

Original Paper

Restriction of Technical Capabilities, Public Investment and
Human Development: A Panel Results Analysis for Local
Governments of the Department of Ayacucho in Peru,
2010-2012

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Abstract

The present research work analyzes the contribution of the restriction of technical capacities to the level of human development registered in the local governments of Ayacucho during the period 2010-2012. This paper is testing to evaluate if during 2010-2012 period, the reduction of human development levels of the local governments of the department of Ayacucho is due to the restriction of technical capacities that limit the execution of public investment at the local level. In particular, the results obtained support the research hypothesis that during the reference period, the expenditure of the local governments of the department of Ayacucho is mainly limited by two factors: first, the restriction of technical capacities in municipal policy and management; and second, the strategic planning. These two factors in turn, reduce the execution of public investment by 9.32% and 6.12%, respectively. Likewise, this capacity restriction contributes to a reduction in the execution of public investment by 8.35%.

Additionally, it is found that, although the impact of public investment on human development at the local level is positive, in terms of magnitude, it is relatively minor, as shown in the empirical work carried out by Correa & Morocho (2015). Finally, it is found that during the period 2010-2012, the technical capacity constraints in municipal policy and management, plus lack of appropriate strategic planning, reduced the Human Development Index (HDI) of the local governments of Ayacucho by 0.10%, 0.06% and 0.08%, respectively.

Keywords

local governments, human development, technical capacities, municipal policy and management, strategic planning, public investment, capital expenditure

1. Introduction

Aragón and Casas (2009) point out that technical capacities, such as management and planning skills, are part of the technology by which local governments provide public goods and services to satisfy the local demands. Furthermore, these capacities are relatively fixed in the short term because local administration takes time to learn and gain experience, or recruit qualified personnel due to limitations of the financial resources, but also because of their endowment of experience and human capital. The rationale behind this approach is the idea that if a local government has a capacity constraint, then it will have difficulties spending additional financial resources effectively, thus limiting the execution of local spending. This would consequently translate into less human development for the nation.

The Peruvian scenario is not an exception to this. Specifically, in the case of the Department of Ayacucho, between 2010 and 2012, public investment registered an 82% growth, going from 905 millions of soles (Note 1) to 1,648 millions of soles. However, this apparently would not have been reflected in the conditions of human development, since the Human Development Index (HDI) between 2010 and 2012, decreased by 2.36%, going from 0.3426 to 0.3336, while the majority of the other departments of the country registered a positive trend in the HDI.

Thus, the role of public investment in improving the living conditions of the population would be partially questioned since the budget increase for the purpose of better development conditions not only negatively affected at the departmental level, but also at the level of most local governments. During the period of 2010-2012, parallel to the reduction of the HDI in the Department of Ayacucho, we noticed that there was also an increase in training requirements by personnel (public officials of local governments).

Notably the case of the requirement of technical capacities in municipal policy and management, which increased from 84 to 92 local governments, indicates that of the 111 municipalities during that period, approximately 83% of local governments, have restrictions of technical capabilities. Measuring technical capacity constraints is complex. For our case study, following Aragón and Casas (2009), the capacity restriction was measured from the training requirements reported by the local government. A similar situation is true for the strategic planning measurement and examining if there are any training requirements necessary.

In this regard, in Tables 1 and 2, it can be seen that in the last two years of the 2010-2012 period, on average, local governments with capacity constraints in municipal management and strategic planning presented a lower level of execution of public investment, as well as low levels of human development, compared to local governments that did not present a capacity constraint.

Table 1. Restriction of Capacities in Municipal Policy and Management and Strategic Planning and Execution of Public Investment (EPI) (%), 2010-2012

Municipal Policy and Management	EPI-2010	EPI-2011	EPI-2012
No Capacity Restriction	77.53	71.81	68.55
With Capacity Restriction	71.33	66.27	60.44
Strategic planning	EPI-2010	EPI-2011	EPI-2012
No Capacity Restriction	71.75	71.89	64.57
With Capacity Restriction	73.45	65.25	60.34

Source: Economic Transparency—Ministry of Economy and Finance (MEF) and UNDP (2013), and authors' calculations.

