Mapping stakeholders' viewpoints on innovation along a livestock value chain: a Q method application

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ABSTRACT
Innovating is vital to farmers in sub-Saharan Africa, to adapt to challenges and benefit from opportunities. Stakeholders' decisions to engage in innovation programmes are influenced by their perceptions. This article uses the Q-method application to investigate these perceptions along the swine value chain in Benin. Fifty-five statements were established with local stakeholders and then graded by 25 interviewees on an 11-grade scale. Three main discourses were identified: an optimistic discourse tied to an endogenous vision of innovation, and a pessimistic one to a top-down, exogenous vision. A third discourse highlighted more nuanced redistributive effects of innovation. Innovation platform projects, stimulating local innovation, should rest on and reinforce the first optimistic discourse.

Introduction

Their ever-changing and challenging environment drives farmers in sub-Saharan Africa to continuously turn toward technical, organisational and institutional innovations to get the most out of locally available resources and actively develop knowledge and practices (Klerkx, Van Mierlo, and Leeuwis 2012). This on-site development of new practices is called endogenous innovation. Resulting from relevant local insights into socio-economic and environmental issues, endogenous innovations are considered to be well adapted, and therefore the basis for sustainable development. However, exogenous or introduced innovations, to be successfully adopted, also require adaptation, to be simplified, enriched or tailored to actors' practices (Vall et al. 2012). Therefore, to become sustainable, exogenous innovations (technical, institutional or organisational) call for crucial endogenous innovations as well (Govoeyi et al. 2019).

To encourage the necessary increase in agricultural outputs in the continent, policies need to support these local dynamics. This further calls for involving a wide range of stakeholders in innovation programmes and creating dense connections between them, according to the theory of agricultural innovation systems (Hounkonnou et al. 2012). The role of social networks is paramount in the process of innovation (Spielman, Hartwich, and Grebmer 2010). However, adequate ways of conducting this support have remained an important challenge, raising many technical, economic and social questions. Stakeholders' decisions to create, adopt and share innovations are influenced by their current knowledge, attitude and perceptions. These are expressed in a diversity of opinions that reflect the diversity of values and goals between stakeholders (Pereira et al. 2016). Hence, as in other sectors, for agricultural innovations to succeed and create a sustained local dynamic, this diversity has to be understood and taken into account. Among the various networks in play, a classical framework used in agricultural development is that of the value chain, which covers all actors

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and processes interacting in the production and delivery of a defined product to consumers. Framing the study of agricultural innovation within a value chain perspective entails: (i) focusing on a social process involving sustainable development of institutions and techniques; (ii) extending beyond the sole primary production to involve actors, upstream and downstream of the value chain; (iii) affirming a triple objective of putting quality products on the market to the benefit of the consumer, maximising the value created in the chain, and sharing these benefits between the different actors. Agricultural value chains in sub-Saharan Africa often consist of traditional structures. As well as technical issues, these are subject to organisational challenges that need to be solved in the face of an operational context marked by globalisation, and environmental and socio-political changes. Livestock in these systems is not merely a mode of production but sustains a whole lifestyle and culture, embedded in a complex system of livelihoods (Sell et al. 2018).

This complexity highlights the importance of managing the diversity of stakeholders in innovation programmes involving the value chain concept. This calls for operational methods and tools that characterise the positions of diverse stakeholders on innovation in order to design supportive actions and inform policy-making. The Q method is a promising tool for such purposes (Pereira et al. 2016). In the West African livestock sector, the Q method has been used to characterise actors' views on animal genetic resources management (conservation and improvement) along multi-stakeholder innovation systems (Hamadou et al. 2016; Siddo et al. 2018). In Benin, pig keeping appears to be mainly a complementary source of income or insurance for households, and also has socio-cultural importance, such as in funeral ceremonies (Agbokounou et al. 2016). Benin's national strategic plan to revive its agricultural sector identified pig production as a leading value chain to be promoted (MAEP 2011). High demand has developed in cities such as Cotonou and Porto-Novo, mainly through the multiplication of small, specialised restaurants and shops. Profoundly affected by the epizootics of African swine fever of 1997 and its subsequent outbreaks, the pig value chain represents a typical case of a promising sector of economic development facing internal constraints, calling for strong innovation processes, both technical and organisational (Govoeyi et al. 2019).

