Towards a Non-workflow Theory of Business Processes

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The keynote overviews the efforts of a group of researchers and practitioners to build and test a theory of business processes (BP) that could be of use for building non-workflow based business processes support (BPS) systems. The background for these efforts lies in two scientific disciplines outside the domain of business process management, namely: *Systems Thinking* and *Mathematical System Theory*.

Systems Thinking served as an inspiration of regarding a BP instance/case as a temporal (sub)system created as a reaction on changes in the enterprise's external or/and internal environment and discarded after the goal set for the subsystem has been reached. This view can be explained with the help system-coupling diagrams from [1] as illustrated in Fig. 1. The diagram describes a general case when a particular situation in the environment, on the left-hand side of the diagram, causes a larger system, e.g., an enterprise, to create a respondent system, e.g., a project, to handle the situation. The respondent system is built from the assets that the larger system already has. Some of these assets are people, or other actors (e.g., robots). Other assets are control elements, e.g. policy documents, that define the behavior of the respondent system. The latter are denoted as black dots in Fig. 1.

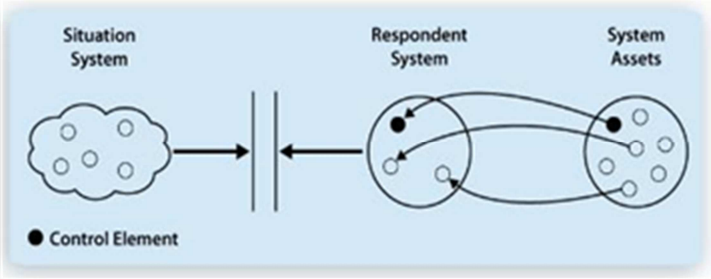

Fig. 1. System coupling diagrams from [1]

Based on the above interpretation we have drafted a dynamic model of enterprise as a system the behavior of which is defined by interactions between three types of elements: assets, sensors, and business process instances (BPI) [2]. Sensors "watch" the enterprise's environment and starts BPI's when needed. Both sensors and assets are regarded as (sub)systems that are "manned" by assets. Some of these assets are control elements that guide the work of sensors and assets. Sensors and BPI's can be complex and decompose in the same way as the larger system. Assets on their own do

not produce any changes inside or outside the enterprise; all changes are introduced via BPI's (respondent systems (in terms of Fig. 1) "manned" by assets.

Mathematical system theory [3] deals with the dynamical systems/processes in the physical world. This theory gave an inspiration to consider BPI as a point moving in a multi-dimensional state-space. A BPI is then defined as a trajectory in the space-time, and business process model - as a set of formal rules describing all "valid" trajectories. Different formalisms can be used for describing the trajectory; the choice of the most appropriate one depends on the nature of the business process in question. When valid trajectories are grouped together so that deviations between them are insignificant, a prescriptive way, e.g. workflow, can be of use. When deviations between the instances are significant some constraint-based rules are preferable. One of the non-prescriptive way of defining rules, operationalized via dynamic distributed planning, was suggested in [4,5].

From the state-oriented point of view, a BPS system is a system that assists BPI participants to follow one of the valid trajectories. When the workflow model is appropriate for describing the process, a system based on a workflow engine can suite well. However, when deviations between the trajectories are substantial, such a system will hinder the participant to find the right "road" through the state space instead of helping them. When the "territory" is shifting like on Iceland, a road that was good yesterday might become impassable the next day. In such circumstances, the minimum a BPS system can do is to provide BPI participants with a common interactive "map" where they can together try to find their path towards the BPI's goal despite the "roadblocks" appearing where they are not expected. As the space is multidimensional, the "map" should allow participants to move the instance independently in different sub-spaces where appropriate, and coordinate their efforts where the movement in several dimensions should be done simultaneously. Such a map could be provided in a form of a shared space available to all BPI participants. Some of our experiments on different ways of structuring and using such maps are presented in [6]. When the interactive "map" has been provided, the next step would be to provide a kind of a flexible "navigator" that can suggest a path from any given position to the goal. Some of our experiments in this area are presented in [5].

References

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