

DEMO Construction Model Generation Process from Business Model Canvas

Novandra Rhezza Pratama and Junichi Iijima

Department of Industrial Engineering and Economics, Tokyo Institute of Technology, Tokyo, Japan

Keywords: System Development Process, DEMO Construction Model, Business Model Canvas.

Abstract: Enterprise engineering is a discipline aspect of enterprise, including designing and modelling a system. In system development process, a construction of Using System is developed into function of Object System, and then continued with development of construction of Object System. Construction can be represented by DEMO Construction Model and function can be represented by Business Model Canvas. To manipulate a function system, we need to define a specification or construction of that system. Therefore we need to be able to generate a construction from a function. This study attempts to create a linkage between Business Model Canvas and DEMO Construction Model as a construction design process. A methodology of generating DEMO Construction Model from Business Model Canvas is proposed. Case study of City Logistics is used to illustrate the proposed methodology. We found the correspondence between Business Model Canvas and DEMO Construction Model, and the proposed methodology proved to be able to create DEMO Construction Model from Business Model Canvas through step-by-step process.

1 INTRODUCTION

Enterprise engineering is a discipline aspect of enterprise, including design and modelling a system. A real-life system or a Using System (US) can be represented as an Object System (OS) consists of functional model and system ontology (Dietz, 2005). The representation process of OS from US is further developed into system development process (Dietz, 2006), as seen in Figure 1.

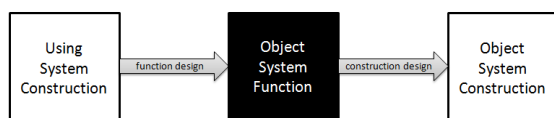


Figure 1: System Development Process (Dietz, 2006).

Construction of an enterprise can be represented by DEMO (Design & Engineering Methodology for Organizations) (Dietz, 2006), in particular DEMO Construction Model, one of the aspect models of DEMO. DEMO is a methodology of enterprise ontology (Albani and Dietz, 2011) presenting aspect models of an enterprise and method for the development (Dietz, 2006), and the only approach

that produce a truly ontological models (Perinforma, 2015).

One of popular representatives of function of an enterprise is a Business Model. In recent years, Business Model is getting more relevance in information system fields (Salgado et al., 2014). Business Model, as a tool for management (Magretta, 2002), represents activities of a company (Wirtz et al., 2016). One of the established business model template is Business Model Canvas (Osterwalder and Pigneur, 2010) that expresses the building block of a given business serving as a value or function of the business, and one of the most used frameworks of business models.

A function system, or a black box model, is a dominant yet vague sort of model, and does not explicitly shows any information about construction (Dietz, 2006). Meanwhile, a construction system can be decomposed into several subsystems, and those subsystems can be merged into another construction system (Suga and Iijima, 2015).

Therefore, to manipulate a function system, we need to define a specification or construction of that system. This leads to motivation of this paper, to connect function with construction of a system by generating a construction from a function as a *construction design* process.

There are several researches that links DEMO as a construction with function in the system development process, such as e3Value (Pombinho, Tribolet, and Aveiro, 2014), and Organizational Implementation (Op't Land and Krouwel, 2013). However, there is no clear representation of business model as a function, especially Business Model Canvas. Therefore we need to find the connections between Business Model Canvas and DEMO Construction Model. These statements lead to the following research questions:

1. What is the correspondence between Business Model Canvas and DEMO Construction Model?
2. How can we generate DEMO Construction Model from Business Model Canvas?

2 BACKGROUND

2.1 Business Model Canvas

Business Model Canvas (BMC) (Osterwalder and Pigneur, 2010), is a strategic management tool for developing a new business model, or simply capture the existing one (Salgado et al., 2014). BMC was firstly introduced as a new design science approach of business model ontology (Osterwalder, 2004). BMC is popular in its way to pinpoint the essential elements on a business as leverage for innovation (Martikainen, Niemi, and Pekkanen, 2014).

BMC has 9 building blocks as a representation of business activity (Osterwalder and Pigneur, 2010). Figure 2 illustrates BMC and the building blocks.

In the BMC, the building blocks are positioned according to their classification. The left side of the canvas represents the internal business of the company on how to create business values, whereas the right side represents the customer side of the business and how to deliver those values. The bottom side can also be classified as a financial aspect of the business.

