

FOSE-MAS 2008 – Type 2 Position Statement

SWOT-analysis and its implications

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Strengths, Weaknesses, Opportunities and Threats for the application of multi-agent systems relative to its mainstream alternatives shape the search space for FOSE-MAS.

The most relevant strength of mainstream software engineering and technologies is that they, *ceteris paribus*, are a user's first choice and enjoy critical user mass. MAS need a compelling reason, in the perception of their customers, to be selected. The most relevant weakness of multi-agent systems is that they are not a mainstream technology and lack the associated maturity and massive support. Inherent qualities of MAS are unconvincing to prospective users whenever they perceive mainstream technologies to answer their needs. Therefore, ***FOSE-MAS must target applications with decisive value to customers for which mainstream IT is unable to offer a satisfactory solution.***

The most relevant weakness of mainstream IT is generally referred to as rigidity: severe limits to its ability to adapt, self-organize, auto-configure, etc. in dynamic and sophisticated environments. Conversely, mainstream IT is able to provide solutions when:

- *The application environment may be adapted to the technical requirements/limitations of the software.* Enterprise Resource Planning systems (ERP) belong to this category: business and administrative processes are re-engineered to fit the ERP software limitations. Note that ERP consultants have a 'rule of dumb' stating that ERP is unsuited for the core business.
- *The application environment is sufficiently stable/simple/important for a customized solution.* Again, rigidity is tolerable because adaptation is not required and/or is achieved by brute force (big budgets, supervision by skilled personnel).

This leaves to FOSE-MAS a target comprising core business related applications that exhibit variability and heterogeneity and in which accounting for the application specifics is vital. Fortunately, this coincides with a generally accepted strength of MAS technology. A large application area with these properties concerns industry, transport, energy, etc. in which the application bottle-neck is the decisive element. In contrast, applications that only manipulate information often are too malleable to qualify.

An opportunity for MAS is its highly-regarded status in software technology. Conversely, a serious threat to MAS is its overly academic image associated with prolonged conceptual discussions, tolerance for combinatorial explosions and application domain ignorance.

More relevant for the research agenda are customers accepting the limitations of mainstream IT because they ignore/disbelieve the ability of MAS to deliver a competitive edge. In this respect, ***MAS-SE needs to deliver confidence-building solutions:***

- *Practical convincing MAS applications*
- *Incremental development with intermediate applicable results but also promising a decisive competitive edge in the end*
- *Speedy application development*
- *Integration with non-MAS systems*
- *Integration and harmonization with mainstream software engineering*

In the above, coping with a dynamic complex environment is crucial. Here, it is insufficient to have MAS technology that is able to handle such environments in principle only. **MAS-SE technology needs to CAPTURE DOMAIN KNOWLEDGE IN SOFTWARE ARTIFACTS – components, frameworks, architectures – to avoid that every application needs to build this from scratch and learn application-related lessons repeatedly.**