Arctic Design: The systemic development of a new domain

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ARCTIC DESIGN

THE SYSTEMIC DEVELOPMENT OF A NEW DOMAIN

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WHAT IS THE ARCTIC?

↘ **What the Arctic is:**

- "A region experiencing transformation arising from the interactive forces of climate change and globalization" [Young 2012, p. 75]
- A centre of global competitive confrontation as well as interdependent cooperation [Young 2012; Claes 2017; Stokke 2013]

↘ **The Arctic example of the human-technology-environment relationship illustrates the world's situation in miniature, in its sharp economic, political, socio-cultural, and environmental tensions:**

- In the world, where any environment is under the probability of becoming extreme over the next 20-50 years, the very concept of the Arctic goes beyond its geographic boundaries.
- This is a lab that provides for a testing ground for new life-support solutions and in further perspective for a radical reconsideration of the existing technology-augmented way of living.

ARCTIC TENSIONS

↘ There is an **extreme environment** that requires specific (biological and cultural) means of adaptation

↘ There is a dominant **"transient community"** of non-indigenous residents who have neither the necessary knowledge and skills, nor appropriate technologies and practices for onboarding life in the extreme environment

↘ There is an existing pool of **local/indigenous knowledge** that is under the radar of modern science and engineering (and design)

WHAT IS ARCTIC DESIGN?

↘ **The wide-scale problem of scientific, technological, and – eventually – human development of the Arctic runs into the need for a tangible "shell" for newcomers (workers, researchers, tourists etc.) from the middle and low latitudes:**

- The Arctic cannot be considered as a "case study" for design practice; and there are no reasons for employing existing design principles, methods, and approaches, which have been developed and tested in moderate climatic conditions.

↘ **We promote Arctic Design as a lens that brings to bear sensitivity to human and non-human wellbeing:**

- This is a human activity to organize autonomous existence in an isolated/extreme environment through creating technologies.

- This is a general theoretical framework for design/development actions with a focus on human adaptation, safety, and wellbeing in the extreme environment.

RESEARCH QUESTIONS

Track 1: Self-determination and interdisciplinary collaboration

- How to "pack" existing disparate methods and approaches to design for an extreme environment (the North) into a coherent methodology?
- How (and whether) can Arctic design collaborate with other disciplines in finding solutions to global problems related to the interaction between human, technology, and nature?

Track 2: Real-life context

- How to stimulate the emergence and adoption of locally relevant technologies to facilitate people's living in remote, sparsely populated areas with harsh climatic conditions?
- How to encourage the self-organization and cooperation of users in the form of user innovation communities? How to develop and support collaboration within and between these communities?

↘ **Track 1: Self-determination and interdisciplinary collaboration**

• Hybrid content analysis of literature on the subject area: the combination of (human) expert evaluation with semi-automatic and automatic algorithms (by Active Systems Lab, ICS RAS);

• The method of complex evaluation and formalization of the factors that influence the success/failure of Arctic design projects (by Active Systems Lab, ICS RAS)

↘ **Track 2: Real-life context**

• Ethnographic methods of immersing into the context of making, using and maintaining Arctic technology (field trips);