Table 2. Restriction of Capacities in Municipal Policy and Management and Strategic Planning and Human Development Index, 2010-2012

Municipal Policy and Management	HDI-2010	HDI-2011	HDI-2012
No Capacity Restriction	0.2698	0.2976	0.2778
With Capacity Restriction	0.2796	0.2732	0.2721
Strategic Planning	HDI-2010	HDI-2011	HDI-2012
No Capacity Restriction	0.2705	0.2628	0.2822
With Capacity Restriction	0.2810	0.2830	0.2678

Source: Economic Transparency—Ministry of Economy and Finance (MEF) and UNDP (2013), and authors' calculations.

Thus, the Tables presented above would partially allow us to assume that lower levels of human development would be associated with higher requirements for technical capabilities. Thereby, the present research seeks to answer the following question: Do the technical capacities of the local governments contribute to the levels of human development registered during the period 2010-2012?

In order to answer this question, it is postulated as a research hypothesis that the restriction of technical capacities existing in the local governments of the department of Ayacucho, have limited the execution of public investment, thus reducing the levels of human development recorded during the period 2010-2012. Therefore, the objective of the research is to analyze the contribution of the restriction of the technical capacities of the local governments of the department of Ayacucho to the level of human development registered during the period 2010-2012.

This research paper is structured in 9 Sections. In Section 1, an introduction to the subject of study, in Section 2, the relationship between public investment, infrastructure and development is explained. In Section 3, the importance of technical capabilities, local expenditure and development will be examined. Section 4 will include the review of literature. In Section 5, the research objective and

hypotheses are presented. In Section 6, the methodology and econometric model data set static panel are presented. Section 7 presents the analysis of results, and in Section 8, the main public policy implications are discussed. Finally, Section 9, presents conclusion remarks of the research paper.

2. Public Investment, Infrastructure and Development

According to the MEF-DGPP (2011), public investment is defined as the expenditure made by the Central Government and Regional and Local Governments, in productive assets of longer duration than the accounting period that they are purchased. In this sense, it is also constituted as any disbursement of resources of public origin destined to create, increase, improve or replace physical capital stocks in the public domain, in order to expand the country's capacity to provide services and production of goods.

Public investment has always been associated with and oriented to infrastructure development. The Inter-American Development Bank (IDB, 2001) distinguishes four dimensions integrated into it: economic, social, sustainable and institutional, which are shown in Table 3. In particular, it is defined "As the set of engineering structures and facilities -in general, with a long useful life- that constitute the basis on which the provision of services considered necessary for the development of productive, political, social and personal use" (IDB, 2000, p. 13).

The main transmission channels between infrastructure and economic development can be summarized in four areas as established by Comprehensive Poverty Reduction and Growth Strategy (CPRGS) in 2003:

- **Economic level:** Infrastructure produces a direct effect on capital accumulation, which generates an indirect effect on economic growth through improvement in productivity of labor, in creating jobs, and in demands.

Table 3. Infrastructure, according to Sectors, Types and Coverage

Sectors	Types	Urban	Long Distance	International
Economic	Transport	Urban road network, commuter rail lines.	Roads, railways, waterways, airports, ports.	Ports, airports, highways, waterways, railways
	Energy	Electricity and gas distribution networks, generation plants, transformer stations.	Transmission networks, pipelines, compressor plants, oil and gas production centers, power plants.	Transmission networks, gas pipelines, oil pipelines
	Communications	Fixed and cellular telephone networks	Fiber optic networks,	Satellites, submarine cables

		and Internet connectivity.	microwave antennas, satellite	
	Water and Sanitation	Provision of drinking and industrial water.	Aqueducts	Eventually coinciding with the long distance
Social development		Hospitals, schools, household water supply and drainage	Dams and irrigation canals, hydraulic networks	Eventually coinciding with the long distance
Environment		Parks and urban reserves.	Parks, reserves, protected territories, ecotourism circuits	Parks, reserves or shared ecotourism circuits
Information and knowledge		Networks, buildings, cable TV.	Distance education systems, postcards, open and satellite TV.	Network

Source: Sánchez & Wielsmeier (2005), adapted from IDB (2000).

- **Social level:** It improves access and availability to basic services in the sense that it provides transportation, electricity, sanitation, among others. In this way, it reduces the costs and time that residents use to carry out their activities, which, in turn, has a positive impact on their well-being.
- **Job creation and higher income:** Higher economic development, in turn, can attract new foreign and local direct investments in both urban and rural areas and could generate a greater demand for tourism. With an adequate service Infrastructure of the local area, the region and/or the country, international visits are achieved that in turn can generate jobs and contribute to more incomes for the nation.
- **Poverty reduction:** As a consequence of job creation and higher incomes, there is more economic growth that contributes to the improvement of social indicators and lead to higher tax revenues guaranteeing the sustainability of the creation of other infrastructures, as well as the reduction of poverty rates. It also requires the participation of the private channel so that the impact is broader on its rates.

