Describing service models using IDEF0 enhanced with Data Provenance capabilities

AUTHOR: Antonios Arvanitis   Supervisor: Dr Yun-Heh Jessica Chen-Burger

Email address: aa249@hw.ac.uk

Abstract

This thesis, investigates whether IDEF0 + Data Provenance can be used to construct a suitable methodology to describe a service, capture its processes and be able to conduct an analysis that will assist on decision making on issues such as organisational re-structuring, future directions and strategies, for large organisations. Data Provenance and more specifically the W7 Data Provenance model has been used to encode IDEF0 and to serve the need of tracking the source of data for a business service model.

Thesis Objectives and Requirements

The objective of this project is to evaluate whether it is possible or not to have a formal, systematic and standardised way to record information in services by using a newly created modelling method, the IDEF0+Data Provenance that is an enhancement of the existing IDEF0 method.

Requirements: Clear use of symbols and notation, well defined language, correctness, completeness, ease of use, extendibility

IDEF0 + Data Provenance Enrichment
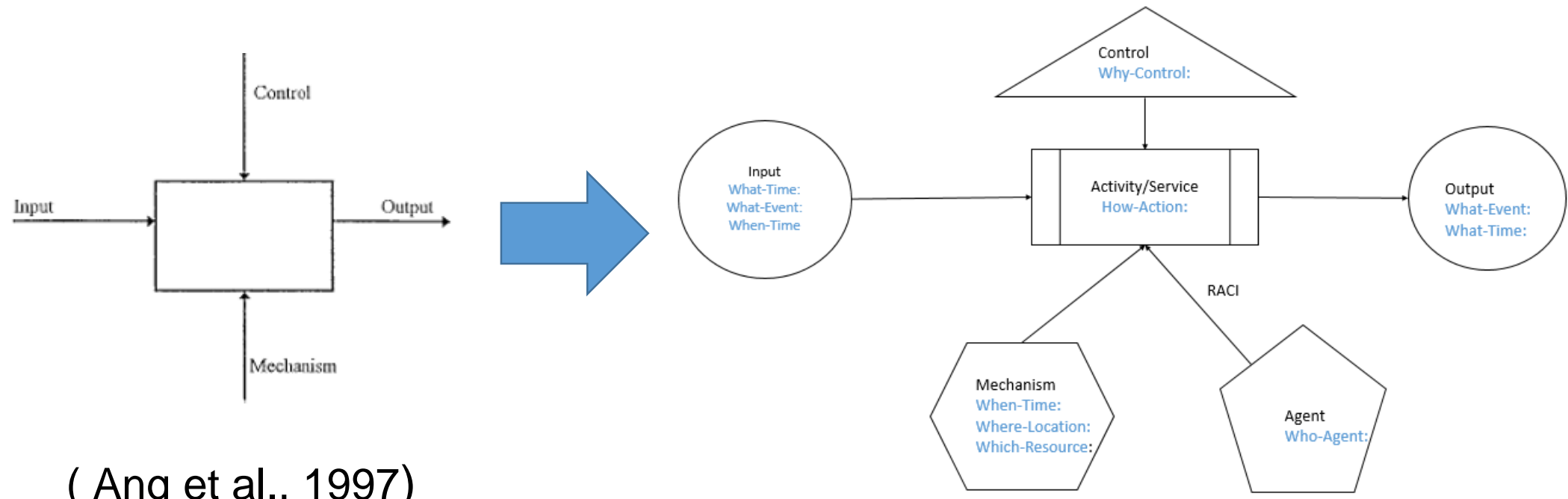
(Ang et al., 1997)

The graphical representation of IDEF0 + Data Provenance differs from the original. Symbols were used to allow captured Data Provenance information to be depicted. Each symbol represents a type of ICOM plus agent.

In this version of IDEF0, it was decided to further elaborate ICOM by adding Agent. In the original version of ICOM, people who are involved in the process belong in the Mechanism category

After the evaluation process, it was also proposed by the evaluator to further elaborate the Agent type by using RACI.

IDEF0 + Data Provenance Language

| Provenance Term	To be used in IDEF0 For:	Application to a Service
What	Input/ Ouput	A change of state (Event) that occurs to data during its life time
How	Service	Describes actions that leads to events. An event occurs when it is acted upon by an agent, which may be a human or software agent. This may include information of methods used.
When	Input/Mechanism/ Output	Time or Duration
Where	Mechanism	Locations that are associated with the Service/Data/Document
Who	Agent	Persons or organization that are involved in e,g, creating, authorizing the data/ document
Which	Mechanism	Tools, Instruments, Resources used
Why	Control	Reason that explain why an event or actions have occurred, inc. external/ internal circumstances, regulation, guidelines or principles

(Adapted from: Ram & Liu, 2007)

