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# Governing Artistic Innovation: An Interface among Art, Science and Industry

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The process of technological innovation drives the reorganization of research in the media arts. The imperatives of innovation and creativity have become the driving forces for industry-transferable research and creation. In this context, “artistic talent” is a highly sought-after, actively encouraged resource [1], so much so that the identity and role of contemporary artists are being transformed: No longer only creators, they are expected to be researchers and entrepreneurs, experts in the “new economy.” Although waging on these new “workers” may be fashionable, the relationship between artistic creativity and innovation remains problematic [2]. New forms of consortium are being created to foster innovative “research and creation” with the potential to generate spin-offs and added value, not only from an artistic perspective but from a scientific and industrial one as well. Such alliances are difficult to establish, first, because the interdisciplinary hybrid known as “research and creation” lacks a stable identity; second, because the products created are not distributed under the same conditions or through the same channels as traditional art or more conventional scientific research; and lastly, because of the uncertainty surrounding the scope and longevity of such initiatives. This uncertainty is linked to the absence of explicit demand that would enable this sector to perpetuate itself socially, recruit practitioners and provide career opportunities, as well as to the lack of assurances regarding the development and/or commercial potential of what it produces, outside the artistic community. The new “artistic organizations,” which are supposed to promote research and creation with social spin-offs, do not easily fit existing organizational models in academia and industry. As a result, the economy of “research and creation” requires a reconfiguration of organizational management in these establishments, but also a redefinition of the positions, workers, tools, works and knowledge to be covered. By taking into account the results of a study [3] conducted among creator-researchers of the interuniversity consortium Hexagram, based in Montreal, Canada, this article offers an initial clarification of the promises and difficulties of these articulations and new organizational interfaces between artistic production and technical innovation [4]. I discuss the various dimensions of, and what is at stake in the inter-relatedness between, development, research and creation. In conclusion, I examine the restructuring of artistic work and the resulting hybridized products.

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Web: <<http://cesta.ehess.fr/document.php?id=80>>; <[www.csi.ensmp.fr](http://www.csi.ensmp.fr)>.

## ENCOURAGING ARTISTIC INNOVATION

The consortium Hexagram [5] is the result of the fusion, heartily encouraged by the government of Quebec, of two previous initiatives in Montreal: the plan to found a University Institute of New Media at the francophone University of Quebec (UQAM) and to create a laboratory of new media (Medialab [6])

at the anglophone University of Concordia. At the intersection of these two institutions, Hexagram brings together about 80 researchers. It receives \$6 million from a public research funding organization, Valorisation Recherche Québec [7], shared among both sister universities. It also receives \$21 million, earmarked for infrastructure expenses, from the Canadian Foundation for Innovation [8]. The magnitude of these subsidies constitutes a double anomaly. For the first time, Canadian organizations for the advancement of university research, usually dedicated to biomedical sciences, are subsidizing artistic disciplines. It is also the first time that such a significant amount of credit (in both meanings of the term) has been allotted to arts disciplines.

In this context, Hexagram plans to associate, in an original way, academic research, artistic creation and industrial production. To pursue this objective and put it into concrete practice, Hexagram’s mission is twofold. On one hand, the consortium proposes to integrate the connected work of the different laboratories and various researchers spread over a large number of overlapping departments at the two sister universities. The purpose is to implement the sharing of the equipment and resources necessary for innovation relying on the modularity and flexibility of research infrastructure. On the other hand, Hexagram proposes the creation of a link between these researchers at different laboratories, departments and universities and the economic sector, as well as certain public organizations, for the implementation of the results of university research. This consortium therefore offers the capability of being a “boundary organization” [9], due to its versatility: not completely stable, this organization must in fact be able to adapt to the conjunctural necessities of its various interlocutors while at the same time retaining a core identity. This articulation and organizational management of research and innovation are not without difficulty, however. An examination of Hexagram—albeit an all-too-rapid one—reveals var-

