Design Competition towards Sustainability: A Case Study of Low2No International Competition in Finland

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In current mitigating-climate-change scenario, the urbanized area is believed to be crucial to the sustainable development of our living environment. In this respect, the low2No international competition has been recently held in Finland with an attempt to trigger systematic change on sustainable development nationally toward a low carbon future. In order to stimulate the systematic change, new competition forms are set rather than following the firm competition tradition in the country. The low2No international design competition is expected to serve as vehicle not only produces sustainable design solutions but also collect and distribute replicable knowledge on sustainability. Therefore, the low2No international design competition provided a new paradigm of design competitions to promote long-term sustainability design strategies in Finland.

By examining the applicability of analytical concepts of 'boundary objects'-BO (Star & Griesemer, 1989) and 'trading zones'-TZ (Galison, 1997), international design competition can be scientifically analyzed in order to avoid so-called 'complicit relationship' of design competition researches. Moreover, the procedural innovations of design competition can be elevated and analyzed based on BO and TZ approach. In this paper, we follow this line of research and propose to consider international design competition as devices designed to produce new 'trading zones' (Liang & Mäntysalo, 2013, in press). Particularly in the Low2No international competition, the procedural analysis on a magnitude of relevant documents, including design completion regulations, procedures, issues, the different roles of stake-holders and their individual perspectives is to be introduced by tracing the development of BO and TZ alongside the whole competition. Questions on how the design and planning issues are formed, interacted and solved and what factors affect the competition process through the Low2No international competition will be answered as preliminary findings.

Keywords: international design competitions, procedural innovations, sustainability design strategy, systematical change.

1. Introduction

In last decades, the importance of international design competitions has been more and more recognized as a standard form of guaranteeing design quality. International design competitions have been accepted widely as platforms jointly allocating better solutions especially with prominent urban projects. Currently, the application of design competition not only lay with design issues, but also in political, social and economic perspective in our built environment. However, the scientific analysis on the dynamics of international design competition is rare in literature. As Alexander & Witzling (1990) stated that most studies - even those that are more systematic - are 'prescriptive' or 'normative': they tend to draw on anecdotal knowledge and personal experience and explicitly aim for the promotion and improvement of competitions.

Malmberg (2006, 3) also concluded that there is a "confusion over the role of the competition itself and how it translates into the built piece of work". This unsatisfactory situation may root in the complexity of design competition, meaning that there are various levels of multidisciplinary communications among stakeholders, heterogeneous components of jury members with hybrid preferences, different technologies of representation (such as images, texts, models and spoken discourses) and their respective preconditions intertwining during the process of design competitions. Therefore, it is of great interest to analyse the complicate competition nature of design competition in a scientific way.

Nowadays, it is a common practice to utilize international idea design competition to gather design knowledge and resources on large scale urban project, which has a potential impact on the sustainable urban development. Lipstadt (2006, 11) further emphasized the importance of identifying competitions that were deemed excellent by those who participated in them, and to extract models for best, or at least better practice from them. Therefore, it is of prime value to scientifically address the model international design competitions regarding their increasingly role in our built environment in a sustainable way. The hidden interrelations of different components of international design competition and their consequent impact on the scientific approach, respectively, need to be clarified. In this respect, the scientific concepts of BO and TZ have enabled us to reveal the complexity of design competition, especially in terms of improving communications during urban development (Liang & Mäntysalo, 2013, in press).

Herein, the Low2No international design competition has been chosen as case study due to its pioneering and specific relation to Finnish national sustainability strategy, its representativeness of procedural innovations towards a model of sustainable urbanism. Based on the analytical concept of BO and TZ, we will analyse how the '*inter-language'* of BO and TZ has been constituted, interacted and evolved during the competition process, in order to clarify the vague nature of the competition and establish design completion knowledge for distribution among global stakeholders with interest to promote sustainable development in their respective area.

2. Research methods

Star and Griesemer (1989) first introduced the concept of "boundary object" in their historical analysis of coordinated interaction of actors from different "social worlds", including scientists, trappers, amateur collectors and university administrators, providing and cataloguing specimens for Museum of Vertebrate Zoology at the University of California, Berkeley, in the first decades of 20th century. As vehicles in coordinating such multi-cultural interaction between different communities involved, "boundary objects" are both "plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites" (Star & Griesemer, 1989, 393). In fact, the BO concept has been widely cited and adopted in the field of knowledge management of computer science, environmental science, management and design. In particular, they were further adopted in the field of urban planning and design in the late 1990s. Henderson (1991) adopted the BO concept on analyzing design activity especially with visual representation such as drawing and diagram, which has put forward the collective work in terms of facilitating the coordination and communication cross boundary groups involved. The concept of BO is closely connected to the concept of 'trading zone'-TZ,

introduced by Galison (1997) in the scenario of dealing with the dynamic and evolutionary processes of multidisciplinary interactions. Galison (1997) further employed the "trading zone" concept to explain such phenomena during the development of radar during WW II; how theoretical physicists collaborated with radio engineers to exchange information and services without a deeper comprehension of each other's respective disciplines.

