

# Managing CoDesign in Dynamic Alliance Networks

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# Declaration

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I, Abdussalam Ali, declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references given.

Signature

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# Abstract

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The research described in this thesis develops ways to support creativity in dynamic business networks. Businesses in a business network are organized to bring their knowledge and assets together to develop new services and products. Traditionally business networks were stable. However, the changing nature of the business environment calls for new knowledge, which is increasingly met by bringing in new businesses with the new knowledge into the network and often changing the network structure. At the same time greater creativity and innovation are needed to address the emerging problems. Consequently, networks must create the environment that supports members from businesses working together to combine their knowledge to create innovative solutions. The design process is thus becoming increasingly collaborative as product design emerges as new ideas emerge. There is more emphasis on supporting collaborative design (CoDesign) where individuals and teams from different disciplines, including customers, consumers and users work together in the design process.

Although CoDesign itself is now well-understood, how to manage it within a dynamic networking environment given greater emphasis on privacy and knowledge is still not well understood. The research described in this thesis will contribute to knowledge of how to integrate business networking arrangements with CoDesign while maintaining knowledge sharing and privacy. To do this we have developed a model that will contribute to knowledge of how to integrate business networking arrangements with CoDesign and enable knowledge sharing and privacy.

To develop the model we have analysed existing business network structures, classified them by a set of concepts and developed a model that covers existing practices, integrates structure with CoDesign and supports dynamic change to networking arrangements. The model is made up of two levels – the business networking level and the design level. The business networking level defines the responsibilities of businesses and the privacy

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constraints. In the model, teams are created across the businesses and organisations. The design level is where these teams carry out CoDesign. The model describes ways for such networks to change as people in businesses join and resign over the time and the governance structures to preserve privacy.

The design level is facilitated by providing people in businesses with an environment to create and share knowledge for CoDesign. Knowledge management related research has been investigated as the CoDesign process is considered knowledge management intensive. In the networking level the model defines spaces where people in businesses join and agree on collaborative activities. In the creativity level those people are provided with tools where they can create and share knowledge. In the thesis we show how Design Thinking tools are introduced to support creativity in the CoDesign process. However, the model can support any tools needed for some special problem. Maintaining privacy is considered where rules and policies are defined to control accessing the knowledge and other components.

The model has been defined and a prototype has been implemented to evaluate the model by following the qualitative method. The model has been evaluated by conducting semi-structured interviews with experts. The experts agree that the model supports creativity in the dynamic business networks. However, their advice for future work and development should be considered.

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# List of Publications

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## Book Chapters

Ali, A. and I. Hawryszkiewicz (2015). Chapter 12 - Cloud as infrastructure for managing complex scalable business networks, privacy perspective A2 - Ko, Ryan. The Cloud Security Ecosystem. K.-K. R. Choo. Boston, Syngress: 249-267.

## Conference Proceedings

Ali, A. and I. Hawryszkiewicz (2015). Supporting Co-Design using Design Thinking Business Networks. 24th International Conference on Information Systems Development. Harbin, China.

Ali, A. and I. Hawryszkiewicz (2014). Services to Support Knowledge Sharing in Complex Business Networks, Big Data as the Source. 11th International Conference on Intellectual Capital, Knowledge Management & Organisational Learning. Sydney.

Ali, A., et al. (2014). Services for Knowledge Sharing in Dynamic Business Networks. 23rd Australasian Software Engineering Conference. Sydney.

Ali, A. and I. Hawryszkiewicz (2012). A Modelling Approach for Knowledge Management in Complex Business Systems. IADIS International Conference WWW/Internet, Madrid.

---

# Table of Contents

---

<b>Abstract.....</b>	<b>ii</b>
<b>Acknowledgements.....</b>	<b>iv</b>
<b>List of Publications.....</b>	<b>v</b>
<b>Table of Contents .....</b>	<b>vi</b>
<b>List of Figures.....</b>	<b>xii</b>
<b>List of Tables.....</b>	<b>xiv</b>
<b>List of Abbreviations.....</b>	<b>xv</b>
<b>Glossary .....</b>	<b>xvi</b>
<b>Chapter 1 .....</b>	<b>1</b>
<b>Ch1: Introduction.....</b>	<b>1</b>
1.1. Overview .....	1
1.2. Dynamic Business Networks .....	3
1.3. Key Issues and Research Goals .....	4
1.4. Research Model.....	5
1.5. Research Contribution .....	6
1.6. Research Methodology and Development .....	6
1.7. Thesis Outline .....	7

