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PROSPECTS FOR THE TRANSFER OF INNOVATION IN THE RURAL WORLD – THE CASE OF THE INNOVATION PLATFORM "CHAMPS D'INNOVATION" IN NORMANDY REGION, FRANCE

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Abstract

This study focuses on the evaluation of the transfer of innovation by taking the example of the 'Innovation Platform' (IP) called "Champs d'innovation", a project initiated by the Normandy region, France. The study focuses mainly on the modalities of innovation transfer and the complementarities between the different interfaces for the transfer of innovative solutions in the agricultural world. The first results of the study highlight the determinants of the transfer of innovative solutions. Furthermore, from an empirical point of view, the study provides a better understanding of innovation systems in general and in agriculture in particular, and more specifically of the different facets of innovation transfer and the measurement of the transferability of innovative solutions between different stakeholders.

Keywords: Innovation Platform (IP), "Champs d'innovation", stakeholders, innovation transfer, prescribers, contributors, farmers.
JEL Classification : O31, O33, Q16, R11.

1. Introduction

The "Champs d'innovation"[1] is an 'Innovation Platform' (IP) (as described by Schut et al., 2016), initiated by the Normandy Chamber and ACTA Normandy together with several stakeholders[2] in the agricultural sector in order to accelerate and develop the performance of Normandy farms. According to Schut et al. (2016, p.537), an 'Innovation Platform' "can contribute to more integrated, systemic innovation that is essential for achieving agricultural development impacts". The "Champs d'innovation" project is supporting change towards farm performance through three levers of action: share and disseminating knowledge, appropriating innovations and developing skills. The aim of this project is to enable professionals to benefit from all innovations and R&D results directly or via their advisors to improve the multi-performance of their farms. Its ambition is to make the transfer of solutions a priority.

More specifically, the project is structured around several objectives: the development of the agro-ecology through a multi-partner governance in order to mobilize organizations on monitoring and evaluation of the projects. In this case, the organization of a common space to exchange on new themes is highly recommended, particularly: in relation to societal expectations; in relation to the transfer of knowledge from the agro-ecology to as many people as possible in order to facilitate the appropriation of innovations and accompany the changes on farms. Thus, the farmer groups are involved directly and facilitation methods allow significantly their involvement in order to build

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[2] ASTREDHOR - representing the ACTA Normandie network, which groups together the agricultural technical institutes established in the region - as co-pilot; Association Bio En Normandie, FRCUMA Ouest, IFPC, SILEBAN and UniLaSalle.

responses that are best suited for their context; the exploration of the social pillar (from the perspective of the work organization, managerial and entrepreneurial skills of farmers, as levers of action); the communication in order to gain support and positive commitment to agro-ecology (concerted and coordinated communication to accompany all the actions that will be carried out in the field and the overall management of the project).

The "Champs d'innovation" is an 'Innovation Platform' that was deployed through several forums in 2017, 2018 et 2019. The aim of these forums is to raise awareness of innovations, and, in the broadest sense, the achievements of research and development work carried out and proposed to the agricultural world by technical institutes, professional agricultural organizations and any other structure with an innovation that can be transferred, in the short or medium term, to farms and/or to businesses with which these farms are in direct contact.

The question of the transferability of 'innovative solutions' (a term used to designate any form of innovation, whether technical, technological, marketing or organizational, and any improvement solution) and the measurement of transferability is at the heart of the "Champs d'innovation" project. The target audiences are the prescribers of solutions (elected representatives of the upstream and downstream agricultural sectors, advisors, trainers, teachers, etc.) as well as farmers. According to Mesa Manzano (2023), there are a multitude of innovations within the agricultural sector (Campos, 2021, Feder et al., 1985, Morgan and Murdoch, 2000, Ruttan, 1996) which are having a huge impact of a number of key sectors that are crucial to agricultural development "such as the adoption of agricultural technologies and inputs, or innovations of a structural nature, such as new forms of organization and cooperation" (Mesa Manzano, 2023, p.2). Different challenges at global level required more sustainable forms of agriculture (El Bilali, 2020, Martin et al., 2018). Related to the scientific literature, the innovation in agriculture is considered as a fundamental factor in order to achieve these new sustainable forms of practicing (De Boon et al., 2022, Herrero et al., 2020, Lubberink et al., 2017). Moreover, in the literature is outlined the growing role of technological innovations within the agricultural sector (De Boon et al., 2022, Eastwood et al., 2019, Klerkx and Rose, 2020, Stilgoe et al., 2013).

The fundamental challenge of this project is ultimately to enable professionals to benefit from all the innovations and results of R&D, directly or via their advisors, in order to use them to improve the multi-performance of their farms. Its ambition is, as already emphasized, to make the transfer of innovative solutions a priority in the R&D actions of all the partners.

This study focuses on the evaluation of the transfer of innovation by extending the "Champ d'Innovation" project. The objective of the research, centered on a panel of given innovative solutions, is to identify the modalities of innovation transfer and the complementarities between these different

interfaces (or devices) for transferring innovative solutions. In the end, the objective is to propose an analysis grid of the 'multi-channel' transfer of innovative solutions in agriculture. In the agricultural model, the innovation actors are different from those in the industrial world, in the sense that they do not play the same roles and do not have the same status as in the classical scheme of innovation transfer. In the industrial world, the sharing and dissemination of innovation is more formalized, i.e., the designer and prescriber groups are separated, and each has a specific role upstream and downstream of the innovation chain. Whereas in the agricultural world, the 'contributors' to innovation have several roles including prescribing the innovation to the target. The origin of innovation in this world is the need of the farmer who will be the future beneficiary (see Figure 2).

The objective of the research, centered on a panel of several given innovative solutions, is to identify the modalities of innovation transfer and the complementarities between these different interfaces.

According to the study, the obstacles to this transfer are multiple: cultural practices, lack of motivation, fear of novelty, lack of time for farmers to consider and solve their professional difficulties, lack of adaptation to the problems and lack of risk-taking. The study highlighted also a real dynamic and a good interaction between all the actors directly or indirectly involved in the transfer of innovative solutions. This system has shown its interest among prescribers as a system for transferring innovation to the agricultural world.

This study therefore focuses on three distinct aspects:

Firstly, a review of the state of the art in thinking about innovation systems (in general and in agriculture) and a reminder of the main concepts used to understand the issue of innovation transfer and the measurement of the transferability of innovative solutions are provided.

Secondly, we described the methodology employed in order to decipher the main relationships between actors.

Thirdly, the main results obtained during the surveys and interviews conducted jointly with visitors (prescribers) and contributors (exhibitors) are discussed.

Finally, a summary of the key points and recommendations, drawn from a global vision of the innovation system and the determinants of the transferability of innovative solutions, is presented.

2. Literature review

Innovation as a concept is not a single or solitary event and several factors can count for it is development. The innovators are one of the most important determinants of it but additional factors like the policy, the legislation, the infrastructure, the funding and the market development are equally

important for supporting innovation (Fieldsend et al., 2021, Rivera et al., 2006, Klerkx, van Mierlo and Leeuwis, 2012). The concept of diffusion of innovation can perform multiple ways of transfer.

Besides the classical framework of 'knowledge transfer', the innovation might be the result or co-production of several "interactions between farmers, researchers, intermediate actors (input providers, experts, distributors, etc.) and consumers" (Fieldsend et al., 2021, p.424). According to the precedent author, the knowledge sharing as a final step is made possible firstly by the identification of the problems by the actors and secondly, by the co-creation of solutions through collective learning (Nederlof, Wongtschowski, and Van Der Lee, 2011, Dogliotti et al., 2014).

The diffusion and adoption of innovation in agriculture can create "economic and environmental sustainability competitive advantages" (Mesa Manzano, 2023, p.3). The agricultural sector has been widely appropriated by scientists concerning the diffusion and adoption of innovations. They have been used to the "presence of processes of adoption and diffusion of innovations in relation to both agricultural practices and the use of different and changing technologies, either by individuals or by certain social groups" (Mesa Manzano, 2023, p.3). For this reason, different theories and concepts were developed in order to explain these processes. For our case, this study concerns the ecosystem of the 'Innovation Platform' "Champs innovation", its organization, types of actors and relationships or nature of collaboration.