To be able to successfully enrich IDEF0 to track and record information and resources that are used in the process of delivering a service the W7 Data Provenance model has been used. The seven provenance terms of the W7 model have been slightly altered from its original form to better match IDEF0 and services. Each term has been assigned to cover all the different processes of IDEF0. By consulting an expert of the domain of services it was decided that each term of W7 should cover the appropriate areas of ICOM that it can be related to. By using the existing classes of the W7 Data Provenance model for services, a conceptual diagram has been created to clearly depict the existing classes and subclasses and how they are linked with the service.
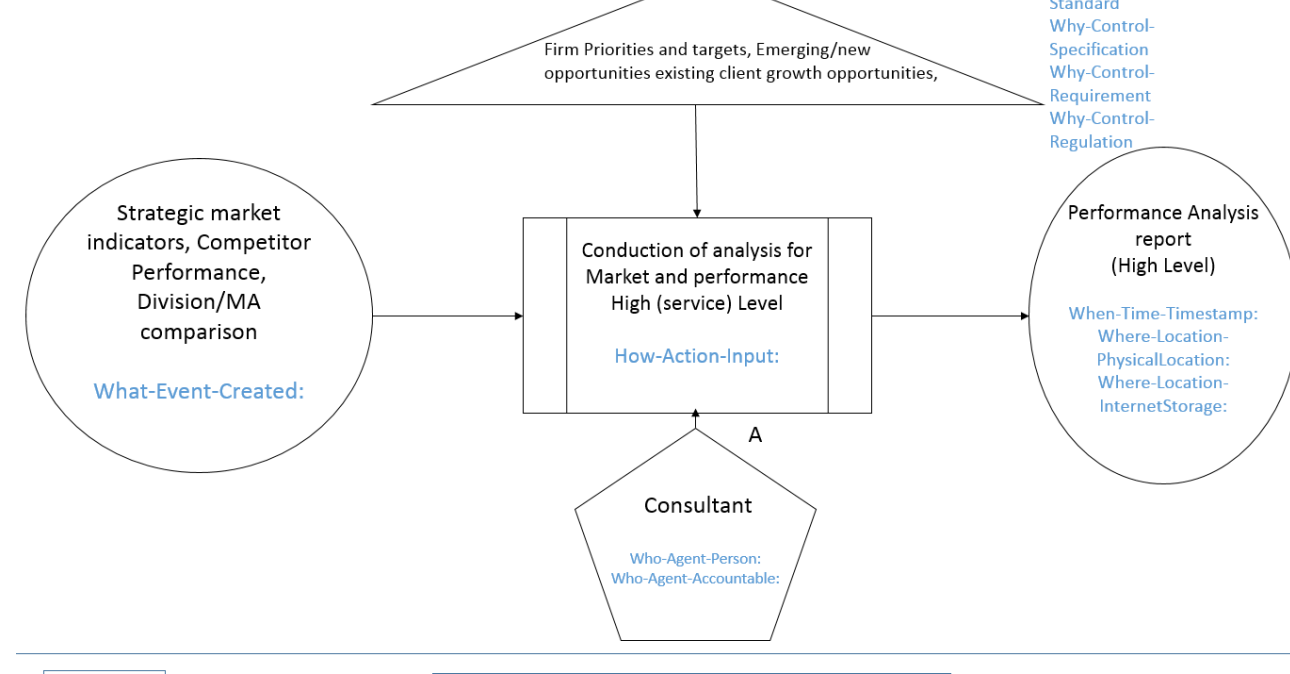