In gathering stakeholders of the pork value chain in south-eastern Benin within an innovation platform, this study analyses the diversity of stakeholders' perspectives about innovation itself, understood as "any change in the way of doing things and interacting with other actors". Hence, the Q-method application is used here as an operational tool to inform the design of a participatory project of multi-stakeholder platform for innovation stimulation (Hounkonnou et al. 2012).

Methodology

Overall study strategy

The local pig producers' organisation divides the department of Ouémé-Plateau into three zones. In each zone, one commune was targeted as a study area. Focus group discussions with livestock extension services enabled the establishing of a list of statements on innovation. Other focus groups with the existing cooperatives of different sectors of the pig value chain in each commune then commented on these statements and select 55 statements to be included in the Q-sample. These were submitted for ranking in face-to-face interviews with 25 respondents selected from the value chain actors and the three communes for Q-sorting and subsequent analysis.

Study area

The departments of Ouémé and Plateau, located in south-eastern Benin, are recognised as important areas of pig production. The pig breeders' umbrella association (ANEP) has decentralised in order to allow closer contact with its members. This decentralisation has split the departments into three zones, taking agro-climatic and socio-economic characteristics into account: the zones of Porto Novo, Vallée and Plateau. One commune was identified in each zone to sample for participants.

In the zone of Porto-Novo, the commune of Porto-Novo was chosen, the commune of Adjohoun in Vallée, and the commune of Pobè in Plateau. These communes were purposively selected based on the presence of the different functions of the pig value chain to ease the sampling and participants meeting. Sampling was done by applying the principles of diversification and saturation (Pires 1997).

Participatory identification in focus group

A first focus group was conducted with five officers from livestock extension services in the study zones. This aimed to identify statements expressing opinions around innovations and their origins, advantages, risks, social effects, current dynamics, as well as factors encouraging and limiting innovations. Then, in each commune, one focus group of five value chain actors was established, taking in consideration the existing cooperatives or associations of the different functions along the value chain. One actor of each value chain function, breeding and fattening, cured-meat trans-formation, marketing, extension and financial services, joined the focus groups on a voluntary basis. This preliminary stage benefitted from active interactions between actors to confirm or refine the relevant statements for data collection.

Each focus group discussion was introduced with explanations to participants of the objectives and expectations of this activity within the study's framework. Through an initial discussion, a common understanding of innovation was progressively built as "any change in the way of doing things and interacting with other actors". The statements were then discussed and listed again with these actors; no additional statement emerged from discussions. Each group was finally asked to ascribe a weight of between zero and 100 through proportional piling indicating their perception of the importance to include the statement in the next step of the study, the "importance of each statement in the overall way of thinking of different actors in the value chain, whether the statement might be a source of divergence or common agreement". The mean score was calculated for the 65 statements that emerged from more than one group and the degree of agreement between groups was estimated through calculation of the Kendall's coefficient of concordance (Vegan package, R 3.0.1). Then, 10 statements with a low mean score (five to 21%) were eliminated after the proportional piling process and 55 statements were retained to constitute the Q-sample, showing mean scores between 52% and 100%, and a minimal coefficient of concordance of 0.57. The final number was also defined in agreement with the subsequent uniform distribution of these along an 11-grade scale.

Identification of pig value chain actors for Q-sorting

Respondents (P-set) interviewed in the three communes were identified by an iterative participant-based sampling procedure, known as snowball sampling (Sadler et al. 2010). Based on a generated list of actors, 25 were selected in order to distribute the sample across the value chain functions and across the three communes. As the Q-method is a qualitative approach, the sampling aims at including a reasoned diversity of actors, here focusing on value chain functions, and does not aim to produce representative values to be extrapolated onto the population. Respondents were enrolled in face-to-face interviews to collect their perceptions on the 55 statements (Q-sorting). All the invited actors agreed to be interviewed. The numbers of actors in each sector of activity and in each commune are indicated in Table 1.

Q-sorting

The 55 statements were individually printed on cards, which were given to the interviewee to sort following a grid in forced rank-continuum following an 11-grade Likert scale (Onwuegbuzie and Frels 2015). A score of −5 indicated the strongest disagreement and +5 the highest agreement, 0 expressed a neutral position (Figure 1). The sorted Q-sample is termed Q-sort. At the end of the

Table 1. The 25 actors interviewed in the individual survey.

