


# Applied Holistic Mathematical Models for Dynamic Systems (AHMM4DS)

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## ABSTRACT

In this article, the author presents the applied holistic mathematical model for the support of dynamic system (AHMM4DS) transformation and integration processes. The AHMM4DS is based on a mixed research method that is supported by a mainly a qualitative research approach, where the main goal is to insure a strategic business competitive advantage. The AHMM4DS uses a natural programming language (NLP) and factors to support a central reasoning engine and a distributed enterprise architecture project's (EAP) concept. This article's proof of concept (PoC) presents the transformation of a dynamic systems, where the central point is the transformation of their services. A DS is managed by a transformation manager, who uses a methodology and a framework that can support and estimate the risks of implementation of a transformation process. Then he uses it to solve various types of problems. The manager is also responsible for the implementation of the DS, and during its implementation phase a transformation framework is needed.

## KEYWORDS

Artificial Intelligence, Dynamic Systems, Enterprise Architecture, Mathematical Model, Software Engineering, Strategic Vision, Transformation Projects

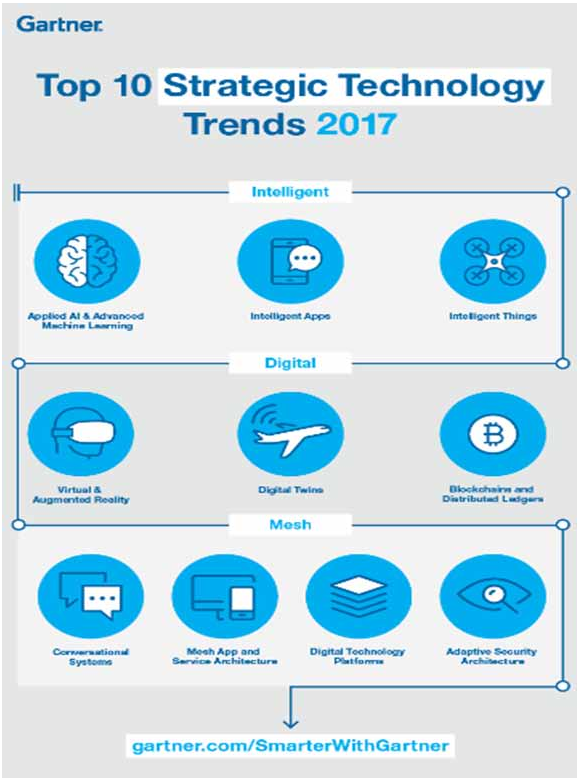
## INTRODUCTION

A priority for the Business Transformation Projects (BTP) to integrate the dynamic economy is its capacity to change dynamically its system's processes. Such a Dynamic System (DS) needs a decision making and risk management support; where the *AHMM4DS* is managed by the mapping of various categories of modules with all used resources and microartefacts. The integration process uses a methodology and a framework that can support and estimate the risks of implementation by using the *AHMM4DS*. The *AHMM4DS* concept is verified by a PoC, in order to prove it's feasibility, by using it in the context of a BTP or EAP (simply a *Project*). This article on DS is a continuation of the author's Research and Development Project (RDP) on various *Project* processes using decision systems and system implementations avant-garde domains, as shown in Figure 1. This *AHMM4DS*: 1) models the *Project's* engineering/mapping, DSs, business case studies, software modelling, business engineering and financial analysis; and 2) And is based on an authentic and proprietary research

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Figure 1. Technology trends (Cearley, Walker, Burke, 2016)



method that is supported by an underlining mainly pseudo-qualitative holistic reasoning/decision module (Trad & Kalpić, 2017b, 2017c; Gunasekare, 2015).

## BACKGROUND

The *AHMM4DS* is based on an empirical process that is mainly based on heuristic decision-making process that can be easily adopted by any *Project* (Bingham, Eisenhardt & Furr, 2007; Della Croce & T'kindt, 2002). This article's background combines: 1) Artificial Intelligence (AI) and decision systems; 2) DS constructs; 3) Knowledge Management Systems (KMS); 4) technology management; and 5) transformation initiatives. As shown in Figure 1, AI and technology trends for DS, are the next decades leading trend (Lanubile, Ebert, Prikladnicki & Vizcaíno, 2010; Cearley, Walker, & Burke, 2016). The *AHMM4DS* uses the Architecture Development Method (ADM) and the Unified Modelling Language (UML) for modelling and architecture (The Open Group, 2011a, 2011b). Enterprise Architecture (EA) is a methodology used to develop the architecture of *Projects*, DS structure, AI modules, KMS modules and its technology engineering components; where here the focus is on ADM's technology architecture phase, as shown in Figure 2 (Trad & Kalpić, 2017b, 2017c).

The RDP is based on an extensive cross-functional literature review, a qualitative methodology and on a PoC for the proposed hypotheses. A holistic DS' approach is the optimal choice to model a *Project* (Daellenbach & McNickle, 2005; Trad & Kalpić, 2016). For the PoC, an Applied Case Study (ACS) is used with the Decision Making System (DMS) interacts with the external world to manage the selected Critical Success Factors (CSF). It is strongly recommended to refer to the author's IGI complete book, *Using Applied Mathematical Models for Business Transformation*, in order to

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