**Chapter 2 ..... 12**

**Ch2: Literature Review..... 12**

---

2.1. Introduction .....	12
2.2. Dynamic Business Networks .....	16
2.2.1. <i>Business Networks and Self-Organising</i> .....	20
2.2.2. <i>Features of Dynamic Business Networks (DANs)</i> .....	21
2.3. Knowledge and Knowledge Management .....	22
2.3.1. <i>Knowledge and Knowledge Types</i> .....	22
2.3.2. <i>Knowledge Management (KM)</i> .....	24
2.3.3. <i>Knowledge Management Processes</i> .....	25
2.4. CoDesign and Knowledge Management .....	26
2.4.1. <i>CoDesign Overview</i> .....	26
2.4.2. <i>Participatory Design</i> .....	28
2.4.3. <i>CoDesign and the Final Deliverables</i> .....	30
2.4.4. <i>CoDesign and Types of Knowledge</i> .....	31
2.4.5. <i>CoDesign and Knowledge Management Processes</i> .....	32
2.5. Systems Support CoDesign.....	33
2.5.1. <i>Supporting CoDesign through Technology</i> .....	33
2.5.2. <i>Dedicated CoDesign Supporting Systems</i> .....	35
2.5.3. <i>Knowledge Management Systems and CoDesign Support</i> .....	39
2.6. Privacy in CoDesign .....	42
2.7. Creativity Tools .....	44
2.7.1. <i>Design Thinking Concepts and Features</i> .....	45
2.7.2. <i>Models of Design Thinking</i> .....	47
2.7.3. <i>Design Thinking Creativity Tools</i> .....	50
2.7.4. <i>Design Thinking and Knowledge Management</i> .....	52
2.8. Discussion .....	53
2.9. Research Framework .....	57
2.10. Chapter Summary .....	60

---



**Chapter 3 ..... 63**

**Ch3: Research Plan and Methodology ..... 63**

---

3.1. Introduction .....	63
3.2. Themes and Enablers of Managing CoDesign in DANs .....	64
3.2.1. <i>Business Networking</i> .....	64
3.2.2. <i>Maintaining Privacy</i> .....	65
3.2.3. <i>Self-Organising</i> .....	67
3.2.4. <i>Knowledge Sharing</i> .....	67
3.2.5. <i>Enabling Creativity</i> .....	69
3.3. Research Constructs.....	69
3.4. Research Hypotheses .....	72
3.5. Choosing Evaluation Methodology .....	75
3.6. Qualitative Research Method .....	78
3.7. Research Model Plan.....	79
3.8. Chapter Summary .....	80

**Chapter 4 ..... 82**

**Ch4: Types of Dynamic Alliance Networks..... 82**

---

4.1. Introduction .....	82
4.2. Practical Classification of the Alliance Networks .....	83
4.2.1. <i>Types of alliance networks based on the outsourcing domination</i> 85	
4.2.2. <i>Types of alliance networks based on the members' relationships..</i> 86	
4.2.3. <i>Types of alliance networks based on the relationship with the dominant business</i> .....	87
4.2.4. <i>Types of alliance networks based on the stage of growth</i> .....	89
4.2.5. <i>Types of alliance networks based on the management structure ..</i> 91	
4.3. Dynamic Alliance Network (DAN) Terminology .....	91
4.4. Conceptual Framework.....	93
4.5. DAN Types Based on the Conceptual Framework .....	96
4.5.1. <i>Types of DANs based on the domination concept</i> .....	96
4.5.2. <i>Types of DANs based on the governance concept</i> .....	97

