Project management competence analysis in rural communities through territorial representation: application to Aymara women communities in Puno (Peru)

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Abstract. The acquisition of technical, contextual and behavioral competences is a prerequisite for sustainable development and strengthening of rural communities. Territorial display of the status of these skills helps to design the necessary learning, so its inclusion in planning processes is useful for decision making. The article discusses the application of visual representation of competences in a rural development project with Aymara women communities in Peru. The results show an improvement of transparency and dialogue, resulting in a more successful project management and strengthening of social organization.

1. Introduction

In the current global context, local initiatives have emerged worldwide as a means for a sustainable regional development. This bottom-up approach gives local groups an active role in their own development [1], which must be not only economic but aiming to the progressive strengthening of the local population, understood as the acquisition of certain skills and knowledge enabling to manage resources properly [2]. The lack of these skills and business experience is the greatest weaknesses of these local organizations, which do not act professionally and often lack the technical and organizational skills [3]. Therefore, the construction of these skills is central in rural communities to the process of expanding rural businesses related to the environment and is done through capacity building programs [4].

Skills and competences have been studied through different approaches in the international literature. Hence there are different models of learning processes and competences development, some based on the workplace [5], on behavior theory [6, 7], others based on business strategy [8], cognitive and motivational models [9] and holistic approach models [10,11]. In the field of rural development projects, models of great interest are the holistic ones that extend the concept of competence by integrating all dimensions of people that allow them to conduct a proper professional performance (i.e. behaviors, skills, knowledge, motivation, strategic and ethical issues). IPMA model [10,12] is an holistic model considered appropriate for its integration into the participatory planning process, that classifies competences in three dimensions: technical, related to the abilities and knowledge needed to manage the project successfully; contextual, that deals with the stakeholders interactions within the project context and the permanent organization; and behavioral, addressing personal relationships between individuals and groups targeted in project management [10].

A bottom-up approach and IPMA holistic competence model can be applied together in development projects in rural areas to measure the organization or community competences, in order

to evaluate the effects of the projects not only in economic terms but also in relation to competence development. To facilitate the participatory process, a visual representation of the competences status is anlyzed. Laverack (2005) revises several approaches to visually represent community capacity, understood as the set of competences and assets available in a community that enable them to take decisions and actions to improve their lives [13]. According to Laverack, some auhtors have developed graphical representations of capacity dimensions like wheel configurations or spider webs to compare changes in the domains that influence community capacity at different times in the life of the project and by different stakeholders. In this case, we propose a different and novel visual representation that emphasizes the territorial dimension of the competences, by representing the three dimensions described above on maps. This visual representation is included in a participatory process that involves all stakeholders in all phases of the project, through which it can assist in the analysis of competences and their strengthening for local development by combining expert and experience knowledge in a continuous process and improving planning processes according to social learning model [14,15]. Therefore competences analysis and evaluation run parallel to project objectives and goals [16], and visual representations through competence mapping can help to share all the information generated in this process and to be a tool to make territorial and time comparisons. The case study discussed in this paper of an association of rural communities of Aymara women in Peru demonstrates that visual representations of a local organization´s competences can be an appropriate approach to interpret and share this type of information as they increase transparency in the project management and enhance the visualization of information, resulting in self-assessment and decision-making processes based on solid information.

2. Material and methods

This section first presents the research context, which includes a description of the study area and the local organization. Second, a description is made of the methodology used to select the competences to be analyzed, diagnose and plan actions to be undertaken based on the analysis. It is a methodology in which several participatory tools were applied, such as personal interviews, group discussions and consultation with experts to analyze a case study in the region of Puno (Peru).

2.1 Case study context: Association of Aymara Women of Puno (Peru)

The project with Aymara communities is located in the region of Puno (Peru) around Titicaca Lake, 3.827m.a.s.l. [17], in an area with a poverty rate of 60.8% and extreme poverty between 51 and 70% [18]. Characteristics and limitations of production for rural population in these areas include extreme temperatures [19]; poor communication and transport infrastructure; low technological level of agricultural production activities; very poor marketing of products at low prices paid by intermediaries; and difficulties for women due to several interrelated aspects: male-chauvinistic idiosyncrasy, low level of education, poor mobilization of financial resources to women and their associations, Aymara language as the only means of expression for many women, low participation in decision-making processes, among others [20]. Wool production of sheep and alpaca is, together with cattle raising, the mainstay of the economy of the region, where there are also conditions for the cultivation of potatoes, quinoa and barley.