2.2 DEMO Construction Model

DEMO Construction Model (CM) indicates transaction kinds and actor roles associated with them and also information links between them, or in simplified term, the construction of the organization (Perinforma, 2015). A Transaction Kind represents coordination act/fact in a business conversation, and an Actor Role represents the initiator/executor of such coordination. CM is a part of four aspect models expressing the ontological knowledge of the target enterprise. The other aspect models are Process Model (PM), Action Model (AM), and Fact Model (FM).

In this study we only focus on the coordination part, or interaction model of CM of an organization, which contains Actor Transaction Diagram (ATD) and Transaction Product Table (TPT). These two composed the interaction structure of an

<p>Key Partners The Key Partners Building Block defines the party, people or organizations that work together with the company to run the business model.</p>	<p>Key Activities The Key Activities Building Block describes the activity of the company to run the business model.</p>	<p>Value Propositions The Value Propositions Building Block describes the products or services that the company provides as a value for their Customer Segment.</p>	<p>Customer Relationships The Customer Relationships Building Block describes relationship between the company and its Customer Segments.</p>	<p>Customer Segments The Customer Segments Building Block defines the party, people or organizations that the company targets to deliver its value.</p>
<p>Key Resources The Key Resources Building Block describes the assets or resources that the company possesses to run a business model.</p>		<p>Channels The Channels Building Block describes the way of transmission and transfer of Value Proposition to reach its Customer Segments.</p>		
<p>Cost Structure The Cost Structure describes the costs that the company has to cover to run the business model.</p>		<p>Revenue Streams The Revenue Streams Building Block describes the revenue that the company receives from its Customer Segment.</p>		

Figure 2: Business Model Canvas (Osterwalder & Pigneur, 2010).

organization (Dietz, 2006). Figure 3 expresses an example of ATD and TPT of an organization, we use an example of simple retail shop that sells a product. The ATD can be created using online modeling tool for process design and animation from www.demoworld.nl,.

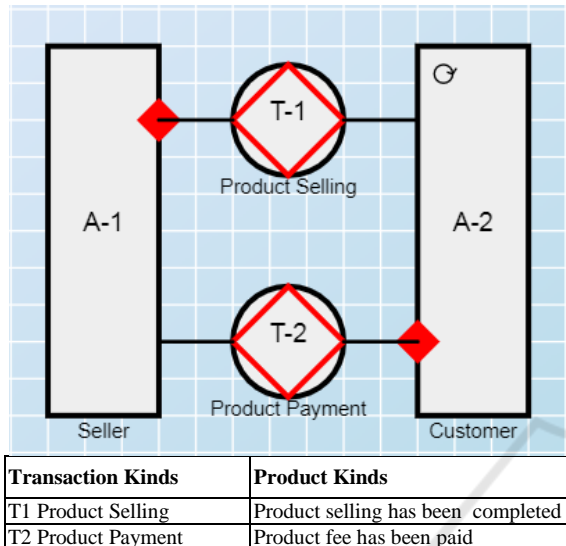


Figure 3: Example ATD and TPT of an organization.

3 GENERATING DEMO CONSTRUCTION MODEL FROM BUSINESS MODEL CANVAS

In this section, we will explain our proposed methodology. The methodology is divided into two parts, the first part is DEMO-Oriented BMC generation from BMC, and the second part is DEMO Construction Model generation from DEMO-Oriented BMC.

3.1 DEMO-Oriented Business Model Canvas

To make conversion from BMC into construction model easier, the authors propose a new concept: DEMO-Oriented Business Model Canvas (BMC). DEMO-Oriented BMC is a specified BMC that includes components of organizational building blocks of DEMO Construction Model, which are actor role and transaction kind. Each building block in BMC may contain either of actor roles or transaction kinds, both of them, or none of them. All items in each building block are given notation to

identify which building blocks they belong to, in order to ease the identification and conversion process. The notation pattern is NNm where NN indicates building block notation and m indicates element number. The building block notations are given based on original BMC's notations (Osterwalder and Pigneur, 2010).

These steps also involve decision making about contents of building blocks in DEMO-Oriented BMC, and eventually DEMO CM. Given that a functional model can have many different construction models depends on scope of interest, the resulting DEMO-Oriented BMC may differ. Therefore, this phase cannot be done automatically.

Below is the proposed description of each building block in DEMO-Oriented BMC:

1) Customer Segments

This building block consists of target customer that the company intends to deliver its value, and is an **Actor Role** denoted as **CSm**.