Figure 1 presents the synthesis carried out by CPRGS (2003) regarding transmission channels between infrastructure and development.

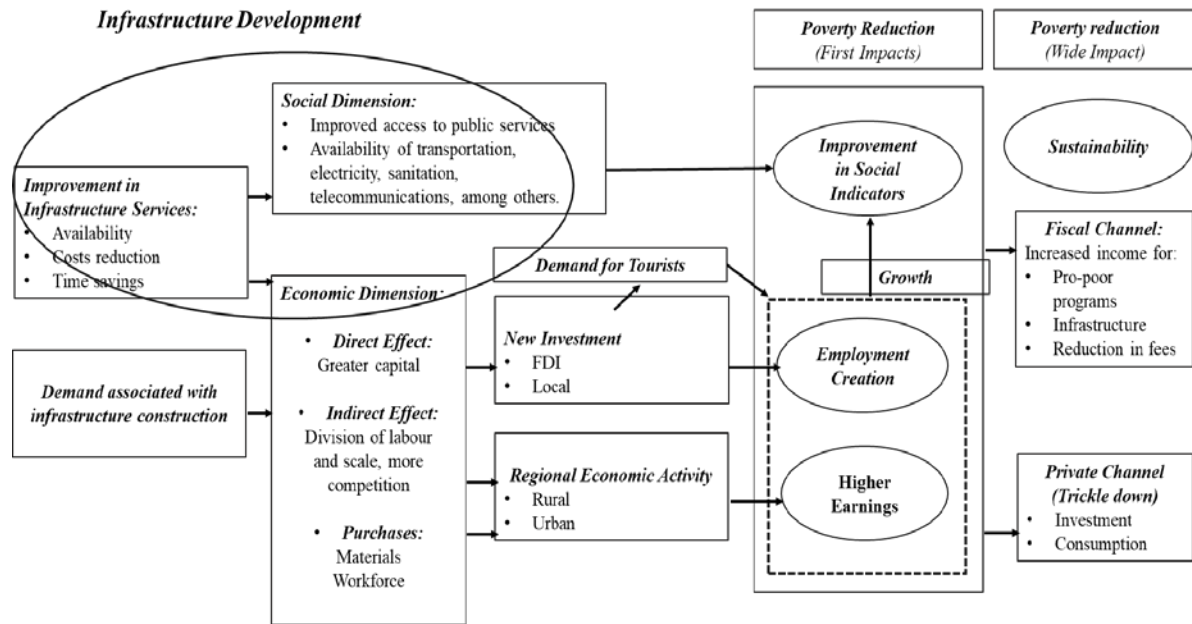


Figure 1. Transmission Channels between Infrastructure and Development

Source: Comprehensive Poverty Reduction and Growth Strategy—CPRGS (2003).

3. Technical Capabilities, Local Expenditure and Development

Aragón and Casas (2009) point out that a central concern in any decentralization process is the adequate provision of the necessary means. This allows sub-national governments to efficiently fulfill the responsibilities they will receive (Bahl & Martínez-Vásquez, 2006). Under the traditional approach, the main attention has been linked to the tax capacity of these governments and to intergovernmental transfers. However, as decentralization processes have been implemented in developing countries, those in charge of implementation have recognized the need to improve institutional aspects and develop planning and management capacities (Litvack et al., 1998).

Parker and Serrano (2000) point out that this concern has led to the implementation of training and technical assistance plans geared towards local governments, generally complementary to a process of fiscal decentralization. They establish that the economic rationale behind this argument is that technical capabilities, such as management and planning skills, are part of the technology by which local governments provide public goods and services to satisfy local demands. Furthermore, these capacities are relatively fixed in the short term because local administration takes time to learn, and gain experience or recruit qualified personnel for financial resources and for their endowment of experience and human capital.

In short, the rationale behind this approach rests on the fact that, if a local government has capacity constraints, then it will have difficulty effectively spending additional financial resources. Thus, their propensity to spend would be less than the maximum potential. An example of this is the one presented by the authors described at the beginning, specifically, they consider that a local government with

limited capacity to design and execute an investment project will not be able to complete the necessary steps to use resources in the construction of a road that is demanded by the population even if there is sufficient financial resources available to them in their budget. So then, this restriction would limit the implementation capacity of local spending and therefore this would result in less economic development for the nation.