The development project was initiated in 2008 by the Research Group on Planning and Management of Rural Development (GESPLAN) of the Technical University of Madrid (UPM) and the Association of Aymara Women (Coordinadora de Mujeres Aymaras, CMA) in order to develop the leadership skills of women in Aymara communities. The CMA currently comprises 400 women organized in 22 groups distributed in 6 districts: Huancané, Moho, Vilquechico (northern area), Platería, Chucuito (central area) and Juli (southern area). The lines of action envisaged in the project include the fields of textile crafts and agricultural production, plus a revolving micro-credit scheme for funding innovative projects already implemented in other areas of Peru [20]. The development of

textile crafts has been the most successful with several home and fashion textile collections and it has contributed greatly to the development of related activities.

2.2 Incorporation of competences analysis in the project management

The incorporation of visual representations as part of the participatory process for strengthening Aymara women's leadership comes from the need of the own women to assess the evolution of their capacities to manage the textile crafts production project. The purpose of including participatory tools, as indicated by Chambers (1994), is to improve the ability of the organization to share and analyze its environment to plan and act, and not as a means of acquiring knowledge by the experts to make decisions from outside [21]. To answer this need, a participatory process was jointly designed, and is described below.

2.2.1. Selection of Competences and indicators

The competence model selected in the study was developed by IPMA for being a holistic model adapted to project management. In this model, "a competence is a compendium of knowledge, personal attitudes, skills and relevant experience necessary to succeed in a particular function" [10]. Upon this basis, the study variables selected –according to IPMA– were those skills considered crucial in terms of the context and the objectives of the specific project being worked on, considering that the other competences are related to these. Also indicators to analyze each variable were defined, resulting in 12 variables and 29 indicators in the final design of the study (table 1).

2.2.2. Analysis and diagnosis phase

The analysis and diagnostic phase of the state of the selected competences includes a participatory process through semi-structured interviews, the transformation of the results in a digital database and their return to the local organization for discussion.

Semi-structured interviews: a guide was designed to conduct a semi-structured interview based on the variables and indicators defined. Such interviews include predefined series of open questions and allow for dialogue on other issues not covered [22]. The guide was validated together with the group of women from the board of the CMA and was applied to the selected sample. The personal interviews were conducted by a team of GESPLAN-UPM and technicians from the CMA, in Puno, in March and April 2010. A representative sample of the population equal to 45% of all members of the CMA was taken, with a random distribution and proportional to the population of each group. The sampling error of the variables was calculated, being less than 9.2%.

Transformation of results into a digital database: the results of the interviews were processed and entered into ArcGIS 9.3, grouping data by district as the minimal administrative unit. Map drafts were prepared containing the information gathered for each indicator. For the analysis of the areas of competence, the values of indicators were homogenized through a transformation at a scale of 1 to 4 (1: very low; 2: low; 3: medium; and 4: high) depending on the situation, knowledge and experience about them. The information obtained was incorporated through the participatory process using the expert knowledge according to the three areas of competences, equally weighing all the indicators to obtain a final average, which was represented graphically.

Discussion of results with the rural communities: joint workshops were organized to set out the information obtained and encourage the learning process, analyzing the state of competences and proposing a series of actions, which modify and reorient the project in order to improve the business organization.

First of all, the map drafts were reviewed to check the level of acceptance and understanding of them by women. Visual characteristics that were not clear to them were modified, and new maps were produced. Women showed interest in continuing working with this information.

Secondly, in the presence of 18 presidents of the CMA groups and members of the board, the local technician and the administrative assistant, printed maps were distributed to each participant and

screened to discuss the results obtained. Work was done in small groups, using topographic maps to define the area of influence of each group and the meeting places; visits were arranged to verify these data.