IDEF0 + Data Provenance Application
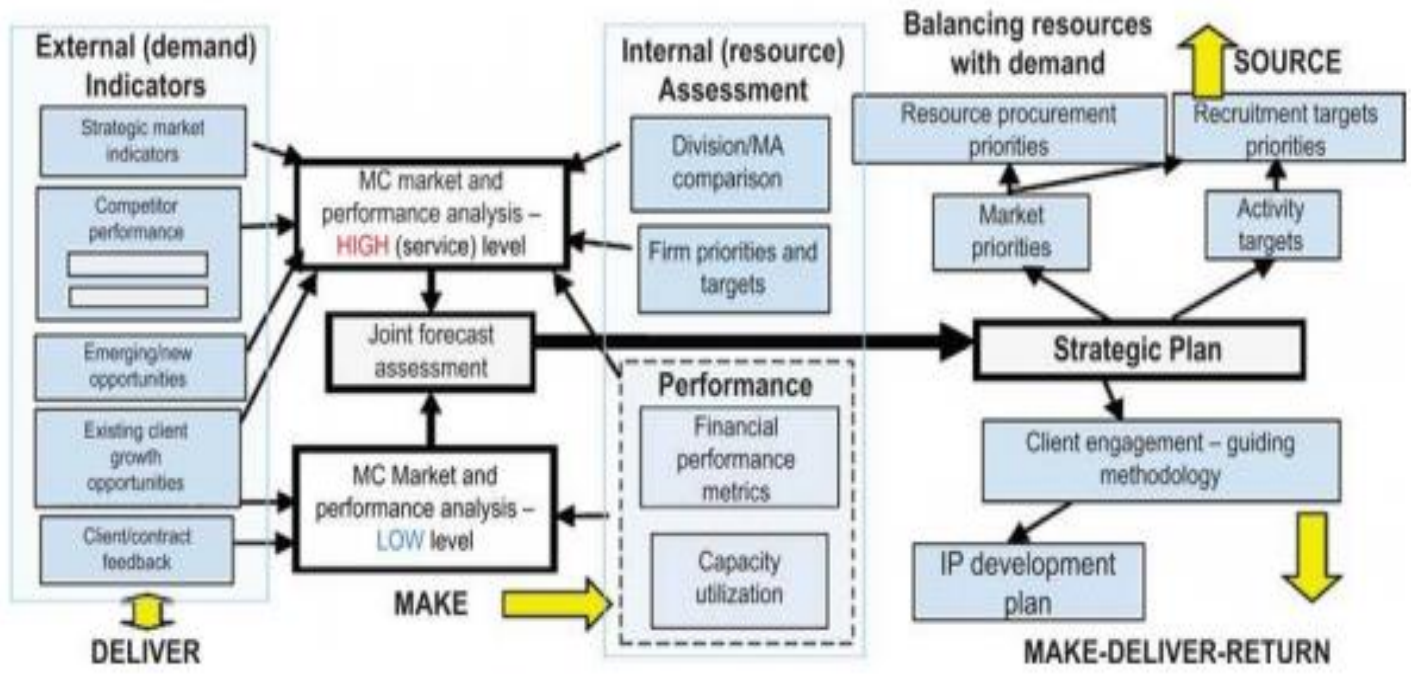
Strategic Level Planning (Giannakis, 2011)
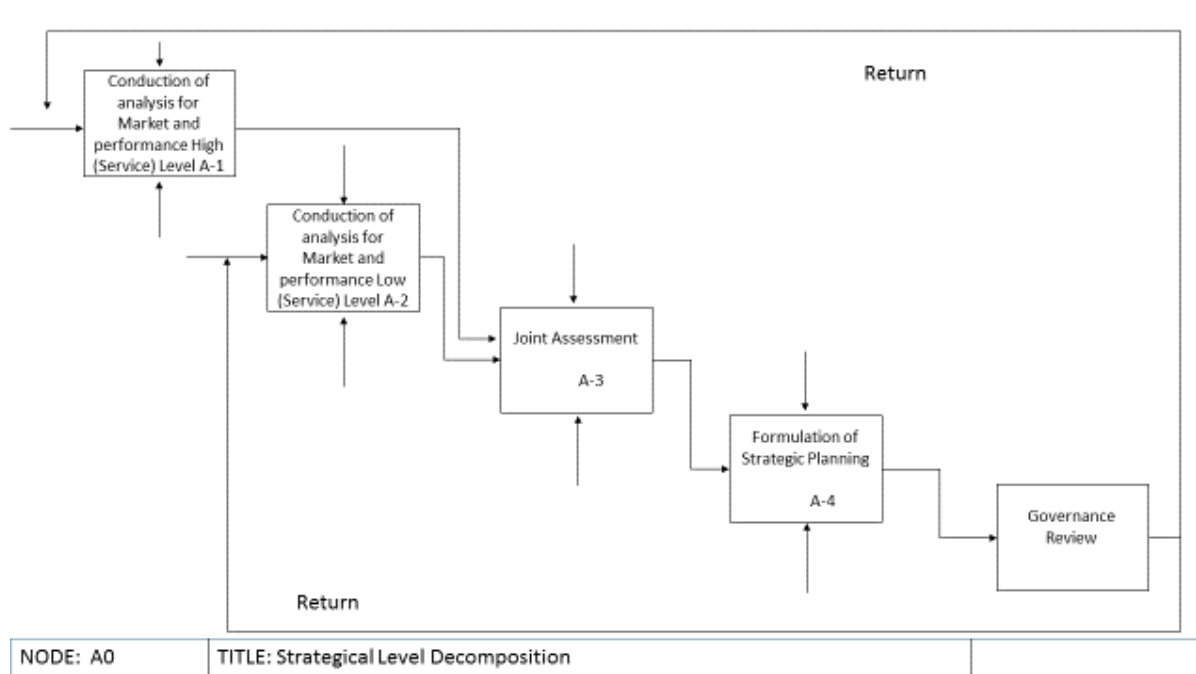
Decomposition Diagram

A-1 Block

For the application of the proposed methodology, a consulting service has been selected as an example. The case study conceptualizes consulting services from a supply chain perspective. For better user readability, the decomposition of IDEF0 + Data Provenance has retained its original form and the W7 Data Provenance language is used when the blocks are investigated with more detail. The consultants involved in the process are identified by using RACI as Accountable. In this shape Data Provenance tracks the consultants involved and assigns them their role.

Results

Based on the evaluation that was based on the thesis requirements:

-IDEF0 + Data Provenance has been approved as appropriate to describe a service model

-It creates a good basis for researchers to further expand and enrich the existing methodology.

-The methodology can be used as a mean to identify existing gaps in the description of a service.

-The methodology at its current state does not restrict its application on any case of usage and keeps its generic design. At the same time there is room for new functionalities to be added.

Future Work Recommendations and Limitations

Future Work Recommendations:

- Include financial aspects

- Differentiate services from processes

- Establish different levels of services (global, national and regional)

Limitations:

- It was not possible to populate Data Provenance with actual data

- On the case study, many information were considered as self evident by the author and therefore required further elaboration.

References

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