Decision Support Systems 57 (2014) 34–41

Contents lists available at ScienceDirect

Decision Support Systems

journal homepage: www.elsevier.com/locate/dss

Semantic and structural delineation of market scenarios by the event bush method

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ARTICLE INFO

Article history:
Received 7 May 2012
Received in revised form 25 July 2013
Accepted 25 July 2013
Available online 8 August 2013

Keywords:
Event bush method
Scenario
Consulting
Market
Knowledge engineering
Expert

ABSTRACT

Considered is the retrospective application of a new method of knowledge engineering, the event bush, to a real collision that took place in the North-American market of cool sparkling drinks in the 1980s. The paper briefly introduces the modeled task, provides an outline of the method, presents the results of modeling and discusses them, stressing new opportunities for market analysis and directions of further work. The results of modeling provide ground to reasonably expect improvement of consulting and advising services with application of the event bush method.

1. Introduction

To analyze and forecast the market, one needs to compare various scenarios of market development and behavior of players. In doing this, a question repeatedly posed by any analyst to him/herself is, how much the observed scenario or state of things resemble the known cases. Up to now, this question is being answered mostly intuitively, and following application of statistical computation, neural networks [1] or other mathematical modeling and decision support methods (see, e.g., [2]) has been based on intuitively felt similarity or difference. Successful attempts of more or less strict description of semantics of marketing are performed by means of ontology design [5,9], but ontologies describe classes, their properties and relations, which refer rather to a "fixed state" of market than to an a-developing environment, i.e., present rather "anatomy" than "physiology" of the context. Trying to cope with this shortcoming, the so-called dynamic ontologies [7], process ontologies (see, for instance, UN/CEFACT's Modeling Methodology — UMM, in [4]) and others were suggested. However, process ontologies simply take processes for another kind of "fixed" entities and do not display actual scenarios that take, or may take, place, and dynamic ontologies just postulate the fact that changes of given objects may occur in given time but do not specify what in particular can happen and in what way. The same can be generally referred to another well-known business and technical process modeling tool, the Integrated Definition (IDEF) 0 notation [6]. Nonetheless, this method, being an extension of Structured Analysis and Design Technique (SADT; see, for instance, [17]), makes one step further and shows particular scenarios and, in the SADT framework, their hierarchical relationships. Still, in doing so, this method, and also some others, e.g., event-based process chains (EPC; [19]), specify only a limited set of scenarios that the mind of the expert suggests. Therefore, in our opinion, these methods are better suitable for analysis of more or less simple business processes or production operations than multiplayer market environments. Besides, they put little or no explicit semantic control on generation of events or require additional features to do this (the presence of decomposed block in SADT or an associated ontology in EPC).

Business Process Modeling Notation (BPMN; [3]) offers much more opportunities for semantic control (like "swim lanes" or inheritance of subjects and predicates from parent to child nodes); however, these opportunities do not take form of strict rules and therefore are insufficiently used to formally model the scenarios that the expert has not put forth (e.g., scenarios of possible failures or unexpected success).

Thus, the question remains open, if there is a way to put at least somewhat strict and formal constraints on the market scenarios enabling us to construct (that is, to foresee), extract and compare them in a more or less delimited context.

Obviously, a method is needed that would be semantically as strict as ontology but, unlike the latter, would offer an opportunity to track the changes of objects, their properties and relations. Such method was proposed in the field of geosciences by Pshenichny and Khrabrykh [15] and Pshenichny et al. [12,14,16] and recently developed by Pshenichny and Kanzheleva [13]. As stated in the quoted publications, it evolved from a purely applied geoscientific tool to a universal method of knowledge engineering applicable in a variety of fields. Then, it looks straightforward to study the applicability of the event bush method to semantically and structurally delineate the scenarios of market player behavior and expected results. This constitutes the purpose of the

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http://dx.doi.org/10.1016/j.dss.2013.07.008

present paper; to achieve it, below we will (i) consider a simple and well-known marketing task, (ii) give an outline of the method of event bush, (iii) consider its application to the described task and (iv) discuss the results. In any case, these results should be considered highly preliminary and neither proving nor refuting the applicability of the said method in the marketing field; nevertheless, they must shed light on whether the chosen approach to formalization of market scenarios is encouraging and, if yes, what should be done to proceed to its successful application.

2. A case story of dramatic market behavior

One of the classical examples of highly versatile behavior of the market dates back to 1985 when the Coca-Cola Company, realizing that the market was increasingly occupied by their main concurrent, the Pepsi, tried to bring it back by producing a drink with a new taste. An exhausting narration of this story can be found in many sources [10,20,21], so only some key facts will be quoted here based on these.

After a detailed market and production study aiming to reveal and test people's preference and create the formula to best satisfy it, which required itself a 4 million dollars investment, the production of new Coke was launched. This was announced in the presence of about two hundred TV and newspaper reporters, at an opulent ad hoc event, to make the US customers aware of the change and make them appreciate it immediately.

