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Successful Projects Executed with Public Resources in a Southern Region of Colombia

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Abstract: This study describes the success of projects financed with general system royalty resources between 2012 and 2017 in the State of Huila, Colombia. Additionally, it shows the landscape of public investment through project execution. A retrospective observational descriptive study was performed and the source of information was a national database called Monitoring, Checking, Control and Evaluation System (SMSCE), the study took into account only approved projects within the period of study as well as their sector application, cost, size, contracts, implementation phases, execution times and objectives achieved. There was found to be a low success rate of projects as just 50% were completed satisfactorily, according to the iron triangle model (the most frequently unmet criteria was cost). Furthermore, a direct association between contracts, cost and number of projects finished was found. This information can be useful for future strategies and interventions for public projects.

Key words: Project success, project management, iron triangle, public investment, direct association, future strategies

INTRODUCTION

The main function of governments is to seek the improvement of the quality of life of their citizens. For this purpose, public resources can be invested in different sectors such as infrastructure, transportation, education and housing among others. These investments are made through projects which are the means by which activities are organized to achieve the desired objectives and the way those strategies are implemented (Beleiu *et al*., 2015).

In Colombia, many of these projects are financed with resources from the General Royalty System (SGR) which aims to boost regional growth increase equity between regions, reduce poverty rates and increase competitiveness, based on criteria of regional, social and intergenerational equity. This money comes from the economic consideration of the exploitation of a non-renewable natural resource and its execution follows certain conditions, given that the territorial entities must formulate projects that guarantee the improvement of the living conditions of the inhabitants and that are aligned to the regional development plans.

The SGR is made up of 6 different funds: the savings and stabilization fund, the pension savings fund of territorial entities, the science, technology and innovation fund; The regional development fund, the regional compensation fund and the direct royalties fund. These represent 95.5% of the total royalties received while the remaining 4.5% are allocated for monitoring, control and evaluation as well as the administration of the SGR.

The execution of these resources has presented a series of irregularities and controversies regarding the inefficiency of the projects undertaken and the administration of money (Benavides *et al*., 2000; Gaviria *et al*., 2002; Hernandez-Leal, 2004; Gamarra, 2005; Pearce, 2005; Sanchez *et al*., 2005; Viloria-De-La-Hoz, 2005; Bonet 2007; Perry and Olivera, 2009; Bonet and Urrego, 2014). According to data from the National Planning Department (Anonymous, 2018a) as of June 30, 2017, 12% of the projects financed by the SGR are in critical condition which represents more than one billion US dollars in costs. A similar situation exists in the State of Huila (Anonymous, 2018) where 16% demonstrate criticality, representing more than $50 million. This criticality is measured in terms of the presence of risks in the execution of the project or inadequate management of the funds by the administrating organizations and the contractors of the project.

It is common for this type of project to show non-compliance in any of its stages which necessitates reprogramming of the project, this leads to the timeframe or scope being modified, varying from what was previously proposed in the formulation of each project. In turn being sure of the real success of the

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projects in terms of time compliance is difficult, since, the monitoring is done based on the current reprogrammed times.

It is well known that successful projects generate positive effects, both in the short and the long term (Jugdev *et al*., 2001; Muller and Jugdev, 2012; Badewi, 2015), directly influencing development and competitiveness and (Meskendahl, 2010; Beleiu *et al*., 2015) improving the socioeconomic conditions of the population.

Therefore it is necessary to identify this panorama in order to establish baselines that allow an adequate execution of the projects, guaranteeing the real impact required by the population. For this reason, this study describes the investment behavior of the resources from the SGR in the department of Huila in addition to the success achieved by these projects.

Project success: There is an old but active, discussion regarding the concept of project success (Pinto and Slevin, 1988; Wit, 1988; Belassi and Tukel, 1996; Atkinson, 1999; Chou *et al*., 2013; Motoa, 2015) where two perspectives have been identified: one of them addresses success from the management viewpoint and the other from the impact of the results (Rincon-Guio and Jaramillo, 2017). In addition to this, many authors make a distinction between success criteria (Davis, 2002; Fortune and White, 2006) and success factors (Kog and Loh, 2011; Chou *et al*., 2013; Mir and Pinnington, 2014), the first covers those variables by which success occurs and the second are the aspects that influence the success of the project.

Project management is considered the planning, monitoring and control of all processes and activities related to the execution of the project, always directing efforts to ensure compliance with the stated objectives and goals as well as budget and time (Radujkovic and Sjekavica, 2017). In this way, these criteria measure the success of the project (Atkinson, 1999). These three criteria are commonly called the triple restriction (Kerzner, 2009) or the golden triangle (Westerveld, 2003). Although, this measure provides significant data it does not determine the actual success of the project for this it is necessary to refer to other indicators. However, there is still no consensus on establishing the set of indicators needed to measure this success (Shrnhur *et al*., 1997; Atkinson, 1999; Muller and Jugdev, 2012; Rincon-Guio and Jaramillo, 2017).

