

# **Design Wizard:**

## **Tools to Accelerate the Outline of Innovation Process**

### **Regarding Co-Design Structure and Project Scope**

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### **Abstract**

This article proposes the basic outline of a tool to provide a consistent basis for successful innovation in co-design. Forms of interaction are currently affected by technology, meaning a great array of collaboration and innovation pathways. To achieve desired outcomes, project outline process can include steps to devise the appropriate strategy. Definitions and main concepts of innovation and collective interactions are transformed into stages to adequately evaluate the appropriate approach, partners and concepts in defining the innovation pathway. Essentially open while sustained by academic research, classification and theoretical concepts by OECD, Verganti and Pisano, Krippendorff and Dewey, we propose a process tool in three phases (Requirements and Partnership Strategy, Innovation Sources and Resources and Conceptual Design Approach) to methodologically assist in project scoping and assess the most appropriate 'co-design innovation strategy'.

### **Keywords**

Innovation, Co-Design, Design Methodology, Meta-design, Management Productivity.

### **Introduction**

The analysis method proposed in this article intends to speed decision making by assisting project scoping carried on by different initiatives (companies, individuals, universities, government and non governmental organizations) through guided brainstorming sessions and kick-off innovation meetings. It is about designing from design theory, or objectifying social memory in media domain (Levy, 1993, p.127). This research process consists in mapping options of co-design scenario. Strategy, trade-offs and core principles were transformed into structured analysis steps in order to scan possibilities offered in the innovation context.

The organization of concepts in image and interactive tools facilitates the use and creates mnemonic devices for advanced design. The process is named elaborative rehearsal, since it engages the learner via multiple presentation media and results in deeper processing of information. "The key determining factors as to how deeply the information is processed are distinctiveness of information, the relevance of the information and the degree to which the information is elaborated." (Lidwell, Holden and Butler, 2003, p. 60)

In order to provide a more consistent basis for successful collective innovation in design, systematization contributes to reach high-performance levels in smaller time frames.

Systematization can also encourage the development of products and services by increasing assertiveness while offering consistent 'check-points' to be understood and shaped according to specific needs and circumstances.

Because the process assists in the definition and the sharpening of strategies, it can also be applied simultaneously to developing conceptual projects (ideation), supplying information for devising implementation plan or steps, and understanding and exploring innovation design scenario. We aim to develop a pathway of aspects to be covered, used or discarded in the process, which can easily be adapted to individual circumstances. We aim to lower complexity in making choices through feedback from given information.

The article perspective is the application of design thinking into project development, i.e., designing design process. The final proposition (its process presented here) is a layout of available innovation route options in the form of tools that allow zooming in and out of each project circumstances, favouring the recognition of other agents and trade-offs among different forms of association. We assume that objective realities play part in project development as well as the participant's intrinsic subjectivity, and two last elements, those of group formation (the spirit of the arrangement) and of historical context (the spirit of the time, or *zeitgeist*). This makes design activity a hybrid discipline with social sciences, art and natural sciences, working with both static laws and transitional (contextual) elements. Our perspective is derived from initial research by scholar Kees Dorst (1995), specifically relating to the suggested systematization of a designer's actions and the apprehension of the situation<sup>1</sup>. Also from architect and design researcher Nigel Cross (2006, 2010), we adopt the specific perspective of 'design thinking' cognitive aspects; and from the practical and contextualized application based on market expertise by IDEO co-founder Bill Moggridge (2007, 2008), we follow the interdisciplinary matrix of design practice and commercially focused 'design thinking'.

This is a design management view of innovation process; enlightening designers who are either managers or agents in an innovation scenario to better understand 'design situation', take advantage of and/or shape the circumstances. "Almost all companies have a marketing strategy or a sales strategy, but only very few companies have an innovation strategy" (Lindegaard, 2010, p.4). And we believe this tool might assist in changing this scenario.

In the innovation process, a lot of problems will arise simultaneously, such as: "Who to work with? How to access target markets? How to brand the venture? How to budget? How to raise funding? How to find business partners and collaborators?" (Hillner & Leon, 2013, p.342) At the moment, we will focus on aspects relating to key partners and collaborators by applying design principles to design research, i.e., transforming theory into means of action through design as well as defining the project scope, that have a role in determining who should participate in the innovation process.