However, what happened next ruined all the expectations. Within a week of the change, one thousand calls a day were flooding the company's phone number, and over forty thousand letters added to these. Customers were furious about the new taste and, many of them, were saying that they were seriously considering switching to Pepsi. Finally the Coca-Cola management decided to turn back to the old flavor that very soon resulted in eighteen thousand calls of gratitude and taking the market back.

This well-known case of market behavior will be analyzed further by means of the event bush. For this, a brief synopsis of the method will be presented below.

3. Outline of the event bush method

3.1. The purpose

The knowledge engineering method of event bush intends to give a strict and finite but extendable display of an area of reality and corresponding domain of knowledge. Importantly, it does not intend to paint an objective and true picture of reality based solely on formal grounds. The purpose of the event bush is to more or less impartially structure and shape up the subjective information gathered by an expert and communicated by expert to decision-makers. Like any other formalization, it does not say itself what is true and what is false, or what is relevant and what is not, for the studied market. Nevertheless, it helps organize what expert considers relevant, allowing for formulating everything that can happen given a list of premises. It imposes some requirements on these to ensure the most complete and objective inference, but the choice of premises is totally at the expert's discretion. In a discourse or polemics, the tool of event bush may help us formally express and compare contrasting standpoints. Meanwhile, formalization itself often urges an expert to revise knowledge, find gaps and strands of "wooly" reasoning, terminological and conceptual intricacy and the like. Such imperfections can be tackled and to some degree cured by the event bush. But like any other weapon, in principle it can be used alternatively, e.g., to produce a beautiful, formally perfect nonsense.

3.2. The technique

The method of event bush rests on the assumption that some areas of reality (e.g., change of consumer preferences given various actions of market players) can be represented as shown in Fig. 1. In the considered area of reality, the following events are identified.

(ia) Primary internal events. These are primary, not overlapping and non-unique inputs (basic objects, processes or tendencies) — e.g., consumers in prehistoric era, having no preferences in cool drinks. Such inputs, according to the concept of event bush, would determine any further course of events ("happenings").

(ib) Primary external events meaning the circumstances that come from the environment. They indicate the way the environment may affect basic inputs or influence their further, indirect manifestations, thus "shaping up" different "happenings". For instance, appearance of any new player in the market may affect the preference of consumers.

(ii) Secondary events (processes or objects) that result from primary inputs with or without the contribution of incoming circumstances — the "happenings" proper ("Consumers prefer drink A and do not prefer drink B") formulated in a strict concise way indicating their core features determined by the causes, following the principle "one more cause–one more property".

(iii) Tertiary events that denote end results, or products, generated either by primary internal or by secondary events, with or without primary external ones. Tertiary events document the completed "happenings". In the considered case, it looks reasonable to take as end results the various preferences of consumers.

Other types of events (e.g., those describing some other type of results — say, quaternary ones) can be added, but the presence of (i)–(iii) is mandatory. Their general interrelation is shown by an example in Fig. 2.

In accordance with the syntax of event bush presented in Fig. 1, the relations between (i)–(iii) can be set:

Events (ia) and (ib) must not lead to other (ia) or (ib);
Event (ib) may lead to an event only together with (ia) or (ii);
Event (ii) must not lead to (ia) or (ib);
Event (iii) must not lead to (ia), (ib), (ii), and another (iii).

These relations are enforced by the connectives of the event bush, each having a graphic designation. Pshenichny and Kanzheleva [13] define four connectives, flux, influx, conflux, and furcation, of which the first two, flux and influx, are mandatory for an event bush.

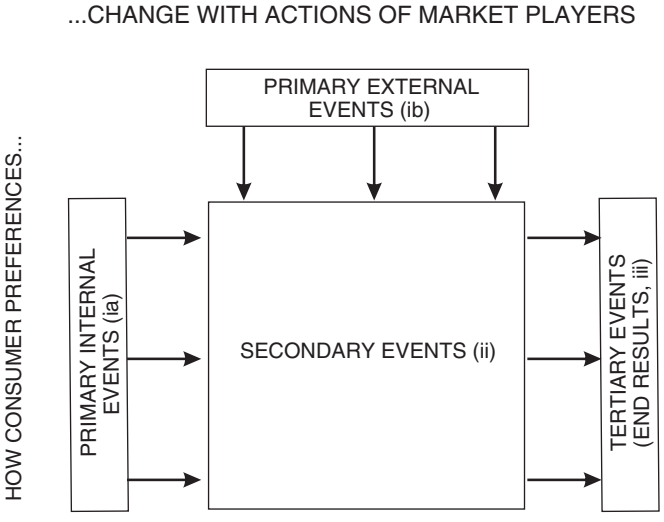

Fig. 1. Syntax of basic blocks of the event bush.