Building information modeling is increasingly popular in transportation infrastructure. With digital delivery in transportation, also known as BIM for infrastructure, agencies can not only design projects in a 3D platform but also maintain assets digitally rather than with plan sheets. While there is a cost to implementing any new technology, agencies are continually evaluating competing priorities and need to be able to justify their investments.

A new 18-month study, funded by the Federal Highway Administration Turner-Fairbank Highway Research Center gathered an expert panel to answer the question: What is the return on investment of transitioning to digital delivery in transportation projects?

In this interview, two of the study's authors — HDR's Alexa Mitchell and Chris Williges — share what they found and how agencies can determine their own return on investment.

Q. THERE'S A PERCEPTION THAT MOVING TO DIGITAL DELIVERY IS AN EXPENSIVE TASK. WHAT DID YOUR RESEARCH FIND?

Williges: We found that it's hard for digital delivery not to pay for itself within a few years. We looked at different types of implementation and different levels of maturity for different sized digital delivery programs. Regardless of the assumptions, With digital delivery, designers can clarify their intent and contractors can understand the impacts of the design. In the case studies we examined, with project costs ranging from $5

that software will eventually become unsupported and the newer versions will automatically include digital delivery capabilities. Organizations can choose to take advantage of these tools or not, but they're likely to eventually spend this money either way.

incurred otherwise, can also be implemented over multiple projects. Although they will experience upfront costs, agencies will see a return on the hardware and software over multiple projects.

Of course, there are also personnel-related costs, such as employee training, developing new procedure manuals,

ranging from decreased document storage costs to staff time savings. In general, our research determined that these costs

Q. WHY IS THIS RESEARCH IMPORTANT?

Mitchell: In any transportation agency, funds are limited and leaders need to choose where to invest.

The initial setup of the digital delivery environment is quite

it's time consuming and it is. But more importantly, there's a legitimate question of whether that effort will pay off.

When I was at the Missouri Department of Transportation and I

"How much is that going to cost us?" and "Are we going to get our money's worth?" For digital delivery, I couldn't answer that very well. I didn't have hard numbers — we hadn't consistently determined that value.

It was very important to come up with a consistent way to

each other to come up with that value added. People want

Most studies have done more of a qualitative analysis. Everyone sees the qualitative value, but we wanted to quantify that value and develop a tool and a strategy to give to technical champions at DOTs and other agencies the backup needed to make their business case.

Q. DIGITAL DELIVERY IS THOUGHT OF AS A TOOL FOR MEGAPROJECTS. IS IT ALSO BENEFICIAL FOR MIDSIZE PROJECTS?

Williges: The short answer is yes.

We grappled with project size during our research. The state DOTs and other agencies overseeing our work were interested in looking at digital delivery, not just for megaprojects, but also for their regular projects. As a result, we researched the

projects — the middle 85% of projects by size — that ile 85% of p

For some agencies, advancing digital delivery implementation might be a small jump and easy to do. But those further behind their peers will need a longer roadmap.

The Pennsylvania Department of Transportation is

delivery implementation. We're working with them on that implementation. Over the course of this transformation, they'll complete a series of pilot projects and assess whether they need to shift their approach in order to reach their goals. One of the strategies was to create a safe space for people to experiment. This level of digital transformation is an iterative process — it will take several trials before a process is properly

Other agencies are also working toward full digital delivery implementation.

Utah has developed a strategic plan, completed over a dozen projects with digital deliverables, and now considers itself institutionalized for digital delivery. The department's next step is to advance the technology's use to asset management, which opens exciting possibilities.

Iowa, too, is looking to follow suit — the DOT will develop its

recognize the power of digital delivery and the importance of a strategic plan in harnessing the power of the technology.

Another important consideration for any agency is to assign a lead who can take it on as their full-time job. Digital delivery implementation can't be part of someone's "other duties as assigned." Even if an agency has the assistance of a consulting team, it's important to have an agency lead who's accountable for overall implementation.

They will also explore the use of open data standards, such as the Industry Foundation Classes or IFC. Today, software

who do not use the same software. This can present real challenges for the user — for example, the recipient can't

information is provided. Soon, we hope to have IFC exports in all digital delivery software so we can share information with one another without worrying whether the recipient can view

Q. OVERALL, WHAT ARE THE AGENCY BENEFITS OF IMPLEMENTING DIGITAL DELIVERY ACROSS A TRANSPORTATION PROJECT LIFECYCLE?

Williges:
delivery earlier such as reduced change orders.

be. During our 18-month study, we developed a tool to help

We purposely designed the tool to be easy. If agencies don't have a lot of data, we can give them a general answer. If organizations really want to get into the weeds and want a detailed, customized answer, we can do that too.

Agencies can assess their digital delivery maturity level using

maturity they'd like to achieve and use the tool to identify the

Agencies can enter limited information to get a general

information, such as the size of their staff, the average pay per individual, and the average size of project. If they do this, the

program.

Mitchell:
delivery for asset management.

location, type, size and maybe even manufacturer warranty information to help aid in the recovery process.

About the Author

Alexa Mitchell, PE, is HDR's transportation BIM program manager and one of the premier industry leaders on BIM for infrastructure. She is active throughout the industry, drawing from her public and private sector experience to help clients with their digital delivery needs, as well as serve on a variety of high-level working groups and committees.

Chris Williges is HDR's director of economics and statistics. He brings more