

Competencies and Other Prerequisites for DES Application

DES is a powerful tool that enables for accurate decision making in various processes. The appliance of DES is however very resource demanding and requires several areas of expertise such as statistics, systems analysis and project management.

The subject of competence is widely developed in related areas such as Logistics and Supply Chain Management (LSCM) where research show that competencies has a substantial impact on financial performance¹. A Swedish furniture retailer and manufacturer has shown an interest in bringing DES application in-house in order to provide decision support to tackle the increasing competition in the market. In order to bring the application in-house, several competencies and prerequisites need to be in place within the organization in order to facilitate DES projects and to make them successful.

With the use of a single case study with an instrumental design in a simulation project at one of the company's factories, the authors managed to reveal what competencies and prerequisites facilitate the application of DES. The findings were enabled by focusing on three units of analysis; a buyer, a seller and a supplier of a simulation project. The goal of the simulation project was to provide a solid and running simulation model by following Jerry Banks² methodology including experimental designs and recommendations for improvements.

Table 1. Identified categories with its respective competencies and prerequisites.

Group/ Number	R. RESOURCES	P. PROJECT MANAGEMENT	O. OPERATIONS MANAGEMENT	A. ANALYTICAL ABILITIES
1	TIME	COMMUNICATIONAL ABILITY	PROCESS MAPPING	DES APPLICATION
2	MONEY	STRONG DOCUMENTATION SKILLS	PROCESS UNDERSTANDING	SOFTWARE ENGINEERING
3	CAPTURING OF DATA	OPEN MINDSET	SYSTEMS ANALYSIS	MATHEMATICAL STATISTICS
4	COMPANY SPECIFIC METHODOLOGY			DATA HANDLING
5				ABILITY TO MAKE ASSUMPTIONS AND SIMPLIFICATIONS

The findings from the case study reveals a set of 15 identified competencies and prerequisites that facilitate the application of DES project with regards modelling and experimentation. The competencies and prerequisites can be categorized as resources,

operations management, project management and analytical abilities. The competencies and prerequisites in its respective category is presented in Table 1.

The identified competencies and prerequisites are applied in different steps and in different combinations throughout the simulation project, visualised in table 2. This comes from the different needs and requirements in the various steps of simulation.

Table 2. Competencies and prerequisites in each step of a simulation study.

Unit of analysis / Step in Banks' (2004) simulation methodology	Project Team	Factory Management Team	Top Management Team
Problem formulation and setting of objectives	O1	A1	R1
	P1		R2
	A1	O2	R4
Data collection	A1	R3	R1
	P1		R2
	A4	A5	R4
	A3	A1	R4
	A5		P3
Conceptual modelling	P1	O2	R1
	A1	A5	R2
	O3		R4
	A5	P3	P3
Coding	A2		R1
			R2
Verification	A2		R4
			P3
Validation	A3	P3	R1
	O3	R3	R2
	P1	O2	R4
Experimentation			P3
	O2	O2	R1
	P1		R2
Documentation			R4
	P2		R1

From the findings, it can be summarized that DES is an area that requires several areas of expertise, which also is revealed in the colourful tables. Still, there are only a few competencies and prerequisites that can be seen as isolated DES-attributes. This takes us to one of the most important conclusions; that communicational ability, which can be described as a general competence, has a surprisingly high impact on simulation projects' success and is applied in almost every step.

Other conclusions stress that simulation projects are facilitated by having large amounts of resources and that it is the combination of the competencies and prerequisites that are the true facilitators of successful simulation projects.

¹ Bowersox, D., Closs, D., Stank, T., & Keller, S. (2000). How Supply Chain Competency Leads to Business Success. *Supply Chain Management Review*, 70-78.

² Banks, J. (2004). *Getting Started with AutoMod*. Chelmsford, Massachusetts: Brooks Automation, Inc.