2) Value Propositions

This building block consists of value delivered by the company, and has no appropriate correspondence in construction model, and is denoted as **VPm**.

3) Channels

This building block represents the way of communication, not the communication itself, so that there is no appropriate correspondence in construction model, and is denoted as **CHm**.

4) Customer Relationships

This building block consists of activities by the company to support the customer, and is a **Transaction Kind** denoted as **CRm**.

5) Revenue Streams

This building block consists of payment activities that is done by the customer, and is a **Transaction Kind** denoted as **R\$m**.

6) Key Resources

This building block consists of resources within the company, which are:

- Human Resources is an **Actor Role** denoted as **KR-Hm**, and/or
- Other resources like facilities and knowledge are included, but not a part of construction model, and denoted as **KR-Fm**.

7) Key Activities

This building block consists of activities that are conducted by the company to provide value to their customer, and contains a **Transaction Kind** denoted as **KAm**.

8) Key Partners

This building block consists of two parts, which are:

- Supplier or partner that is an Actor Role denoted as KP-Am, and/or
- Activities provided by them to the company that is a Transaction Kind denoted as KP-Tm.

9) Cost Structure

This building block consists of activities in a company that incurred costs to the company, and is a **Transaction Kind** that can be divided as:

- **External** Transaction Kinds (related to external actor roles) are denoted as **C\$-Em**, and/or
- **Internal** Transaction Kinds (not related to external actor roles) are denoted as **C\$-Im**.

To summarize, Table 1 shows the proposed correspondence table between Business Model Canvas and DEMO Construction Model. This table acts as a guideline to determine the entities in each building block of DEMO-Oriented BMC.

Table 1: Correspondence between BMC and CM concepts.

Business Model Canvas	Construction Model
Customer Segments	Actor Roles
Value Propositions	-
Channels	-
Customer Relationships	Transaction Kinds
Revenue Streams	Transaction Kinds
Key Resources	Actor Roles
Key Activities	Transaction Kinds
Key Partners	Actor Roles, Transaction Kinds
Cost Structure	Transaction Kinds

We can generate DEMO-Oriented BMC directly from description on business, or convert it from a standard BMC. The step-by-step process of DEMO-Oriented BMC Generation is explained as follows:

STEP 1 : Identify all parties

The first step is to identify all parties involved in the business that is stated in existing BMC. Involved party can be divided as internal (e.g. human resources) and external (e.g., supplier or customer). Then write it as a noun in their respective building blocks. These will represent Actor Roles in the DEMO CM.

STEP 2 : Identify all activities

The next step is to identify all activities of business coordination stated in existing BMC, also other activities initiated or executed by parties that are identified from the previous step. If there is a payment activity, indicate it clearly. Then write it as a noun in their respective building blocks. These will represent Transaction Kind in the DEMO CM.

STEP 3 : Identify any other information

The next step is to identify any other necessary information to be written in DEMO-Oriented BMC. These usually include values obtained from the business, channels to deliver value, or company resources. These will not represent any components in DEMO CM, and act as a complementary of DEMO-Oriented BMC.

STEP 4 : Make sure that all activities has all initiator and executor written

The final step is to check that all activities has all initiator and executor written in DEMO-Oriented BMC. Sometimes there is missing information of who is the initiator or executor of an activity in the standard BMC. As DEMO CM needs all information of the Actor Roles that become initiator and executor of all Transaction Kinds, this missing information of initiator/executor of an activity has to be filled. The filled information, and the resulting DEMO-Oriented BMC, should be verified by the stakeholders of the business.

3.2 Generating DEMO Construction Model

After DEMO-Oriented BMC is completed, we can generate DEMO Construction Model. DEMO CM Generation process from DEMO-Oriented BMC is explained as follows:

STEP 1 : Identify Transaction Kinds

The first step is to identify any transaction kind in the BMC. Identify any activity that is initiated or executed by the company in the BMC that can be considered as a transaction kind, then make the table of its notation and the transaction kind.

STEP 2 : Identify Actor Roles

The next step is to identify any actor role in the BMC. Identify any party that is involved in this business and stated in BMC that can be considered as an actor role. Also identify the type of the actor role, whether it is internal or environmental actor role, then make table of its notation, actor role, and type.