## ABSTRACT

The author presents an analysis of the workings and tensions involved in the integration and articulation of academic research, artistic creation and industrial production. He makes use of the results of a study conducted among creator-researchers of a Canadian prototype for the organization of these relationships: the Montreal, Canada-based interuniversity consortium Hexagram.

ious initiatives and adjustments aimed at symmetrically (re)defining a directional model, an organizational schema, modalities of research and creation and an organization and economy of creative work capable of resolving this paradox and fostering the creation of value from artistic research. Over 6 years, Hexagram has experimented with three directional models: a relatively hierarchical and directional “artistic enterprise” model, too far removed from the realities of university research, projecting enormous but unrealistic profits [10]; a more democratic and consultative model, with one administrative and two scientific directors (one per university), reflecting a desire for greater independence (a paradoxical redissociation?) between the creative, research and development components; and, finally, an interface approach, under which the administrator acts as a mediator between the universities and the “milieu.” The new organizational diagram [11] of Hexagram is that of a body devoid of lucrative goals: an autonomous institute, situated between the two universities, departments, laboratories and organizations of research development.

### CREATION-RESEARCH: AN INTERDISCIPLINARY HYBRID

In Montreal, the origins of the concept of “research and creation” date back to the late 1960s, when, a decade after the United States, universities integrated art into university curricula and the main art schools, notably the Montreal School of Fine Arts, closed their doors. University artist-academics found themselves taking on new duties that would gradually reshape their role, first by transforming them into teachers as much as artists, then by the attempt to treat them as “researchers” by assigning them to university labs. Without overlooking the lively controversy sparked by this historic redefinition of the status of artists, it would appear that universities have finally succeeded in integrating “creation” as a potential outcome of university research and in transforming the art exhibition into a legitimate means of showcasing the result, much like a scientific publication. Numerous government programs (Table 1) now attest to the newfound credibility of “research and creation,” the result both of artists’ determination to redefine the processes and purposes of art itself and of greater official recognition for the scientific character of artistic disciplines.

Certain exemplary cases of the economic transfer of results from techno-

artistic research within universities, with the creation of breakthrough enterprises in the fields of cinematic post-production (Softimage), video games (Ubisoft) and multimedia performance (Cirque du Soleil) [12], have succeeded in reinforcing Canadian economic interest in these operations of encouragement and support for artistic innovation. These programs have introduced two criteria now considered essential: teamwork (interdisciplinarity) and the requirement of transversal “research programs” involving a number of artistic works or projects. They also promote increasingly decentralized creative management and the formation of ad hoc, project-focused teams that stay together for varying periods but tend to focus on maximizing benefits in a relatively short timeframe.

In this context, the typical-ideal project is the one that produces the most opportune marriage among these multiple aesthetic, scientific and economic logics [13]. In practice, however, defining the meaning and scope of “research and creation” remains subject to controversy:

- The term can mean the rather mechanical transposition of the notion of research onto traditional artistic activity to describe all steps leading up to the production of a work: documentary research, visual and sound research, mockups, sketches, work

plans, demos, etc., according to long-established artistic methods and conventions.

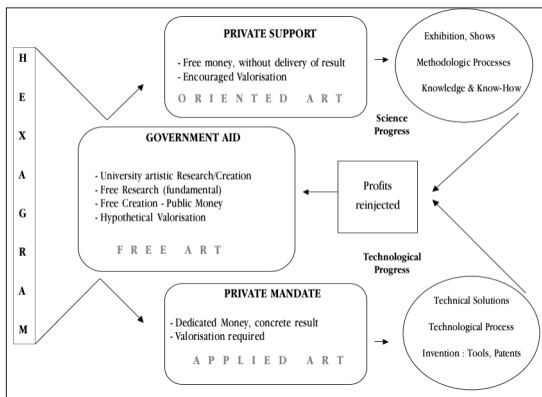
- It can alternatively imply a renewed methodology that assumes an outcome different from the work itself: From this perspective, artistic research must aim for social usefulness or commercial or industrial applicability and produce research externalities in addition to the work, such as scientific knowledge, technological processes, methods, inventions, tools, patents, etc.

