



# Participatory Innovation: Lessons from breeding cooperatives



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## ABSTRACT

Throughout the last decades, breeding in the plant sector, husbandry and aquaculture have come under the ownership control of multinational, investor-owned firms. Breeding in these sectors is risky business, but can be extremely profitable for the involved parties. Against high odds, a few breeding cooperatives have successfully increased their competitiveness in breeding by means of collectively organized efforts, here referred to as “Participatory Innovation”. Illustrated by data from four breeding cooperatives, we explore conditions for success at intra- and inter-organizational levels. “Participatory Innovation” is a strategy to leverage individual members as co-innovators and make them benefit from a multiplier-effect. We advance the idea that “Participatory Innovation” is a distinct conceptual mode of innovation, differing from the more well-known metatheories “Vertically Integrated Innovation”, “Open Innovation” and “User Innovation”.

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## 1. Introduction

A radically new bio-technical platform based on DNA-mapping and genomic selection opens novel business opportunities in plants, husbandry and aquaculture (Hope, 2008; Solberg et al., 2008). Availability of high-density marker maps in combination with cost-effective genotyping enable fast and precise exploration of the complex links between actual genes (genotypes) and trait variation (phenotypes) (Cooper, 2008; Solberg et al., 2008; Tvedt et al., 2007). This new approach to breeding is not for everyone (Parry and Dupré, 2010). The development is both capital- and knowledge intensive. Although the surge of recent biotechnological inventions brings down unit costs of the necessary biotechnological analysis, economic efficiency is still a significant driver for the evolution of new organization forms. Breeding is risky business, but successful industrial breeding can be very profitable for actors who control the necessary technical and commercial resources (FAO, 2007; Feindt, 2012; Romstad and Stokstad, 2005; Rosendal et al., 2005; Van Overwalle, 2009). Multinational investor-owned firms can reduce their commercial risk in multiple ways; e.g. through continuous upgrading of breeding material or through bio-patenting (Rosendal et al., 2005; Tvedt et al., 2007). Their new inventions and innovations are based on proprietary science of breeding, where in-house inventions can be patented, and thereafter commercialized. Among the market-dominating oligopolists in breeding of plants, husbandry and aquaculture are vertically integrated global companies such as Hendrix, Monsanto, Dow and EW-group (Feindt, 2012; Gura, 2007; Hope, 2008; Howard, 2009).

In the current global breeding market, two small-scale Norwegian breeding cooperatives (Geno and Norsvin) have against high odds managed to build and retain a strong competitive position. Geno and Norsvin is owned by roughly 9500 cattle farmers and 1500 pig farmers, respectively. Both cooperatives are members of the Federation of the Norwegian Agricultural Cooperatives. Their success can be contrasted to the breeding nucleus of the Norwegian salmon and poultry industries, either of which have disintegrated and been taken over by global conglomerates (regarding salmon, see Aarset and Borgen, 2015; regarding poultry, see Kolstad, 2002; Skarstad and Borgen, 2007). This is the factual background for the research task to be addressed in this article: What explains the success of Geno and Norsvin with regard to innovation and competitiveness? We find that their success is inseparably related to their distinct mode of innovation; summarized here under the label “Participatory Innovation” (PI). Our article discusses the core characteristics, rationale and dilemmas of “Participatory Innovation” in more detail. In Section 2, we present the generic conceptual building blocks of this innovation mode. Our methodological approach follows in Section 3. Section 4 is devoted to a presentation of the two breeding cooperatives and the politico-economic institutional context into which they are embedded. This presentation leads us to Section 5 where we make sense to our findings by integrating empirical findings with selected insights from cooperative theory and innovation theory. Conclusions are drawn in Section 6.

## 2. Theoretical framework: innovation in cooperatives

How do cooperatives work as producers, possessors and mediators of knowledge that are crucial for innovation? To address such questions with specific reference to the two breeding cooperatives, we present

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selected theories about cooperatives and innovation respectively. Let's start with core characteristics of the cooperative form. A cooperative is "a user-owned, user-controlled business that distributes benefits on the basis of use" (Cobia, 1989), and operated by a pool of members working for their own benefit (Hart and Moore, 1996). From the perspective of the individual member, the advantages of cooperative membership relate to the creation of joint investments as well as pooling of risks. The cooperative is set up to overcome the members' diseconomies of scale by realizing a multiplier-effect to the benefit of all members. To reap this benefit from joint action, farmers must delegate some of their decision power to the cooperative of which they are members. Control is transferred from members to the cooperative without transferring asset ownership (Fama and Jensen, 1983; Grossman and Hart, 1986). Ownership right is separated from control and decision rights.