4. Literature Review: General Studies

Jiménez (2007) performs an analysis of the relationship between public spending and human development in the municipalities of Veracruz, for the period 1995-2004, the municipalities of Córdoba and Orizaba as the field of study. The research findings show that, for the municipalities under analysis during the reference period, there were stages in which current spending decreased, while resources for investment spending increased, as a result, the author noticed improvement in the living conditions of the nation.

UNDP (2008) concludes for the case of the Republic of Panama, that the difficulties in local administration do not lie in the lack of management instruments but in the capacity to make use of them. This is due to the lack of qualification of the human resources, and in part, to the lack of organizational structure that prevents the specialization of functions. For example, in the vast majority of municipalities, there is only one technical officer, the treasurer. The treasurer lacks availability of time to arrange activities such as planning or analysis and information processing.

UNDP (2009), for the case of the state of Jalisco (Mexico), analyzes the role of institutional capacities for human development. In particular, the study concludes that along with financial resources, the human resources of each local government are the main input to carry out its tasks. In this case, the study suggests that in order to enhance the quality of public servants, a professionalization policy is required that turns public service into a long-term career based on results and not exclusively personal decisions. This could then be the trigger for better public policies that translate into better conditions of education, health and income for Jaliscienses.

Steiner (2010) investigated the contribution of local government capacity to family consumption and school enrollment in Uganda. Using household survey data, he found evidence that both household consumption and school enrollment are positively related to the level of capacity of district governments. In this sense, it is verified that local governments with higher capacities achieve higher family consumption and a higher enrollment rate in public schools compared to those with lower capacities.

Gómez and Varea (2014), for the case of Colombia, evaluate the results of a set of technical assistance carried out in the local governments of Colombia to achieve their institutional strengthening based on Management for Results (MfR) and improving the quality of decentralized spending. The main results of their study demonstrated that the local governments benefited by this process and recognized the articulation between planning-budget-monitoring and stronger evaluation of the results. These areas were the ones that presented the greatest weaknesses in the evaluations carried out. It should be noted,

that in the short term, one can delve into two of the three areas. These areas are the ones that contribute most to performance-based decision-making processes: budget for results and monitoring and evaluation.

Barcelata (2015), for the case of Mexico, analyzes the link between the circles of poverty and municipal finances. Among the main findings, the study highlights the effect of municipal public spending on development that in turn depends on the way resources are administered and the way in which the intra-municipal spending is allocated. Additionally, the author finds that there is a huge lack of municipal regulations, which has a negative impact on economic development. Without such regulations, many municipalities are unable to promote economic growth, improve social welfare and create adequate conditions for development.

OECD (2016), for the Colombian scenario, addresses the issue of capacity-building at the sub-national level. The findings highlight that capacities at the sub-national level, particularly in the municipalities, vary considerably throughout the country. These challenges are associated with the relatively small size of the subnational public sector, as well as high staff turnover, low salaries, and executive profiles of a more political than technical nature in the municipalities. It also identifies that the low capacity for project design in rural regions contributes to territorial inequalities.

OECD (2017), the case of Chile with regards to the theme of strengthening the capacities of human resources in the public sector, highlights that public spending on municipal personnel is low compared to OECD countries. It also identifies that municipalities fail to attract and retain talents due, in part, to low wages. In this sense, the attraction for municipal public employment could be improved through competitive wages. Furthermore, the author finds that the recruitment and promotion of public servants is perceived as a response to personal and political factors rather than merit. Finally, it is concluded that municipalities should place more emphasis on the performance evaluation development function and improve their management capacity to improve performance.

Piña and Avellaneda (2017) evaluate the impact of organizational capacity on the government's effectiveness in securing infrastructure subsidies. In particular, the study is based on a data set of approximately 54,000 proposals for infrastructure subsidies submitted by 340 (out of 345) Chilean municipalities during a nine-year period (2005-2013), which covers three periods of municipal administration: 2005-2008, 2009-2012 and 2013-2016. Controlling for past performance and other characteristics of the grant and the municipality, the results suggest that municipal effectiveness is positively influenced by administrative capacity and political factors. Likewise, the findings obtained are robust in all the specifications and econometric estimates made in the research.