		P-set					
Communes	Breeders	Extension services	Financial services	Breeders' associations	Pig butchers	Animal sellers	Feed sellers
Porto-Novo	2	2	1	1	1	1	1
Adjohoun	2	2	1	1	1	1	0
Pobè	2	2	1	1	0	1	1

interview, actors were asked to briefly explain the reasons for their decisions on statements with −5 and +5 grades in order to collect further qualitative data.

Statistical analysis

The analysis was performed with PQMethod software 2.11 specifically designed for the Q method analysis. After encoding Q-sorts, the first step of the analysis consists of extracting the initial factors through the principal components method (QPCA function), considering 25 Q-sorts as the variables to be summarised in principal components. The latter thus constitute "synthetic opinions" variably correlated to each particular opinion gathered. The correlation between factors and eigen-values are computed to characterise factors. Factors with eigenvalues greater than 1 are selected (Donner 2001). Low coefficients of correlation between factors indicate that these cover distinct patterns of discourse. The varimax rotation (QVARIMAX function) allowed clarifying factors' structure by maximising the variance between each factor and by better distributing the explained variance among the selected number of factors.

Factors are then interpreted by ascribing them Q-sorts, according to the statistical significance ($p < 0.05$) of the correlation between the Q-sort and the factor (factor loading) (Zabala 2014). A requirement in factor's selection is that each is significantly associated to a minimum of three Q-sorts.

For each factor, the mean rounded score of each statement is calculated as the mean score across Q-sorts ascribed to this factor. The interpretation of factors' meaning as "discourses" was made based on this mean rounded score, indicating agreement or disagreement of the factor with each statement. Q-sorts were classified as consensual when their rounded score presented no statistical difference between the three factors. The specific meaning of factors was thus derived by a comparative approach, focusing on statements presenting a significant difference of their rounded scores between factors.

Results

Kendall's coefficient of concordance

The Kendall's coefficient of concordance (W) calculated on proportional piling scores attributed to the complete matrix of 55 selected statements varied from 0.57 to 0.78, indicating a statistically significant agreement between interviewees about their expected usefulness to map stakeholders'
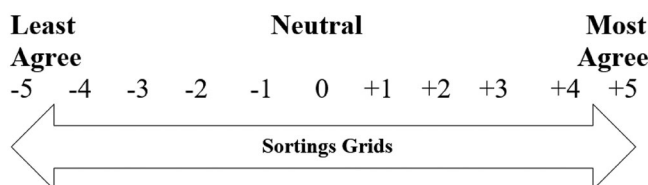
Figure 1. The sorting grid for the repartition of the 55 statements.

viewpoints ($p < 0.001$). This coefficient for the 10 rejected statements varied from 0.66 to 0.83, actors thus strongly agreeing on their weak relative usefulness for the study's goals ($p < 0.001$).

Factor's characterisation

PCA of the 25 Q-sorts delivered eigenvalues of 9.47, 2.51, 2.00 and 1.80 for the first four factors. The three first factors were retained, which after Varimax procedure was shown to be significantly and positively correlated to respectively 13, 3 and 9 Q-sorts. The correlations between these factors vary from 0.47–0.52. The average reliability estimated for the factors is 0.8 with the individual composite reliability of 0.98, 0.92 and 0.97, respectively. Table 2 presents the correlations of the three selected factors with Q-sorts together with the role along the value chain of each of their author's.

Consensus statements

Consensus statements are statements that do not distinguish between any pair of factors at a threshold p-value of 0.01 (Table 3). The three discourses agree strongly on the need for African agriculture to innovate, notably to reach sustainability (statements 12 and 51). In addition, they agree that innovations can be achieved by everyone and are often a benefit for people who adopt them (statements 4 and 8). Regarding the source of innovation, a moderate to strong consensual agreement is also observed about the fact that innovators are field actors who try to solve their own problems (statement 16) and that innovations do not come from local scientific research (statement 2). A common disagreement is expressed with the fact that innovations would be disruptive for the traditional way of life (statement 9).