2.2.3. Planning and design phase

The planning and design phase was proposed on the basis of the analysis conducted in the previous phase, and then, within the participatory process, a series of decisions were made to try to overcome the weaknesses identified at the district and group level. The participatory process for decision making includes not only the group presidents but also the rest of members of the organization. It consists of a series of meetings that start with a presidents meeting where all the topics are discussed and then groups meetings where the group position on each topic is agreed and a last president meeting to finally arrive to consensus.

3. Results and discussion

The results obtained in the project include the selection of the right skills to be assessed and represented through maps and indicators to measure them. The results concerning the diagnosis of skills and the planning of actions to improve them are presented below, as well as other results related to the implementation of PGIS, like the analysis of the acceptance of using the tool by the community and the effect of PGIS in the access to information.

3.1 Selection of competences and indicators

The selected competences are classified as technical, behavioral and contextual. The selection was made from the observation of the most frequently discussed aspects at meetings for having the greatest impact on project management and on which women feel that there is more need of improvement and consensus, as well as adaptation to the context and objectives defined in the project. A definition of each competence can be found elsewhere [10] and the indicators developed for each of them are shown in Table 1. It is in most cases about indirect indicators, through which aspects related to skills are measured.

3.2 Analysis and diagnosis phase

The results obtained in the participatory process (Table 1) were used to analyze the technical, behavioral and contextual skills of women in the districts, and encourage a process of learning and decision making to improve the project management.

Table 1 shows the outcomes of the participatory process. The weighing of the previous results and the integration of expert knowledge resulted in a ranking of districts in terms of their level of knowledge and technical, behavioral and contextual skills, from which maps by districts were produced (Figure 1).

The technical dimension was the best assessed, followed by contextual and ultimately behavioral. Geographically, there were differences in the assessment of competences between the different areas, resulting in a participatory analysis of the causes and the possible solutions to be adopted. These results are broken down into the following sections.

3.2.1. Technical dimension

The main lessons obtained from this work respecting the technical dimension are classified according to the competences: Regarding project organization and information and communication, maps evidenced the gaps in knowledge especially in the north, due to distance to central office, therefore women suggested to increase the frequency of visits to the less informed groups and with less participation in some activities and open another office in the north for management and coordination with the technical office for the sake of a balanced development of the entire area.

Teamwork and efficiency of time and phases recorded high levels, being the first thought to influence the second, on the grounds that it increases productivity, the exchange of knowledge and support among women. Despite of the high values, women agreed that they need to manage orders with more time to improve the programming of work by the groups.

Quality competence had an average value in the districts, although with lower values in some cases, and it is considered by women the most important pitfall of their organization and the competence that needs more attention in training activities. Quality is related to resources, as it determines the participation of each group in the production of crafts and training can homogenize group abilities and productivity to be able to receive a greater diversity of products in the orders.