4.5.3.	<i>Types of DANs based on the collaboration concept.....</i>	98
4.5.4.	<i>Types of DANs based on the knowledge management.....</i>	99
4.5.5.	<i>Types of DANs based on the privacy concept .....</i>	100
4.6.	Categories of DANs Based on the Conceptual Framework .....	102
4.6.1.	<i>DANs Category 1 (Cat-1).....</i>	103
4.6.2.	<i>DANs Category 2 (Cat-2).....</i>	106
4.6.3.	<i>DANs Category 3 (Cat-3).....</i>	107
4.6.4.	<i>DANs Category 4 (Cat-4).....</i>	108
4.7.	Chapter Summary .....	109
<b>Chapter 5 .....</b>		<b>110</b>
<b>Ch5: Research Model.....</b>		<b>110</b>
5.1.	Introduction .....	110
5.2.	DAN Spaces (DAN-Spaces) and CoDesign Spaces (CoDesign-Spaces).....	111
5.2.1.	<i>DAN Space (DAN-Space).....</i>	113
5.2.2.	<i>CoDesign Space (CoDesign-Space).....</i>	114
5.3.	Governed and Not-Governed DAN-Space .....	115
5.3.1.	<i>Supporting the conceptual framework features by DAN-Space and CoDesign-Space .....</i>	116
5.3.2.	<i>The idea of Governed and Not-Governed DAN-Space .....</i>	118
5.4.	Supporting DANs by Governed and Not-Governed DAN-Space ...	119
5.4.1.	<i>Supporting the category Cat-1 of DANs.....</i>	123
5.4.2.	<i>Supporting the category Cat-2 of DANs.....</i>	125
5.4.3.	<i>Supporting the category Cat-3 of DANs.....</i>	128
5.4.4.	<i>Supporting the category Cat-4 of DANs.....</i>	130
5.5.	Roles Defined by CoDAN .....	132
5.5.1.	<i>CoDAN roles description .....</i>	133
5.5.2.	<i>Knowledge transfer modes in CoDAN.....</i>	142
5.6.	Maintaining Privacy.....	144
5.6.1.	<i>Selecting the privacy modeling approach in CoDAN .....</i>	145
5.6.2.	<i>Roles Defined in CoDAN based on Permissions and Constraints.....</i>	149
5.7.	Enabling Creativity by CoDAN .....	152

5.7.1. <i>CoDesign activities and creativity tools</i> .....	152
5.8. Research Model and Research Framework.....	160
5.9. Chapter Summary .....	162
<b>Chapter 6</b> .....	<b>164</b>
<b>Ch6: Prototype Design and Implementation</b> .....	<b>164</b>
6.1. Introduction .....	164
6.2. Model Components in the CoDAN Prototype .....	166
6.3. Design Thinking Tools Defined in the Prototype .....	169
6.4. Object Oriented Model (OOM) of the Research Model.....	172
6.5. Software Development Tools .....	175
6.6. Prototype Modules.....	176
6.7. User Interface .....	179
6.7.1. <i>Supporting business networking</i> .....	179
6.7.2. <i>Supporting creativity</i> .....	182
6.7.3. <i>Maintaining privacy</i> .....	191
6.8. Chapter Summary .....	194
<b>Chapter 7</b> .....	<b>195</b>
<b>Ch7: Model Evaluation</b> .....	<b>195</b>
7.1. Introduction .....	195
7.2. Participants Selection .....	196
7.3. Hypotheses and Testing Strategy .....	198
7.4. Conducting Semi-Structured Interviews .....	203
7.5. Data Analysis Method.....	205
7.6. Findings .....	208
7.6.1. <i>Self-Organising</i> .....	208
7.6.2. <i>Maintaining Privacy</i> .....	211
7.6.3. <i>Developing Domain Knowledge to Enhance Expertise</i> .....	213
7.6.4. <i>Creative Thinking Skills Development</i> .....	214
7.6.5. <i>Collaboration</i> .....	215

7.6.6. Knowledge Management Processes .....	216
7.6.7. Supporting Tacit and Explicit Knowledge.....	217
7.7. Communicating Research Hypotheses.....	218
7.8. Discussion .....	221
7.9. Chapter Summary .....	225

## **Chapter 8 ..... 227**

## **Ch8: Conclusion and Future Work ..... 227**

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8.1. Introduction .....	227
8.2. Summary of Research Findings.....	228
8.3. Contributions of the Research .....	230
8.3.1. Contribution to the Academic Research and Theory .....	230
8.3.2. Contribution to Practice .....	233
8.3.3. Contribution to Teaching and Learning .....	233
8.4. Directions for Future Work.....	234
8.5. Chapter Summary .....	235

## **Bibliography..... 238**

## **Appendices..... 247**

---

Appendix 1: Full Scale Consent and Information Form (The Ethics Form).....	247
Appendix 2: Information Form .....	249
Appendix 3: Semi-Structured interview questions .....	252
Appendix 4: Prepared Scenario for Evaluators (Innovative Bags Design). .....	260
Appendix 5: Object Oriented Modeling Concepts .....	265

