

Toolbox Value Creation Final Report (WP-101)

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This report is in the public domain.



Abstract

This document contains the deliverables of TransForum project WP-101, "Toolbox Value Creation". Its contents, together with Web addresses given in it, allow users to use a summary analysis toolbox made for charting and improving value chains in the areas of People, Planet and Profit.

Features of the toolbox are:

- Guidance in organizing a quick scan and change process
- Create summary graphic overview of the materials balance of a production network
- Model People and Planet and Profit separately but in conjunction
- Allow flexible inclusion or omission of actors, processes and products
- Analyze value of improvements

A handbook for using the toolbox, including QChain, is a separate document.

Context and dilemma

Agro-food chains routinely produce things that are worthless for the direct stakeholders. These 'things' could be physical by-products but also abstract things such as sounds or landscapes. In countries such as our own where natural resources are scarce and people are plentiful and have time and money to spend, tradeoffs between agro-food production and other activities are pressing. This is all the more true if not only economic value, 'Profit', but also People and Planet issues are taken into account (this is referred to as 'PPP'). When inputs are considered as well as outputs the picture becomes even more complex. In short, agro-food producers are in situations of multi-input, multi-output and the puzzle of bringing outputs to value as inputs for others is complex.

The answer can be sought in creating innovation networks that systematically consider the total value created by the network. This includes asking questions about what customers and stakeholders value and how much, where hidden costs reside, or how to convert useless by-products into valuable assets. It should be possible to get an overall picture of the value created, or destroyed, by the network in terms of PPP.

An important derived question is: for whom? Whom should be included in the innovation network to obtain these desirable result? Will this result also be sustainable and robust in the face of changes? This question can be restated as searching for the best composition of an innovation network.

While mathematical optimality cannot be obtained in real-world situations with many stakeholders, it should be possible to compose innovation networks in a way that performs better in terms of shared value creation than just relying on traditional networks as usually happens today. TransForum aims to promote sustainable development that includes People and Planet considerations alongside Profit This requires adopting an inclusive view of production networks, including the inputs, processes and outputs of many stakeholders.

Aim of the project

The project aims to come up with an interactive toolbox that innovators can use to analyse the value that their network could create in terms of PPP, taking an integrative view. The toolbox should allow to model People, Planet and Profit as separate areas of concern. It should be right-sized, i.e. neither so general as to be remote from operational activities, nor requiring a level of detail for which data are hard to obtain. It should enable the identification of processes and their multiple inputs and outputs ('MiMo', multi-input, multi-output) as well as the flows between them.

As a second step the toolbox should be flexible as to inclusion of new stakeholders, and allow considering potential consequences of various possible network composition options. The toolbox should be accessible to non-specialists. It will contain simulation tools. The simulations will work with 1) all possible tangible and intangible network inputs and outputs, in the area of People, Planet, and Profit (nicknamed 'PPP value chain'); 2) different possible sets of stakeholders who are involved in the network; 3) the cost and value of each input and output depending on the presence of certain stakeholders.

What we did

We created a multi-disciplinary team including expertise about change processes, process modelling, tool development, agro-food domain case (the pork chain). We developed user requirements. We searched for existing tools (Appendix 1) and developed missing elements. We integrated findings and came up with both:

- A modelling tool QChain (by Pieter Bots of TuDelft, available standalone at <http://qchain.net/>), embedded in QChain summary (by Toolbox team), <http://www.lds.wur.nl/UK/Products/Toolbox+Value+Creation/>).
- A handbook for using QChain can be found in Appendix 2.

Scientific articles about the toolbox approach are in preparation. One includes justification for the approach from a business perspective (for MISQ, Management Information Systems Quarterly). Another describes the design and operation of the QChain tool (for the International European Forum on System Dynamics in Food Networks, www.fooddynamics.org).

Main findings

Existing tools for describing agro-food production networks were surveyed (Appendix 1). They turned out to be available in two main categories:

- Problem finding tools with high-level drawing tools and a non-quantitative or semi-quantitative modelling perspective.
These were not applicable to the project because they lacked a mass balance of inputs and outputs in the production chain. This made them unusable for quantifying things such as production volumes, CO2 production, noise production.
- Issue analysis tools with quantitative models. These include MCDM (Multi-criteria Decision Making) and LCA (Life Cycle Analysis).
These were not applicable for the project – at least not as the only modelling tool - because they were inflexible as to problem delineation. Flexibly adding actors, types of input and output or processes was a requirement.