## 1. Innovation

Innovation process is part of any initiative's strategic behaviour.<sup>2</sup> It determines the position occupied by the initiative in its niche, thus affecting the projected image and its final

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<sup>1</sup> In studying design as a process, one is looking at the process-component of largely content-based decisions. (...) We are strongly convinced that in order to obtain a deeper understanding of the design activity, design methodology should now start to address at least some more aspects of the design situation (Dorst, 1995, p.265).

<sup>2</sup> We choose the broad range of the term initiative as "ability to assess and initiate things independently" (Apple, 2009) to indicate companies, individuals, universities, governmental and non-governmental organizations, once innovation is by no means a behaviour adopted in exclusivity by any of these subjects. Despite the fact that current research has been partially based on business administration literature, up to this point there are no evidences indicating that parties with aims other than profit would not benefit from

perception.<sup>3</sup> Such process benefits from synergy of all the involved agents (Kotler, 1994, p.282).

For the sake of reference, we will consider definitions of innovation by Cox and OECD. According to Cox, it consists of “the successful exploitation of new ideas. It is the process that carries them through to new products, new services, new ways of running the business or even new ways of doing business” (Cox, 2005, p.2). The Oslo Manual covers innovation in the business sector at the level of the firm, dividing it into four types: product (both entirely new and significant improvements in goods or services), process (production and delivery methods), organizational (changes in business practices, in workplace organization or in the firm’s external relations) and marketing (changes in product design and packaging, in product promotion and placement, and in methods for pricing goods and services) (Organization for Economic Cooperation and Development [OECD], 2005, §26, 32, 33). Therefore, innovation results from a sequence of creative, executive and operational activities in search of originality as a competitive or progressive differential.

Innovation can stem from an array of occasions and contexts. It often takes place as identification of opportunity and demand. This process can be made effective by the application of several techniques (BSI, 1999, p.21). The nature of innovation will derive from new approaches to: paradigm, knowledge, technology, product, style, process, demand, material and source of material. Of the many methods, we will highlight the more relevant aspects for co-design practices and develop further for the sake of the present argumentation: partnership evaluation as co-design strategy, knowledge mapping and analysis of customer product experience cycles.

## 2. Phase 1: Requirements and Partnership Strategy

An understanding of the distinction between network, group and team will help define the type of co-design.

A ‘network’ is a flexible arrangement between components, an informal structure. Its elements preserve a degree of uniqueness or individuality, and interactions determine its bonds. Categories are secondary to its characteristics and they are not final but mostly circumstantial to interactions. Through idiosyncratic actions, there are connections and interactions.

A ‘group’ shares paradigms or cognitive matrices. The main characteristic of a group is that the elements are part of the same category. Among group members, there is identity but not necessarily direct interaction. We can quote examples of groups such as: the sum of workers in a firm, people who share the same nationality. By the same bond that a group is inclusive, it is also exclusive in the sense that it defines its participants and those external to it.

In the notion of team, participants are not only gathered by a common characteristic, they are effectively part of the “same side”: they work together. The concepts of integration and

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attempting to improve aspects of their operations and resulting artefacts by innovation. When the innovation initiative is part of a formal institution, it is intrapreneurial. When it intends to form an institution, it is entrepreneurial. In both cases, alignment with vision and philosophy is essential. In the former case, vision alignment is made by endorsement, in the latter, by tailoring.

<sup>3</sup> Innovation behaviour, translated into active or passive adopted strategy, concerns designers for it affects traditional field concerns such as project integration, image and perception. For example, Country governments and City Councils engage in *place branding* (example that further justifies the use of the term ‘initiative’ rather than company) and their innovation strategy affects such branding aspects, widening the scope of discussions regarding innovation.

cohesion are increased and interdependence is part of internal dynamics. In a team, the complementarity among the parts composes a unique totality. The cohesion effect of the team results in better work than the simple gathering of individual contributions. The team is known to have higher synergy of all the three arrangements.

Technological tools have mimicked different structures in work practices. Software and applications can simulate some characteristics of interaction and collective environments facilitating the creation of networks, the identification and gathering of groups and the interaction among teams.