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# List of Figures

---

Figure 2.1: The three components of creativity according to Amabile et al. (1996).....	13
Figure 2.2: Our work according to the three components of creativity.....	14
Figure 2.3: Literature Review Domain Themes .....	15
Figure 2.4: Business networks and interaction between them.....	18
Figure 2.5: Businesses Collaboration Scenario .....	19
Figure 2.6: Transferring between tacit and explicit knowledge .....	23
Figure 2.7: Knowledge Management Processes .....	26
Figure 2.8: IDEO's 3 I Model.....	48
Figure 2.9: The Model of the Hasso-Plattner Institute .....	49
Figure 2.10: The 4 D or Double Diamond Model of the British Council.....	49
Figure 2.11: Traditional Model of Knowledge Management Processes .....	52
Figure 2.12: Iteration Feature of Knowledge Management Processes in Design Thinking .....	53
Figure 2.13: Research Framework.....	60
Figure 3.1: Research Framework.....	66
Figure 3.2: Research Constructs and Enablers .....	72
Figure 3.3: Constructs and Enablers in Relation to Hypotheses.....	73
Figure 3.4: System as such strategy (Cronholm and Goldkuhl, 2003) .....	76
Figure 3.5: System in use strategy (Cronholm and Goldkuhl, 2003) .....	76
Figure 3.6: CoDAN Evaluation Methodology.....	77
Figure 4.1: Types of Alliance Network (Miles and Snow, 1992).....	85
Figure 4.2: Types of Alliance Network (Liu and Brookfield, 2000).....	88
Figure 4.3: Types of Alliance Network (Lin and Zhang, 2005) .....	90
Figure 4.4: Cisco DAN Scenario as derived from Furr et al. (2016).....	105
Figure 5.1: The kinds of spaces defined by CoDAN .....	111
Figure 5.2: CoDAN model (DAN-Spaces and CoDesign-Spaces).....	112
Figure 5.3: Generic structure of DAN, DAN-Spaces and CoDesign-Spaces .....	115
Figure 5.4: Governed DAN-Space Scenario (Supporting Cat-1 DANs) .....	125
Figure 5.5: Supporting Cat-2 DANs by Governed DAN-Space.....	127
Figure 5.6: Supporting Cat-3 DANs by Governed DAN-Space.....	130
Figure 5.7: Supporting Cat-4 DANs by Not-Governed DAN-Space .....	132
Figure 5.8: Governed DAN-Space Scenario.....	144

Figure 5.9: Assigning and updating roles in CoDAN.....	147
Figure 5.10: Privacy Modeling in CoDAN.....	148
Figure 5.11: CoDesign activities and Creativity Tools.....	154
Figure 5.12: Governed DAN-Space Scenario.....	157
Figure 6.1: CoDAN defined components (as shown in Figure 5.2) .....	166
Figure 6.2: Design Thinking activities and tools in the prototype.....	168
Figure 6.3: Persona-map Tool .....	170
Figure 6.4: Lotus Blossom Tool .....	172
Figure 6.5: Object-Oriented Modeling of CoDAN.....	174
Figure 6.6: Prototype Block Diagram Design .....	176
Figure 6.7: Control Panel Screen and Main Menu .....	180
Figure 6.8: DAN-Space Screen .....	181
Figure 6.9: CoDesign-Space screen.....	183
Figure 6.10: Creating and Managing Storyboarding Activity screen.....	184
Figure 6.11: Creating and Managing Persona-Map Activity screen .....	185
Figure 6.12: Creating and Managing Lotus Blossom Activity screen.....	186
Figure 6.13: Managing All Activities screen.....	187
Figure 6.14: Storyboarding Tool .....	188
Figure 6.15: Persona-Map Tool Main Screen.....	188
Figure 6.16: Persona-Map Tool (Answering the selected question) .....	189
Figure 6.17: Lotus Blossom Tool (Main Screen) .....	189
Figure 6.18: Lotus Blossom Tool (Posting Screen).....	190
Figure 6.19: Accessing All Activities screen.....	190
Figure 6.20: Knowledge transfer to and from CoDesign activity.....	193
Figure 7.1: Qualitative Analysis by NVivo .....	205
Figure 7.2: Qualitative Analysis by NVivo (Pre-prepared themes).....	206