Taking into account this dichotomy, the focus must remain on the fact that the projects revolve around changing a present situation through a critical and objective analysis of this reality where the best route to achieve it is proposed through an adequate execution of an organized set of interrelated activities with specific and tailored structure which leads to a positive impact by providing a solution to the problem. This makes it possible to show that the success of the project lies in the contribution to the change of the present unwanted situation but the change of the present situation must be measured from the perception of the parties that are involved in that situation (Joslin and Müller, 2015; Liu *et al*., 2014).

MATERIALS AND METHODS

A retrospective observational descriptive study was performed while the source of information was a national database called Monitoring, Checking, Control and Evaluation System (SMSCE) and took into account only approved projects executed between 2012 and 2017 including their sector application, cost, size, contracts, implementation phase, execution time and objectives achieved.

Data analysis was restricted to projects with dates of completion during the study period. The analysis was performed for the UNINAVARRA Research Center team using the statistical program IBM-SPSS®, Version 24.

Central tendency and dispersion measurements were used for the quantitative variables; in addition, bivariate analysis was performed to correlate sector, cost, time and objectives. Various statistical confidence tests were applied such as spearman Rho and Chi^2 (x^2).

RESULTS AND DISCUSSIONS

Examining the information contained in the SGR databases, evidence showed that 12,305 projects were approved with a total investment of $14,262,349,382 throughout the Colombian territory between 2012 and 2017. Of these projects, 4.19% (n = 516) were approved in the state of Huila, representing 3.24% ($ 461,521,599) of the total investment. In addition, it was found that the contribution of funds from the SGR was 77 and 75% for Huila and the rest of the country, respectively (Fig. 1)

Of the 516 approved projects, only 37.07% obtained endorsement in 2015. This was the year with the highest number of approved projects, representing 25.86% of the total investment and 28.58% of the funding from the SGR

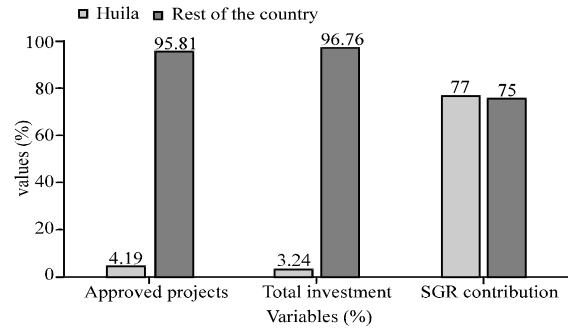

Fig. 1: Projects approved between 2012 and 2017

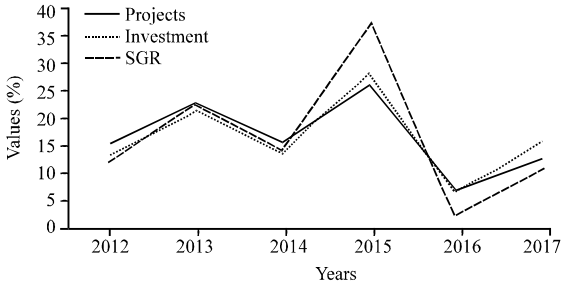

Fig. 2: Projects approved by period

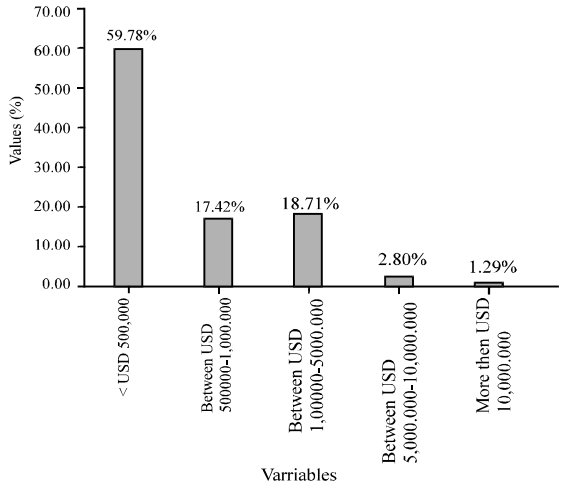

Fig. 3: Value of approved projects

fund. In 2016, 2.13% of the total projects were approved, reflecting an investment of 7.3% and an SGR percentage of 6.27% (Fig. 2).