In general, BO is believed to be sort of limited case of trading zone: "boundary objects might be thought of as a kind of time slice of a trading language" (Galison, 2010, 46). TZs concern coordinated interaction of scientists and professionals as a locally emerging and evolving hybrid language, whereas BOs were fixed artefacts and concepts for a certain fixed purpose of multi-cultural collaboration. Carlile (2002, 451-452) pointed out the effective boundary objects "establish a shared syntax or language for individuals to represent their knowledge"; and "to learn about their differences and dependencies across a given boundary". Mengis (2007) also specified that the shared language in a structure and format made boundary objects to facilitate the knowledge transfer and integration. This is also closely related to the 'inter-language' of TZ. Galison argued that 'inter-languages', as semispecific pidgins, or even full-fledged creoles, can be generated for the *local* coordination of different systems of discourse despite their *global* difference (Galison, 1997, 783; Gorman, 2010, 8). It is the "local infrastructures of shared concepts and instruments that had enabled such exchange" which Galison identified as 'trading zones' (Galison, 1997, 803). Mäntysalo, Balducci and Kangasoja (2011, 262) have stressed the importance of "practico-linguistical challenges involved in attempting to create local conditions for meaningful bargaining and compromising between the "subcultures of interest groups - a trading zone of planning, where each party involved would have the capacity to sufficiently grasp the meaning of issues and solution proposals to be traded with".

The aforementioned concepts have been already pioneered in several planning studies. Recently, in the book entitled '*Urban Planning as a Trading Zone',* numerous case studies, applying the trading zone and boundary object concepts in urban planning, have been collected by Italian and Finnish researchers, (Balducci & Mäntysalo, 2013). For example, Valeria Fedeli reported two selected case studies of ideas competitions in 'Grand Pari(s) de l'agglomeration parisienne' and 'Città di Città' cases. According to Fedeli, ideas competitions can serve as a "device designed and promoted in order to produce new 'zones for trading' around 'problems of the public' in conditions in which traditional planning tools and devices have shown their limits and aporia" (Fedeli, 2013, 41). Liang & Mäntysalo (2013, in press) has recently applied the research methods of BO and TZ in Baietan, Guangzhou international urban design and planning competition by monitoring the evolvement of 'inter-language' of BO and TZ.

The analytical concepts of BO and TZ are potentially helpful to understand how the interrelations come about and what they could produce in terms of generating knowledge. In the case study, the emerging need of redrawing the boundaries of mind and skill sets on sustainability through interaction of multidisciplinary stakeholders of an international design competition is particularly feasible using BO and TZ.

In current mitigating-climate-change scenario, a better understanding of the poineering form of

Low2No design competition to promote the communication across the boundary and to generate 'inter-languages' as knowledge innovations is to be established. Hence, it is greatly interesting to study the feasibility of the concepts of 'trading zone' and 'boundary object' in elaborating dilemmas and complexity involved in the international design competition of low2No in Finland, which are similarly confronted with a manifold of stake-holders with different disciplines and cultural backgrounds, in need of gaining systematic innovation on sustainable strategy development.

We will follow the line of research and consider international design competitions as devices designed to produce new 'trading zones' as communicative approach. Design competition as a 'designed trading zone' (Fedeli, 2013, 41) is able to provide us an empirical case to identify, trace and analyze the interrelations of different stake holders involved in connection to local conditions. Analysis from the reflection of the newly-reformed low2No international design competition, will supply us a pair of lens to look into the urban project, allowing us to analyze how the design or planning issues are defined, evaluated and connected to the urban development. The theoretical foundation provided by these concepts will enable us to trace the flow of 'inter-language' of the TZ and BO, how boundary objects of international design competitions have been interacted, developed and constituted trading zone, to facilitate mutual "translation" between actors from different fields. Following questions is to be answered:

1. How does the international design competition of Low2No develop innovative strategies for sustainable development in Finland?
2. Is Low2No international design competition analysable in terms of BO and/or TZ concepts?
3. What are the important results through the analysis?

The current research is based on documentation analysis and interpretation from different levels of archives crossing government laws, official design competition announcement, the competition request for qualification, and articles document competition process at the first place and official announcements. Thanks to the documentation laws on design competition in Finland, there exist fruitful publications on the topic of the Low2No international design competition from governmental, professional and public level and content considerable data. Translations are strictly related to the original resources. The reliance on document interpretation could be compromised due to the lack of first-hand information. However, at the first stage of our research, the authors focused on the dynamics of the international design competition in order to gain more general insights of improving competition procedures.