Table 1: Results of the participatory process in the Association of Aymara Women

Dimensions	**Indicators**	**H**	**V**	**M**	**C**	**P**	**J**[1]
Technical field							
Project organization	% of members who know the project and its participants	44	16	60	86	63	77
Information and communication	% of participants who know the project activities	38	16	50	59	38	69
Teamwork	% of participants who prefer working in teams	75	81	90	95	94	71
Time and phases	% of members who deliver products in time	93	-	88	95	89	95
	% of members satisfied with the order delivery deadline	73	-	88	86	44	78
Quality	% of members who delivered right quality products	67	67	63	71	78	54
Resources	% of participants in the June orders	69	3	40	55	44	50
	% of participants in the December orders	94	9	80	95	56	77
	% of members pleased with the production infrastructure	60	80	43	40	15	57
Behavioral field							
Commitment and motivation	% of participants in courses	13	3	0	59	38	48
	% of participants in Assemblies	31	6	50	64	69	54
	% of participants in design workshop	13	3	20	18	6	27
	% of participants in fields of work	13	13	0	77	0	17
Creativity/ initiative	% of women with improvement proposals	94	22	80	100	69	69
Contextual field							
Permanent organization	Number of members in the CMA	42	112	10	34	15	113
	Number of groups	2	6	1	2	2	9
	Average age of members	34	39	36	37	44	41
	Average level of education of members[2]	2.9	2.0	3.0	2.5	2.4	2.5
Legal	Existence of agreed standards[2]	4.0	4.0	4.0	4.0	4.0	4.0
Business	Number of garments knitted in 2009	102	0	33	588	212	183
	Time spent in knitting in 2009 (days)	767	0	220	507	286	305
	% of members who sell through intermediaries	0	19	0	91	88	88
	% of members who sell directly to clients	38	19	70	23	19	10
Finances	Average incomes earned by the project (S/.)	144	-	141	91	137	95
	Monthly income per handicraft (S/.)	20	22	58	110	100	112
	Monthly income from non-agricultural activities (S/.)	197	59	460	294	141	136
	Monthly household incomes (S/.)	252	116	538	409	246	266
	% of members pleased with the payment received	87	33	88	81	90	86
	% of members happy with the payment period	40	-	88	67	11	65

[1]H: Huancané, V: Vilquechico, M: Moho, C: Chucuito, P: Platería, J: Juli; [2]Weighing from 1 to 4

3.2.2. Behavioral dimension

The behavioral dimension was the worst assessed in the diagnosis made at the district level. Yet it is a highly relevant dimension [10] to be considered for the success of the project management; hence the need to expand future training was recognized.

The analysis considered issues related to commitment, motivation, consultation, creativity or initiative of women in the districts, and leadership. By studying the degree of participation in

activities, training and motivational needs were detected in areas with lower rates, which coincide with the northern districts. The main entrepreneurship areas detected where related to the improvement in the textile sector, small livestock rearing, floriculture and tourism as activities likely to engage in. These new activities can be analyzed by using the maps.

Promoting Aymara women's leadership was one of the objectives of the project. In the discussion it was found that this element was essential in the case of the women presidents of the groups, in determining the status of other skills such as commitment and motivation, for their influence on the rest of the group involvement.

3.2.3. Contextual dimension

The main learning events in terms of the contextual dimension of the project management are classified according to ongoing organizational, legal, business and finance skills. Regarding the association structure, it was noticed that there was a need to regularize the lists of group members, noting that about 43% of women members did not participate in the orders, and other participants in the groups are not included in the census.

In relation to the business, several aspects where analyzed as part of the influencing context of the project, such as the specialization of craft production by zones, the differences in the monthly production of handicrafts (much lower in the north), the existence of tourism that determines the relationship with the market through direct selling where it does not exist (in the north) or intermediaries where it is important (central and south area), the economic activities in the districts and the monthly family income

Regarding financial skills, benefits where analyzed and differences mapped, so several fields for improvement were noted: training to calculate costs and benefits among women; transparency and rules of allocation of orders to reduce inequalities; and benefits management.