The technology transfer as a linear model is considered obsolete when taking into account the farmer empowerment within the rural framework (Brown et al., 2022). The agricultural innovation system approach could provide solutions to the innovation diffusion through "dynamic networks of interactions and feedbacks loops involving institutional and policy settings to nudge the system to help stimulate technological change and innovation" (Brown et al., 2022, p.499). One of the most important parts of the agricultural innovation system is the 'Innovation Platform' (Brown et al., 2022, ISPC, 2015, Maru et al., 2018). These 'Innovation Platforms' (cited in Brown et al., 2022, p.499) are considered "as a physical, virtual, or physico-virtual network of stakeholders which has been set up around a commodity or system of mutual interest to foster collaboration, partnership and mutual focus to generate innovation on the commodity or system" (as defined by Adekunle and Fatunbi, 2012, p.983). Using the definition of Sanyang et al. (2016) (cited in Brown et al., 2022, p.499), we described the 'Innovation Platforms' "as a vehicle for change in the interaction among research, farmers and farmer organizations, advisory services (public and private), agro-food processors, traders, input dealers, financial institutions (such as microfinance and banks), policymakers, transporters, and the media (including rural radio)".

The ‘Innovation Platforms’ are considered as “a strong proxy for identifying trends in STI” (FAO, 2022, p.45) since they are gathering “different actors in different actors of the ecosystem in one place to identify solutions or to achieve common goals” (FAO, 2022, p.45).

According to Teno and Cadilhon (2016), the ‘Innovation Platforms’, are essential in order to promote the agricultural innovation (Nederlof and Pyburn, 2012) and to resemble heterogenous stakeholders with the scope of diffusing knowledge and promoting common goals (ILRI, 2012). Little research has been done concerning the implementation and the description of the types of innovation platforms with regards to the agricultural system.

Facilitating interaction and collaboration in networks of agricultural actions are among the most important attributes of an ‘Innovation Platform’ (Schut et al., 2016). Other attributes like the continuous engagement and the exploration of innovations are taking into account for several reasons: on the first line, the heterogenous stakeholders can diffuse the information/knowledge about “the biophysical, technological and institutional dimensions of the problem” (Schut et al., 2016, p.538) and “what type of innovation are technically feasible, economically viable and social-culturally and politically acceptable” (Schut et al., 2016, p.538); on the second line, a crucial aspect is their interdependencies when common goals are within their reach (Leeuwis, 2002, Massely et al., 2013); on the third line, stakeholders are prone to engage and apply ‘specific solutions’ as they are considered part of the decision making-process (Faysse, 2006, Neef and Neubert, 2011).

Considering the relationship between the stakeholders, the ‘Innovation Platforms’ can improve the capacity of innovation on multiple ways (according to Leeuwis et al., 2014): identification and prioritization of issues related to the environment; experiment and risk with socio-technical options and make compromises; activate resources related to these options; share information and knowledge within these processes; collaborate and coordinate in order to focus and realize common goals through common action.

In recent years, the ‘Innovation Platforms’ have been integrated within the agricultural research for development (AR4D) for their capacity to improve participatory and collaborative approaches in fostering agricultural innovation (Schut et al., 2019). The ‘Innovation Platforms’ are seen “as a model for achieving development outcomes through participatory action research” (Schut et al., 2019, p.576). According to Schut et al. (2019, p.576), most of the scientific literature outline the importance of “how to implement and facilitate innovation platforms for technological or institutional change”. Moreover, the same authors emphasized the “lacks in the literature” concerning “the usefulness of innovation platforms in overcoming a range of agricultural challenges” (Schut et al., 2019, p.582).

2.1. Types of actors and the nature of their collaboration

As seen in the Table 1, several actors participate in the transfer of innovation: the contributors, the prescribers and the targets of innovative solutions. Our inquiry is the following: How to facilitate the transfer of innovation between the contributors of agricultural innovations and the prescribers who will play the intermediary role of supporting these innovations between the different actors participating in this chain? The questions that arise from this issue are complex: Who are the contributors? Their status and role? What are the types of innovation and their stage of maturity (TRL)? What are the means of transferring these innovations used by the contributors? Who are the prescribers? Their status and role? What are the obstacles to the transfer of innovations according to the prescribers?

To define the "contributors", these are the parties who will collaborate on a project within the framework of a network, this collaboration can be the emergence of a new idea from the downstream of the sector in an institutional way or from the farmer. The contributors can play the role of funders to help design the innovative solution.

The types of innovation perceived in the agricultural world during this forum are: agro-ecological innovations; digital innovations and discovery innovations (equipment). These innovations fall within the framework of improvement (incremental) or service innovations.

To define the 'prescribers', we propose several definitions: according to Kilelu (2011, p.11) "in the context of agricultural innovation, innovation intermediaries facilitate the setting of the innovation agenda: by organizing producers, building coalitions of different actors, promoting information and knowledge sharing platforms, experimenting with and learning new approaches, and facilitating institutional organization and capacity and business skills building". According to Klerkx (2012) the 'innovation brokers' are individuals or organizations that, from a position of relative impartiality, deliberately catalyze innovation by bringing actors together and facilitating their interaction. Innovation brokering extends the role of extension from that of a one-to-one intermediary between research and farmers to that of an intermediary that creates and facilitates many-to-many relationships. As an organization and function, innovation brokering differs from traditional extension and R&D as it represents the institutionalization of the facilitation role, with a broad systemic, multi-actor and innovation systems perspective.

Table 1. Ecosystem of innovation in the agricultural world

Ecosystem of innovation in the agricultural world		
Contributors of innovative solutions	**Prescribers of innovative solutions**	**Targets of innovation**
Chambers of Agriculture, Regional Directorates, Technical Institutes, Higher Education and Research Institutions, Farmers Groups, Start-Ups/Enterprises	Farmers/Cooperatives, Chambers of Agriculture, Training Centers/Universities, Companies, Public Organizations	Farmers, Cooperatives, Companies, Service providers

Source: Own representation

According to the "Réseau Wallon de Développement Rural" (2016), the 'innovation brokers' aim to identify, create and strengthen links between rural actors involved in supporting innovation in agriculture and forestry. Also, their role is to network, federate and support the agricultural world to foster the creation of collaborations, partnerships and innovative projects and to facilitate the exchange of knowledge and know-how between innovation actors in order to capitalize on their innovative practices and to disseminate them to all rural actors.

2.2. Obstacles to transfer

From the very beginning we mention that this section related on the means and obstacles to the transfer of innovation will be further explored in the results section. The drivers and barriers to innovation adoption and diffusion have been more extensively studied in the literature, with the costs and benefits of new technologies influencing farmers' decision-making regarding innovation adoption (Läpple et al., 2015). Costs can be related to "purchasing inputs, equipment, managing pest and disease control", while benefits are related to "household income, food security, soil fertility improvement, health and nutrition, firewood and building materials" (Meijer et al., 2015, p.44). The barriers to innovation are more studied in the literature, we can mention, uncertainty and initial investments represent important obstacles. Risk-taking and lack of relevant information are recognized by Meijer et al. (2015) as important determinants of innovative behavior. Information sharing can be crucial for decision-making on innovations. The prescriber can play the informative role in sharing information sources for decision making regarding innovation adoption.

3. Method

The data were collected during the three forums organized on the research scheme deployed on the "Champs d'innovation" project between 2017 and 2020, with three innovation forums, in 2017, 2018 and 2019. The objective of this forum is to raise awareness of innovations, and, in a broader sense, the achievements of research and development work conducted and proposed to the agricultural world by technical institutes, professional agricultural organizations and also any other structure carrying an innovation that may be transferable, in the short or medium term, to farms and/or businesses with which these farms are in direct contact. We used different methods to collect the data for the three innovation forums:

- 1st FORUM: The design and sending of a questionnaire. Following three reminders by email and telephone, we received several responses between June 15 and 29, 2018. This questionnaire contains three parts: overall satisfaction at the 1st forum which took place in December 2017, participation on the 2nd forum on October 18, 2018, and the transfer of innovative solutions.