In other words, artistic research must henceforth generate the production of new products associated with added value for Hexagram.

The multicentric results of Hexagram’s creation-research activities are thus co-opted by “peers,” depending not only on their degree of originality and innovation and their contribution to renewing the field but also on their commercial potential and economic spinoffs. This is one source of tension: This new promotion of artistic research, which values experimentation and trial and error over any imperative regarding final results, contrasts with the emphasis, also very strong, on creating value for industrial markets through research and creation. This tension continues to divide the artists at Hexagram, who vary in de-

Table 1: Canadian government research-creation programs

<b>Canada Council for the Arts (CCA)</b>
Inter-Arts Program: Non-traditional arts context Various identifiable art products
<b>Fonds de recherche sur la société et la culture</b>
Establishment of new researcher-creators Support for research and creation groups Promotion of interdisciplinary arts
<b>NRC/CAC</b>
ARTRE pilot program Artists-in-Residence for Research Canada Council for the Arts National Research Council of Canada
<b>Natural Sciences and Engineering Research Council/CCA</b>
Joint projects—double evaluation Partnering of artists and researchers in engineering Canada Council for the Arts Natural Sciences and Engineering Research Council
<b>Social Sciences and Humanities Research Council/CCA</b>
Research/creation grants in fine arts Pilot program for researcher-creators Canada Council for the Arts Social Sciences and Humanities Research Council



**Fig. 1. Results of research creation.**

gree of acceptance of the notion that they are no longer solely creators of public art, but are also conscious of their power to initiate projects and act as commercial developers. In other words, must “artistic research” always remain linked to the production of artistic works, or can the results of university research qualify as works of art?

*Hexagram* is not a substitute for Canada’s Council for the Arts. Its mission is not to finance a work of art but to develop creation-research in the arts that can be utilized by industry. When we founded Hexagram, we adopted the word “creation-research” to put forth the idea that it is not the artistic creation that is financed but the research that leads to creation. Therefore, it is the search for the tools, the interconnectors, of the apparatus, of the ways of creation. The importance of artistic research becomes here a central criterion [14].

At Hexagram, artworks’ impact is now evaluated based on the potential effects that the research program has on the projects of other Hexagram researchers and artists, as well as on the affected research domain. Transferability is understood as the possibility of improving the program results of research outside Hexagram and the artistic community. Visibility is evaluated based on the potential enhancement of Hexagram’s image at the time of various demonstrations, such as exhibits, technological fairs, etc. This model is expected to permit the deployment of productions fashioned differently according to the market (scientific or artistic) for which they are designed (Fig. 1).

By deliverable results, we mean new knowledge, a technical innovation (products and processes) or social, economic, or commercial innovation. . . . The “milieu” is not necessarily the business community; it may be the museum, theater, dance, performing arts, or another sector [15].

I would like to conclude with a prototypical case that illustrates artistic re-

search and creation in a university milieu and the modular and flexible nature of the activities and outputs that result. The Darwin Research Project was launched in 2000 by professor Michel Fleury for simplifying virtual character creation for professional animation (Fig. 2). With Hexagram support, the project also consists of the development of a database of virtual actors topologically equivalent and a software application called Evolver™ (“virtual humanoid generator”) that creates new distinct characters by combining attributes (Fig. 3). In 2004 David Chamandy, co-founder of Internet dating portal Lavalife, joined Fleury as an angel investor and managing director to help turn the research project into a commercially viable venture, Darwin Dimensions. Springing directly from this research project, the Darwin Dimensions company has established a real Agency of Virtual Characters as well as enabled the direct commercialization on the Web of “turnkey approach” characters. The results of this research and creation are

