yourself, the rest is easy. Podcasts, YouTube channels, industry publications, memberships in industry organizations and forums, LinkedIn, and newsletters are all great ways to stay current with trends. There are all sorts of ways to keep up – but it must be purposeful, and you must make the time.
- c. Make sure to collaborate with your strategic partners if you see opportunities for co-venturing.