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## Incoming: Do Legacy Systems Always Need to Be Replaced by New Ones?

If a solution or system isn't broken, should it receive upgraded functionality or be set aside in favor of a new solution "just because?"

BY MAJ. GEN. JENNIFER NAPPER, USA (RET.)

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Innovation has propelled the government and society forward with lasting advances in science, technology, medicine and many other fields. Its relentless nature has created competition among technology providers, shortened product life cycles and resulted in many solutions being shelved in favor of upgraded ones.

However, some legacy systems remain useful and still fulfill customer needs. If a solution or system isn't broken, should it receive upgraded functionality or be set aside in favor of a new solution "just because?" If so, what's the criteria for doing so?

For mission-minded government agencies, the decision path starts with evaluating the benefits of a newer solution against the older one and its potential update. For example, if a network security solution is under consideration, how many more unauthorized network intrusions would be prevented? Would this reduce the manpower with the current solution? Or would it replace more than one device, thereby reducing complexity and cost? Showing a positive and ideally quantifiable outcome establishes a baseline for moving forward.

Analysis of old versus new must include interoperability with other agency systems as well as with other government agencies and external partners. Just as soldiers in the field need radios with specific frequencies and capabilities, newer solutions such as hybrid clouds have to function with legacy, on-premises infrastructure and solutions.

Another point to assess is whether the newer option positions an agency as an early adopter. This role may make sense for specific missions in the military, but risks arise if the solutions are more aligned with commodity information technology. For example, certain technologies may not scale, they may create resistance that inhibits adoption and they may have unknown/untested cyber vulnerabilities. In these cases, updating an existing system versus adopting something completely new may offer better long-term value.

Even with these reasons guiding choices about technology acquisition and disposition, many agencies base their decisions on the very rational justification of cost. After all, just because something is old doesn't mean it's obsolete, and leaders spend a lot of money procuring solutions, rolling them out, training staff on their use and maintaining them. They want to make the most of these sunken costs and keep solutions in place with ongoing updates.

Cost comparison between new versus upgraded solutions can become nuanced pretty quickly. Legacy systems can account for a substantial part of technology budgets because of maintenance, especially when there are few experts available to support them. On the other hand, new technology can have long development cycles, wider deployments and extended training—all of which incur increased costs along with lost productivity during the changeover.

Even with a definitive cost-benefit analysis showing a promising choice, agencies can still struggle with how to proceed because of political or cultural reasons. Leadership may prefer a specific solution because of familiarity with it, or because it is already embedded and gets used regularly, for example. If decision makers encounter this scenario, how can they increase their confidence in making the best choice?

First, any solution needs to have a modular design so that components are replaced, instead of whole systems or subsystems, without sacrificing functionality. For example, a helicopter can receive a radar or weapon system upgrade without all the electronics on board needing replacement. Likewise, avoiding proprietary interfaces in networks and other communications systems allows for more diversity of choices when singular components need to be replaced.

A second consideration is to ensure any new or existing/extensible solution has been thoroughly tested by actual users. Just as warfighters try out equipment in the field, agile software teams rely on end users as part of the development cycle for the practical, real-world feedback.

Finally, there must be open communication between users and providers. Too often, an agency fields a new technology and the users have to ask what it is for. This delays deployment and productivity as participants learn what to expect from a solution and how it connects mission needs and requirements to outcomes.

Limited time, budget, skill sets and other resources mean innovation must be tied to a purpose with tangible benefits. Some agencies find they can achieve their missions with existing and extensible solutions, while others need to replace them with new technology to meet performance requirements. Embracing either approach requires an artful and resolute mix of data and intuition.

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