**Fig. 2. Michel Fleury, Darwin Dimensions, 2007. (© Michel Fleury)**



multiple autonomous “applications”: software, a TV show, an interactive installation, scientific articles, a variety of prototypes with commercial potential on parallel scientific, industrial and/or artistic markets. Consequently, this project can be interpreted as an itinerary that simultaneously fosters an emerging body of work and creates an environment capable of producing externalities: The art Fleury’s research is intended to serve may take multiple, intermediate or fragmented forms; the research itself can be a source of added value and be used to produce outputs. Reversing our gaze, we can also ask: Where is the art in this? What is it? Does this approach not in some cases give primacy to technology over art? Consequently, if innovative organizations such as Hexagram may help to preserve the valuable heterogeneity of creation processes, at the same time, it considerably renews the imprints, factors and economic consequences of the arts. The results therefore constitute a stake doubly analytical and prospective for the initiation of renewed types of management and valorization of the partnership between art, science and industry: It brings into view the transformations in progress of the profession and of the identity of committed artists, as well as the invention of original kinds of accompaniment and of regulation of the “multicentric” career of artistic works. In any case, despite the difficulties of completing a project on the same scale as industrial R&D while at the same time producing work that qualifies as art according to more traditional definitions, we can see here the emergence of

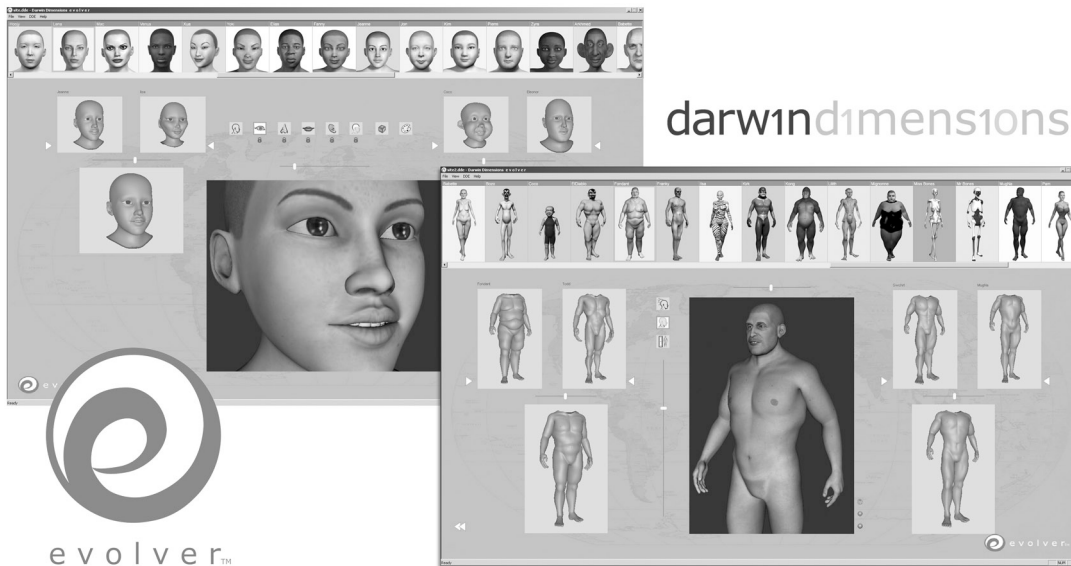


Fig. 3. Michel Fleury, Evolver Interface, 2007. (© Michel Fleury)

new forms of investment and production, which without being entirely applied or entirely free, leave space for the hybridization of art, research and technology.