---

# List of Tables

---

Table 2.1: CoDesign Supporting Systems in the previous Research.....	36
Table 2.2: Enablers of Managing CoDesign in DANs .....	57
Table 3.1: Constructs, enablers and hypotheses .....	74
Table 4.1: DAN Types against the concepts of the conceptual framework .....	95
Table 4.2: The four categories of DANs based on the conceptual framework.....	102
Table 5.1: Supporting conceptual framework by DAN-Space and CoDesign-Space .....	117
Table 5.2: Governed DAN-Space and Not-Governed DAN-Space Comparison .....	119
Table 5.3: Supporting conceptual framework by Governed and Not-Governed DAN-Space .....	120
Table 5.4: Supporting DAN categories by DAN-Spaces .....	121
Table 5.5: Supporting Cat-1 DAN types by the Governed DAN-Space type .....	123
Table 5.6: Supporting Cisco DAN by the Governed DAN-Space type.....	124
Table 5.7: Supporting Cat-2 DAN types by the Governed DAN-Space type .....	126
Table 5.8: Supporting Cat-3 DAN types by the Governed DAN-Space type .....	128
Table 5.9: Supporting Cat-4 DAN types by the Not-Governed DAN-Space type .....	130
Table 5.10: CoDAN Roles in Governed DAN-Space .....	135
Table 5.11: CoDAN Roles in Not-Governed DAN-Space .....	137
Table 5.12: Roles in Governed DAN-Space (Permissions and Constraints).....	150
Table 5.13: Roles in Not-Governed DAN-Space (Permissions and Constraints) .....	151
Table 5.14: Enablers supported by CoDAN .....	161
Table 7.1: The participants in evaluation process, their qualifications and experience ....	197

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# List of Abbreviations

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<b>SECI:</b>	Socialisation, Externalisation, Combination and Internalisation. The model of knowledge transfer mechanisms developed by Nonaka.
<b>KM:</b>	Knowledge Management
<b>DAN:</b>	Dynamic Alliance Network
<b>CoDAN:</b>	The acronym of our research model
<b>CoDesign:</b>	Collaborative Design
<b>WWW:</b>	World Wide Web
<b>CAD:</b>	Computer Aided Design
<b>DT:</b>	Design Thinking



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# Glossary

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## **Alliance Network**

In business context alliance network is where businesses of common interests build relationships to collaborate. Participants in alliance networks create and share knowledge for innovative outcomes and competitive advantages (Chen and Chen, 2002).

## **Brainstorming**

Brainstorming is where teams collect as many ideas as possible in a short time. The main purpose is to get ideas rather than discussing them (Tschimmel, 2012).

## **Business**

In this thesis we refer to an organisation, a company and firm as a business. According to the business dictionary (2018a) business provides goods or services, either privately owned or not-for-profit.

## **CoDAN**

CoDAN is the acronym for our research model, the model for supporting CoDesign in Dynamic Alliance Networks (DANs).

## **CoDesign**

CoDesign is the process where two or more businesses in a business network collaborate to create a product or service. People from different disciplines, including users and customers, participate in the CoDesign process ( (Du et al., 2012) and (Kankainen, 2012)).

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## **CoDesign Outcomes**

CoDesign outcomes are goals and business objectives to be achieved through the CoDesign process such as developing new products and services.

## **CoDesign Process**

CoDesign process is a number of activities, which are carried out to achieve the CoDesign outcomes and are performed collaboratively.

## **CoDesign Space (CoDesign-Space)**

CoDesign space in CoDAN is where business members in the network create the outcome of CoDesign Activities. CoDesign-Space is created in the DAN-Space. The person who creates CoDesign-Space becomes CoDesign-Space-Owner.

## **CoDesign Activity**

CoDesign Activity in CoDAN is what a group of people do and perform to achieve one or more of CoDesign outcomes in DAN. CoDesign Activities are the breakdowns of CoDesign process.

## **CoDesign Activity to CoDesign Activity knowledge transfer mode**

In this mode the knowledge is transferred from one CoDesign Activity to another within the same CoDesign-Space.

## **CoDesign-Space to CoDesign-Space knowledge transfer mode**

In this mode the knowledge is transferred from one CoDesign-Space to another within the same DAN-Space.

## **CoDesign-Space-Owner**

A role defined by CoDAN assigned to a person who creates CoDesign-Space to manage it. In Governed DAN-Space this role is assigned to DAN-Space-Coordinator. In Not-Governed DAN-Space it is assigned to DAN-Space-Contributor.