STEP 3 : Generate Transaction Product Table

The next step is to generate one part of DEMO CM, which is Transaction Product Table (TPT). Identify the Product Kind for each identified transaction. Draw Transaction Product Table consists of Transaction Kind and Product Kind.

STEP 4 : Generate Actor Transaction Table

The next step is to generate Actor Transaction Table as a baseline to create Actor Transaction Diagram

later. Identify the initiator and executor for each transaction kinds from the identified actor roles. Draw Actor Transaction Table consists of Transaction Kind, Initiator and Executor. To aid this process, we propose actor-transaction relation table (Table 2).

Table 2: Actor-Transaction Relation.

Transaction Building Block	Initiator Building Block	Executor Building Block
Key Activities (KA)	Customer Segment (CS)	Key Resources (KR)
Revenue Streams (R\$)	Key Resources (KR)	Customer Segment (CS)
Customer Relationships (CR)	Customer Segment (CS)	Key Resources (KR)
Key Partners (KP-T)	Key Resources (KR)	Key Partners (KP-A)
Cost Structure (C\$-E)	Key Partners (KP-A)	Key Resources (KR)
Cost Structure (C\$-I)	Key Resources (KR)	Key Resources (KR)

We determined the initiator and executor building block for each respective transaction building block.

STEP 5 : Produce Actor Transaction Diagram

The last step is to produce other part of DEMO CM, which is Actor Transaction Diagram, thus completing DEMO CM. Draw Actor Transaction

Diagram based on Actor Transaction Table. The resulting Actor Transaction Diagram then verified whether it is suitable and valid as a construction model of the business.

4 CASE STUDY: CITY LOGISTICS

In this section, we attempt to test our proposed methodology to a City Logistics Case, as a case study. City Logistics (Quak, Balm, and Posthumus, 2014) is a study of developing a Bentobox as a business model of a city logistics and delivery service. The Bentobox is a delivery station with removable trolleys to deliver goods within the city. Operators can deliver the parcels to the recipients, or the recipients can take the parcels themselves from the delivery station after receiving username and password from operators. A Business Model Canvas of this case is already provided, and can be seen in Figure 4.

4.1 DEMO-Oriented Business Model Canvas of City Logistics

The first phase is to create the DEMO-Oriented BMC from the existing BMC. For the length of this paper, we only present brief explanation. We applied

Key Partners Bentobox Supplier Vehicle Supplier	Key Activities Loading & Unloading Sent an E-mail	Value Propositions Reliable Flexible Less Disruption & Emission	Customer Relationships Self-Service Personal Delivery	Customer Segments Small Shop Owners
	Key Resources Vehicle Driver Software Bentobox Bentobox Location		Channels Bentobox Touch Screen Email	
Cost Structure Bentobox Training Insurance Software		Revenue Streams Delivery Collection		

Figure 4: Business Model Canvas of City Logistics (Quak, Balm, & Posthumus, 2014).

the four steps proposed in Section 3.1 here.

STEP 1 : Identify all parties

The parties or actors involved in this business and stated in the BMC are all identified. They are included in their respective building blocks:

- Key Partners: KP-A1 Bentobox Supplier and KP-A2 Vehicle Supplier
- Key Resources: KR-H1 Driver
- Customer Segments: CS1 Small Shop Owner

STEP 2 : Identify all activities

The business activities or transaction that stated in the BMC can be identified. Bentobox should be renamed as Bentobox Payment to indicate payment transaction, and Delivery Collection should be renamed as Delivery Payment for the same reason. Loading & Unloading and Sent an E-mail is part of business activity of Delivery Completion. Self-Service and Personal Delivery is part of business activity of Customer Support. Insurance and Software is part of Operation & Maintenance in the internal of the company. Training is the business activity of HR Training, also in the internal of the company.

The business activities that initiated or executed by parties identified in Step 1 can also be identified. Bentobox Supplier executed Bentobox Supply and initiated Bentobox Payment, and Vehicle Supplier executed Vehicle Supply and Vehicle Payment. Driver executed Goods Delivery, that is part of a Cost Structure building block, because the delivery itself incurred cost to the company. Small Shop Owner initiated Delivery Completion and Customer Support, and executed Delivery Payment.

