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Request for Information on the National Digital Twins R&D Strategic Plan

Scott McClure

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Via FDMS

Scott McClure, 7/28/2024



My colleagues and the NIBS team I work with are submitting a separate comment to make recommendations for the National Digital Twins R&D Strategic Plan. Unlike that submission though, this comment is one perspective regarding a separate, often overlooked area for these complex sociotechnical systems. The below recommendation to promote grant funding for research into culturally sensitive change management is applicable to the topics of Business, Ecosystem, Regulatory, Responsible, Standards, and Workforce. Through my efforts leading the Digital Twin Integration Subcommittee and co-authoring two papers on the subject of Digital Twin (with a focus on the general public), I've come to realize that the interdisciplinary social challenges of bringing an organization to work with a Digital Twin are most often oversimplified in a subtle regard: though there is a tendency to rightly say that the technical requirements are complex, advocates generally assume that once the system is developed the workforce will simply want to use it. This "field of dreams" approach risks neglecting the "socio" component of the sociotechnical system, and my experience has been that it very often results in mistrust, delayed adoption, and inefficient/ineffective implementation. Evidence of this often shows in the struggles to transition Digital Twins from R&D into operations (i.e. "crossing the chasm"). I think it can be said that dynamic organizations need effective change management, but this can and should begin well before investments are made to develop a Digital Twin. Clearly, the organizational culture must be understood so that the tool can be effectively designed to better promote a healthy shift into this future reality. But unfortunately, few organizations - particularly in the federal government - have change-practices that address the subtle cultural sensitivities around digital transformation. Stated plainly, the problem is that many folks in the workforce do not trust this type of change. Worse, framing this skeptical population as the "late majority" or "laggards" (a popular innovation framework) creates a cross-cutting adversary rather than a resource. They tend to be disregarded even though their insights do have value. As a result of this negligence, their disaffected narratives drive resistance and degrade quality in transformation efforts. But few recognize that, in some ways, this fierce independence is a hallmark in the identity of the American People, something that must be well considered! And once researched, any effective, scientifically derived change management strategy must be authoritatively communicated throughout organizations facing this sort of disruptive change. Therefore, I propose that the FTAC on Digital Twins recommend in the national strategy "grant funded research into optimized and scientifically derived strategies for culturally sensitive change management in the Digital Twin domain". This type of research can affect responsible innovation throughout the US economy, particularly if it is implemented as a whole of government effort across key federal industries (because federal contract language drives many topics of discussion within organizations and trade venues, and research findings in this area will be attractive to many businesses). In support of this proposal, consider the following NITRD request statement: "a Digital Twin is a set of virtual information constructs that mimic the structure, context, and behavior of a natural, engineered, or social system." Though a Digital Twin may not be of the social system (implied by the use of "or"), the social component of a Digital Twin cannot be

disregarded because Digital Twins change the tools used by the American workforce and these tools are a part of the identities Americans live by. This makes Digital Twin a social issue! Implemented poorly - even when guided by the right motivations and the best technologies - this risks harming cultural identities and undermining our best efforts to change. In closing, it should be noted that the industry I've spent my career in (the Architecture, Engineering, Construction, and Owner/Operator industry) is the single greatest industry for suicides in the United States. Based on 15 years of experience, I believe much of that comes from the difficulty in transitioning blue collar workforces through a series of maligned and haphazard "identity changing" management efforts. Grant funding "culturally sensitive change management" can address key national priorities such as suicide prevention and is highly likely to develop methods that fast-track agency missions through responsible, informed, and compassionate change practices. And thank you. I appreciate the NSF providing the public with the ability to submit individual comments for equal consideration on merit even though these comments may not be as refined as many of the submissions you're otherwise receiving.