Software Development Factories,  
the Project Management Perspective

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Abstract: In a software factory, the applications are developed in the same way Henri Ford started manufacturing cars. In such a way, a customized solution could be obtained within a reasonable budget and within the foreseen timeframe. This development method offers a flexible solution that can be re-adapted rapidly and automatically to the changing business needs, so the Project Management becomes a real challenge.

Keywords: software factory, software development, project management, project life cycle, project phases.

The Concept of Software Factory  
Software factories are the next logical step in the journey of software development.

A traditional factory is (definition according to dictionary.com):

- a building or group of buildings with facilities for the manufacture of goods.
any place producing a uniform product, without concern for individuality (see Figure 1).

However, a description of the software factory cannot be found into the dictionary, so an alternative source, wikipedia.org, will be used for a definition (Figure 2):

- a software factory is an organizational structure that specializes in producing computer software applications or software components according to specific, externally-defined end-user requirements through an assembly process.

- a software factory applies manufacturing techniques and principles to software development to mimic the benefits of traditional manufacturing. Software factories are generally involved with outsourced software creation.
As we can see in the pictures above (Figure 1 and Figure 2), the factory paradigms in traditional manufacturing and software development are very different since the software factory is not dealing at all with replicas of the items to be manufactured.

Software factories are already a reality of our days since the factory approach can be taken for software development simply because the software development is no different from producing cars, for example. In an article in the June 2010 edition of the *IEEE Computer* magazine, Margaria and Steffen suggest that the automobile industry matured into a mass market provider through:

- Better, more robust components
- Better streets
- Better driving comfort
- Better production processes
- Better maintenance & support
The authors argue that the equivalents of these in the software industry are not all that different. We should be striving for:

- Better, more robust components
- Better connection and interoperability
- Better user comfort
- Better production processes
- Better maintenance & support

Another interesting point of view would be that the software factory resembles more to construction industry than traditional manufacturing because every product is different and it needs to be assembled from scratch, as see into the next image (Figure 3).

Figure 3—Software Factory, Construction or Manufacturing?
The Project Management Perspective

Project Management becomes a real challenge for the software factories of our days, so the question that appears here is how to properly manage such a projects? Is there a way to adapt the existing project management principles for software development factories?

The starting idea could be the PMI’s point of view related to the way in which projects from various fields could be managed. The theory states that any project should use the same project management methodology (also called process), since the methodology is industry independent. By looking the things from this perspective, any software development project from the factory will cover the same five project management process groups (Figure 4):

- **Initiating** – based on the high-level planning completed at this level, it could be decided the project will be selected to be accomplished
- **Planning** – the detailed project management plans are developed
- **Executing** – performing the work to be done according to the plans
- **Monitoring and Controlling** – verify the project is on the track in terms of scope, time, cost, risk and quality
- **Closing** – make sure all the work is completed according to the plans and the project met the objectives stated into the project management plans
The project management process groups can only be applied together with a progression of phases that are industry dependent, also called project lifecycle, so projects from various fields will implement different stages (generally sequential).

Small projects typically use a single set of project management process groups, as illustrated in Figure 5, while large projects are usually divided into phases, each phase having its own set of project management process groups (Figure 6).
Figure 5 – Project Management Process Groups for Small Projects

Figure 6 – Project Management Process Groups for Large Projects
Conclusions

Software factories can be found in almost any area of software development. Factories can be implemented for several types of software projects, from mobile applications to complex collaborative systems.

The success or failure of such factory oriented software development could be influenced by the associated project management process. In order to be successful, a very good project management process is required and it has to be adapted to the specific characteristics of the factory.

References