- 2nd FORUM: The design and submission of a new questionnaire to contributors on the day of the forum by a group of students ('4A Entrepreneurship and Innovation course' at UniLaSalle Polytechnic Institute -Beauvais site).

- 3rd FORUM: The design and submission of a questionnaire to contributors and prescribers on the day of the forum, dated November 21, 2019, by a group of students ('5A Agronomy course' at UniLaSalle Polytechnic Institute -Rouen site). We have taken the same questionnaire submitted to contributors from 2018 in order to compare the results on the last two forums and we have designed a new questionnaire for prescribers. These two questionnaires were constructed using Google Forms, which helped students fill in the answers directly on their laptops and smartphones.

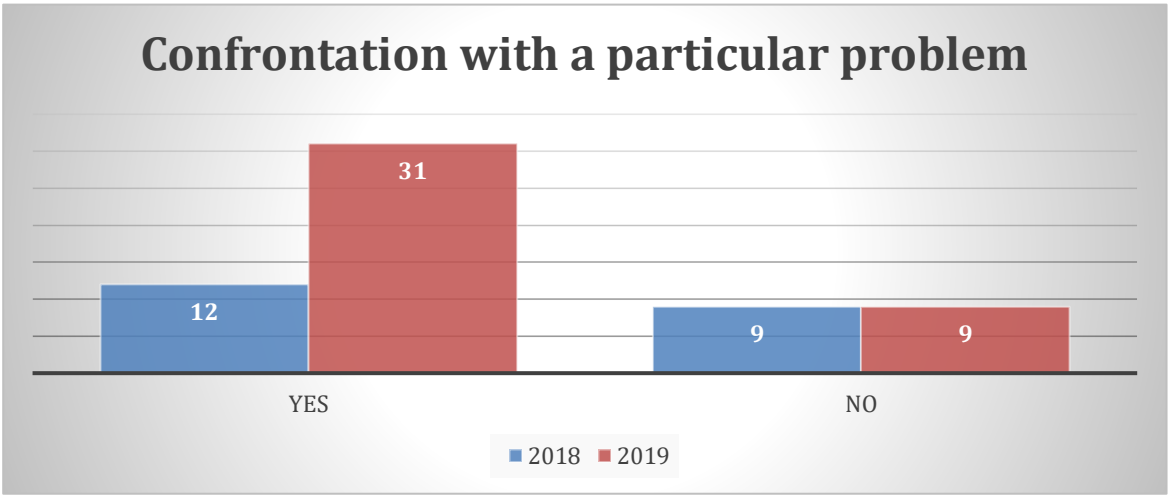
4. Results and Discussion

Following the methodology used by Ngwenya and Hagmann (2011), concerning the steps towards establishing the innovation platforms, partnerships, and business models, we put together several criteria when characterizing the innovation platforms, by key steps with detailed activities, methods and processes. In order to present the results of the contributor survey, we have processed mainly the data on the last two forums (2018 and 2019) to raise the convergences and divergences in the set of responses. The numbers on the different diagrams in the following figures (Figures 1-14) represent the sample of respondents from the forums in 2018 (in blue) and 2019 (in red) who answer on the different topics addressed.

Reflection and creation of the innovative solution

Most of the contributors were faced with a particular problem to innovate, with a major difference between the number of respondents which are confronted with a particular problem (31 respondents in 2019) but lesser in 2018 (only 12 respondents) (Figure 1).

Figure 1. Confrontation with a particular problem

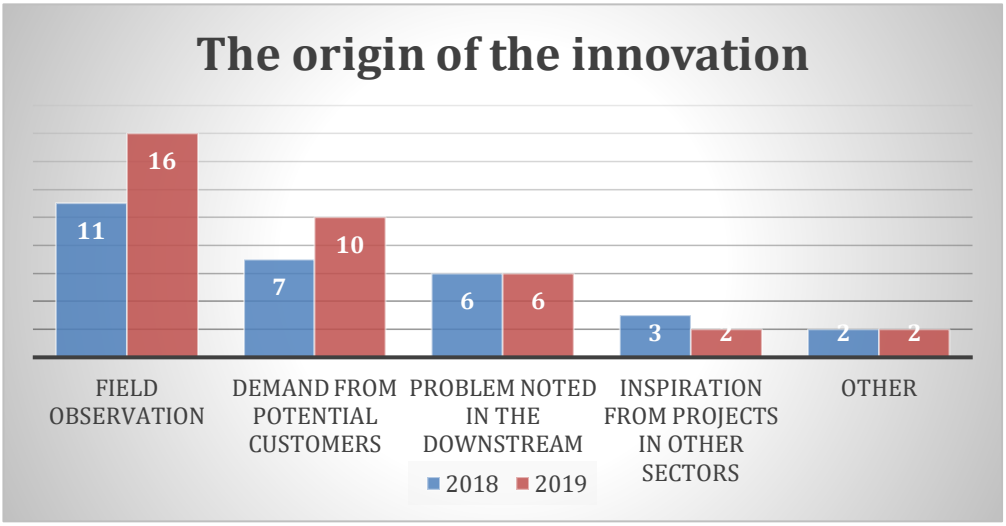


Source: Own representation

The origin of the innovation

The origin of these innovations is mostly linked to observations in the field (16 respondents in 2019 compared to 11 respondents in 2018), followed by a request from potential customers and the third place occupied by a problem observed downstream in the sector (Figure 2).

Figure 2. The origin of the innovation



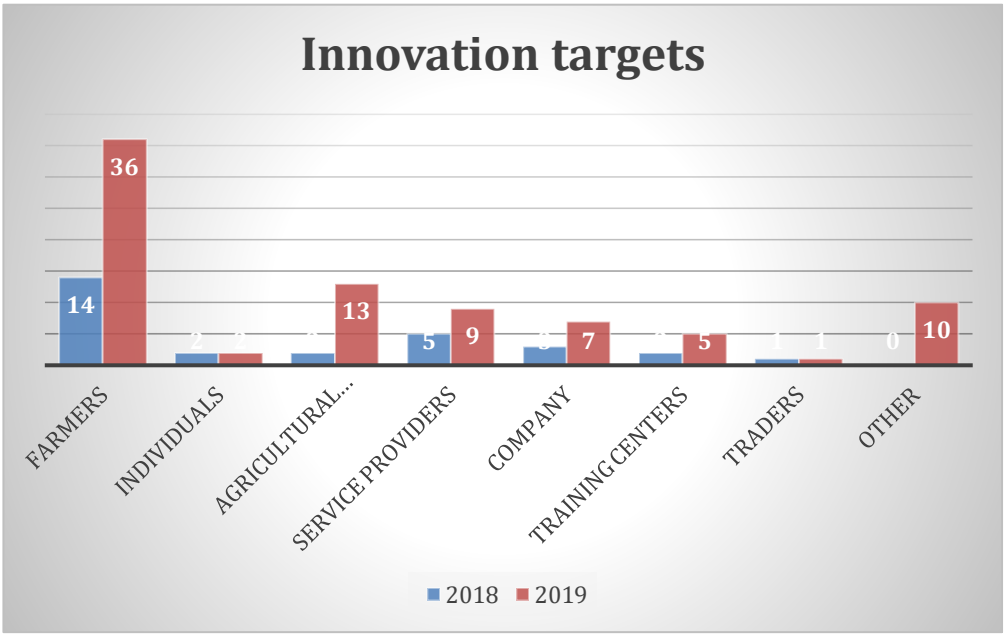
Source: Own representation

Innovation targets

The targets of these innovations are by far the farmers followed by the agricultural cooperatives, service providers and so on. There are big differences for the first position concerning the respondents in 2019 (36 respondents) and those registered in 2018 (14 respondents).

