



# Software System Categories

## System and Industry Drivers

### Value of Quality

The value of software lies in

- a) the risk and cost of failures, and
- b) the profit derived from operating a system.

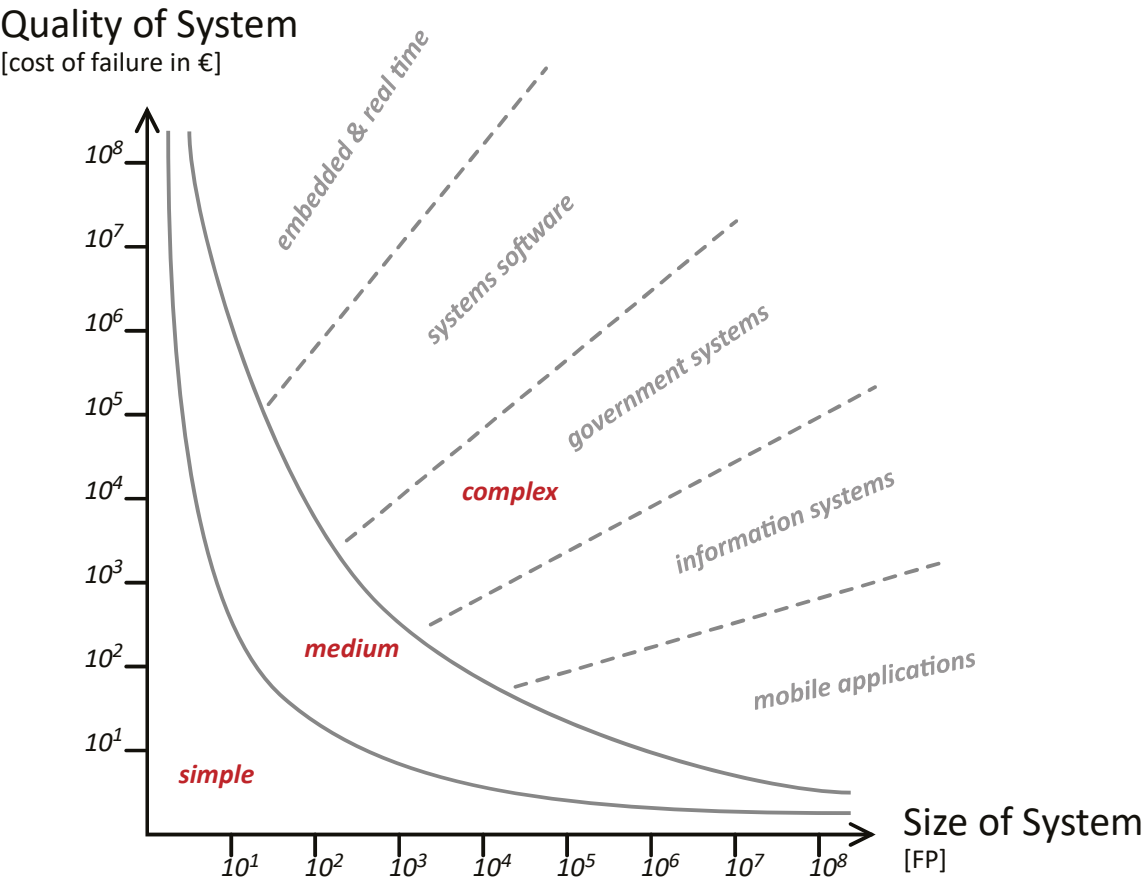
Many failures have an assigned monetary value, including human lives. The World Health Organization estimates the following values (2014, Western Europe):

loss of life	1574 K€
major injury	205 K€
minor injury	16 K€

Loosing an hour of office work costs between 10 and 1000€, depending on whose work is considered.

Other factors are more difficult or even impossible to assess reliably, such as missed market opportunities, decreased customer loyalty, deteriorating client relations, or public embarrassments.

### System Types across System Quality vs. System Size



### System Size

“Function Points” is a well-established metric for the functional size of systems. It takes into account the inputs, outputs, complexity of processing, and several aspects of technology and organisational capability. Function Points are standardized in ISO/IEC 19761 (COSMIC), and ISO/IEC 20926 (IFPUG). A similar metric are Use Case Points.