According to the value of each project, evidence showed that 59.78% had a cost lower than $500,000, followed by 18.71% of the projects with value between $1 and 5 million. In addition, only 1.29% had an investment of more than $10 million (Fig. 3).

Table 1: Projects approved by sector

Sector	Projects (%)	Project values (%)
Transport	28.39	28.47
Housing	16.13	14.41
Drinking water and basic sanitation	14.19	7.39
Culture, sports and recreation	11.83	9.28
Education	9.03	13.60
Agriculture	4.95	10.52
Health and social protection	3.66	2.28
Science and technology	3.66	6.25
Environment and sustainable development	3.01	4.59
Social inclusion and reconciliation	1.94	1.43
Mines and energy	0.86	0.07
Commerce, industry and tourism	0.86	0.69
Defense	0.65	0.37
Communications	0.43	0.31
Planning	0.22	0.20
Work	0.22	0.14
Total	100	100

Additionally it was evidenced that the most benefited sectors were transport (28.39%), housing (16.13%), drinking water and basic sanitation (14.19%) and education (9.03%), representing an investment equivalent to 73.15% of the total projects (Table 1) next, the projects distributed according to sector and value range are presented (Table 2).

During the study period, 67.44% (n = 348) of the approved projects had scheduled completion by December 31, 2017, of which 80.17% (n = 279) were able to achieve. The projects that failed to meet these criteria negatively affected investments in the sectors of transportation (4.6%), housing (4.6%), drinking water and basic sanitation (2.59%) and education (2.01%), representing a value greater than $ 90 million-19.89% of the total resources approved for the department of Huila during the study period (Table 3).

Of the total projects scheduled to be completed during the study period, 63.79% had a cost of less than $ 500,000; of these, 84.23% were completed. Of the projects with a value between $ 500,000 and $ 1,000,000 (17.53%), 80.33% were completed. Furthermore, 25% of the projects with a cost between $ 5 million and $ 10 million and 33% projects with a value greater than $ 10 million were completed, respectively. Additionally, 94.25% of the completed projects were executed through the awarding of 0-5 contracts with a compliance percentage of 80.97% (Table 4).

The projects that failed to meet the deadline for completion were distributed within each sector and by their cost range as follows (Table 5). The study showed that only 53.16% (n = 185) of the total projects programmed to finish complied with the deadline, the budget and the planned objectives. Likewise, time was the criterion with the highest percentage of compliance, followed by the objectives and the cost. Regarding cost,

Table 2: Projects approved by sector and values range (thousands of dollars)

Sector	<USD 500	USD 500-1,000	USD 1,000-5,000	USD 5,000-10,000	More than 10,000	Total (%)
Transport	95	23	23	8		28.4
Housing	71	7	5	2	2	16.1
Drinking water and basic sanitation	52	13	6			14.2
Culture, sports and recreation	46	7	8		1	11.8
Education	23	6	14		2	9.03
Agriculture	8	7	8	1	1	4.95
Health and social protection	6	10	3			3.66
Science and technology	2	4	10	1		3.66
Environment and sustainable development	6	3	5	1		3.01
Social inclusion and reconciliation	8	1	1			1.94
Mines and energy	4		1			0.86
Commerce, industry and tourism	2	2				0.86
Defense	1	1	1			0.65
Communications			2			0.43
Planning	1					0:22
Work	1					0.22
Total	326	84	87	13	6	100

Table 3: Projects programmed to be finished by sector

Sector	Not completed (%)	Completed	Value of projects not completed	Total (%)
Transport	4.60	24.43	5.85	29.02
Housing	4.60	10.92	5.77	15.52
Drinking water and basic sanitation	2.59	12.36	1.13	14.94
Culture, sports and recreation	1.72	10.34	2.76	12.07
Education	2.01	7.76	7.14	9.77
Agriculture	1.15	2.87	1.22	4.02
Health and social protection	0.57	3.16	0.42	3.74
Enviroment and sustainable development	0.57	2.30	0.08	2.87
Social inclusion and reconciliation	0.29	2.30	2.15	2.59
Science and technology	1.15	1.15	2.15	2.30
Defense	0.00	0.86	0.0	0.86
Commerce, industry and tourism	0.00	0.57	0.0	0.57
Mines and energy	0.00	0.57	0.0	0.57
Communication	0.29	0.29	0.43	0.57
Work	0.00	0.29	0.0	0.29
Planning	0.29	0.00	0.01	0.29
Total	19.83	80.17	29.11	100