For other targets, contributors mentioned agricultural dealers (machinery and repairs), agricultural advisors, local authorities, and technical institutes like the 'Livestock Institute'. (Figure 3). The innovation targets are strongly linked with 'the innovation process' since this process concerns "the emergence and development of a new object and its adoption in one several farming situation(s)" (Salembier et al., 2021, p.60).

Figure 3. Innovation targets



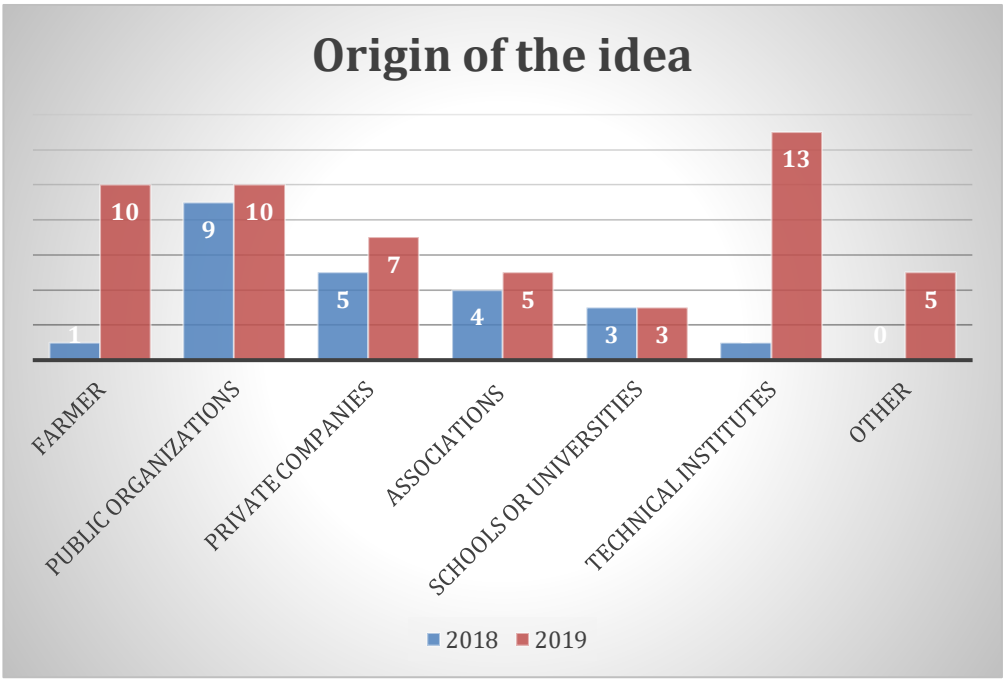
Source: Own representation

Origin of the idea

We see a difference over the last two years, where there is a growth in the number of farmers and technical institutes that are behind the idea followed by public bodies and companies. In 2019, other organizations that originated the idea include the Ministry of Agriculture and Environment, experimental farms and ADAS Institute. The origin of the idea can be led by both a public body, as in the case of Bretagne 'Développement Innovation' (in the framework of the Agretic programme), and the private body like the 'General Secretariat for Investment'. In another case observed, the idea may be the result of a reflection between the farmer and an association, as in the case of Bio Normandie following questions from a woman breeder in Burgundy (Figure 4).

The creation of innovations, its origin, the innovation targets and the origin of the ideas are related to what we call the 'farmer innovation tracking' which is "an active process leading to the discovery of innovations" (Salembier et al., 2021, p.60). Thus, the innovation is "a novel object that is either emerging or has already been developed and implemented" (Salembier et al., 2021, p.60).

Figure 4. Origin of the idea

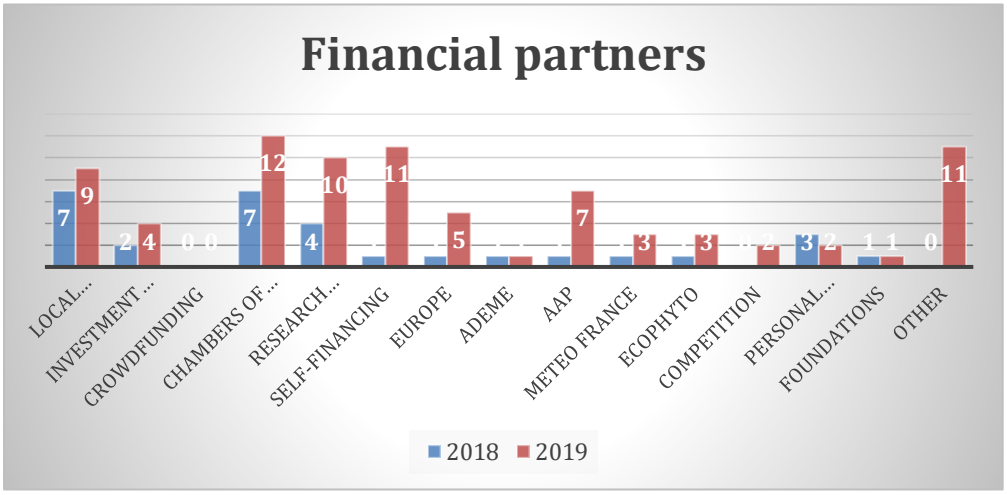


Source: Own representation

Financial partners

The financial partners are mainly the chambers of agriculture, the technical and research institutes, and the local authorities.

Figure 5. Financial partners



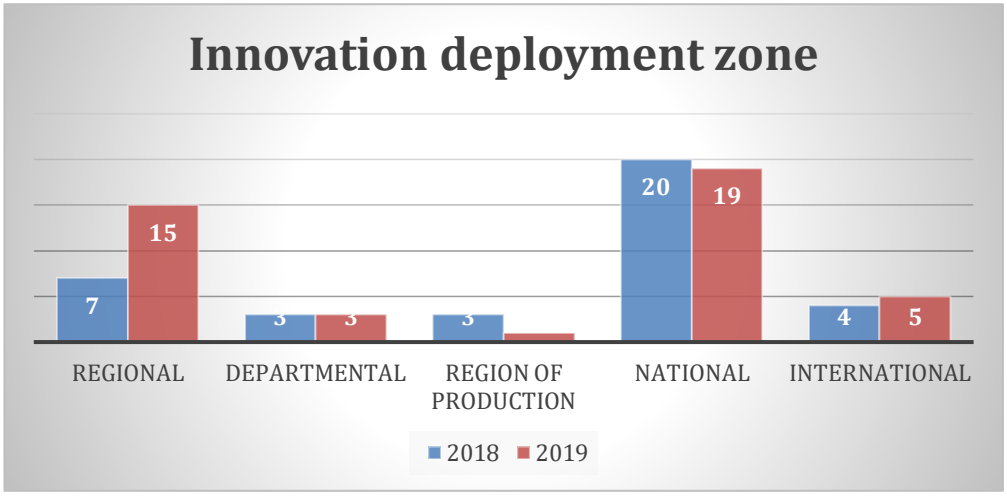
Source: Own representation

We note an evolution on the side of self-financing of contributors and calls for projects (AAP). In 2019, other funding is sourcing from the following: a) the Dairy control, b) the Cooperatives, c) Insta, d) Casdar, e) Danone Foundation, f) OPA (MSA, GDS, IDELE...), g) Water Agency, IDELE, CNIEL, h) Universities, farmers' networks, i) Adnie BPI, j) MAS Seeds and JD, k) Syngenta, CER Broceliande, l) DRAAF. Moreover, in particular cases, there may be a combination of self-financing in phase 1 and a call for projects in phase 2 (Figure 5).

Deployment of innovation

The areas of deployment of the innovations on display are mostly national and regional (Figure 6) and the primary objective is to provide assistance to the problems of the agricultural sector.