“Collaborative architecture” is the structural and organizing principles of relationships that should be assessed by companies recognizing trade-offs when choosing between four possibilities of collaboration mapped. These possibilities are variations of combinations between open and closed participation and flat or hierarchical governance, as explained further. (Verganti & Pisano, 2008)

A Closed model of innovation is also referred to as “fully integrated” or “innovation through total control”. In closed participation, only selected participants contribute and have access to the process. The main challenge is in identifying the right knowledge domain and the right parties. A particular advantage in this case is having solutions formulated by experts on demand. In this model, it is important to spot new talents in relevant networks and to develop privileged relationships with parties (Verganti & Pisano, 2008).

In an Open Innovation approach, other agents integrate a wider process. Internal market pathways are recognized as one source of knowledge, but not the only one (Chesbrough, 2003). The main challenge in open participation is in attracting several ideas from a variety of domains and screening them. Inversely, the great number of solutions from domains beyond the realm of expertise and a broader range of ideas is a plus (Verganti & Pisano, 2008). The main idea behind the open innovation model is that “the role of R&D needs to extend far beyond the boundaries of the firm” (Chesbrough 2003, p. 41) and external ideas and knowledge are to be combined with internal R&D. (Table 1)

	Closed Innovation Principles	Open Innovation Principles
1	Experts Work In-house	Experts and Expertise from Everywhere
2	Discovery + Development + Delivery = Profit	External R&D + Internal R&D = Profit
3	Secrecy is Agility	External Research can be Profitable
4	Getting First	Having a Good Business Model
5	Large Number of Great and Special Ideas	Best Usage of Internal and External Resources
6	Controlling Intellectual Property	Buying and Selling Intellectual Property

Table 1: Contrasting principles from Closed and Open Innovation Models, 2003. Source: Chesbrough, 2003, p. 38.

Governance is the strategy to conduct relations. In hierarchical governance, one of central control, the main challenge is in determining the most appropriate direction. The initiative can control the intention and direction of innovation, its profits and benefits. It requires understanding of both market and of user needs, as well as system design to coordinate work and reintegrate tasks and inputs. In flat governance, control is horizontal and the main challenge is to get all participants to converge in a solution profitable to the initiative. The main advantage in flat governance is to share the burden of decisions and work. (Verganti & Pisano, 2008)

Companies can use the combination of collaboration modes simultaneously to support their strategies. (...) [A] key component of strategy is exploiting firm's unique assets and capabilities. (...) Open [participation] is not always better than closed, and flat [governance] is not always better than hierarchical (Verganti & Pisano, 2008, p. 85-86).

The four modes of Co-Design (Fig. 1) vary on their type of participation (open vs. closed) and governance (hierarchical vs. flat), consisting on:

- Closed and hierarchical network, or elite circle: “a select group of participants chosen by a company that also defines the problem and picks up the solutions”;
- Open and hierarchical network, or innovation mall: “a place where a company can post a problem, anyone can propose solutions, and the company chooses the solution it likes best”;
- Open and flat network, or innovation community: “a network where anybody can propose problems, offer solutions, and decide which solutions to use”; and
- Closed and flat network, or consortium: “a private group of participants that jointly select the problems, decide how to conduct work, and choose solutions” (Verganti & Pisano, p.82).