Discourses

Tables 4 and 5 show the statements distinguishing all three factors between them and those distinguishing each factor from the two others. These statements are presented here to describe the discourses translated by each factor.

Discourse 1: an optimistic view on an endogenous innovation dynamic
The first factor explains 23% of the total variance and represents the point of view of 13 respondents including four technical support actors, two financial services actors, four breeder's organisation respondents, two women breeders and one pig trader. This discourse may be described as an optimistic view of innovation, agreeing with the potential gains of innovations in Africa (statements 28, 33, 35, and 46) and denying some drawbacks or limitations of innovations (statements 18, 19, 29, and 54). This discourse considers indigenous new practices as innovations (statement 5), calls for additional efforts from local institutions for the promotion of innovation (statement 48), and disapproves a view of innovations as blueprints (statement 10) originating from foreign research (statement 1). It also regrets that farmers from Africa grant little importance to innovations (statement 30).

Discourse 2: a pessimistic view on an exogenous innovation dynamic
The second factor represents 14% of the total variance. It relates to the Q-sorts of three respondents including one financial services actor, one butcher and one feed seller. This discourse appears rather pessimistic, denying the positive impact of innovations (statements 33 and 46) and pointing at various drawbacks: innovations being showed as risky (statement 7), expensive (statement 34), generating more losers than winners (statement 28), potentially harmful to farmers (statement 54) and irrelevant to field realities (statement 32). Innovations are here considered as originating from foreign research (statement 1), being applied as blueprints (statement 10).

Table 2. Repartition of stakeholders in factors.

Q-Sorts	Actors	F1	F2	F3
1	(1) Development agent	0.55*	0.03	0.39
2	(2) Development agent	0.66*	0.21	0.18
3	(3) Development agent	0.45*	0.10	0.42
4	(4) Development agent	0.27	−0.02	0.66*
5	(5) Development agent	0.69*	−0.04	0.40
6	(1) Microcredit agent	0.45*	0.16	0.19
7	(2) Microcredit agent	0.63*	0.37	0.28
8	(3) Microcredit agent	0.240	0.90*	0.23
9	(1) Member of breeders' association	0.52*	0.32	0.38
10	(2) Member of breeders' association	0.83*	0.26	−0.11
11	(3) Member of breeders' association	0.41*	0.15	0.14
12	(4) Member of breeders' association	0.81*	0.28	−0.10
13	(1) Breeder (woman)	0.67*	−0.05	0.24
14	(2) Breeder (woman)	0.72*	−0.08	0.23
15	(3) Breeder (youth)	0.23	0.38	0.57*
16	(4) Breeder (youth)	0.23	0.36	0.58*
17	(5) Breeder (older)	−0.04	0.39	0.55*
18	(6) Breeder (older)	0.44	0.06	0.55*
19	(1) Pork butcher	0.14	0.16	0.66*
20	(2) Pork butcher	0.04	0.34	0.59*
21	(3) Pork butcher	0.23	0.91*	0.21
22	(1) Livestock feed seller	0.20	0.90*	0.21
23	(2) Livestock feed seller	0.33	0.01	0.67*
24	(1) Live swine trader	0.64*	0.22	0.17
25	(2) Live swine trader	0.12	0.16	0.67*

Note: *Indicates the respondents significantly associated to the specific factor.

Discourse 3: a cautious view focusing on socio-economic impacts of innovations

The third factor represents 18% of the total variance and represents the perception of nine actors: one financial services actor, two young and two old breeders, two butchers, one feed seller and one pig seller. This discourse appears moderately optimistic regarding the impact of innovations (statements 33 and 46) but points to the distributive impacts of it (statements 27 and 29) and its greater dynamism in the downstream sector of the value chain (statement 45). It appears favourable to a better public involvement in its stimulation, through financial services (statement 49) and better

Table 3. Consensus statements between all factors.

N°	Statements	F1	F2	F3
2*	Innovations come from local research	−5	−5	−5
4*	Innovations can be achieved by everyone	4	5	4
8*	Innovations are often a benefit for people who adopt them	4	2	2
9	Innovations are disruptive for traditional way of life	−3	−3	−5
12*	We have to innovate for a sustainable agricultural production	5	5	5
16	Innovators are those who have problems and decide to resolve them	3	5	4
41*	The actors of agricultural value chains have little incentive to innovate	−1	−3	−2
51*	The innovations are challenges to be faced in Africa	4	4	3

Note: All listed statements are non-significant at $p > 0.01$ and those flagged with an * are also non-significant at $p > 0.05$.