Figure 6. Innovation deployment zone



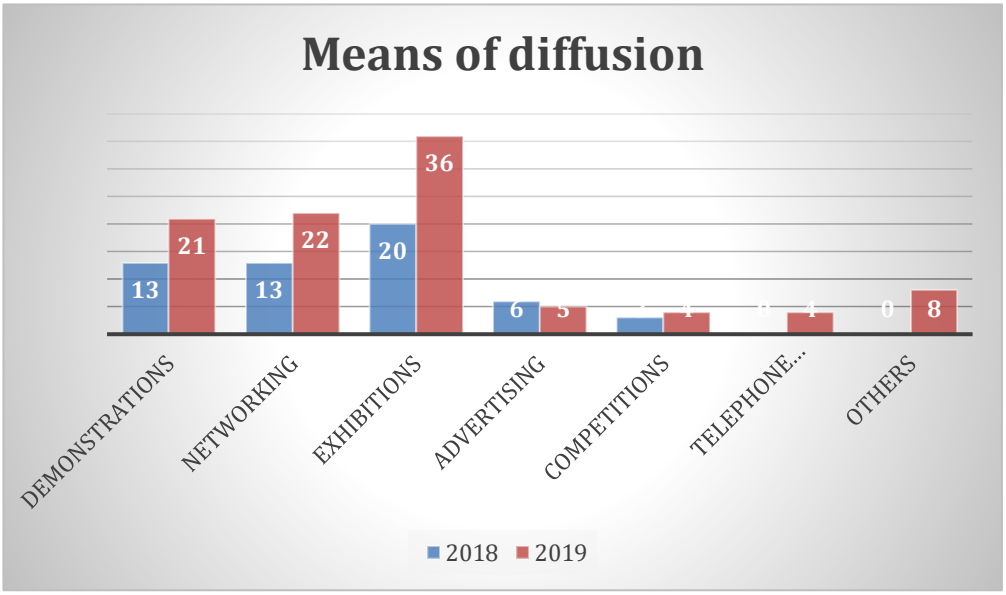
Source: Own representation

Means of diffusion

The means of disseminating these innovations are mainly exhibitions, followed by demonstrations and networks (Figure 7).

The deployment of the innovation and the means of diffusion are being part of 'the design of innovation' since 'the design' is considered "as a process driven by a desire to generate something that does not yet exist" (Salembier et al., 2021, p.60). This process is based on a progressive development of an innovation from the discovery to its application within a socio-technical environment (Papalambros 2015, Wynn and Clarkson 2018, Hatchuel et al. 2017).

Figure 7. Means of diffusion



Source: Own representation

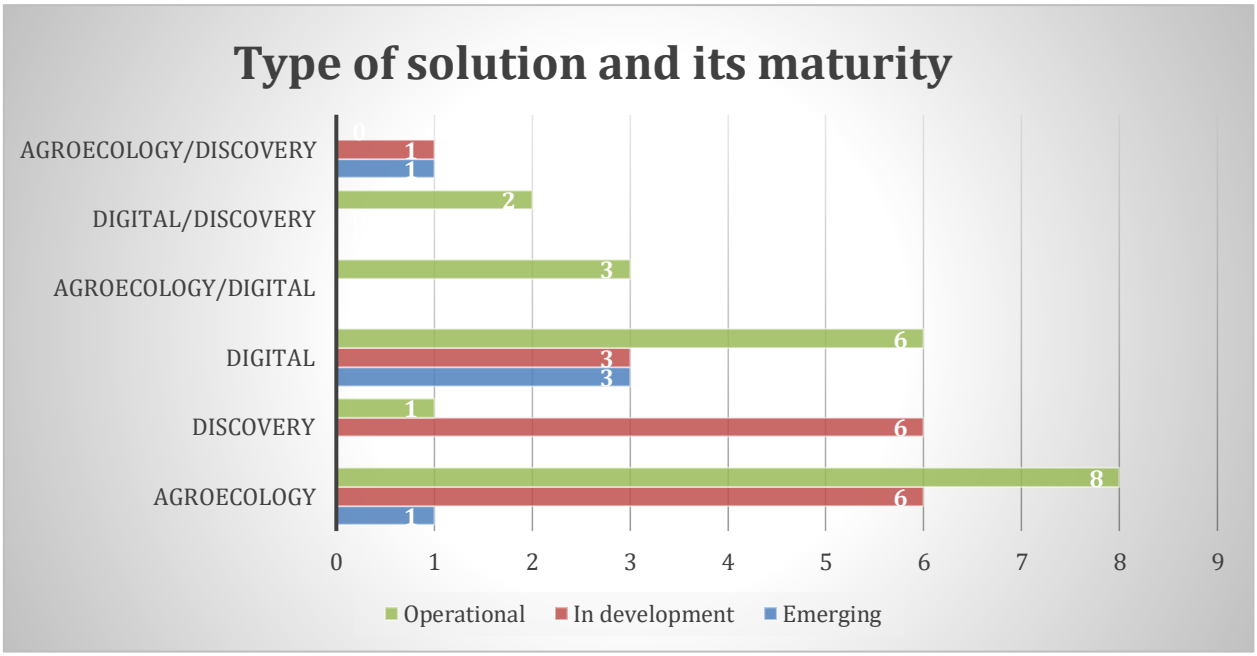
Type of solution and its maturity

According to the round-table discussions organized by the Regional Chamber of Agriculture of Normandy, on the day of the forum (the 3rd forum in 2019), we matched the types of innovative solutions and their maturity according to the contributors interviewed. What emerges is that innovations in agro-ecology and digital technology are mostly operational. Innovations called 'discovery' (in equipment) are developing on a pair with agro-ecology innovations. Digital innovations are half in development and half in emergence (prototype phase). A minority of solutions combine two fields such as application in agro-ecology and digital, or digital and discovery.

Most of these innovations are accepted in the agricultural sector. The obstacles raised are related to: i) technical problems, ii) sometimes the appetite is limited to digital, iii) problems of communication and deployment of the innovation, iv) the payment. To make these innovations

known, trade fairs are more adapted to agro-ecological innovations, and networks are adapted to digital and discovery innovations. The networks and cooperatives help to disseminate agro-ecological and digital innovations, and the chambers of agriculture help to disseminate discovery innovations (Figure 8).

Figure 8. Type of solution and its maturity



Source: Own representation

Relevance and interest of the forum as an innovation transfer mechanism

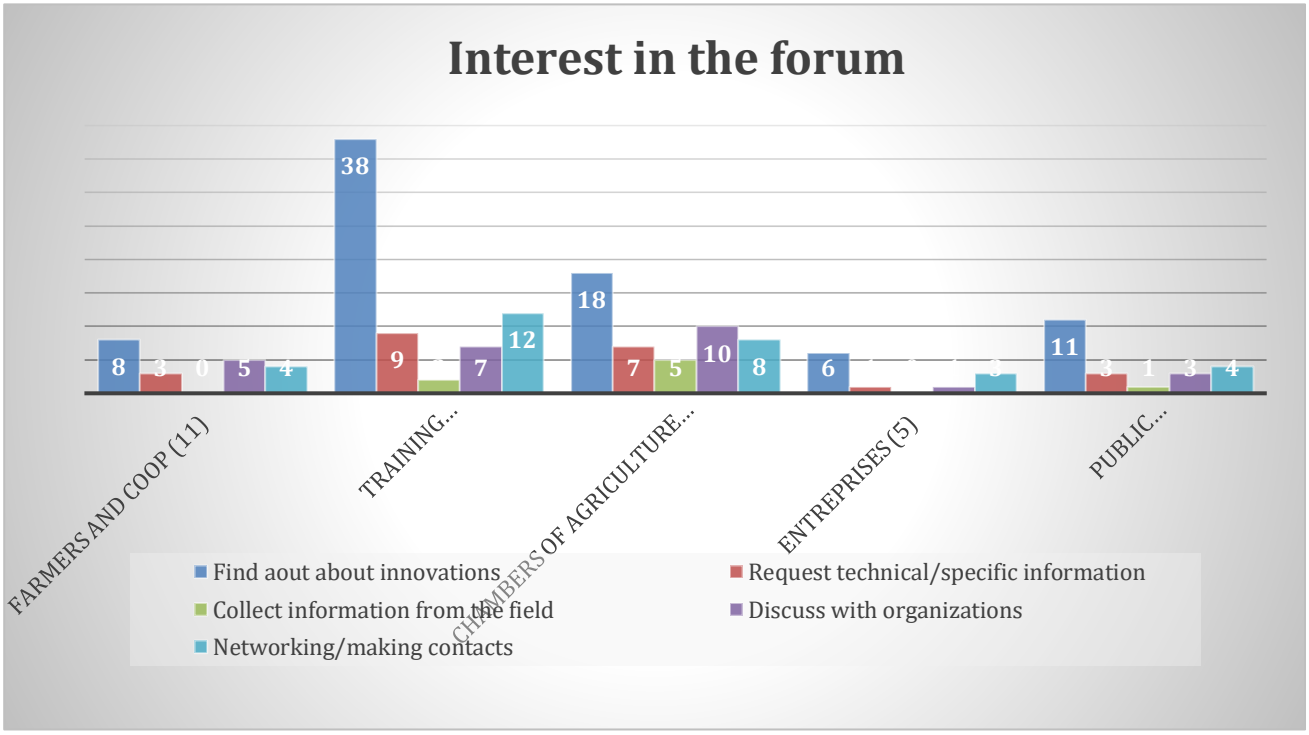
Generally speaking, the results show a synthetic analysis of the information collected during the three forums on the system set up, the transfer, its deployment, the obstacles and improvements on the part of the contributors and the prescribers.