Unlike “lines of code”, FP is independent of the level of abstraction of any given programming language.

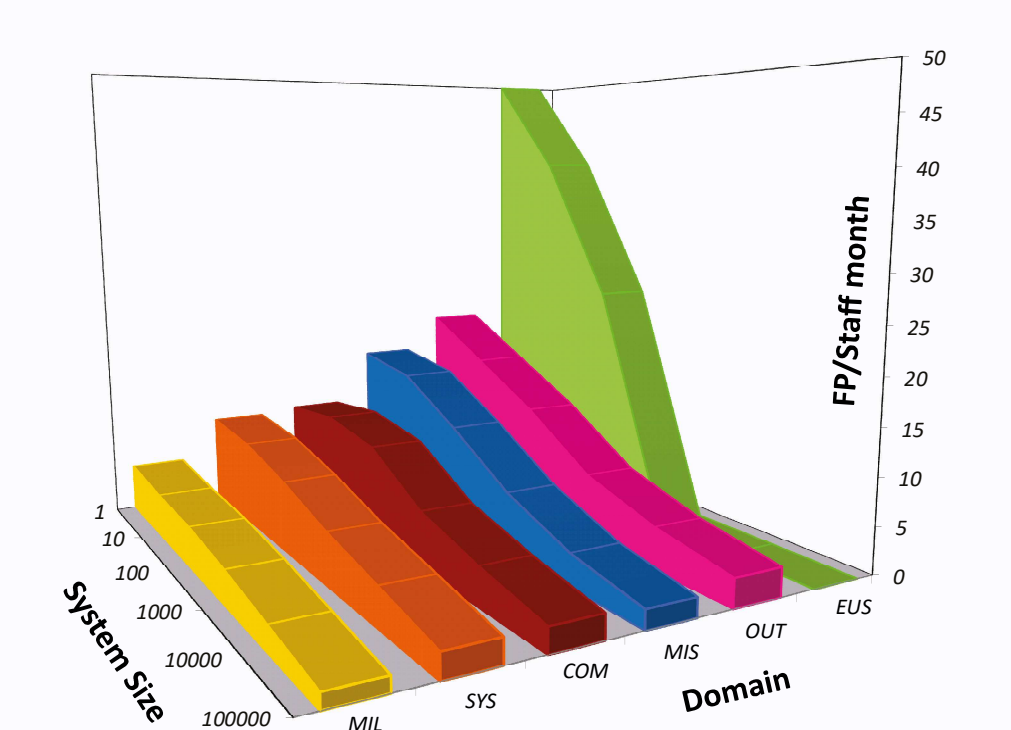
Unlike “story points” FP-assessments are valid across time, teams, and organisations. Therefore, we may learn from previous experiences, adjust future estimations, and improve processes and organisations.

### Domain Drivers

Different application domains have specific drivers determining largely what technologies and processes are suitable and cost-effective. For instance, aerospace applications focus on traceability and regulation compliance in extreme lifespans. Defense systems are often very large and complex systems on the edge of technology. Corporate information systems maximize maintainability, web systems and mobile devices are faced with extremely volatile markets and requirements, and so on. Jones suggests the following categories.

- MIL** - Military Systems
- SYS** - System Software
- COM**- Commercial Sw.
- MIS** - Mgmt. Info. Systems
- OUT** - Outsourcing
- EUS** - End-User Software (e.g. Macros)

### Productivity across System Type vs. System Size



### Industry Cultures

Every industry has specific characteristics beyond the application domain that affect the productivity level. One might call it culture, and it can be expressed, to some degree in the cultural dimensions of Geert Hofstede which are also applicable for societies as a whole. They include factors like

- power distance,
- individualism/collectivism,
- masculinity/femininity,
- uncertainty avoidance, &
- long-term orientation.

Clearly, these factors influence decision making, what tools and techniques are adopted, and so on in an industry and company. Notably special cases are defense and government, aerospace and medical applications with very high regulatory pressures.