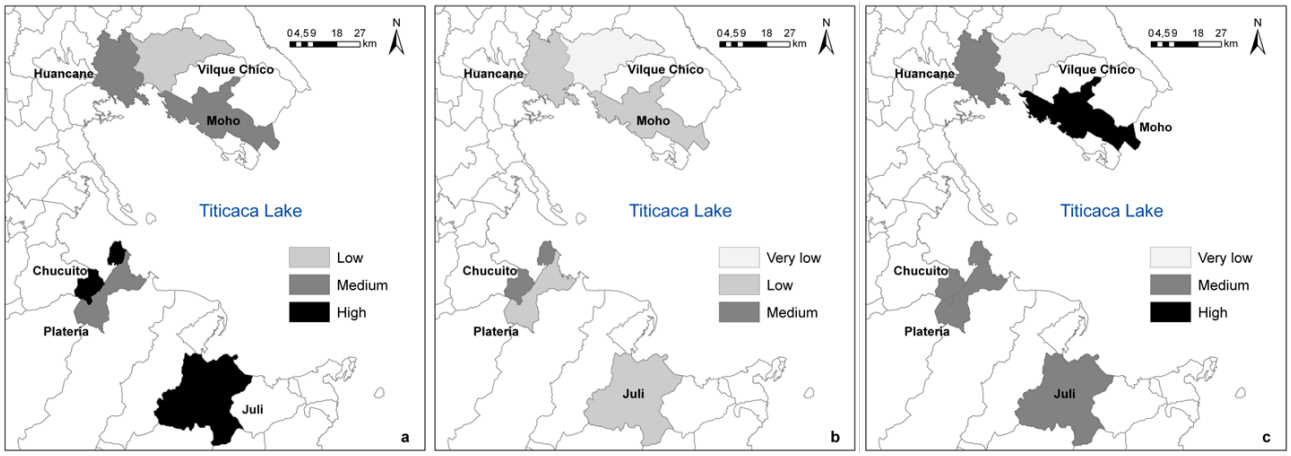

Fig. 2: State maps of the technical (a), behavioral (b) and contextual (c) dimensions

3.3 Planning and design phase

The previous phase allowed the organization to identify several topics that needed to be strengthened in relation with the three dimensions. After the identification, there was a prioritization of the topics in the short, medium and long term taking into account that some of the actions where subject to obtaining the necessary funds and the consolidation of some of the groups. Regarding the technical dimension, the first areas to work where related to enhancing quality by searching training opportunities in the region and nominating three quality area supervisors, improving communication by augmenting the frequency of visits from the board of directors to all groups and increasing the time to organize orders. In the long term they proposed to study the feasibility of opening another office in the north for the management of the CMA and the storage of material to avoid delays due to the

transport of materials over long distances between areas. In relation to behavioral competences, it was decided to organize an annual meeting with all women members to promote sense of belonging to the organization and enhance motivation and commitment. As to contextual competences, in the short term they started to regularize the lists of group members and they programmed a series of meetings with the technical office and visits to improve their knowledge on suppliers and clients; and with a longer perspective they agreed to search training opportunities related to financial skills. All these initiatives have been included in the project as it is continuously being modified by interactions of all stakeholders in this participatory approach.

4. Discussion and Conclusions

We argue that the incorporation of maps in the analysis of project management competences in a rural development project is a useful tool combined with the three dimensions approach because it provides an easy visual approach to the state of each domain (technical, behavioral and contextual) that can be easily shared with all stakeholders. In the case study, maps have allowed all stakeholders to have access to territorial and global information on the CMA districts. The increased access to the information available in the CMA has the effect of improving the transparency of project management [13,23], and has been identified as an important element in the effectiveness of programs. Transparency is seen as a key element in decision making, as it allows interested people to better understand what is being decided [24]. As suggested by Poole (1995) and McCall (2003), among others, participatory mapping and GIS has been used to promote community awareness of the local context of the CMA, and this favors the strengthening of the institution [23,25].

Maps allow visualizing not only the state of the domains in each district included in the project but also the territorial differences between districts. In the CMA project, it is noted that the organization is better in technical aspects than in those related to context and behavioral and that there are differences in the three project areas, generally with lower values in the north. Specifically, the participatory process allowed to identify needs that were related at the technical and contextual levels to improving the organization of the project, the communication channels, production, including aspects such as the allocation of orders, profit sharing and the reduction of inequalities in productivity. Behavioral aspects should be considered as key elements in the upcoming training to reduce the current imbalance by promoting issues such as leadership, negotiation, conflict and crisis management, as well as commitment and motivation.

Besides the usefulness of the tool to visualize an abstract concept in a way that all stakeholders understand, to better analyze it, it is also useful in decision-making about actions to be undertaken from this analysis to strengthen the organization because it facilitates the debate among women [26] and the decisions made are based on a better access to information and increased transparency in the project management, which fosters relationships of trust between women participants [27] and awareness within the community of the situation of the organization.

So far, maps have been applied as a visualization tool for the promotion of further discussions. The incorporation of this tool should be extended to a wider context of planning and evaluation to produce a real strengthening of the management capacity in both the textile project and other projects arising in the community for the rural development of the area.

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