Following our survey, the participants (contributors) are globally satisfied with the system. The majority of contributors have achieved their objectives in terms of establishing contacts or collecting information. From the first forum, the system generated a great dynamic. Indeed, 81% of contributors expressed interest in participating in the second forum, of which 1/3 of contributors wanted to propose an improved solution, the second third for a new solution and 15% of contributors for the same solution.

Indeed, nearly half of the contributors interviewed had feedback on the request for technical information (46.7%) while 20% of contributors had a return on the request for training. The last 13% of contributors had a return on the request for a demonstration. The event was not intended to be commercial (13.3% of them had a commercial follow-up) but it is above all to show and exchange

around the innovations. Indeed, most of the visitors asked for technical information on the innovative solutions. Indeed, according to the figures concerning the general interest of the forum, most of the visitors were present to get information on recent innovations, followed by ones who exchange with the registered organizations or networking and requesting technical information. (Figure 9).

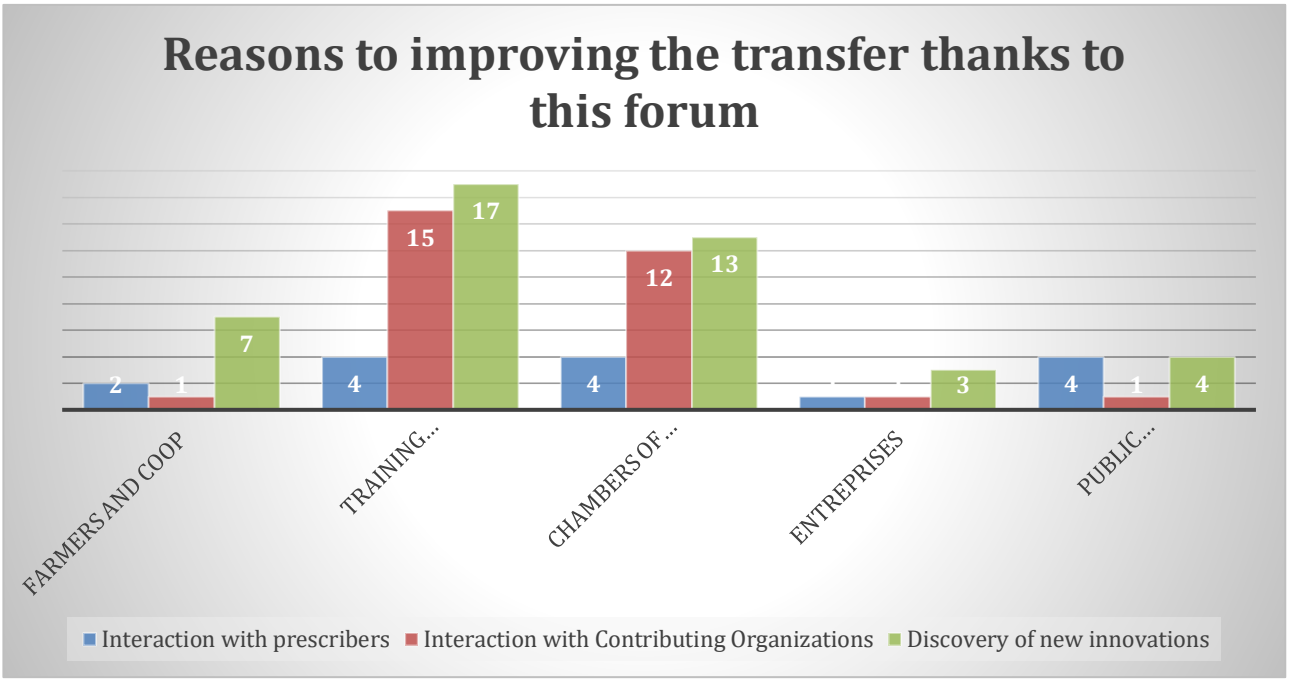
Figure 9. Interest in the forum



Source: Own representation

The farmers, the Chambers of Agriculture, the companies and public bodies agree that this forum has improved transfer. On the other hand, 40% of training centers and schools do not agree that this forum has improved the transfer of innovations. Most of the prescribers find that the two reasons for improving transfer are: interaction with contributors and the discovery of new innovations (Figure 10).

Figure 10. Reasons to improving the transfer thanks to this forum



Source: Own representation

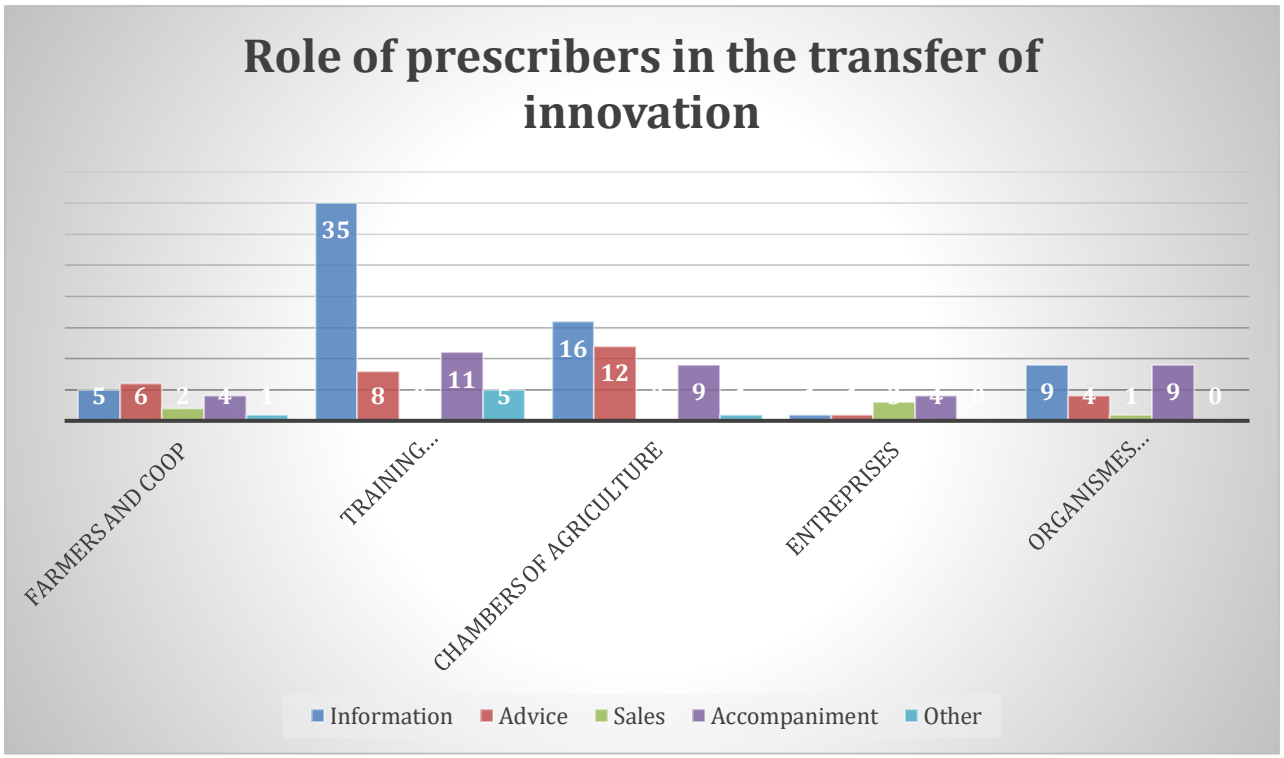
Transfer of innovative solutions

One of the main objectives of this forum is to facilitate and improve the transfer of innovative solutions. Following this study, contributors stressed the importance of direct contact and online media as transfer channels. Other contributors responded that advisors and the organization of technical and training days for the sector can improve transfer. They proposed the organization of bilateral meetings with potentially interested structures and direct farmer groups.