Our own design activities had led to a mock-up of a tool for which a development path was now sought. During the tool survey, one of the tools that came closest to our wishes was DANA (Dynamic Actor Network Analysis). DANA was a problem finding tool that allowed to create perception graphs with flexible delineation and perspective taking of various actors. It was decided to consult with the maker of DANA to see if their tool could be adapted for the project. Its designer, Pieter W.G. Bots from TU Delft, subsequently developed a tool specifically suitable for our specifications: Our project team added some reporting and overview facilities to this version, yielding our dedicated tool QChain that is a central deliverable of the project.

QChain will no doubt lead a life of its own. It is available as a shareware software piece at <http://qchain.net/>. The way in which we advocate its use in a project of collaborative chain value creation is described in our second project deliverable, the Handbook Collaborative Value Creation.

The pilot project was a mixed experience. On the one hand it confirmed the fact of life it is not easy to start an innovation project in a company if that project is not emergence-driven, and if other events attract top level attention. On the other hand we obtained the collaboration of some key decision makers and the confirmation that this is a valuable tool. Results from the pilot study are:

- In a production environment, the notion of a change process is not necessarily alluring while the idea of drawing a MiMo mass balance model of the chain is attractive. Once the mass balance model is there, the need for a change process becomes understandable.
- Obtaining reliable, complete data about the primary chain process is a nontrivial task on its own, even in a high-quality company. The tool shows where the 'knowledge holes' are.

- In a large, modern food production company, it is not possible to find somebody who combines encyclopaedic knowledge about the whole chain process with detailed knowledge about its components. The tool can help bridge the two.

A workshop about the toolbox project at the conference WICaNeM, May 2010, generated applause from an international audience. A public presentation at the Grand Opening of F&N and TIFN, 29 September 2010, showed a varied and sincere interest in the toolbox from around ten enterprises and not-for-profit institutions.

Conclusion

This was a brief project (14 months) with limited capacity, based on a straightforward idea: that innovation in a production network is served by adopting a perspective that combines 1) a whole-chain multi-input, multi-output perspective on all processes, 2) a flexible problem delineation allowing to include non-obvious stakeholders, 3) Inclusion of People, Planet and Profit considerations as separate variables in one model.

The tool QChain that it delivered is straightforward and easily usable. A freeware version is in the public domain and further development with interested parties is possible. The process model around it has been only partly tested in the pilot project, but looks promising.

Relevance for TransForum

TransForum seeks ways to facilitate open, transition-enabling innovation processes. This project provides a toolbox to do so. The tool consists of three elements:

Way of thinking

The project provides a proof of principle for the perspective that People- and Planet-related considerations need not be converted to currency before they can be meaningfully incorporated into decisions on innovation in production networks.

Way of drawing

QChain combines the explicit modeling of PPP (People, Planet, Profit) with a clever way of visualizing a production network, including additional stakeholders or processes, and calculating the mass balance of the network based on conversion ratios in its processes. The balance between rigour and relevance, and the explicit support for scoping, make it very usable for both charting existing processes and investigating potential changes.

Way of working

The Toolbox, including the PPP perspective and QChain, enables a quick scan of an organization to be made. It can make use of QChain's visualization techniques in collaborative modelling, but can also support in-depth modelling by a consultant or domain expert.

The toolbox is now ready to prove itself in practice and to be further developed in that process.

Societal Relevance

The toolbox exemplifies the practical, change process-directed approach heralded by TransForum. It has generated considerable interest, as its appearance coincides with a rise in attention to indicators of sustainability or corporate social responsibility, such as e.g. CO2 footprint. The first presentation at a workshop about the toolbox project at the conference WICaNeM, May 2010, was

much appreciated by an international audience. A demo session at the Grand Opening of F&N and TIFN, 29 September 2010, showed a varied and sincere interest in the toolbox from around ten enterprises and not-for-profit institutions. Some of them have been in contact since. A major project using the Toolbox for analysing agricultural chains in Germany is in preparation in the context of the Quarisma programme.

Participants

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Publications

This project started in November 2009. Publications could not yet be finalized. Two are in process and more may follow.

Chatenier, E. Du, A. Kassahun, G.J.Hofstede, H. Scholten, J. Bloemhof & S. Korver (in preparation for MISQ, Management Information Systems Quarterly) "Value Creation for Sustainable Production Chains: A Tool that Balances Societal, Environmental, and Commercial Goals".

Kassahun, Ayalew; Pieter Bots, Elise du Chatenier, Gert Jan Hofstede, Siem Korver & Adrie Beulens (accepted) "Development of a Software Tool to Support Discussion on sustainability of Production Chains." International European Forum on System Dynamics in Food Networks 2011, www.fooddynamics.org.