Enterprise Engineering

An enterprise originates when man and machine are organised to pursue some common goal. In spite of this organisation around a common goal, enterprises often evolve in an ad-hoc way, resulting in incoherent/inconsistent design. Enterprise engineering (EE) is emerging as a new discipline to address the design of the enterprise in a coherent and holistic way. The new EE discipline could be defined as the body of knowledge, principles, and practices to design and govern the evolution of the enterprise.

Numerous approaches exist that intend to design and/or govern and/or align the enterprise. Acknowledging the multi-disciplinary nature of enterprise design we presented a common reference model to encapsulate the existing EE body of knowledge, called the Enterprise Evolution Contextualisation Model (EECM). We used a questionnaire to gather the views of practitioners on the EE domain (de Vries et al., In Review). The study applied a survey to validate the boundaries of the EE domain and also prioritise 22 core problems or topics of interest. Several research questions could be formulated from the 22 topics of interest to perform empirical research.

We provide an extract of the 22 topics of interest in EE:

- There is a need for architecture description, reference models and modelling practices for different enterprise design domains. Architecture description usually manifests as architecture description languages, such as DEMO or BPMN or as architecture frameworks, such as the Zachman Framework. Generic reference models are used to quick-start architecture efforts, such as e-TOM and SCOR. Modelling practices provide additional guidance when applying an architecture description language.

- There is a need for selection and measurement of concerns and interests. Multiple stakeholders are involved during enterprise design. Mechanisms are required to select appropriate concerns and interests for the entire enterprise and its demarcated design domains. Performance measurement mechanisms are required to measure against the stated concerns and interests. An example of a mechanism to select and measure concerns is the Balanced Scorecard.

- There is a need for design methodologies for designing the entire enterprise. The scope of a methodology could be defined in terms of the object/entity/sub-system that needs to be designed. Some methodologies focus on the design of a single domain/sub-system, e.g. the information domain. Yet, there is a need for methodologies that facilitate design of the enterprise as a holistic entity.

- There is a need for architecture governing principles to ensure unified and integrated design. Architecture principles are general rules and guidelines that support the way in which an enterprise intends to fulfil its mission. The phrase ‘decision criteria’ is also used as a synonym for shared principles that guide decision-making during enterprise design.

- There is a need for governing mechanisms, practices (practice frameworks) & standards. Governing mechanisms are required within existing management areas to ensure coherent and consistent evolution of the enterprise. Existing management areas include architecture management, change management, strategy management, risk management, program & project management, requirements management, configuration management, quality assurance. Required governance practices are often embedded in frameworks, such as SCOR (Supply-Chain Operations Reference-model). Prescribed standards are needed to constrain design freedom, especially during the design of the ICT system, e.g. the Standards Information Base developed by the Open Group.

- There is a need for problem analyses prior to enterprise re-design. Problem analyses practices and mechanisms facilitate the identification of problems and the severity/effects of existing problems.

- There is a need for impact analyses during enterprise re-design. An impact analysis is used to estimate the impact/feasibility of different alternative solutions in terms of cost, schedule or change impact.
Join our team

For: Masters or PhD in Industrial Engineering

- Complete Honours in Industrial Engineering. In addition to the compulsory modules (see Postgraduate Research Guide at www.ie.up.ac.za), we suggest the following modules to specialise in Enterprise Engineering (EE):
  - Enterprise Architecture (BBA 781) – MANDATORY for EE
  - Supply Chain Processes (BLK 781)
  - Supply Chain Design (BVK 80)
  - Business Engineering (BAR 80)
  - Electives, also from other departments, as required for your Masters
- Compile a proposal (as part of Research Methodology - INI 781) in consultation with a possible supervisor.
- Receive guidance from the supervisor to scope a research project for a Masters and possible extension for a PhD.

Contact details:
Honours requirements: www.ie.up.ac.za
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Guidance on masters/PhD topics in EE:
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For: Masters or PhD in Informatics/Information Systems

- Students that prefer to focus specifically on aspects of Data Science within Enterprise Engineering should contact the Department of Informatics for further guidance. Suggested modules include:
  - Advanced Database Design - Data warehousing (INF 785)
  - Knowledge Acquisition & Sharing - Data Mining (INF 791)
  - Electives also from other departments, as required for your Masters
- Research Methodology and IS Theory - INF 830) in consultation with a possible supervisor.
- Receive guidance from the supervisor to scope a research project for a Masters and possible extension for a PhD.

Contact details:
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