According to our observations, the prescribers interviewed play different roles in the transfer of innovation: farmers and cooperatives are more into advice and information; the training centers play an informative and accompanying role; the farmers' chambers play an informative, advisory and support role; companies play a support and sales role; the last group of public bodies plays an informative, advisory and guidance role (Figure 11).

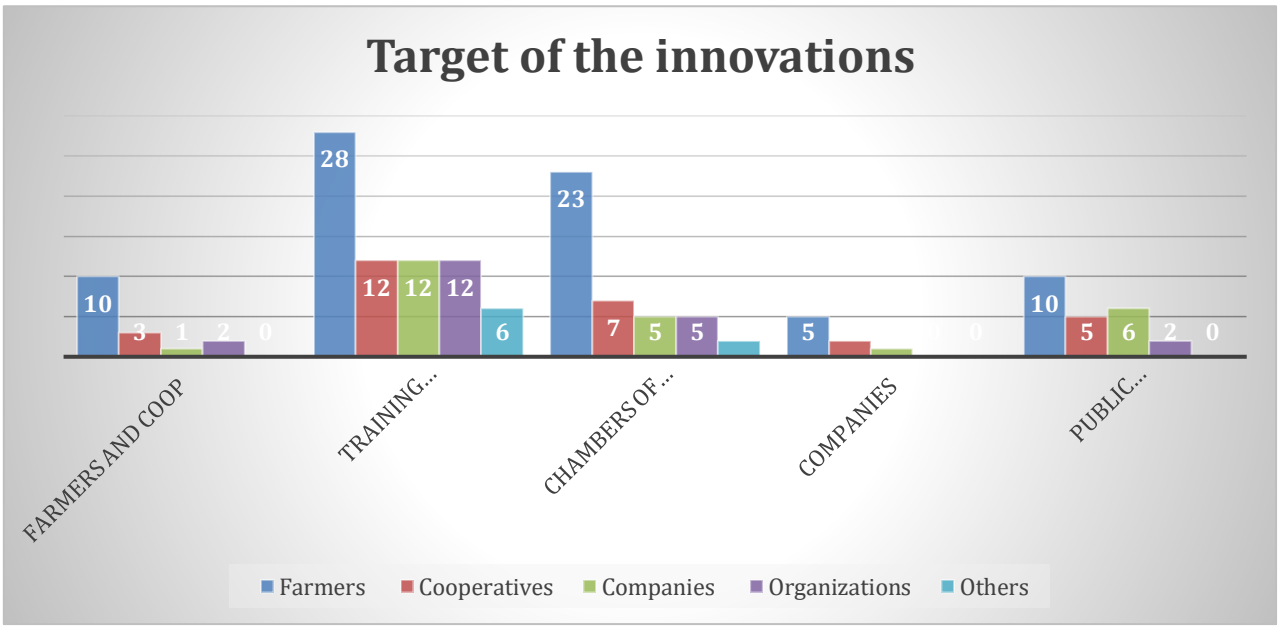
The prescribers acknowledge that the target of these innovations are the farmers, followed by the cooperatives, and lastly, by the companies and public bodies (Figure 12). The types of innovations most questioned in the agricultural world in ascending order were as follows: innovations in production techniques, innovations in equipment and digital innovations (Figure 13).