3. Case study

3.1 Design competition initiatives: a platform of stimulate systematic change

In Finland, two-thirds of the greenhouses gas emissions originated from fossil fuel usage in the energy production sector (Nenonen, 2010), and this value is comparably higher in Nordic counties. With ambitions of transforming Finland into a carbon neutral country, it was recognized[1] by the

[1] Refer to an interview with Esko Aho-the leader of SITRA : "We [SITRA] recognized that most of the changes required now are systemic… The need now in Finnish society is not related to technological capacity or to skills, but how we use them and take full advantage of them." - Bechthold & Kane (n.d., 2011), P5

SITRA - the Finnish Innovation Fund - that a systematic change from social, political and technological perspectives is inevitable. With the international opening of pre-qualification process on participators, new competition forms are introduced to provide opportunities of rethinking current sustainable strategy through designing a sustainable city block in Helsinki, Finland. As presented in the competition brief: "*We hope that a model of sustainable urbanism emerges from the proposals that will not only serve the City of Helsinki and its inhabitants, but more broadly, be a learning model for development globally*"[2]. The Low2No international design competition is supposed to generate replicable solutions for radically sustainable design, leveraging its reputation and institutional knowledge of private industry and government and eventually triggering systematic changes towards a low carbon society in Finland.

The competition site is located on 100 hectares reclaimed land areas of Jätkäsaari, one of the large redeveloped areas along with the relocation of Helsinki's port facilities to the eastern edge of the city in 2008. The aim of the competition is to "*to design a large building complex on an approximately 3/4 hectare site on the reclaimed goods harbor at the western edge of Helsinki's central business district*"[2]. The location of Jätkäsaari city block came out from the rounds of negotiations. After meetings with the deputy mayor, real estate department, Helsinki's mayor and the planning department, the requirements for the Jätkäsaari city block were significantly loosened to the needs of the competitions. On December 11, 2008, the city council voted to give SITRA the corner block of Jätkäsaari area.

The interrelations of stakeholder were rather complicate, as the organizer - SITRA - determined to trigger national systematic change by stimulating knowledge input by introducing a new form of international design competition, the Low2No case. However, the external knowledge input not only requires preconditions of incubation but also transformation in connection with local conditions.

[2] As quoted from the design competition brief of Low2No competition. Retrieved 26 Nov. 2013 from http://www.low2no.org/pages/resources

Figure 1: Jätkäsaari goods harbour, courtesy of Suomen Ilmakuva Oy
Source: Low2No competition brief

3.2 The shift on competition rules, brief and request for qualifications

Design competitions have been vastly used in the area of education, culture and area planning in Finland. Most of them were administered by the Finnish Association of Architects (SAFA), and they have been accepted as a common method to evolve innovative and qualitative proposals (Kazemian & Rönn, 2009a). The development of the design competition policy in Finland heavily rooted in the foundation of SAFA and partly influenced by the Swedish one as well (Huotelin & Kaipiainen, 2006; Solla, 1992). Over the past decades, there were over 2000 design competitions held in Finland. International design competitions were accepted as tools for accumulating design knowledge in urban and regional development of Helsinki such as the international design competition of greater Helsinki vision 2050. Almost all open competitions in Finland were well documented and publicly accessible; the results of invited competitions were published on the SAFA website, the museum of Finnish architecture and in the appendix of the Finnish architectural review that is periodically published by SAFA' (Huotelin & Kaipiainen, 2006). These open sources provide information for researchers, and make the competition procedures more transparent for the public. The Finnish competition rules are considered as the result of 130 years of continuous improvement and have steered the development of the architectural system (Huotelin & Kaipiainen, 2006). However, in order to promote systematic innovations, new forms of competition have been specified by STIRA: "*...people to redraw the boundaries of how they think, and reposition their skill sets. (..) Without it you will have a competition that is all about what is already known, and the standard format with standard results*."[3] The intention of redefining the boundary of mind and skill sets on sustainability is challenging with respect to the propounded competition tradition in Finland.

[3] As quoted from the Interview with Steinberg, 11 Feb, 2011 by Martin Bechthold and Anthony Kane (2011), P8

New competition rules are set for facilitating the scopes of the Low2No international design competition. With a review of competition rules of SAFA and Low2No, the rules of Low2No emphasized the type of competition as "*sustainable development competition which has a significant architecture component*"[4]; the fulfillment of requirements of public procurement legislation is also highlighted. The competition was publicly announced both on design objectives and process.

Kazemian and Rönn (2009b, 6) argue that the competition system in Finland is one of the most effective in the Nordic countries in terms of implementation, based a research of architectural competitions carried out during 1999-2000, which highlighted the strong competition culture of consensus among jurors and considered "disagreements among the jury members in the final statement as something dangerous as that have to be avoided". In the new rules concerned with Jury of competition, the requirement of agreements of the jury panel is changed from "*a quorum shall be formed by the entire jury panel*" of SAFA rules to "*a quorum shall be formed by 2/3 of the jury" of Low2No rules*" to increase the tolerance of advancing, innovative yet somehow controversial proposals, which is considerably deviated from the competition tradition in Finland.