Table 4. Statements distinguishing between all three factors.

N°	Statements	F1	F2	F3
1	Innovations come from foreign research	−4	3	0
18*	A minimum of instruction and experiences are required to innovate	−3	5	0
29*	The poor farmers will remain lagging behind innovations	−2	−5	2
33*	The innovations can foster abundant production in the African context	5	−5	2
46	The innovations allow for improving agricultural yields	4	−1	1

Note: $p < 0.05$; asterisk (*) indicates significance at $p < 0.01$.

Table 5. Statements distinguishing each factor.

N°	Statements distinguish each factor	F1	F2	F3
	Distinguish factor 1			
5	Indigenous news practices can be regarded as local innovation	5	3	1
25*	Fatalism is an obstacle for innovations	5	−5	2
30*	Farmers from Africa grant little importance to innovations	4	−3	2
35	Innovations reduce the arduousness of work and increase well-being at work	4	−2	−4
48	Local research institutions sufficiently promote innovations	1	4	5
55	Sustainable development would be possible without innovations introduction	−3	2	−5
54	Innovations are harmful to farmers	−4	5	0
10*	Innovations are blueprint solutions	−5	3	4
	Distinguish factor 2			
32*	The innovations could move away farmers from their socio-economic realities	−3	5	0
7	Innovations are risky because results are unknown	−2	5	2
20	Young people are more innovating	−4	3	0
11	Development agents gain more than producers from innovations	−3	1	−2
19*	Even illiterate people can innovate	−3	1	−2
28*	Innovations in the African context create more winners than losers	0	4	1
47*	Development agents promote innovations	5	−5	2
34	Innovations do not necessarily ask for big means	3	−5	2
	Distinguish factor 3			
37	To move beyond subsistence agriculture, farmers have to innovate	2	3	5
45	There are more innovations in the agricultural marketing sector	3	2	5
27*	Only wealthy farmers can profit from the innovations	−3	−3	5
36*	Exchange visits between actors favour fostering innovation	−2	5	2
39	Socio-cultural realities can inhibit innovations	1	−3	2
3*	Innovations are different from inventions	1	2	−3
43*	Farmers' organisational framework do not promote innovations in Benin	1	1	−4
49*	Agricultural loans do not encourage innovations	−2	0	−4
40*	The political environment in Africa is favourable to innovations	−2	−1	−5

Note: $p < 0.05$; asterisk (*) indicates significance at $p < 0.01$. Shading illustrates the scores of statements that differentiate each factor.

policies (statement 40). It judges positively the action of farmers' organisations regarding innovations (statement 43) and supports the idea of exchange visits between farmers (statement 36). It has a neutral position about the fact that innovations are imported or would also emerge from field actors' practices (statements 1 and 5).

Discussion

Methodology

The Q-method is a qualitative research tool. Although it makes use of statistical analysis methods in a heuristic objective, it has no pretention for quantitative extrapolation of its results to the population and does not aim at representativeness (Watts and Stenner 2005). Therefore, to ensure its results are relevant, it is vital to ensure the validity and relevance of the sample of statements. The methodology has involved value chain actors to foster interaction and debate in order to base the choice of statements directly on the collected stakeholders' considerations on innovation. Proportional piling in focus groups and the calculation of Kendall's coefficients of concordance allowed securing a set of statements based on a shared view between stakeholders about what features of innovation make sense to them and cause divergences. The Kendall's coefficient of concordance obtained for both rejected and retained statements showed a strong agreement between stakeholders, as Heiko (2012) proposed that a coefficient of 0.7 indicates a clear consensus.

By making stakeholders totally aware of the objective and modalities of the research process, we believe that they were able to provide a meaningful set of statements. This participation helped avoiding the individual-blame bias, which is a common feature of exogenous innovation promoters who tend to blame individuals for not adopting innovations without searching for the rationale of non-adoption (Hannah and Jost 2011). Most statements in this study focus on the characteristics of

innovation itself rather than that of adopters. Those focusing on adopters present a balance between socio-economic features (endowment, constraints) and attitudinal ones. Another bias avoided by applying the methodology is the tendency to consider innovations as strictly technological changes. Exchanges in focus groups also spontaneously included organisational innovation, which appear to stakeholders as major evolutions. This was probably enabled by the explicit reformulation of innovation as "any change in the way of doing things and interacting with other actors".