Table 4: Projects programmed to finish by size and number of contracts

Size	Not compelted (%)	Completed (%)	Total (%)
<USD500,000	15.77	84.23	63.79
Between USD 500,000 and USD 1,000,000	19.67	80.33	17.53
Between USD 100,000 and USD 5,000,000	27.27	72.73	15.80
Between USD 5,000,000 and USD 10,000,000	75.00	25.00	1.15
More than USD 10,000,000	66.67	33.33	1.72
Total	19.83	80.17	100
Number of contracts	19.21	80.79	94.25
0-5			
5-10	25.00	75.00	1.15
10-20	50.00	50.00	1.15
20-50	33.33	66.67	2.59
50-100	0.00	100.00	0.57
Total	19.83	80.17	100

a variation of 5.79% ($ 17,479,622) was evidenced with respect to the total value of the projects scheduled to be completed during the study period (Table 6). The projects that met all criteria (time, cost and objectives) were distributed thusly (Table 7)

Guaranteeing the success of a project is the main premise of the private and public sectors, the first goal is to increase their business and the second is to improve the quality of life of the population. If adequate monitoring and control of project management is not carried out, the failure of these projects is unavoidable (Mir and Pinnington, 2014).

Our study made it possible to show that a number of approved projects demonstrate irregular behavior, presenting peaks in opposite extremes in two consecutive years. This is associated with the periods of governance of the territorial entities of the country, since for these 2 years there was a change in the government. In addition, we find that the percentage of approved projects is directly proportional to the corresponding percentage of the total value of the projects. Thus, the greater the investment, the greater the number of projects. Additionally, we find that the contribution of the general royalty system in the projects is related to the value of the approved projects.

In our study, we found a direct association with the size of the project, represented in its value and the sector for the project's intervention, given that the sectors with the largest number of approved projects correspond to transport, housing, drinking water and basic sanitation; Culture, sports and recreation and education where projects with a value of <$500,000 predominated. This same behavior was present in the projects that completed their completion.

Table 5: Incomplete projects by sector and value (thousands of dollars)

Sector	< USD500	USD 500-1,000	USD 1,000-5,000	USD 5,000-10,000	More than USD10,000	Total (%)
Housing	13	1		1	1	23.19
Transport	4	4	7	1		23.19
Drinking water and Basic sanitation	6	2	1			13.04
Education	2		3		2	10.14
Culture, sports and recreation	4	1			1	8.70
Science and technology	1	2		1		5.80
Agriculture	1	1	2			5.80
Health and social protection		1	1			2.90
Evironment and sustainable development	2					2.90
Planning	1					1.45
Social inclusion and reconciliation	1					1.45
Communications			1			1.45
Total	35	12	15	3	4	100

Table 6: Compliance with the triple restriction

Time cost	Objectives	Total (%)
Yes	Yes	53.16
Yes	No	2.30
No	Yes	22.41
	No	2.30
Not completed		19.83
General total		100.00

Table 7: The cost objectives

Criteria	Met (%)	Not met (%)
Time	80.17	19.83
Cost	55.46	44.54
Objectives	75.57	24.43

Table 8: Projects meeting the triple restriction by sector and value (thousands of dollars)

Sectors	<USD 500	USD 500-1,000	USD 1,000-5,000	USD 5,000-10,000	More than USD 10,000	Total (%)
Transport	42	9	2			28.65
Drinking water and basic sanitation	28	3	4			18.92
Culture, sports and recreation	19	1	3			12.43
Housing	18	1	1	1	1	11.89
Education	9	3	5			9.19
Health and social protection	4	3	1			4.32
Agriculture	2	2	2		1	3.78
Social inclusion and reconciliation	5					2.70
Environment and sustainable development		1	2			1.62
Science and tecnology		2	1			1.62
Defense	1	1	1			1.62
Commerce, industry and tourism	1	1				1.08
Mines and energy	2					1.08
Work	1					0.54
Communications			1			0.54
Total	132	27	23	1	2	100

It was possible to demonstrate a direct relationship between the number of contracts with which the projects are executed and the number of completed projects, showing that the projects with a high number of contracts finish to a lesser extent. This indicates that complex projects present greater difficulty in their execution, obtaining a lower probability of success.

Additionally, we found that only half of the projects can be considered successful when satisfactorily fulfilling the programmed time, the budget allocated and the established objectives. In addition, a quarter of the projects met two of the three criteria, with cost being the criterion of the highest non-compliance.

The results found contribute significantly to theoretical and practical areas for the administration and management of projects, economics and also as input for decisions regarding public policy. In addition, this study reflects a little-addressed scenario (Machado and Martens, 2015) regarding investment behavior, application of public resources and the dynamics presented by the projects with which this money is executed which serves as a baseline for future studies at a national and international.

CONCLUSION

The conclusions presented in this study can aid in designing strategies that allow adequate follow up and intervention for projects executed with public resources, contributing to adequate management and guaranteeing its success.

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