Moreover, requirements on the composition of jury of "*At least 1/3 of the judges must be professionals in a relevant field*[5]*, and a proportion of these must be independent experts*" from the SAFA competition rules are removed in the new low2No rules. A technical expert evaluation from the Helsinki University of Technology was proceeded to evaluate the feasibility of design proposals and presented to the jury. Eight individuals constituted the jury and three of them are academic experts from the United States.

In the section of adjudication of the competition, the requirement of "*an entry which deviates essentially from the binding design requirements, as set out in the competition conditions, cannot be awarded a prize in an open competition, but it can be purchased*" was also removed in the new Low2No competition rules in order to leave more spaces for the design innovations. Moreover, a study trip of Finnish stakeholders to sustainable example projects in California was organized to raise the awareness on sustainable design.

Form of competition are specified as two-stage with open request for qualifications-RFQ and continuation of best team selected from the RFQ started from March 2009 to April 2009. In the first stage 74 applications from 23 countries were received, out of which 5 finalists were qualified to propose further sustainable development strategies. 'Multidisciplinary team expertise' and 'systematic thinking' were highlighted with a wide 'interdisciplinary competency' in the RFQ, which deviate from the Finnish traditional competition practices.

[4] Quoted from the international low2No design competition rules, P1 Quoted from Martin Bechthold and Anthony Kane (2011), P8

[5] A professional is here defined as:
- a person who is a qualified architect or who has the qualifications set out in the Land Use and Building Act and the orders issued by virtue of it, or
- a person with an education which, in the case of an open competition, has been approved by the SAFA competitions council, or, in the case of an invitational competition, by the SAFA competitions secretary. Such a person must be sufficiently qualified to evaluate the designing task. - SAFA competition rules

Figure 2: the criteria of RFQ Source: Low2No Competition RFQ

In the Finnish procurement laws, it is required that jury evaluation report should be publicly accessible. A committee within SITRA reviewed and scored the respondents based on the following minimum criteria: "*Quality of the team 0-40 points; Experience of the team members 0-40 points; Evidence of systemic thinking 0-20 points*"[6]. It was pointed out that these interdisciplinary criteria could "*exclude Finnish practices, instead of favoring international teams*"[7]. After the first stage of RFQ, none of the five shortlisted[8] teams from the RFQ was from Finland, which led considerable controversy in the host country. Some Finnish architects argued the feasibility of promoting Finnish knowhow without involving of Finnish experts (Bechthold & Kane, 2011). In the end, three of the finalists involved Finnish firm in their consortium (see Figure 4). Bechthold and Kane (2011) stated[9] that SITRA considered the integration of the external knowledge can trigger the national systematical change instead of following traditional local design culture. The international five finalists included expertise from various disciplines which covering investment consultants, traffic, customer behavior, design, engineering and planning fields (see Figure 5).

[6] Quote from the competition RFQ documents, P3.
[7] Quoted from Bechthold & Kane (2011), P11
[8] There are Arup (London), BIG (Copenhagen), REX (New York), Rose & Partners (Cambridge, MA) and WSP (London).
[9] "Systemic change was bound to come from outside, with SITRA acting in its natural role as translator and mediator between languages and cultures", quoted from the interview with Steinberg, 11 Feb., 2011- Bechthold and Kane (2011), P11

C_LIFE	ARUP	Lontoo, Iso-Britannia
	Sauerbruch Hutton	Berliini, Saksa
	Experientia	Torino, Italia
	Galley Eco Capital	San Francisco, USA
CRADLE OF INNOVATION	WSP Group	Lontoo, Iso-Britannia
	Heatherwick Studios	Lontoo, Iso-Britannia
	B & M Architects	Helsinki, Suomi
	JKMM Architects	Helsinki, Suomi
	Space Syntax	Lontoo, Iso-Britannia
	Helsinki University	Helsinki, Suomi
	AA Palmberg Ltd	Helsinki, Suomi
	Pekka Himanen	Helsinki, Suomi
LOW CARBON – HIGH URBAN	Peter Rose & Partners	Boston, USA
	Michael Van Valkenburgh Associates	Boston, USA
	Guy Nordenson and Associates	New York, USA
	Matthias Schuler, Transsolar Climate Engineering	Stuttgart, Saksa
	Mobility in Chain	Milano, Italia
	ARO Architectural Research Office	New York, USA
	Peter McKeith	St. Louis, USA
RECIPROCITY	Bjarke Ingels Group, BIG	Kööpenhamina, Tanska
	Vahanen	Helsinki, Suomi
	ARUP Foresight Innovation	Kalifornia, USA
	Transsolar Energietechnik	Stuttgart, Saksa
	Anttinen Oiva Arkkitehdit AOA	Helsinki, Suomi
	Masu Planning	Kööpenhamina, Tanska
	Passiivitalo.fi	Espoo, Suomi
	Pasi Mäenpää	Helsinki, Suomi
	Mikko Jalas	Helsinki, Suomi
REBUILDING	REX Architecture	New York, USA
	Transsolar Energietechnik	Stuttgart, Saksa
	Magnusson Klemencic Associates	Seattle, USA
	Bureau Bas Smets	Bryssel, Belgia
	Now Architecture	Helsinki, Suomi