• Participatory/codesign methods of product development
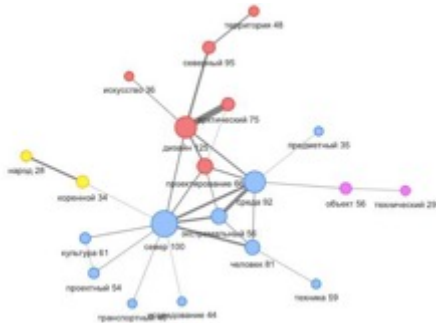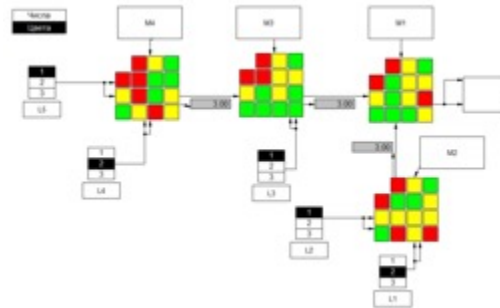
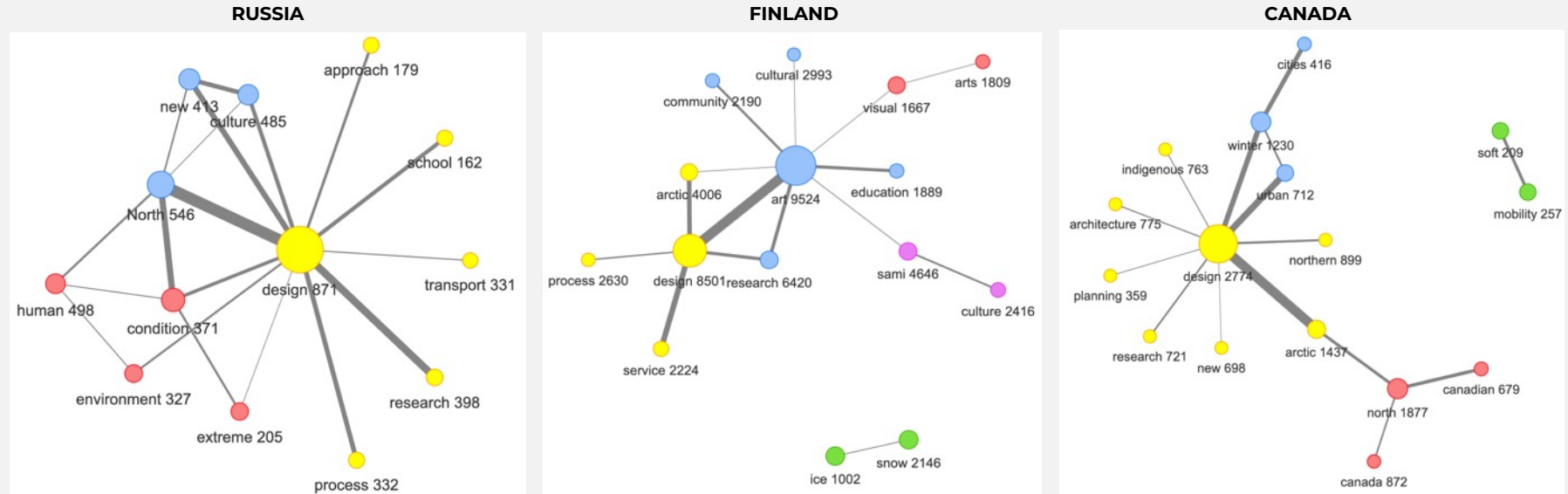Hybrid content analysis   Complex evaluation of AD projects   Product development

SUBJECT AREA ONTOLOGY

The focus is on three areas/countries representing different parts of the Arctic and, consequently, different approaches to Arctic design

Database: articles, monographs, Masters' and Doctoral theses

RUSSIA

FINLAND

CANADA

COMPLEX EVALUATION OF ARCTIC DESIGN PROJECTS

COMPLEX EVALUATION OF ARCTIC DESIGN PROJECTS

|	Dataset: 42 BA and MA Degree projects conducted at the Industrial Design Department, Ural State University of Architecture and Art, 1978-2019					
Project No	L1 / Relevance	L2 / Economics	L3 / Ethics and ecology	L4 / Aesthetics	L5 / Producibility	Total (3-point score)
1	3	2	2	3	1	3
2	2	1	1	2	1	2
3	2	2	3	1	3	3
4	3	2	3	3	2	3
6	2	2	1	2	2	3
7	2	2	2	2	2	3
8	3	3	3	2	2	3
10	3	3	3	3	3	3
12	2	3	2	3	2	2
13	2	1	2	2	1	2
14	1	2	2	3	2	2
16	3	3	2	3	2	3
17	3	1	2	2	2	3
18	3	3	2	2	1	3
19	3	3	3	3	2	3
20	2	2	3	2	2	3
21	1	2	2	2	2	3