Cooperative members retain property rights over their farms and production resources. One implication hereof is that the cooperative form is characterized by incomplete integration of ownership both horizontally and vertically. To overcome this incompleteness, three dimensions of the vertical relation between the individual member(s) and the cooperative need to be coordinated; i.e. the governance relationship, the transaction relationship, and the investment relationship (van Bekkum, 2001). The *governance* aspect refers to the collection of rules structuring the transactions between different stakeholders. The *transaction* aspect involves delivery of the cooperatives' products in return for a price. The *investment* aspect involves contribution of capital (individually and/or collectively), risk-bearing, and right to residual claims (Cook and Iliopoulos, 1998; Nilsson, 2001). These organizational characteristics allow and invite to active engagement from cooperative members' in decision-making and control. Evidently, the cooperative form does not by necessity provide more and better innovations than other organization forms like e.g. the investor-owned form (IOF). We can easily find examples of inefficient cooperative forms plagued by low or no capability to innovate. Several scholarly studies of cooperatives have claimed that inefficiency is caused by ill-defined property rights in the cooperative ownership form, followed by a wide range of ex-ante and ex-post incentive problems (Cook and Iliopoulos, 2000; Nilsson, 2001; Vitaliano, 1993). First, the *common-property problem* is concerned with the disparity between members' contribution to the investments and the distribution of benefits that results from these investments (Cook and Iliopoulos, 1998; Nilsson, 2001). If a disparity exists between a member's contribution of equity and the benefit from the same equity, an incentive to "free ride" will emerge. If the common-property problem is improperly solved, the cooperative will probably not be able to provide sufficient risk-bearing equity. Second, the *horizon-problem* stems from the fact that residual claims of cooperatives are contingent rights to cash flows whose validity expires when a member ceases to patronize the organization. The horizon-problem says that members tend to become preoccupied with myopic perspectives on their cooperative membership. "Here-and-now" actions are assumed to dominate long-term, strategic deliberations on the purpose of the cooperative. Third, the *portfolio-problem* refers to the situation that members may have diverse risk/reward-profiles. As long as cooperative members have unequal time horizons, there will be different evaluations and preferences with respect to the cooperative's risk/reward-profile. Portfolio problems can give rise to further differences in preferences among subgroups of members, with a general tendency for them to favor decisions with lower levels of risk. These problems may weaken active engagement among members as well as inhibiting the cooperative's innovative capacity.

The intriguing question is under what conditions cooperatives can ameliorate inherent incentive-problems of various types. The scholarly literature on cooperatives underlines that cooperatives are "incompletely integrated" horizontally and vertically (Nilsson, 2001). Subsequently, the Vertically Integrated Innovation mode (VII) (Bogers and West, 2010; Chandler, 1977, 1990) is not as appropriate and efficient for cooperatives as for investor-owned firms (IOFs). So how do

cooperatives actually innovate? The emerging field of distributive innovation research has recently opened the door for several alternatives to the in-house vertical integrated innovation model (West et al., 2014). In particular three antecedents to this renewed interest in innovation theory tend to be emphasized; i.e. the emerging understanding that innovation has its roots outside the firm (e.g. Allen, 1977), the studies by Teece (1986) on how firms profited from their innovations, and the growing interest in business models following the new value chains of the digital industries (see Chesbrough and Rosenbloom, 2002). In this paper, we use elements from particularly three meta-theories of innovation (VII, OI, UI) in order to construct another ideal-type, which we entitle "Participatory Innovation" (PI). None of these provides a realistic account of reality; they are rather constructed to help *structuring* the complex reality of innovation activities. So how can cooperatives innovate efficiently? There's obviously no generic answer to this question. We take as our point of departure that this is an empirical question. More specific knowledge can be gained through empirical studies of cooperatives that have successfully innovated to a significant degree over a long time period. The two breeding cooperatives Geno and Norsvin can contribute with relevant knowledge. We explore the two cases in Section 4, but will first (Section 3) present our methodological approach.

### 3. Methodological approach

The two breeding cooperatives – Geno and Norsvin – have been selected by virtue of being unusual or even extreme (Flyvbjerg, 2006). "Unusual" here refers to success against high odds for this particular type of organization. To our knowledge, no other breeding cooperatives have hitherto managed to succeed equally well as Geno and Norsvin. As claimed by Stake (1994), a researcher may have intrinsic or instrumental research interests, or any combination of the two. An *intrinsic* case study is undertaken because one wants to better understand the particular case in question. The study is not undertaken primarily because the case represents other cases or because it illustrates a particular trait or problem, but because, "in all its particularity and ordinariness, this case itself (be it a specific organization, project, person event etc.) is of interest" (Stake, 1994, p. 237). Also according to Stake (1994), the purpose is different in *instrumental* case studies. Stake argues that the case is of secondary interest; it plays a supportive role, facilitating our understanding of something else. In other words, the most interesting issue is not whether the cases are typical or not. Our discussion in this article is predominantly conceptual and instrumental in nature, but first and foremost inspired by the real-life experiences and success of two Norwegian breeding cooperatives. Our purpose is to expand and generalize theory, more than to enumerate frequencies. The basic idea and core concept we expand here is entitled Participatory Innovation. Our empirical study of the two breeding cooperatives is not samples in the strict statistical sense of the word. Rather, our selection of cases is driven by theoretical suppositions (Eisenhardt, 1989) and a wish to contribute to innovation theory. The typology by Bogers and West (2012) distinguish between three ideal-typical modes of innovation: Vertically Integrated Innovation, Open Innovation and User Innovation. Data and lessons from our case-studies are used to extend Bogers and West's typology. We advance a fourth ideal typical mode of innovation, labeled "Participatory Innovation".

Our primary source of data is semi-structured interviews with 15 persons who have first-hand insights about agribusiness in general and breeding cooperatives in particular. Twelve of the informants are in top positions in cooperatives. The last three informants are experts representing other parts of the Norwegian agribusiness and aquaculture industries. Our secondary data source consists of research reports and annual reports, articles in newspapers and magazines, as well as the breeding cooperatives' internal memos and international studies of the status of genetic resources in the agriculture sector.

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