These activities then included in their respective building blocks:

- Key Partners: KP-T1 Bentobox Supply and KP-T2 Vehicle Supply
- Key Activities: KA1 Delivery Completion
- Customer Relationships: CR1 Customer Support
- Cost Structure: C\$-E1 Bentobox Supply Payment, C\$-E2 Vehicle Supply Payment, C\$-I1 HR Training, C\$-I2 Operation & Maintenance, and C\$-I3 Goods Delivery
- Revenue Streams: R\$1 Delivery Payment

STEP 3 : Identify any other information

The other necessary information to be written in DEMO-Oriented BMC can be identified from other

components that are neither an actor nor a transaction, or part of them. For the sake of simplicity, we only write them as-is form the existing BMC, and included in their respective building blocks:

- Key Resources: KR-F1 Vehicle, KR-F2 Software, KR-F3 Bentobox, and KR-F4 Bentobox Location
- Value Proposition: VP1 Reliable, VP2 Flexible, and VP3 Less Disruption & Emission
- Channels: CH1 Bentobox Touch Screen and CH2 Email

STEP 4: Make sure that all activities has all initiator and executor written

In this step, each transaction is checked whether they have their respective initiator and executor written in DEMO-Oriented BMC. If such initiator and executor are not yet stated in the BMC, a new parties or actors needs to be defined, and include them in their appropriate building blocks. This step involves decision making and verification, whether the newly defined actors are actually involved in the business. After the process, we found out that the following information should be added in the DEMO-Oriented BMC:

- Key Resources: KR-H2 Delivery Manager, KR-H3 Customer Service Manager, KR-H4 HR Manager, KR-H5 Operation Manager, KR-H6 Bentobox Purchasing Manager, and KR-H7 Vehicle Manager

The resulting DEMO-Oriented BMC can be seen in Figure 5. Note that there is no difference in building blocks compared to other BMC, only the content of each building block is specified to organizational building blocks of DEMO CM.

4.2 Generating DEMO Construction Model of City Logistics

After DEMO-Oriented BMC is created, we proceed to the next phase proposed in Section 3.2.

STEP 1 : Identify Transaction Kinds

Using Table 1, we can identify Transaction Kinds from DEMO-Oriented BMC. Those are Delivery Completion, Delivery Payment, Customer Support, Bentobox Supply, Vehicle Supply, Bentobox Supply Payment, Vehicle Supply Payment, HR Training, Operation Management, and Goods Delivery.

Key Partners KP-A1: Bentobox Supplier KP-A2: Vehicle Supplier KP-T1: Bentobox Supply KP-T2: Vehicle Supply	Key Activities KA1: Delivery Completion	Value Propositions VP1: Reliable VP2: Flexible VP3: Less Disruption & Emission	Customer Relationships CR1: Customer Support	Customer Segments CS1: Small Shop Owner
	Key Resources KR-H1: Driver KR-H2: Delivery Manager KR-H3: Customer Support Manager KR-H4: HR Manager KR-H5: Operation Manager KR-H6: Bentobox Purchasing Manager KR-H7: Vehicle Manager KR-F1: Vehicle KR-F2: Software KR-F3: Bentobox KR-F4: Bentobox Location		Channels CH1: Bentobox Touch Screen CH2: Email	
Cost Structure C\$-E1: Bentobox Supply Payment C\$-E2: Vehicle Supply Payment C\$-I1: HR Training C\$-I2: Operation & Maintenance C\$-I3: Goods Delivery			Revenue Streams R\$1: Delivery Payment	

Figure 5: DEMO-Oriented BMC of City Logistics.

STEP 2 : Identify Actor Roles

Again, using Table 1, we can identify Actor Roles from DEMO-Oriented BMC. Those are Bentobox Supplier, Vehicle Supplier, Driver, Delivery Manager, Customer Service Manager, HR Manager, Operation Manager, Bentobox Purchasing Manager, Vehicle Manager, and Small Shop Owner.

STEP 3 : Generate Transaction Product Table

Based on results in STEP 2, we can generate Transaction Product Table after the Product Kinds of each Transaction Kinds are identified. The resulting TPT can be seen in Table 3.

STEP 4 : Generate Actor Transaction Table

Based on the rule in Table 2, we can identify and draw the Actor Transaction Table of City Logistics. The result can be seen in Table 4.

STEP 5 : Produce Actor Transaction Diagram

Finally we can produce Actor Transaction Diagram to complete generation process based on Table 6. The resulting ATD (Figure 6) is suitable to represent a construction model of City Logistics.

Table 3: Transaction Product Table of City Logistics.