Figure 4: The composition of five finalists Source: Jury report

In order to foster a comprehensible design proposal, four central design objectives are highlighted in the competition brief for the second stage: "*energy efficiency; low to no carbon emissions; high architectural, spatial and social value; sustainable materials, methods & operations*"[10]. The broad defined design concepts of low carbon design were set up in order to trigger potential systematic changes. As shown in the title of the competition, the low2No represents a strategic meaning of transition from low carbon to carbon neutrality situation. According to Mr. Justin Cook - the sustainable design lead - who helped to shape the design objectives of competition, the focus on carbon design objective will supply connecting points to systematic innovation[11]. The connecting point of the 'carbon' focus of design issues to a certain degree promoted the cohesion and integrity of the design proposal.

[10] Quoted from the competition rules of Low2No design competition

[11] "There was an increased appreciation for the potential of something like this, the potential impacts, and a recognition of how all of the elements of a competition with a wide scope would align with all of the activities and goals of SITRA. Once we made that connection (ED: to carbon) the competition took off as a much bigger thing."-- Bechthold & Kane (n.d.,2011), P8

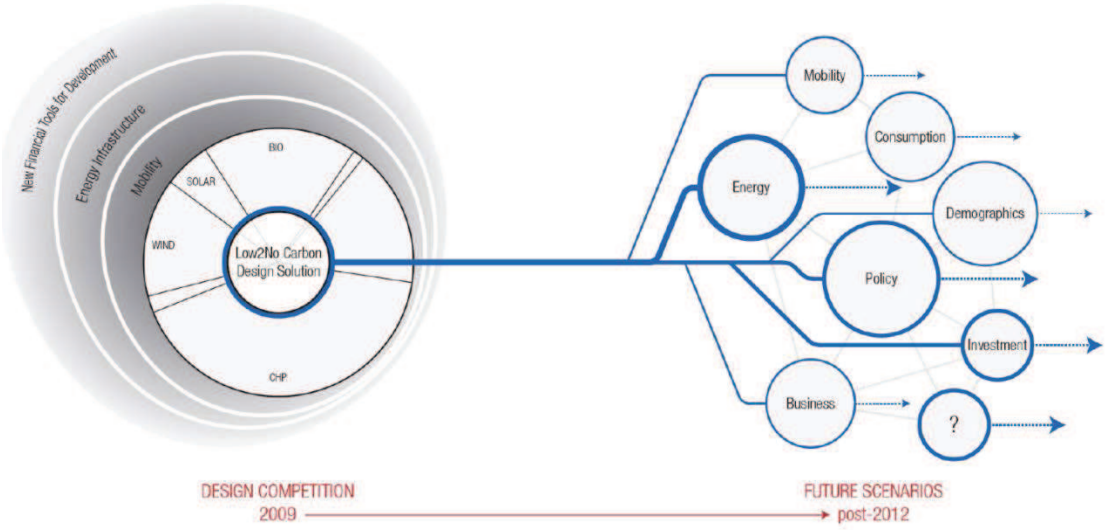

Figure 3: The Low2No competition design issues Source: Low2No brief.

Bechthold and Kane (2011) argued that the long history of societal consensus and common action constitutes the basis of change on interrelations of stakeholders. It shows that the shifts on competition rules, brief, request for qualifications and project site were made possible due to the strength of organizer, SITRA, which are considered as the strong promoter for innovation and could report directly to the Finnish parliament.

3.3 Design competition evaluation and implementation

The qualified competing teams from the RFQ will propose indicators which measure the degree towards carbon neutrality, and also provide a new approach compared to the traditional Finnish competition. The qualified five teams are required to submit three tasks from July 8, 2009 to August 17, 2009, which included following works:

"1. *A framework for sustainable development that was replicable and could be adapted to other sites.*

2. A system of indicators that could provide measurable evidence of how carbon neutrality was accomplished.

3. A design solution - referred to as the 'vision' in the brief - to serve as a tangible example for the implementation of the sustainability strategy, testing the degree to which it allowed for soft accomplishments such as high spatial value, vibrant neighborhoods, and changing user behavior to be realized." - Competition brief of the Low2No design competition