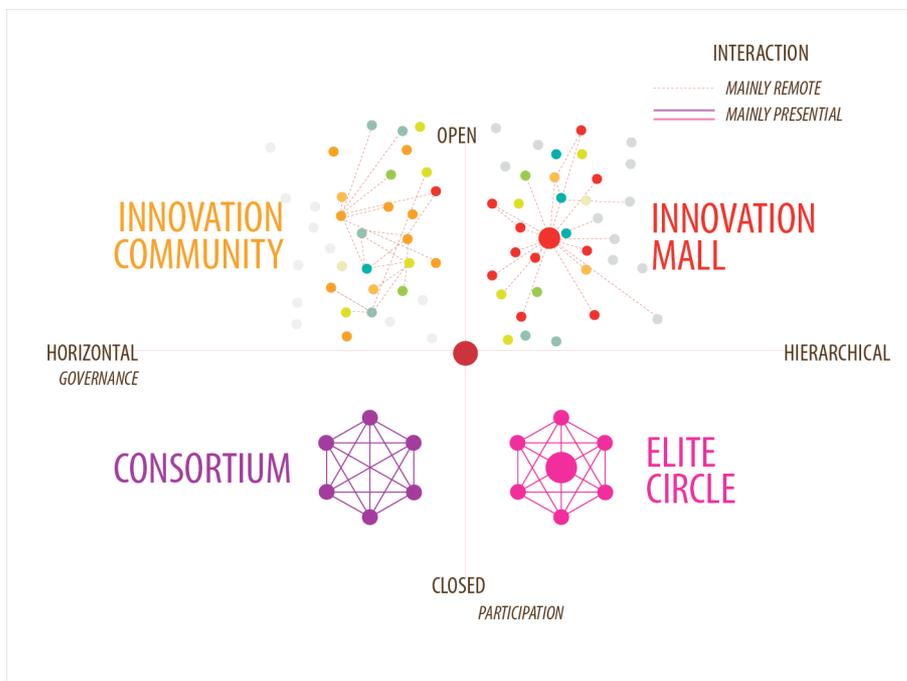


Figure 1: Types of Co-Design, 2013. Source: Verganti & Pisano, 2008.

The proposed tool (Table 3) presents 28 questions with polarized exclusive answers, 13 in the category Participation (open or closed), 15 in the category Governance (hierarchical or flat). The participants are to answer all the questions. After that, they assign the correspondent letter and count the score per letter. An odd number of questions were devised in order to avoid ties in score. For scores too close to tie (6-7, 5-8 or vice-versa in participation or 8-7, 9-6 or vice versa in governance), it is recommended to give the project further analysis in terms of possibilities and intentions. Additionally, a sub-division of the project in steps with different complementary approaches must be designed. The combination of scores will reveal the appropriate strategy for each project, higher numbers being equivalent to dominant strategy.

Each concept stated in the research was summarized and transformed into a question. Next, an example of the process adopted:

	Stated Concept	Concept Abstract	Instrumental Question and Value
1	Alessi is looking for concepts whose value is based on intangible properties such as aesthetics and emotional and symbolic content. Since there is no clear right or wrong answer, Alessi could receive thousands of proposals, creating a massive evaluation burden for the company. And because the company's strategy is to offer products with radical designs that anticipate market needs, its offerings often initially confuse consumers. Therefore it can't shift the evaluation burden to customers by asking them which designs they prefer, as Threadless does. That's why Alessi has to ensure that it will receive a few good ideas from a relative handful of contributors (Verganti & Pisano, 2008, p. 82).	<b>Topic:</b> underlying project concept <b>Main idea:</b> when developing concepts based on intangible properties, closed networks might work best	<b>Question:</b> What are the main properties of the conceptual project? <b>Options:</b> Intangible or Tangible <b>Value:</b> Intangible = Closed, Tangible = Open

Table 2: Concept systematization into instrumental questionnaire, 2013. Source: Elaborated by the author based on Verganti & Pisano, 2008.

As stated by Verganti and Pisano (2008, p.86):

It is no longer a matter of [only] hiring the most talented and creative people or establishing the right internal environment for innovation. The new leaders in innovation will be those who can understand how to design collaboration networks and how to tap their potential.

Following, we present the questionnaire that intends to assist the understanding and catering of the most appropriate collaboration architecture for each innovation project.

Collaborative Architecture Assessment			
	Question	Answer	Value
1	What are the main properties of the conceptual project?	a) Intangible b) Tangible	C O
2	What is the main drive for developing the project?	a) Active: strategic position, opportunity b) Reactive: avoid losing market-share	C O
3	Is the knowledge domain clearly defined?	a) Yes b) No	C O
4	Is the problem clear?	a) Yes b) No	C O
5	Do you know where to look for solutions?	a) Yes b) No	C O
6	What is the problem's level of complexity?	a) High, integral and interconnected b) Low, modular and separable	C O
7	Who defines the problem?	a) The initiative, with its own knowledge	H F