The forced uniform distribution has been preferred for the Q-sorting step. Watts and Stenner (2005) explain the various possible forms of distributions in Q methodology. A forced ranking helps interviewees express the importance of their agreement with statements relative to another. By giving the same occurrence to different levels of agreement from +5 to −5, the flat distribution does not make such a strong assumption on the a priori distribution of interviewees' thinking as the Gaussian distribution would. Interviewees did not show any difficulty in building Q-sorts in accordance with this requirement.

The selection of three factors was driven to reach a balance between a discourse agglomeration in a simple set of opinions and the readability of these synthetic opinions. Most Q-method studies end up with three discourses (Ramlo and McConnell 2008). Three factors may be the minimal number to propose a dialectical structure of opinion, allowing for two "extreme" discourses and one more nuanced or intermediate one, as found, for example, in Hamadou et al. (2016) and Siddo et al. (2018). The composite reliability coefficients of all the factors are significant and exceed the conventional threshold of 0.7 indicated by Van Exel and De Graaf (2005). This indicates that the factors may be considered as valid for interpretation.

Discourses

Interestingly, the overall structure of the three discourses tends to reach beyond the dialectal framework of thesis, antithesis and synthesis. Beyond the optimistic, pessimistic and intermediary discourse, each opinion appears to highlight a distinct feature of innovation within the overall positive attitude towards innovation that was shown by consensual statements. An important finding of this analysis is the direct link made between the optimistic or pessimistic view and the origin of innovation, with optimism focusing on endogenous processes and pessimism arising from deceiving exogenous processes. Therefore, oppositions do not appear as clear-cut and irreconcilable, as might appear in Hamadou et al. (2016) or Siddo et al. (2018). Moreover, unlike the latter examples, none of the three discourses is borne by a particular actor category of the value chain, instead, each has a diversity of profiles. Avoiding a scheme that would oppose value chain actors with conflicting interests, this tends to show the internal variability of opinions inside each value chain level, with the possibility for common views to be developed all along the value chain.

The overall positive consensus on innovation, its need in the African context, and its shared possibility, appears favourable to the implementation of an innovation platform. Innovations find their incentives in the daily challenges met by active stakeholders, willing to improve their situation, as also shown by Fisher et al. (2018) regarding agriculture in Malawi. This contradicts the image of traditional farmers, unwilling or unable to innovate, and fits well in the context of a dynamic suburban supply chain, showing a true potential to attract newcomers provided that constraints can be alleviated.

A salient finding of this study is the strong consensus on the lack of contribution of local research to innovation. Such distrust is a crucial indicator to be accounted for in future strategies to create a direct and fruitful link between stakeholders and local research. This situation may be the result of local institutions frequently being bypassed by foreign actors promoting innovations, or from their low visibility when they are involved. A lack of funding for local researchers may have prevented their involvement in value chain development, in addition to the overall incentive structure of current scientific research. Action research is often a slow process, hence lowering rates of publications, while working under controlled conditions of research stations offers the possibility to

implement up-to-date technologies that are still poorly applicable or relevant to the field conditions of African value chains.

The first discourse has been qualified as an "optimistic view on an endogenous innovation dynamic". It did not use any terminology opposing innovation. This viewpoint, according to which old ways for doing things no longer meet current needs, is in line with messages conveyed by Juma and Yee-Cheong (2005): developing countries face the rising threat of climate change and will contribute to global food security by innovating in technologies, infrastructures, technical training and market organisation. Interestingly, this positive view of innovation is tied to its conception as endogenous, meaning that it originates in field actors themselves, given that local research is not considered as a source of innovation. This confidence in local innovations is promoted at the global scale for sustainable natural resource management, also promoting the international exchange of locally born innovations. Hence, the Prolinnova Global Partnership Program bases its activities on local innovations in a variety of countries (Waters-Bayer, Wettasinha, and van Veldhuizen 2007). The presence of this first discourse in the value chain is therefore a solid basis to launch participatory research processes, which are founded on the same assumption of stakeholders' ability to create solutions to their issues. An important challenge will be to foster trust in local research institutions to allow for the strengthening of capacities and continuous exchange to generate and concretise ideas.