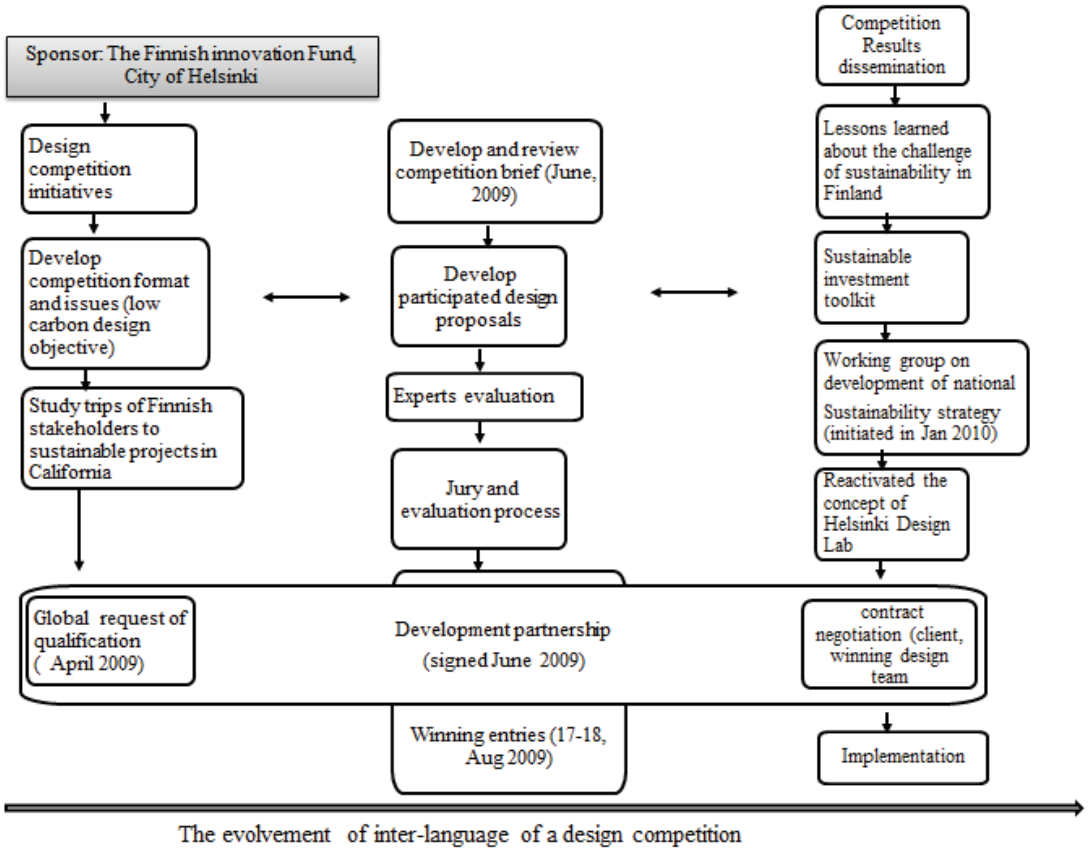

Diagram 1: the procedural flow of Low2No competition as described by the author

Eight evaluation criteria were also specified[12] to score the design proposal from the five finalists. However, critical voices on the conflicts between the ambition and time limits of the low2No competition were raised as well (Bechthold & Kane, 2011). The design tasks and evaluation criteria have functioned as infrastructures for fostering expected outcomes of replicable knowledge on further sustainability development national wide. At this stage, texts, diagrams, models and other types of technics of representing the design proposal came out as kind of boundary objects to promote the development of 'inter-language' at the professional level. The jury played a crucial role to guide the development based on the evaluation criteria.

The competition brief guided the subsequent evaluation of the five finalists, especially with elements concerned with sustainability in a systematic approach. For example, the financial strategies developer from proposal C_life claimed that they were inspired by the criteria of competition brief, which required to "*consider how their proposals generate wealth across stakeholders and find ways to define price in a way that does not externalize costs onto society*" (Bechthold & Kane, 2011, 17). As Lisa Galley, who interacted with the design proposal of Arup & Partners reflected that: "*This competition was an example of a process where the disciplines were*

[12] "The efficacy, sensibility and rigour of the total low/no carbon solution; the efficacy and robustness of the broader, holistic model of sustainability; the robustness and simplicity (of the approach and use) of the sustainability indicator framework; the urban and architectural quality, and the near and long term implications of the design proposals conveyed through the visual representation of the vision; the ability of the framework/strategy for the proposed approach to be replicable within similar contexts; the feasibility of proposals including the overall economic efficiency and life cycle costs."- Low 2No Competition brief

all brought in on the front end rather than later on"[13]. Various perspectives such as architecture, engineering, climate landscape, and development finance and mobility behavior were presented in the design proposal. The shift on competition rules, brief and request for qualifications were supposed to set up the preconditions for fostering innovative knowledge through the competition. In the competition brief, the original master plan was challenged with the competition design proposals. The Low Carbon - High Urban competition design proposal focused on 'urban scale' and radically proposed a new master plan. Indeed the 'urban scale' were emphasized from the requirement of competition brief with the statement of first phase of master plan will be realized by 2012. Even it is not directly disqualified by the jury according to the new competition rules (see P7), as Marco Steinberg - the director of strategic design of low2No put: "*We didn't want to exclude the opportunity that somehow the master plan could be impacted, but you can't erase the master plan. You have to take it as a given and figure out where the space for opportunity is. I hope we communicated to the teams that we were interested in an approach and not a solution*"[14]. But this opposition to old master plan lowers the feasibility of design proposal[15], since the infrastructure construction of the old master plan already began. The Rebuilding 2.0 proposed a high rise tower and also broke the zoning limitations from the old master plan. The idea of constructing high rise tower was intended to increase the urban density. However, it was considered deviated from the Finnish building culture by the Jury.