		b) Contributors	
8	Who will choose the solution?	a) The initiative, with its own knowledge b) Contributors	H F
9	Does the initiative have clear understanding of the relevant technology?	a) Yes b) No	H F
10	What is the nature of the technical challenges of the project?	a) Great b) Minor	H F
11	What is the expected level among group members' knowledge and skill?	a) Mainly Homogeneous b) Mainly Heterogeneous	H F
12	Does the company understand well its markets and user needs?	a) Yes b) No	H F
13	Is there an initial direction or perspective of the project outcomes	a) Yes b) No	H F
14	How much of the profit value is intended for the initiative?	a) Great b) Minor	H F
15	What is the decision process like?	a) Centralized b) Joint or Decentralized	H F
16	What is the nature of the budget?	a) From the initiative (even if funded with risk for the initiative) b) Shared among participants	H F
17	Does the initiative have the intention and ability to coordinate the process?	a) Yes b) No	H F
18	Does the initiative have the intention and ability to assess the results?	a) Yes b) No	H F
19	Can the initiative sponsor the process of searching, screening and selecting?	a) Yes b) No	H F
20	Who will assume the risks involved?	a) The initiative b) Shared among participants	H F
21	Does the company understand well its markets and user needs?	a) Yes b) No	C O
22	Are solutions related to a level, quality or standard?	a) Yes b) No	C O
23	What is the intended rate of use per proposal?	a) High b) Low	C O
24	Are experts needed?	a) Yes b) No	C O
25	Are the right collaborators known?	a) Yes b) No	C O
26	Are the right collaborators at reach?	a) Yes b) No	C O
27	Does the solution affect all of its participants directly?	a) Yes b) No	C O
28	Is participation in decision and in solution independent?	a) Yes b) No, they are co-dependent	C O
29			C
30	SCORE (Complete with the number of corresponding answers)		O

31		H
32		F
33		CH
34	HIGHER SCORES (Mark with an X the combination of higher score between C and O and between H and F)	CF
35		OH
36		OF

Table 3: Questionnaire for Evaluation of Co-Design Strategy According to Project Scope, 2013.

### 3. Phase 2: Knowledge Sources and Resources

This phase represents knowledge management stage (Fig. 2). All the activities of acquisition, application and sharing of knowledge compose “knowledge management” (OECD, 2005, §67).

The innovative activities of a firm partly depend on the variety and structure of its links to sources of information, knowledge, technologies, practices and human [sic] and financial resources. Each linkage connects the innovating firm to other actors in the innovation system: government laboratories, universities, policy departments, regulators, competitors, suppliers and customers (OECD, 2005, p.20).



Figure 2: Knowledge Mapping System, 2013. Sources: OECD, 2005; Chesbrough, 2003.

Type of access to knowledge and technology in innovation processes can vary as: free access to, co-operation for, and acquisition of knowledge and technology (OECD, 2005, §51). According to available budget and time for the project, some sources are more indicated than others. Actors for partnership in the Innovation Structure vary according to type of access. They are: Internal within the Initiative; Other Initiatives from the Group; External Market and Commercial; Public Sector; General Information Sources and Innovation Agents (Fig.2 includes detailed participants).

## 4. Phase 3: Conceptual Design Approach

Krippendorff (1989) indicates semantic contexts for understanding product experience, i.e., circumstances in which the same artefact has different meanings. Contexts and dimensions (secondary categories) are helpful in framing issues around artefacts, possibly enlarging their realm. Contexts can be:

- Operational (...), in which people are seen as interacting with artefacts in use.
- Sociolinguistic (...), in which people are seen as communicating with each other about particular artefacts, their uses and users, and thereby co-constructing realities of which objects become constitutive parts.
- (...) Genesis, in which designers, producers, distributors, users, and others are seen as participating in creating and consuming artefacts and as differentially contributing to the technical organization of culture and material entropy.
- Ecological (...), in which populations of artefacts are seen as interacting with one another and contributing to the autopoiesis (self-production) of technology and culture (Krippendorff, 1989, p. 17).

Operational context unfolds into dimensions of: identity, qualities, attributes, orientation, location, affordances, states, logic and dispositions, motivation, redundancies. Sociolinguistic context unfolds into: user identity expressions, signs of social differentiation and integration, content of communication, material support for social relations. Context of Genesis unfolds into: participation in the respective network(s), ability to communicate, raw material availability and use, costs and benefits, adaptability, entropy and contamination effects. Ecological context implies: competition of applications and uses, creation and participation in cultural complexes and autopoiesis (or symbolic reproduction strategies). (Krippendorff, 1989)

Such characteristics are mostly related to extrinsic aspects of artefacts and their handling (production, use/consumption, relationships and outcomes in larger system by its participation in a 'chain'). Artefacts also resonate to their owners and users by creating effects of psychological fulfilment of objective and subjective needs, or by creating or enabling to create and undergo distinctive episodes. Therefore we suggest the addition of one more context category:

- Experience context, in which people get intrinsic gratification from the artefact or the situation enabled by the artefact: creation, use or appreciation.