Beube, et al. (2018), suggest ways that states and cities can collaborate together to encourage shared prosperity. They articulate why affordable housing, job growth and upskilling workers, matter to the statewide shared prosperity, and explore how state and local governments can more effectively partner in these areas.

5. Literature Review: Specific Studies on Peru:

Aragon and Casas (2009) studied the local municipalities of Peru, during the period 2000-2005, to evaluate the effect of the lack of technical capacity on the performance of local government spending. The research results find robust evidence that municipalities lacking project management, accounting and finance skills, planning and coordination with other public entities were less able to spend the additional resources provided by the national government. They also estimate that, on average, technical capacity constraints reduce the propensity to invest by at least 6 percent. Additionally, they demonstrate that the experience of local authorities can contribute positively to the spending capacity of a municipality.

Arnao (2010) analyzes the contribution of the decentralization process from the municipalities. In particular, the author concludes that, in a scenario of fiscal decentralization, training must guarantee an adequate transfer of knowledge to the participants of the provincial municipalities. They can later elaborate and apply proposals that allow them to modernize their administration; as well as to reproduce and promote their successful experiences in the district municipalities of their jurisdiction, through feedback processes and continuous improvement.

Arnao (2011), performs an analysis of local public investment management in Peru. The research found out that the financial administration of the municipality, together with the administration of human resources, purchasing and contracting, and administration of goods, must make it possible to supply, in a timely manner, form, and quality, these necessary inputs allow the executing units to offer the locality what it demanded, effectively and efficiently. Likewise, it indicates that it is necessary to require from the National Government, activities related to the strengthening of the municipal investment management capacity, these consist of carrying out assisted work involving the participation of the municipal human resource, to contribute to designing and improving of the instruments of management.

Comptroller General of the Republic (2014) conducted a study of the decentralization process in Peru. In particular, the findings of the study highlighted that capacity development has been one of the greatest weaknesses throughout the decentralization process. Likewise, it highlighted that there is no adequate planning of human resources in the public sector, depending on the objectives of its entities. Additionally, the study identifies that there are no rigorous and transparent personnel selection processes.

The problem of the politicization of the positions is a particular characteristic of personnel selection processes both at the time of hiring and in the provision of training opportunities to the personnel. On the other hand, there is also evidence that there are multiple labor regimes, which generate unequal conditions among officials, especially in remuneration and job stability. Likewise, the remunerations are not satisfactory for officials and are insufficient to attract highly trained personnel.

The absence of a true training and skills development policy, both due to the lack of a budget and the lack of interest on the part of the authorities must be added. In particular, in this aspect the actions are focused exclusively on training and do not have a vision of capacity development. The trainings carried out are limited to workshops or short courses and are not aimed at specific personnel. They are general and do

not contribute to the profile of each worker. Likewise, the high turnover of personnel is a problem for the entities, since the results of the trainings cannot be socialized in the entity nor are the acquired knowledge managed.

On the other hand, public entities have not been able to implement mechanisms for proper evaluation of the staff performance. This situation occurs in the midst of a culture that tends to resist evaluation, as staff relates such evaluations to mass layoffs, hindering the conception of a meritocratic human resources system. It seems in the recent years, the offering of training has increased, both at the level of short courses and postgraduate specializations, but this offer has been heterogeneous in terms of quality of content and does not necessarily respond to the specific needs of each entity.

Finally, the study concludes on the need for a clear governing body for capacity development and more coordination among different agencies. For example, the Ministry of Decentralization, SERVIR and the Ministry of Public Management, although they do have competencies related to capacity development; but these three entities are also associated with the Presidency of the Council of Ministers, which have not been acting in a coordinated manner, creating duplication in capacity building plans when they should talk and form one.

Public Management Secretariat—Presidency of the Council of Ministers (2012), in its National Policy for Modernization of Public Management, establishes meritocratic civil service as one of its pillars. In this regard, the model that underlies this policy is oriented towards the professionalization of the public function at all levels, seeking to attract qualified people to key positions in public administration, and prioritizing meritocracy in access, promotion, evaluation and permanence through a public sector human capital management system, in line with new global employment trends.

Palomino, Cerna, and Rios (2013) find evidence that a large part of the district mayors, especially in municipalities far from urban areas, have few options to hire qualified personnel, or hire professionals with experience for management positions. On the other hand, through an interview carried out as part of the investigation, most of them referred to the high turnover of staff as problematic and indicated that the cause of this has as its origin in decisions made by mayors or councilmen, who tend to dismiss and rotate staff under flexible hiring regimes at their discretion.