COMPLEX EVALUATION: INTERMEDIATE OUTCOMES

There are 31 examples in the training set out of 243 possible

There are 105 possible convolution tree structures in total

There are 71 structures that implement the whole training set

There are 29 examples out of 31 with the worst quality of implementation
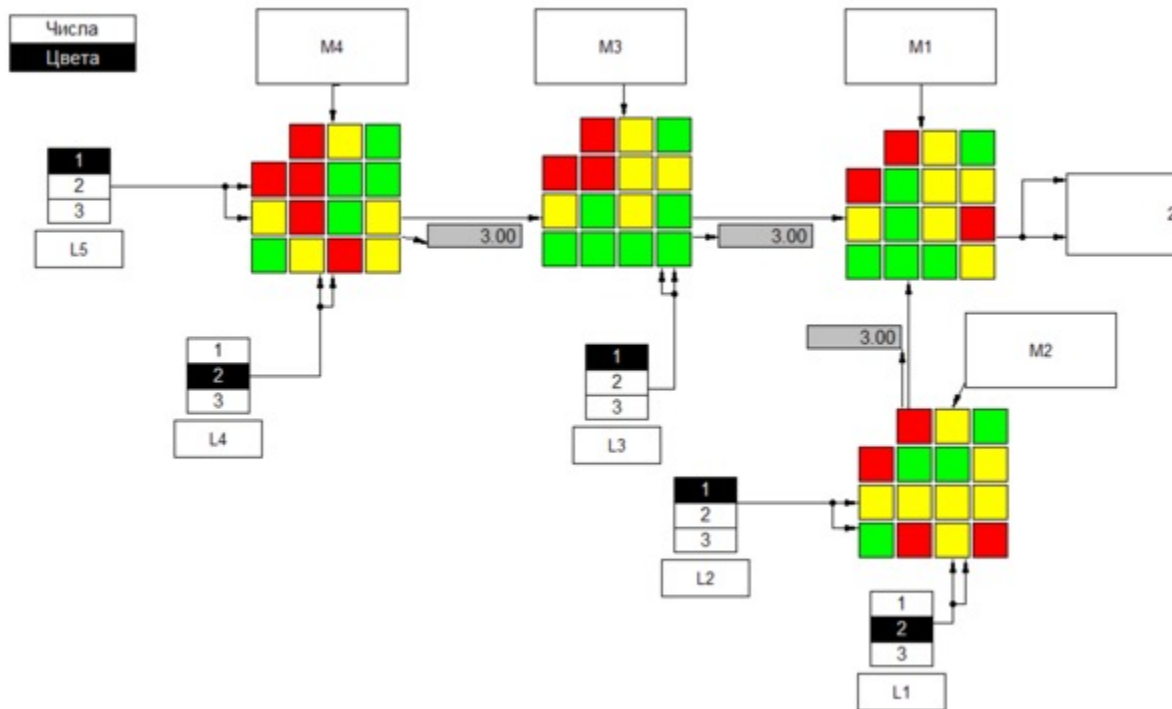
L1	L2	L3	L4	L5
relevance	economics	ethics/ecology	aesthetics/imagery	technology

ACTUAL MAKING: WORKING WITH DIY COMMUNITIES

A rural community that develop their own transport vehicles for everyday living in the North (utilitarian)

An urban community that develop their own transport vehicles for short-term visits to the North (sports, recreational)

Pozhva village, Permskiy Krai

Wolfgang Customs and E-max Laboratory, Moscow

ACTUAL MAKING: WORKING WITH DIY COMMUNITIES

A rural community that develop their own transport vehicles for everyday living in the North (utilitarian)
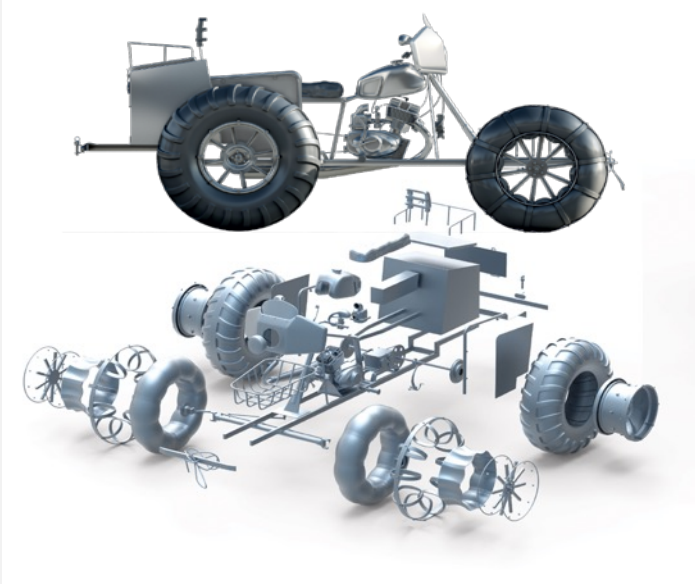

Pozhva ATV on low-pressure tires

An urban community that develop their own transport vehicles for short-term visits to the North (sports, recreational)

A pilot sample of an electric snowbike

DISCUSSION: IMPLICATIONS

↘ Theoretical:

The AD framework offers researchers and practitioners new insights into the relationship between humans and technology in the presence of an influential environment – it brings forward the aspects that are less visible in milder climates and more "civilized" environments

↘ Educational:

AD calls for integration of field study into the curriculum on a permanent basis: for transferring the traditional ideating-making-reflecting activities from the studio into the real-life settings

↘ Practical:

AD reveals its contradictory nature:

- it enhances general credibility for developing reliable technology that could also work in less extreme contexts (becoming literally "placeless"), and
- it challenges the very concept of "placelessness", which is totally unachievable, useless, and even harmful in case of the Arctic applications, because the Arctic is very patchy and climatically diverse and thus requires highly specific place-based design solutions.

ACKNOWLEDGEMENT

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