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### **CoDesign-Space-Participant**

A role defined by CoDAN assigned to a person who is assigned to CoDesign-Space to participate in CoDesign. This role is assigned to the person from a business in DAN or from outside of DAN.

### **Collaboration**

Collaboration is a process of joint decision making for a defined problem key issue. This process is a joint activity performed by people and teams across the business units or between businesses themselves ((Qureshi, 2006), (Scariot et al., 2012) and (Elliott, 2011) ).

### **Complexity (in business context)**

Complex systems are those systems with large numbers of elements. These elements are interrelated and connected. The change of one element may cause big changes to all of the system. Usually complex systems are adaptive to these changes. In business context complexity results from relationships between businesses which share the same environment of operation. As a result, these businesses should respond to emergence and changes to adapt to this complex environment (Bar-Yam, 2004).

### **Components Privacy**

Maintaining privacy in the research model is to control accessing the components defined in CoDAN. These components are; DAN spaces, CoDesign spaces, CoDesign Activities and Creativity Tools. People access these components based on their roles' policies.

### **Conceptual Framework**

Conceptual framework in this research represents a number of concepts which are used to categorise DAN types. These concepts are domination, governance, collaboration modes, knowledge management domination and privacy concern levels.

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## **Contributed DAN**

Based on the conceptual framework, the DAN is considered contributed when a number of businesses participate in the DAN. One of the reasons which motivates businesses to participate is to benefit from the opportunities provided by the network.

## **DAN Space (DAN-Space)**

DAN Space in CoDAN is a virtual space where businesses in DAN can join to network for CoDesign. In the model, DAN Space represents the level of supporting networking between businesses in Dynamic Alliance Network (DAN).

## **DAN-Space-Contributor**

A role defined by CoDAN assigned to a person from the contributing business in DAN. In Governed DAN-Space, the person with this role can only be assigned to CoDesign-Space to participate in CoDesign. In Not-Governed DAN-Space, in addition, DAN-Space-Contributor can create CoDesign-Spaces and manage them.

## **DAN-Space-Coordinator**

A role defined by CoDAN assigned to a person from the governing business in DAN to govern the Governed DAN-Space.

## **DAN-Space-Dominant**

A role defined by CoDAN assigned to a person from the dominant business in DAN to have full access to the Governed DAN-Space.

## **DAN-Space-Participant**

A role defined by CoDAN assigned to a person from outside of DAN in DAN-Space. The person with this role can be assigned to CoDesign-Space(s) to participate in CoDesign.

## **Design Process**

Design in the business context often means the development of processes that lead to the creation of products or services.

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## **Design Thinking**

Design Thinking (DT) is a human-centred approach of solving problems through a set of creativity tools that support CoDesign to achieve innovative outcomes. In our research DANs utilise Design Thinking tools for CoDesign ((Tschimmel, 2012) and (Du et al., 2012)).

## **Dominant Business**

Dominant business is the business that dominates DAN when it, for example, owns all or most of the assets and/or shareholdings in the network. Also, the domination is gained when the dominant business has an experience and expertise over the other member businesses in the network.

## **Dominated DAN**

Based on our conceptual framework, the DAN is considered dominated if it is dominated by at least one business. The DAN can be dominated by more than one business. A business which dominates the DAN is called the *dominant business*.

## **Dominated Knowledge Management (KM)**

Based on our conceptual framework, KM is considered dominated in DAN when at least one business controls the *KM processes* in the DAN.

## **Dynamic Alliance Network (DAN)**

In our research, Dynamic Alliance Network (DAN) is a business networking environment created by businesses for collaboration in CoDesign. Businesses in DAN join and leave at any time. Business networks are known as business alliance networks, and because of their dynamic feature we call such networks in this thesis Dynamic Alliance Networks (DANs).

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### **Flat Governance**

Flat governance, based on our conceptual framework, is when the members of the network share the responsibility of governing and coordinating the network. The flat governance usually encourages sharing the costs, risks and challenges between the members in the DAN (Pisano and Verganti, 2008).

### **Governed DAN-Space**

Governed DAN-Space is a type of DAN-Space that is governed at least by one business from DAN. The person who governs the Governed DAN-Space is assigned DAN-Space-Coordinator role.