T No.	Transaction Kinds	P No.	Product Kinds
T01	Delivery Completion	PP01	Delivery has been completed
T02	Goods Delivery	PP02	Goods has been delivered
T03	Delivery Payment	PP03	Delivery fee has been paid
T04	Customer Support	PP04	Customer support has been done
T05	Bentobox Supply	PP05	Bentobox supply has been done
T06	Bentobox Supply Payment	PP06	Bentobox fee has been paid
T07	Vehicle Supply	PP07	Vehicle supply has been done
T08	Vehicle Supply Payment	PP08	Vehicle fee has been paid
T09	HR Training	PP09	HR Training has been done
T10	Operation & Maintenance	PP10	Operation & Maintenance has been done

Table 4: Actor Transaction Table of City Logistic.

Transaction Kinds	Initiator	Executor
Delivery Completion	Small Shop Owner	Delivery Manager
Goods Delivery	Delivery Manager	Driver
Delivery Payment	Delivery Manager	Small Shop Owner
Customer Support	Consumer	Customer Service Manager
Bentobox Supply	Bentobox Purchasing Manager	Bentobox Supplier
Bentobox Supply Payment	Bentobox Supplier	Bentobox Purchasing Manager
Vehicle Supply	Vehicle Manager	Vehicle Supplier
Vehicle Supply Payment	Vehicle Supplier	Vehicle Manager
HR Training	HR Manager	HR Manager
Operation & Maintenance	Operation Manager	Operation Manager

business model and construction model, in particular Business Model Canvas and DEMO Construction Model. The important finding of this research is that we found the correspondence links between BMC as a function design, and DEMO CM as a construction design. The case study of City Logistics also explains the methodology of process of conversion from BMC to CM, with a step-by-step process. We found the correspondence between Business Model Canvas and DEMO Construction Model, and the proposed methodology proved to be able to create DEMO Construction Model from Business Model Canvas through step-by-step process, thus answered our research question.

The introduction of correspondence table and actor-transaction relation table are very useful to help the generation process, in particular the conversion from DEMO-Oriented BMC to DEMO CM. The resulting TPT and ATD are able to show the construction of the business in the form of DEMO CM, generated from BMC.

This research has some limitations, however, that the formulation of DEMO-Oriented BMC should be refined further. In particular the identification of missing actor roles or transaction kinds, and the validation; to further enhance this, the conversion method should be tested to another type of business. A comparative study across several business models can also be conducted. Also this process should be reversible; one can create a BMC from a given CM.

5 DISCUSSION

This paper proposed the correspondence between

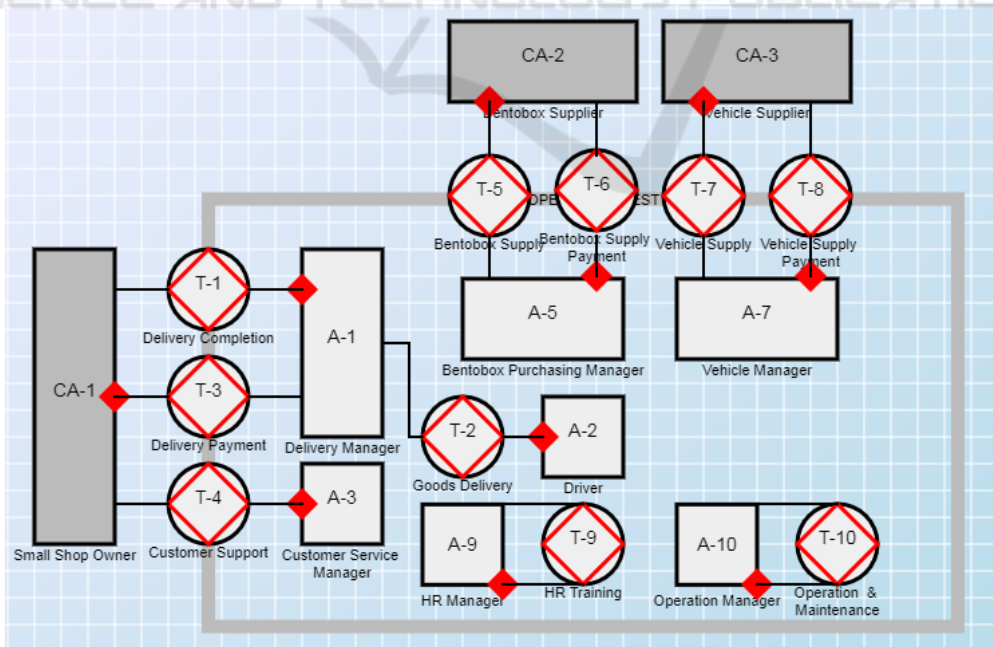


Figure 6: Actor Transaction Diagram of City Logistics.