The second discourse has been termed a "pessimistic view on an exogenous innovation dynamic". This has an opposite perspective to the first discourse, both on the origin of innovation and its effects. This viewpoint also relates to a globally prevailing viewpoint on innovation, being seen as originating from scientific research and then being transferred to the field by extension services and education (Rogers 2010). In the present case, stakeholders based their criticism on the lack of adaptation of these innovations to the field context, which may point to faults in the basic qualities an innovation needs for its successful dissemination: relative advantage, manageable complexity, compatibility, trialability, and observability (Rogers 2010). Therefore, this pessimism has to be understood as tied to this framing of innovation as a top-down and exogenous process. This also tends to create in this viewpoint a focus on farmers' ability to adopt, such as training, endowment and experience. Therefore, this opinion may be interpreted as a mirror to the classically illustrated individual-blame and pro-innovation bias. It seems to result from the failure of past cooperation projects or public programmes aiming at diffusing innovations, suggesting this failure to have resulted from a lack of actors' participation and active involvement by the project or programme. In the context of cotton production in Burkina Faso, the involvement of stakeholder associations in collective decisions increased mutual trust and stakeholders' adoption of the proposed technology (Metouole et al. 2018).

Furthermore, the second discourse raises a criticism that development agents, policymakers or extension services are not promoting enough innovations. This may indicate that these actors are used to adopting an attitude of passive accepters of innovation. The literature on value chains, despite its actor-centred approach, also presents such biased perception giving a greater weight to top-down processes in innovation (Gómez et al. 2011). However, the current knowledge of adoption mechanisms should invite a more balanced vision, with a clear importance of bottom-up and decentralised processes. Institutional innovation is thus needed here to involve stakeholders and allow them to actively participate to decision-making.

The third discourse has been termed a "cautious view focusing on socio-economic impacts of innovations". The correlations of this discourse with the two first discourses are estimated at 0.52 and 0.49, respectively. This translates the share of a significant set of ideas between this discourse and the two first discourses, making at the synthesis opinion in the dialectal structure. The neutral position of this discourse on several statements stresses this intermediary situation. Practically, proponents appear optimistic regarding innovation impacts like proponents of discourse 1 but, unlike discourse 2, they support the idea that innovations are risky and entail disadvantages. This discourse is remarkable by the socio-economic insights it proposes on innovations. It agrees

that innovation entails distributive effects, with the political environment and farmers' organisations being unfavourable for innovations, and with agricultural loans being ineffective in fostering innovations. For them, with the current environment of innovations, poor farmers will remain lagging behind the innovation dynamics, with only better-endowed farmers being able to take advantage of innovations. Collier (2008) puts forward a similar point of view, defending the role to be played by policymakers in supporting less-endowed farmers to innovate and respond to the equity concerns of innovation. Also, Hounkonnou et al. (2012) point to the crucial role of the public sector in providing part of the financial resources that are required for innovation as well as to support professional organisations.

Conclusion

The Q-method application in this study allowed engagement in a dialogue with value chain actors regarding the concept of innovation. It produced useful insights for the subsequent animation of a multi-stakeholder platform to spur innovation along the value chain. As a qualitative method, it proved a valuable and operational inception tool, grasping the overall tendencies in local discourses that are likely to influence the social process of innovation. In the later stages of the process, the Q-method will further deliver qualitative insights on the evolution of perceptions, potentially targeting more precise subsets of actors in the value chain.

The common positive view on innovation, as well as the structure of discourses –each highlighting a specific dimension of agricultural innovation – foster hope to gather actors around a common project of endogenous innovation. Some actors still hold a passive attitude, perceiving policymakers as playing the main role in spurring innovation, through scientific research and agricultural extension. This viewpoint is understandable since it has dominated for a long time. Hence, a successful endogenous innovation platform would rest on and reinforce the congruence of innovation optimism and its thinking as endogenous, putting value chain stakeholders in the driver's seat.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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