Figure 11. Role of prescribers in the transfer of innovation



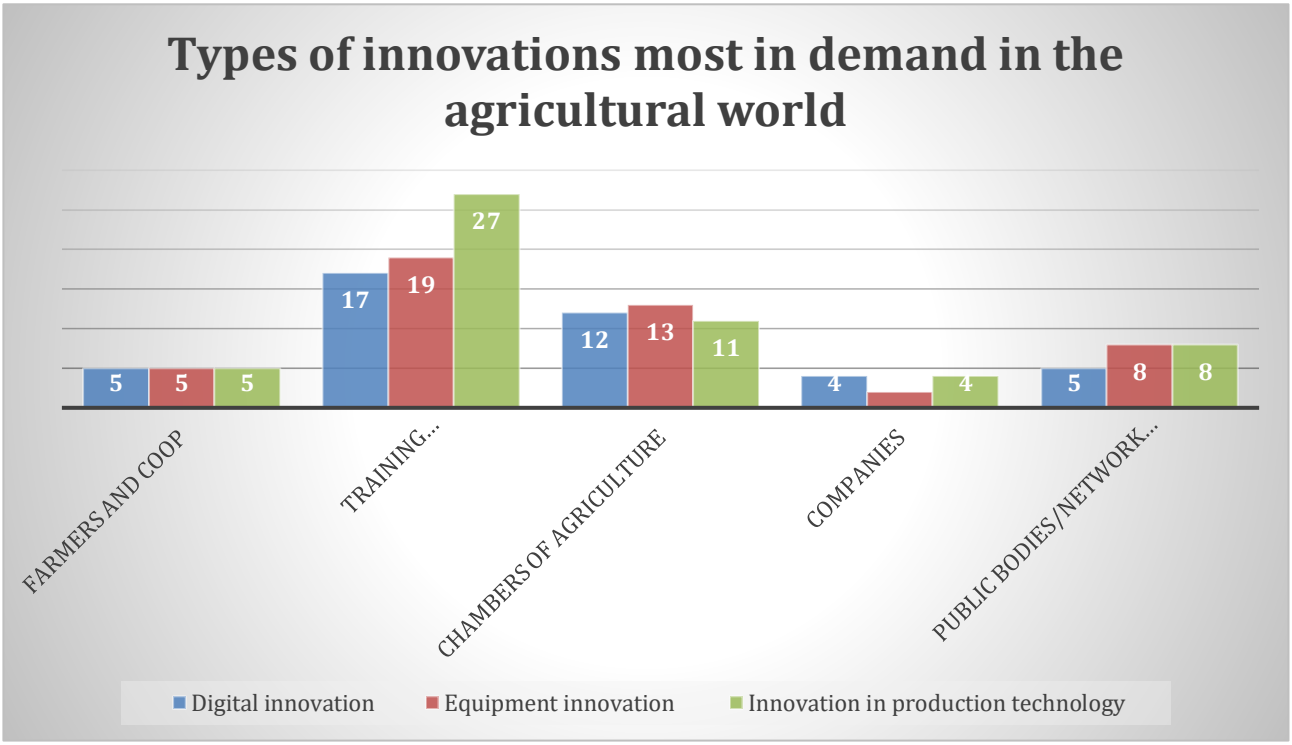
Source: Own representation

Figure 12. Target of the innovations



Source: Own representation

Figure 13. Types of innovations



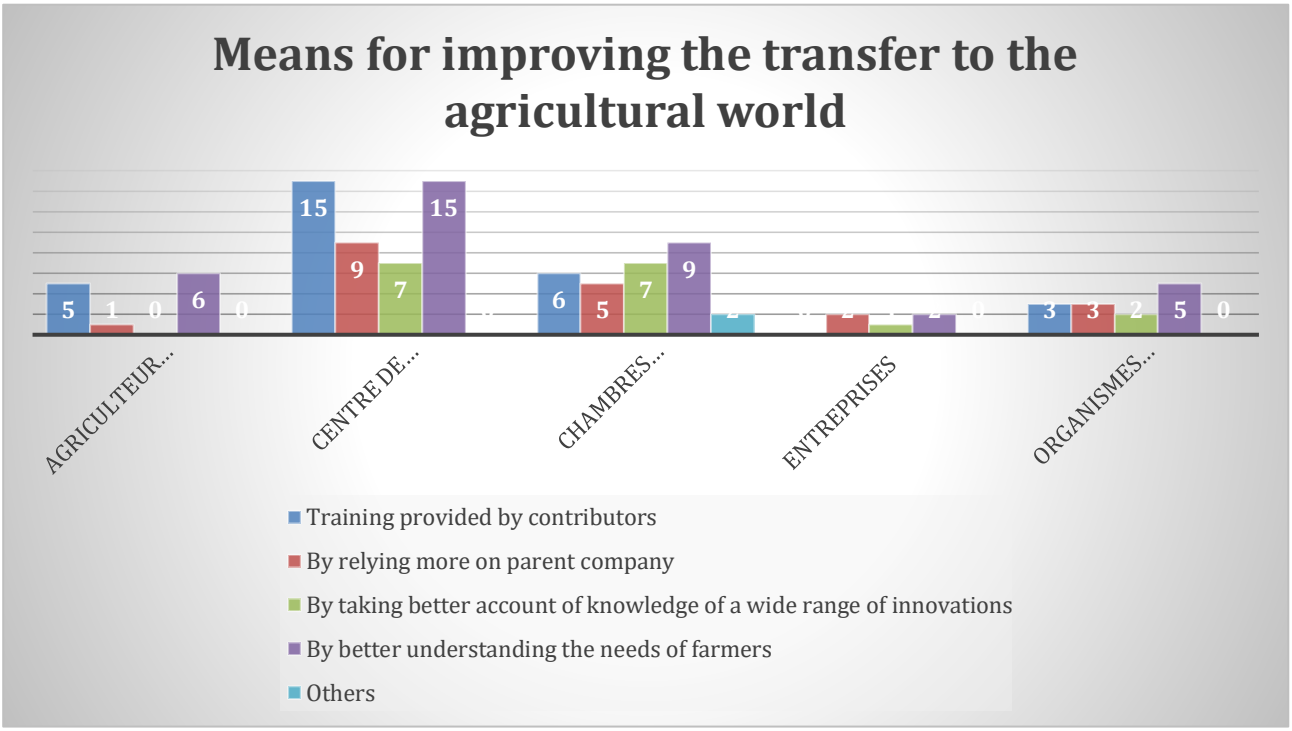
Source: Own representation

Improving the transfer of innovative solutions

To improve the transfer of innovative solutions, the contributors are in favor of training and assistance for their targets by deploying advice and training days between players. They suggest complementing this with other fairs and competitions such as 'Innov'space', 'Sommets d'Or', etc. In addition, the reinforcement of the cognitive and social dimension is recommended in addition to the improvement of the number of visitors, the enhancement of the multi-actor contact.

Indeed, according to the contributors' needs, the strengthening of a multi-actor movement is necessary because the use of single-actor commercial differentiation is largely insufficient to bring agriculture to be able to respond to the challenges it faces, both in response to the challenges of society, the challenges of decision-makers in the sectors and territories and the challenges of the profession. The two means of improving the transfer most cited by the prescribers are: training provided by the contributors and better knowledge of farmers' needs (Figure 14).

Figure 14. Means for improving the transfer



Source: Own representation

Prescribers agree that farmers choose innovations according to downstream needs. The training centres say that the choice is also made according to the cost of the innovation. Farmers' Chambers of Agriculture, companies and public bodies rank the development of interaction between suppliers and demanders, as the second most important.

Difficulties in transfering innovation

The difficulties encountered by contributors are technical and financial, but also in management computing and communication. Contributors cited other challenges: 1) access to data; 2) no support from the Chambers of Agriculture and therefore difficult to make themselves known; 3) the demand for specific and specialized skills; 4) the possibility of gaining access to farmers; 5) the involvement of breeders who do not necessarily feel concerned; 6) the acceptability of the theme (decision-makers, breeders, etc.); 7) the management of personal data; 8) restrictive use of the internet; 9) communication on the operation of a label; 10) the difficultty of finding its place in the market; 11) the sanitary control.

The main obstacle cited by the farmers' chambers, farmers and public bodies is the cost of innovation solutions. The 2nd obstacle cited by training centers and farmers' chambers is the lack of communication. The 3rd obstacle is the lack of support/training. The 4th obstacle is the lack of knowledge about innovation.

5. Conclusions

The study has highlighted a real dynamic and a good interaction between all the actors directly or indirectly involved in the transfer of innovative solutions. For the transfer of innovations in this agricultural world, we noticed that farmers play an important role in this transfer through their institutional networks, social networks, and especially word of mouth (within a geographical dimension). This system has shown its interest among prescribers as a system for transferring innovation to the agricultural world. It can be complementary to other fairs and round-table events for farmers such as 'Innov' action'. However, the obstacles to this transfer may be due to practices that are heavily anchored in several attributes: customs, lack of motivation, fear of novelty, lack of time for farmers to consider the issue, lack of psychology, lack of pedagogy, lack of adaptation to the problems and lack of risk-taking. Ways to improve the transfer include better targeting of speakers, soliciting the mainstream media, and encouraging field demonstrations.

Following the results of the questionnaires, on the one hand, it would be interesting to lighten the institutional proximity to avoid being a monopoly so as not to block the farmer in proposing his ideas and needs. Finding a balance at the institutional level like the distribution of powers would make it possible to reduce single-actor opportunism and create multi-actor objectivity. Finally, having flexibility between contributors and new actors who want to integrate the agricultural world could be considered. On the other hand, encouraging crowdfunding in this ecosystem of agricultural innovations is interesting for the participatory financing of new types of actors, and the collaborative consumption of the product and participatory production like the crowdsourcing in order to create knowledge.

The results of the sample show us detailed answers from the reflection and creation of the innovative solutions to the relevance and interest of the forum as an innovative transfer device. Several remarks should be emphasized since the evaluative evidence of our sample introduces multiple facets of the transferability of innovations from the creation to the diffusion and adoption of knowledge.

Firstly, our results confirm the theoretical framework of Agricultural Innovations Systems and within it, the development of 'Innovation Platforms' as analyzed and described by several authors mentioned in the literature review. For example, most of respondents are confronted with barriers concerning the creation of innovative solutions. One of the reasons could be related to the origin of innovation since most of the ideas are born from fields observations, difficult in terms of costs of traceability and registration. Another reason is the type of innovation: we can notice the fact that the most important innovations are incremental and service ones.

The innovation targets are mostly related to the farmers and these innovations at the farm level refer to production processes. Another important aspect to outline is about the origin of ideas. We observe a large implication of farmers and public and technical bodies. The explication resides in the fact that there is a progressive and constructive cooperation between the one who initiate and represents the origin of ideas and those public bodies, which are considered the closest and the most appropriate when it comes to agricultural and technical advice for the farmers. The same implication we observe for the financial investments provide din order to promote, transform and diffuse the ideas into practice. The financial partners are mainly the Chambers of Agriculture, technical or research institutes since these actors are accompanying permanently the farmers on their activities.

As regards the geographical scale of deployment or the diffusion of the innovation, we observe a national or regional localization since most of the farmers are historically, culturally and economically implanted and linked with public and technical bodies which are 'administratively active' at this spatial scale.

The dissemination of innovations is concerned with the face-to-face exhibitions but also demonstrations and networking. Despite the digital development and the continuous development of artificial intelligence within the agricultural world, there is a major social need of face-to-face contacts and live networking.

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