	c_life	Reciprocity	Rebuilding 2.0	Low-Carbon High-Urban	Cradle of Innovation
Architecture	Sauerbruch Hutton	BIG AoA	REX NOW Croxton Collaborative*	Peter Rose & Partners ARO	Heatherwick Studios B&M Architects JKMM Architects
Engineering	Arup		Magnussen Klemenic Arup New York	Guy Nordenson and	WSP Group
Climate Landscape	Arup Arup	Transsolar Masu Planning	Transsolar* Bureau Bas Smets	Transsolar Michael Van Valkenburgh and Associates	WSP Energy WSP Finland Helsinki University AA Palmberg
Development Finance	Eco Galley Capital	Vahanen Mikko Jalas (economics)	Jonathan Rose Companies		
Mobility Behavior	Experientia	Pasi Maenpa (urban sociology)		Mobility in Chain	Space Syntax
Other		ARUP Foresight (innovation) Passivitalo (passive houses)	Front (facade consulting) 2x4 (graphic design)		Pekka Himanen (Social Philosophy)

* specialty in sustainability

Figure 5: The five finalists Source: Bechthold & Kane (2011).

Regrets on insufficient communications occurred with the lack of presentation to the Jury in person[16]. In the end, the C_life proposal led by ARUP's London office won the design competition with main focus on "human behavior" and "community development", taking a combined bottom-up and top-down approach. "Energy strategy", "carbon neutral policies", "financial strategies such as green mortgages" were mentioned to respond with the competition brief and evaluation criteria of "feasibility including economic efficiency and life cycle cost". The "ethnographic data", "occupant behavior such as 50 ways to change human behavior" and "information infrastructure such as link information campaigns, legislation, economic frameworks,

[13] Quoted from Bechthold and Kane (2011), P8
[14] Quoted from Bechthold and Kane (2011), P18
[15] "…But judging a proposal that challenged every aspect of the existing master plan was difficult for the Jury…Major changes for phase 1 of the master plan—which included SITRA site—were simply unrealistic… " quoted from Bechthold and Kane (2011), P18
[16] As Steinberg agrees "*I think it would have been nice to have the teams engage in a discussion with the jury. Ultimately we were trying to weigh their intellectual capacity and experience.*"- quoted from Bechthold and Kane (2011), P20

and civic infrastructure to encourage both a grassroots, and government regulated, movement toward sustainability." were suggested from the C_life. Project indictors including "overall measure, carbon emissions, energy, transport, and quality of life" with detailed measurements and rationale were proposed. The architectural design solution of C_life is rather "generic suggesting its possible adaptation to various contexts."[17], doubted on some jurors with architectural and technical perspective; as ranked lowest in the technical report in the quantitative evaluation (Bechthold & Kane, 2011, 18). The proposal was based on the provisions of old master plan. As Alejandro Gutierrez, the team leader from Arup's London office admitted that they did not '*challenge the master plan in the traditional, formal way*' (Bechthold & Kane, 2011, 20).

"*The team's proposal best met the Low2No competition assessment criteria. Furthermore the Jury found great promise in the outlined strategy that combined both a clear top-down as well as a bottom-up strategy for leveraging the Jätkäsaari opportunity in the spirit of the Low2No challenge. The jury felt that particularly the consumer/behavioral framework coupled with a monetary/economic model brought the best balance to this holistic strategy*" – P16, Low2No Jury Final Report

At the procedural level, the shift of competition rules and RFQ already put up the change on the profound national competition tradition. Rounds of negotiations on prioritizing the Low2No competition also reconstruct the interrelation of the stakeholder and their perceptions. Key words such as "systemic change", "sustainable development", "quorum", "composition of Jury", "adjudication of competition", "multidisciplinary team expertise", "systematic thinking" and "interdisciplinary competency" were more frequently put forward to constitute the common shared language to promote the competition. At the knowledge level, the shift of competition brief also practically guided the direction of generating knowledge. In particular, requirements of learning about differences and dependencies across a given boundary were specially emphasized in the case from the preference of choosing international design teams. The shifts on competition rules, brief and RFQ considerably constituted boundary objects for fostering and generating "inter-language" as the knowledge innovation.

It was realized by some experts that there were conflicts between master plan and the ambitions of the competition[18]. The conflicts between the 'systemic innovation' and the existing conditions are obvious, and it is hard to define to which extent the design proposal should position itself by just following wording of competition brief. As Galison (2010, 44) stated: "images, symbol systems, calculational and diagrammatic schemes - even complex objects - could be part of a generalized notion of language that is far from 'just words' in the trading zone". As we reviewed from the competition process, the shift on competition rules, brief, RFQ and interrelations of stakeholders constitute effective boundary objects to foster the 'inter-language' as the final outcome of innovative knowledge. However, it is critical to increase the degree of interaction among stakeholders to avoid possible communication gaps due to the time limits of the competition. As

[17] Quoted from the design proposal of C_life.

