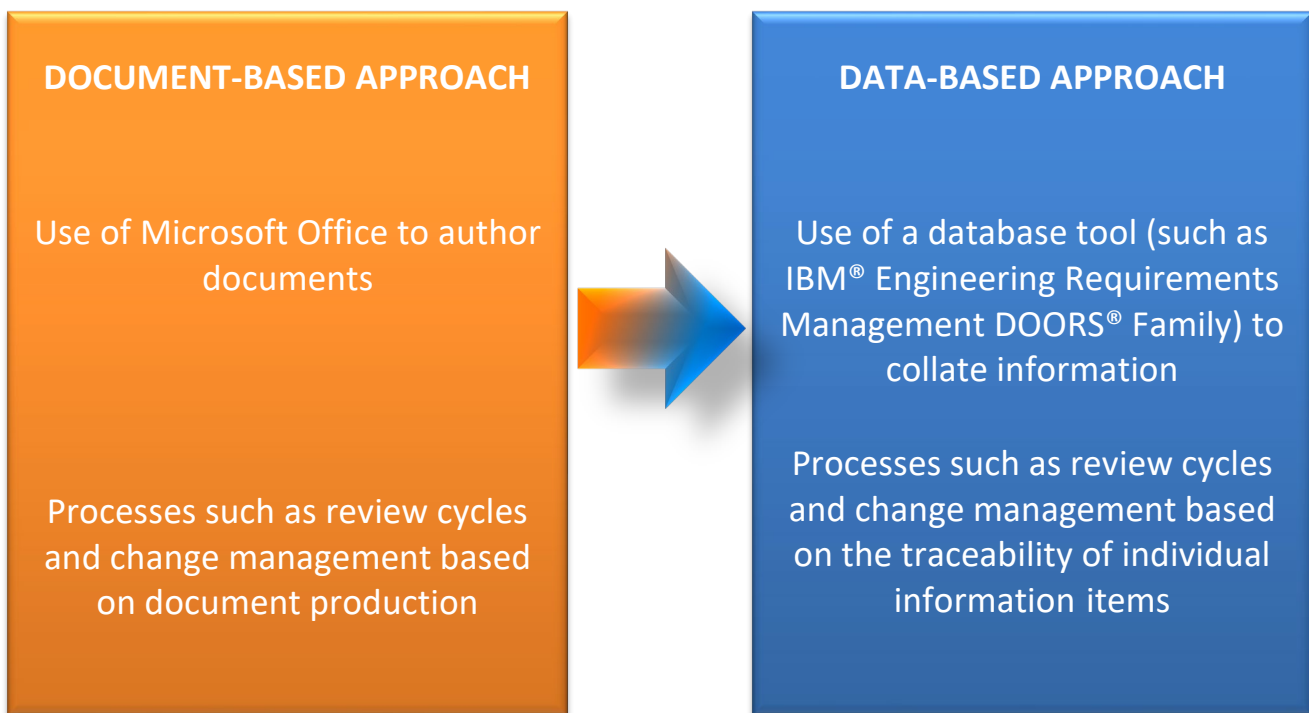## The complexity of implementing systems engineering in an organisation should not be underestimated.

It requires the introduction of new working practices, new processes, new tools - and underpinning all of this - cultural change.

While the technical aspects do take time, it is the winning over of people's hearts and minds that requires leadership, persistence, training and coaching over a considerable period.

The systems engineers at SyntheSys have considerable experience of guiding organisations through the process of introducing systems engineering. The typical starting point for most organisations is to address the requirements management parts of their engineering processes. Requirements management is widely regarded as the aspect of systems engineering that underpins most of the other processes; a properly organised approach to requirements management provides the structures around which the systems engineering process can operate.

Broadly speaking, an organisation is making the following cultural change:

DOCUMENT-BASED APPROACH	DATA-BASED APPROACH
Use of Microsoft Office to author documents	Use of a database tool (such as IBM® Engineering Requirements Management DOORS® Family) to collate information
Processes such as review cycles and change management based on document production	Processes such as review cycles and change management based on the traceability of individual information items

Typically, the requirements management approach is implemented in seven stages:

1.   Gather Process Requirements

The purpose of this is to understand the context of the implementation, the objectives in terms of process development and the specific requirements for the tool-supported process.

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2. Design Tool-Supported Process

Matching tool support to the process needs of an organisation nearly always involves compromise; the processes are adapted where practicable to the nature of the tools available and the tools are customised where necessary to accommodate the process.

3. Implement Tool Support

Customisation of tools requires developers with experience in working with the tools.

4. Document Process and Development Training

These activities are best carried out together, as one of the purposes of documentation is to assist in the training of users.

5. Populate the Database

In almost every instance there is a substantial body of existing material to be brought into the database and moulded into the specific information model. The amount and nature of this material varies widely from organisation to organisation.

6. Deliver Training

This is a process that takes time as there is a limit to the number of people that can be trained in one classroom.

7. Transfer Process and Tools Skills

An end goal has to be that the host organisation possesses the competence necessary to be self-sustaining without the need for continual external intervention. Sufficient skills are required to maintain the existing customisation and to administer the toolset.

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