### References and Notes

1. Numerous authors have discussed the stakes of recent policies of economic revitalization, both urban and social, based on the promotion of an innovation brought forth by a "creative class" within which the artist now occupies a highly prized position. See A. Pratt, *Digital Place* (London: London School of Economics, 1999); R. Caves, *Creative Industries: Contracts between Art and Commerce* (Cambridge, MA: Harvard Univ. Press, 2000); R. Florida, *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life* (New York: Basic Books, 2002).
2. See J. Adler, *Artists in Offices* (New Brunswick, Canada: Transaction, 1978); P.-M. Menger, *Les laboratoires de la création musicale* (Paris: La Documentation française, 1989); E. Chiapello, *Artistes versus managers. Le management culturel face à la critique artiste* (Paris: Métailié, 1998); J.-P. Fourmentraux, "Internet Artworks, Artists and Computer Programmers: Sharing the Creative Process," *Leonardo* 39, No. 1, 44–50 (2006); J.-P. Fourmentraux, *Art et Internet. Les nouvelles figures de la création* (CNRS Éditions, 2005).
3. The "material" used in this text comes from an empirical work prepared for a postdoctoral research seminar held at the Institut National de la Recherche Scientifique du Canada (INRS, Montreal) May–October 2003.
4. See, for example, W.J. Mitchell, A.S. Inouye and M.S. Blumenthal, eds., *Beyond Productivity: Information Technology, Innovation, and Creativity* (Washington, D.C.: National Academies Press, 2003); M.-R. Jackson, *Investing in Creativity: A Study of the Support Structure for U.S. Artists* (New York: Culture, Creativity & Communities Program, Urban Institute, 2003); P. Jennings, *New Media Arts, New Funding Models*, report prepared for Creativity & Culture, The Rockefeller Foundation (New York, 2003). See also E.A. Shanken's dossier "Artists in Industry and the Academy," *Leonardo* 38, No. 4, 277–316 (2005).
5. See Hexagram's web site: <www.hexagram.org>.

6. The project's principal reference point was the prestigious Medialab of the Massachusetts Institute of Technology (MIT), created in 1985 by Nicholas Negroponte and Jerome B. Wiesner to stimulate research dedicated to the most novel technologies and their most innovative applications <www.media.mit.edu/>.

7. Valorisation Recherche Québec (VRQ), <www.vrq.qc.ca>, 1999–2005.

8. La Fondation Canadienne pour l'Innovation (FCI) <www.innovation.ca/program> 1997–2005.

9. See J. Fujimura, "Crafting Science: Standardized Packages, Boundary Objects, and Translation," in W. Bijker, T. Hughes and T. Pinch, eds., *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge, MA: MIT Press, 1990); S.L. Star and J. Griesemer, "Institutional Ecology, Translation, and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology," *Social Studies of Science* 19 (1989) pp. 387–420.

10. This first governance structure, introduced by an artist recruited in the United States as a result of his prosperous relations with the industrial milieu, who was promoted to the rank of general director-president of Hexagram, has gradually met very strong resistance on the part of artist-researchers. His industrial conception of Hexagram, based solely on profit, had the appearance of being too closely tied to the sole goals and aspirations of its director, founded on requirements of transfer and commercialization that were unrealistic because they were a priori too removed from the world of art and university research.

11. The administrator, placed at the juncture of the university and the industrial complex, is responsible for coordinating various consultative bodies. A three-member administrative council—the administrator backed by two scientific directors (one from each university)—composes the principal decision-making body setting the direction of Hexagram's research and creation. A Committee on Research-Creation (CRC), composed of "paired" members outside Hexagram, consulted in the selection of programs and in their long-term evaluation and was responsible for the attribution of funds and related operations in the implementation of efforts contributing to research. Finally, a Committee of Axis Directors (CDA) brings together eight people re-

sponsible for each of the specializations and fields of research covered by Hexagram. See the structure diagram at <www.hexagram.org>.

12. See <www.softimage.com>; <www.ubi.com>; <www.cirquedusoleil.com>.

13. These virtual actors all have attributes (skeleton, coordinate grid for textures, etc.) in order for a 3D artist to animate them in the software of his or her choice through the fbx format developed by Kaydara or through an interactive system. For a more detailed description of this Hexagram project connecting research in design and the development of computer applications, see M. Fleury, "Le projet Darwin. Développement d'une humanité virtuelle," proceedings of the 9th International Conference on Virtual Systems and Multimedia, "Hybrid Reality: Art, Technology and the Human Factor," Montreal, Quebec, Canada, 15–17 October 2003, pp. 610–621.

14. Creator-researcher, Hexagram, 2003, interview with the author.

15. Administrator, Hexagram, 2003, interview with the author.

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