### **Governing Business**

Governing business is the business that governs DAN in terms of coordination and management. Governing business governs the DAN-Space created for DAN. Also, the governing business can be assigned for a single project in DAN.

### **Hierarchical Governance**

In our model, the hierarchical governance is when a specific business has the authority to coordinate and manage the process in the DAN or in the DAN-Space.

### **High Level of Privacy Concern**

Based on our conceptual framework, DAN is considered with a high level of privacy concern when there is a design and production processes performed among the members of the DAN.

### **Human-Centered Design**

Human-Centered design is when users and consumers are involved in the design process for developing a product or service ((Tschimmel, 2012), and (Mootee, 2011)).

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## **Knowledge Management Processes**

Knowledge management processes are those processes involved in managing the knowledge. These processes include knowledge discovery, capturing, filtering and sharing ((Awad and Ghaziri, 2004) and (Becerra-Fernandez and Sabherwal, 2010) and (Dakilir, 2011b)).

## **Knowledge Ownership**

Knowledge ownership defines who owns the knowledge. Knowledge owners can be individuals and/or businesses. When maintaining privacy in CoDesign, knowledge ownership should be considered. The owned knowledge is only accessed by those who are authorised.

## **Knowledge Sharing**

It is the process when tacit and explicit knowledge is exchanged between individuals and groups ((Awad and Ghaziri, 2004) and (Becerra-Fernandez and Sabherwal, 2010)).

## **Knowledge Transfer**

In our model knowledge transfer is moving a specific knowledge from one CoDesign-Activity to another or from one CoDesign-Space to another. Knowledge transfer is a KM process which supports knowledge sharing.

## **Low Level of Privacy Concern**

Based on our conceptual framework, the DAN is considered with a low level of privacy concern when there are no design and development processes performed among the members of DAN.

## **Maintaining Privacy**

Maintaining privacy is the implementation of the procedures and methods to be applied to protect the private assets. These procedures include the ways of how to authorise people to access these assets when needed.

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### **Not-Governed DAN-Space**

The Not-Governed DAN-Space is the DAN-Space type that is not governed by a governing business in DAN. The person who creates this DAN-Space is assigned DAN-Space-Contributor role.

### **Open Mode Collaboration**

Based on our conceptual framework, the network is in open mode collaboration if the problem and knowledge domain are not defined (Pisano and Verganti, 2008).

### **Persona-map**

Persona-map is a Design Thinking tool used to record the knowledge in relation to people's needs ((Tschimmel, 2012) and Crandall (Crandall, 2010)).

### **Privacy**

Privacy is keeping something protected and secured unless authorised. That includes the knowledge and personal information and actions (Muniraman et al., 2007).

### **Research Framework**

Research framework in this thesis shows the guidelines towards designing and implementing a model to manage CoDesign in DANs. In this framework CoDesign management is based on five themes; knowledge sharing, self-organising, business networking, maintaining privacy and enabling creativity. A number of enablers are defined in this research for each theme which are supported by the research model, CoDAN.

### **Role**

Role as defined in the model, CoDAN, is a number of responsibilities assigned to the person when joining DAN-Space and CoDesign-Space.



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## **Shared Knowledge Management (KM)**

Based on our conceptual framework, KM is considered shared, not dominated, when there is no a specific business dominates the KM processes. The sharing of the knowledge management does not involve a specific business as a central point of management.

## **Stakeholders**

Stakeholders are the individuals, groups and businesses who benefit from the developed product or service.

## **Storyboarding**

Storyboarding is a Design Thinking tool used to create stories. Stories in the storyboard form the focus for new ideas (Tschimmel, 2012).

## ***System as such strategy***

It is a strategy when the users are not involved in the system evaluation process. In this case only the evaluator refers to the system and the documentation provided for evaluation ((Cronholm and Goldkuhl, 2003) and (Chen et al., 2011)).

## ***System in use strategy***

It is a strategy when the users are involved in the system evaluation process. ((Cronholm and Goldkuhl, 2003) and (Chen et al., 2011)) .

## **Wicked Problem**

Wicked problem is a kind of problem that has no specific definition or formulation. Every wicked problem can be described in more than one way. This kind of problems has no specific solution. Solutions for wicked problems cannot be described as right or wrong, instead, they are either better or worse. The way to reach this solution is iterative ((Rylander, 2009) and (Buchanan, 1992) ).

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