A methodology of BMC Generation from DEMO CM can be developed as a reverse process of this paper. The void in the correspondence table, that is no correspondence of Value Proposition and Channels, gives the opportunity for DEMO researchers to identify these building blocks corresponds to which components in DEMO.

6 CONCLUSION

In this paper we proposed a methodology to generate DEMO Construction Model from Business Model Canvas. We found the correspondence between building blocks in Business Model Canvas and DEMO Construction Model. We suggest DEMO-Oriented BMC as a specified BMC containing the organizational building blocks of DEMO CM, and step-by-step process to create it. We propose DEMO CM generation step-by-step process from DEMO-Oriented BMC.

In this paper, we only focused on generating Object System construction from Object System function; Object System function generation from Using System is outside the scope of this research. This paper only proposed a methodology to generate DEMO Construction Model from Business Model Canvas, not the other way around. A comparative study across several business models is not yet conducted.

This paper visualized the connection between BMC as an Object System function and DEMO CM as an Object System construction. This paper can contribute to adding an alignment between Object System function and Object System construction, as a part of system development process.

This paper can give some insights about future research related to this work. Formulation of DEMO-Oriented BMC can be refined further. A methodology of BMC Generation from DEMO Construction model can be developed as a reverse process of this paper. A comparative study across several business models can also be conducted. By using proposed methodology in this paper and future studies, we hope that we can gather several business models, generate construction models from them and create a pool of submodels, modify them to create a new construction model, and generate a new business model to create a new business.

ACKNOWLEDGEMENTS

This work has been supported by Indonesia Endowment Fund for Education (LPDP).

REFERENCES

- Albani, A., and Dietz, J. L. (2011). Enterprise ontology based development of information systems. *International Journal of Internet and Enterprise Management*, 7(1), 41-63.
- Dietz, J.L. (2005) • System ontology and its role in system development, in Castro, J. and Teniente, E. (Eds.): *Advanced Information Systems Engineering Workshops (CAiSE 2005)*, Vol. 2 of FEUP Edicoes, Porto, Portugal, pp.273–284.
- Dietz, J. L. (2006). *Enterprise ontology: theory and methodology*. Springer Science and Business Media.
- Magretta, J., 2002. Why Business Models Matter. *Harvard Business Review* 80 (5), 86-92.
- Martikainen, A., Niemi, P., and Pekkanen, P. (2014). Developing a service offering for a logistical service provider—Case of local food supply chain. *International Journal of Production Economics*, 157, 318-326.
- Op't Land, M., and Krouwel, M. (2013). Exploring organizational implementation fundamentals. In *Enterprise Engineering Working Conference*(pp. 28-42). Springer, Berlin, Heidelberg.
- Osterwalder, A. (2004). The business model ontology: A proposition in a design science approach.
- Osterwalder, A., and Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.
- Perinforma, A. P. C. (2015). *The Essence of Organisation: An Introduction to Enterprise Engineering*. Sapio Enterprise Engineering.
- Pombinho, J., Tribolet, J., and Aveiro, D. (2014). Linking Value Chains-Combining e3Value and DEMO for Specifying Value Networks. In *EEWC* (pp. 105-119).
- Quak, H., Balm, S., and Posthumus, B. (2014). Evaluation of city logistics solutions with business model analysis. *Procedia-Social and Behavioral Sciences*, 125, 111-124.
- Salgado, C. E., Teixeira, J., Machado, R. J., and Maciel, R. S. (2014). Generating a Business Model Canvas through Elicitation of Business Goals and Rules from Process-level Use Cases. In *International Conference on Business Informatics Research* (pp. 276-289). Springer, Cham.
- Suga, T., and Iijima, J. (2015) Does 'Merging DEMO Models' satisfy the associative law? - Validation of partial models and merge operation. In *Proceedings of the 7th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management*, vol. 2, pp. 467–478.
- Wirtz, B. W., Pistoia, A., Ullrich, S., and Göttel, V. (2016). Business models: Origin, development and future research perspectives. *Long Range Planning*, 49(1), 36-54.