



One of the most basic insights of systems engineering is that you can apply the scientific method to project management. Requirements are treated with the rigor of a scientific hypothesis, models are produced to make predictions, implementation is the experiment, and verification and validation results should be analysed like experimental data.

Systems engineers do not replace the role of project managers in leading on the operation of the project life cycle, but effective systems engineering requires those operations to be run in a scientific manner. Systems engineering and project management are complementary techniques, and allowing them to interact can be an efficient tool in its own right, as well as enabling the broader range of systems engineering techniques.

Systems engineering takes a longer view of the product life cycle than project management, and is more concerned with governance strategy; for that reason, the two approaches need to work in collaboration, and adapt processes to the needs of the other.

One of the benefits of systems thinking is preventing the structure of a product reflecting the structure of the project, but although systems engineering does take a strong view on how many project management processes should be run, the full gamut of systems engineering process should be adapted to a specific project or context, and need not be implemented in full.

The benefits of systems engineering are more about thinking in terms of systems than they are about specific processes. But having said that, its processes are optimised to reflect systems thinking, and if systems engineering is to be used, it makes more sense that the project should have a specific reason to deviate from a systems engineering process rather than a specific reason to adhere to it.

The main interaction between systems engineers and project managers is usually at major decision gates. In a sense, all systems engineering activity is directed towards making good decisions. Its overall objective at decision gates is to define, measure and assess stakeholder value, and present that information to the decisionmaker in a way that assists them in producing a balanced response to competing objectives.

The information provided by systems engineering relates mostly to performance against requirements, especially cost, time, and the most general requirements of customer need. Systems engineers will develop measures which reflect and synthesise these requirements, come up with creative alternative courses of action, and communicate trade-offs that arise from taking different paths. A similar process is taken when systems engineers have input into the portfolio management process.

At the outset of a project, systems engineers will require input into project planning in terms of tailoring procedures and practices to the particular requirements of the project, and determining at what points in the full life cycle that major decisions are going to be taken. Necessary resourcing, also, in both human and infrastructure terms, will be determined by a systems engineering process.

In terms of the acquisition of system elements, systems engineers will need to be heavily involved with managing the requirements provided to suppliers. The uniform systems modelling language (SysML™) and cloud-based synchronisation solutions like IBM® DOORS® Next, facilitate this process considerably.

Systems engineers perform an analogous role when their company is acting as the supplier, and require frequent, broad and deep interaction with stakeholders on the client side to facilitate requirements engineering.

Beyond this, systems engineering interacts with project management more in terms of governance strategy in general terms. Because systems engineering takes a strong view on the shape of the product life cycle, and encourages consideration of life cycle aspects outside of the development process, repeated use of systems engineering processes implies considerable input into life cycle model management.

Information governance should also reflect systems engineering objectives, including modelling, requirements management and measurement data.

There is some give and take with any business process, and the other articles in this series have focused on what systems engineering can do for you; here we have focused on what you would need to do for it to work. We believe that the benefits outweigh the costs, and that what input systems engineering must have into project management makes it more rigorous and scientific while enabling better governance, data and decision-making.

To discuss how your organisation may use Systems Engineering to accelerate projects, improve quality and reduce costs, contact us via: cet@synthesys.co.uk or call us on: +44(0)1947 821464.

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