Dewey ([1934] 2010) indicated art as an outcome of experience, expanding the notion of contemplative aesthetics into an active process. According to characteristics of experience, this context includes dimensions of: unity, purpose, distinction, emotion and intention (Fig. 3).

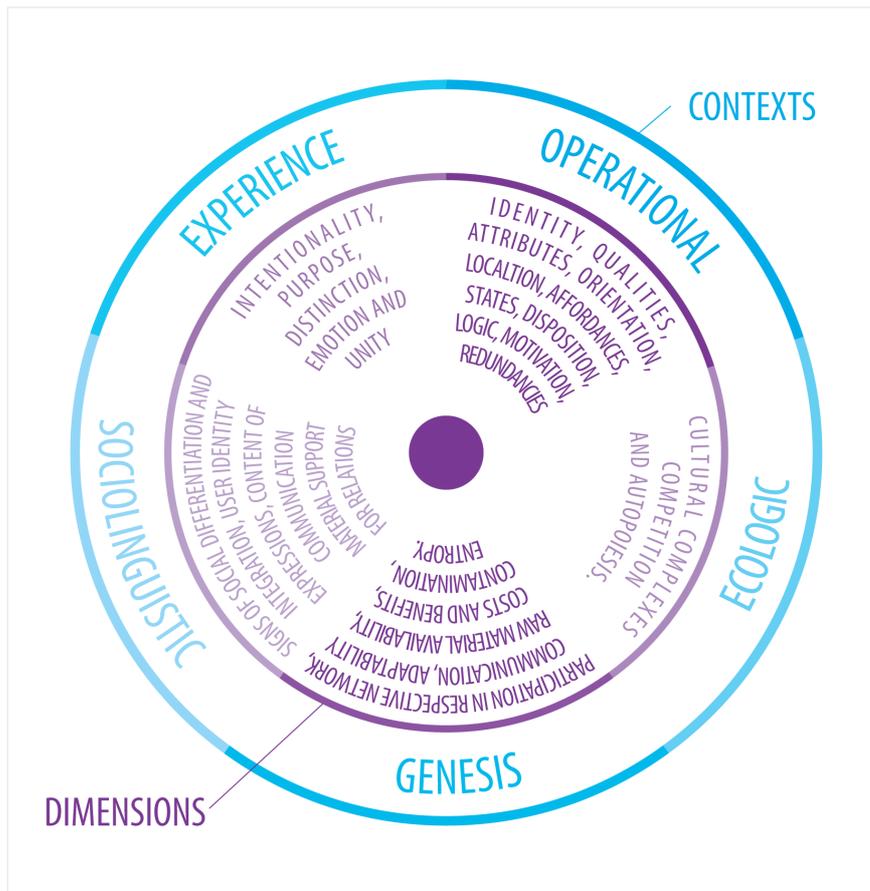


Figure 3: Consumer Product Experience Analysis Tool, 2013. Sources: Krippendorff, 1989; Dewey, [1934] 2010.

This final image is to be used as a tool to generate new artefacts or services concepts and to improve existing ones. It can be used starting from a given artefact and deepening the understanding and correlated contexts and dimensions or by exploring a chosen context and dimension into an innovation.

## Final considerations

We have described main concepts, structure and actors in open and closed innovation processes that are essential for recognizing a broader framework and making more informed decisions in innovation design management. We believe this simplifies intuitive processes, clarifying what is at stake in developing projects. It also permits further delegation and control by bringing tacit knowledge into light.

There are a number of pathways to innovation. Through careful basic research leading to application is possible to identify gaps and offer solutions in specific steps of innovation and knowledge management.

By proposing the evaluation questionnaire, we suggest which appropriate type of co-creation might be best determined by circumstances related to each project and to be managed accordingly without any more complex investment in time or resources.

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