[18] "There was a contradiction in how the competition was set up. It was clear that the competition was for a specific building on a specific site in the existing master plan. It was equally clear that the outcome they were looking for was systemic change at a large scale. Those two things were in conflict."- quoted from Martin Bechthold and Anthony Kane (2011), P20

one action from the pre-Jury evaluation phase, the study trip of Finnish stakeholders to sustainable example projects in California to raise the awareness on sustainable design definitely helped to construct the grounds of the 'inter-language'. However, the lack of interpersonal presentation during the competition evaluation definitely reduced the degree of effective communication. If we ought to set up a better communication environment, we can synthesize a more inclusive 'inter-language' not only from the design excellence of the winner but also other finalists.

Through networks established by the Low2No competition, further steps were proceeded to speed up the communication of sustainability such as the "sustainable investment toolkit" and "Helsinki design lab". Moreover, a working group on national sustainability strategy was initiated in January, 2010 which included heterogeneous stages of interactions by stakeholders and public. In particular, in one session of the "Helsinki design lab", it also included some members of the other five finalists. Up to this phase, it is important to concrete, transfer and integrate the 'inter-languages' in connection to local conditions.

Communications and negotiations between the developer and the winning team are proved to be problematic with concerns of the cultural gaps and heterogeneous working dynamics; they found that they were talking in different languages[19]. In the case study, much was done in order to put the 'inter-language' connected to the local conditions. A series of conferences, workshops and working groups were organized to construct the common basis for understanding on design approaches and working methods by SITRA, which functioned as culture mediator. This practically helped to the evolvement of 'inter-language' generated by the competition, which are interacted with local conditions. In the case study, the focus on input of external knowledge to stimulate national systematic change should connect to the corresponding interactions to localize the knowledge.

4. Preliminary findings

This study demonstrates that the low2No international design competition is not only a platform of producing design solutions, but also an infrastructure to generate knowledge in low-carbon urbanization development. Based on the in-depth analysis, we came to the key question of how the organizer perceives and define the design issues, how they organize the design competition, who participate the design competition and how they are evaluated. In short, how to produce and develop an inclusive, appropriate and integrative enough 'inter-language' of the design competition? How to facilitate the flow of 'inter-language' associated with project conditions? The shift on competition rules, brief, RFQ and preconditions practically served as effective boundary objects to facilitate the production of 'inter-language' as outcome. Moreover, the strong commitment of the organizer and societal consensus of stakeholders actively pushed the evolvement of 'inter-language'. The competition evaluation process further functioned as boundary objects to promote the evolvement of 'inter-language' to the professional level. And the competition implementation process supplied the chances to transform the 'inter-language' in connection with local conditions. However, there were still some gaps which hindered the knowledge development. In contemporary competition format, either open or invited, the

[19] Steinberg was concerned: "This thing is slipping out of our hands. We are talking different languages here."- Quoted from Martin Bechthold and Anthony Kane (2011), P26

professional adviser is responsible in assisting of selecting the jury board, set up the procedural rules (competition conditions) and defining design issues, which will be obeyed during the competition process. The Jury will evaluate the competitors and select winners and distinguish the qualities according to the evaluation criteria specified in the project program document: the competition brief with consensus among them. The roles of sponsor, professional adviser and other possible parties are intertwined during the competition specification phase and put a major impact on the decision of evaluation criteria on choosing the winning entry. However, it is possible that the competition design issues are not appropriate along with the development of competition process. Moreover, the evaluation criteria of selecting winning entry may be not accurate in connection to the competition conditions and brief. Even the Jury could possibly judge the competition proposals with hidden personal preference instead of following the evaluation criteria. In particular, competitors may also take the seemingly known or imagined preferences of the jurors into account during the design process. Major documents such as the competition brief are presented in texts, which also easy to raise confusions for the participators. This emphasized the importance of competition procedural innovations. The rigid formats of contemporary design competition require an intensive degree of effective communications between the organizer, professional-adviser, competitor, client and user, which may largely affect the development of 'inter-language' of design competition. As in the case study, the series of conferences, workshops and groups after the competition practically helped to promote the communication. In particular, the integration of Finnish experts in the process of design proposal development also affected the degree of local coordination and potentially led to the confusion of positioning themselves between of innovation and pre-existing conditions.

This paper also probes and proposes to use the analytical concept of TZ and BO to scientifically analyse international design competition. Design competition researches are often criticized for their 'complicit relationship', from which individuals may derive their data from personal experience. This study allows us to conceptualize the flow of international design competition and thus improve the communication and cooperation in our built environment. The conceptual tools of TZ and BO have been proved to be helpful in conceptualizing the vague nature of international design competition. Further, this research emerges a reminder that the challenges on international design competition are not only concerned on allocating best design solution, but also how they are connected with our built environment.

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