In this sense, the authors suggest that it is necessary to rethink the discretion of the municipal authority -proper of the mayoral regime that governs us- to freely designate and remove the so-called trusted officials this affirms the continuity of officials of career properly prepared and with fair remuneration. In addition, to review and make some regulatory changes to reduce obstacles to the hiring of trained personnel, such as Supreme Decree 025-2007-PCM, which establishes the remuneration caps for mayors and determines, f-For example, in municipalities with an electoral population of no more than 10,000 voters, a municipal official cannot receive more than 2,600 soles, which becomes a mechanism that drives away trained professionals and encourages municipalities to evade the application of the rule.

Public Management Secretariat—Presidency of the Council of Ministers (2016) proposes a model of institutional capacities based on an approach towards institutional strengthening for decentralized

management. In this regard, it determines that the model has four fundamental components: (i) Strengthened Personal Competencies, (ii) Instruments for Inter-sectoral and Intergovernmental Articulation, (iii) Transparency and Citizen Participation; and (iv) Systematic Use of Communication and Information Technologies.

National Civil Service Authority—SERVIR (2016) conducted a study on the type of public managers that the Peruvian State requires. Through said study, the author of the reference released the “Management Model for the Group of Public Managers of the Peruvian Civil Service,” which contains the main characteristics of the new type of Public Managers required by the Peruvian State in the framework of the implementation of civil service reform. Attributes such as merit, the vocation of service to the citizen, capacity, honesty and democratic values are highlighted. Likewise, this new model leaves behind the old criterion of “politicized leadership” that consists of a system where politicians and high-level officials can appoint anyone to serve in senior management positions, provided they enjoy their trust.

Casas (2017) analyzes the impact of the technical capacity of municipal administrations on the debt and financial indicators of the municipalities of Peru between 2012 and 2015. In particular, the study measures the effect of efficiency indicators of the municipal management on the financial indicators that the main urban municipalities of Peru are obliged to present. The results obtained show that the efficiency indicators in functions such as administration and planning, as well as order and security, are those that are significant in the estimated regressions. Furthermore, the results show evidence in favor of financial and administrative management improvement programs, which can be an effective tool for improving the financial health of local governments.

Vega, Rojas, Elías, Koechlin and Solórzano (2018) analyze the phenomenon of corruption and its dynamics in five regional governments in Peru: Ayacucho, Cusco, Piura, Moquegua and Madre de Dios. In the case of Ayacucho, the main findings of the investigation reveal that for certain positions, personnel are recruited who do not meet the technical profile. Likewise, it is corroborated that there is favoritism in the appointment of officials. This is because many of them worked in the political campaign, which is why the political favor must be paid then.

In this regard, it has been identified that in Ayacucho, there are many inspection requirements for this matter. The research findings reveal that “Strategic planning standards and documents are not respected. Depending on the context, the governor may direct works to this or that population even when it was not planned. Also, many works are not related to the Concerted Regional Development Plan where the investment plans and programs are. In short, there is a lot of improvisation and populism to be able to make the investments” (Vega et al., 2018, p. 80).

5. Research Objective and the Hypothesis

The central research objective of this research is to analyze the contribution to the restriction of the technical capacities in the local governments of the department of Ayacucho on the level of human development registered during the period 2010-2012. The hypothesis of this research includes: The restriction of technical capacities, existing in the local governments in the department of Ayacucho, have limited the execution of public investment, thus reducing the levels of human development registered during the period 2010-2012.

6. Methodology

The present study analyzes the 111 local governments of the department of Ayacucho with 333 observations, during the period 2010-2012. Data came from three secondary sources: The UNDP-Peru Report (2013), the Economic Transparency Portal of the Ministry of Economy and Finance; and the National Registry of Municipalities (RENAMU) of the National Institute of Statistics and Informatics (INEI).

Statistics corresponding to the Human Development Index were used from the first source. The second are statistics corresponding to Capital Expenditure (Public Investment), specifically, PIM (Modified Institutional Budget) and Accrued from the Ayacucho districts. Finally, from RENAMU, the information related to capacity constraints (C) was used, which, measured, through the municipal training requirements in administration, accounting, and finance; The Municipal Policy and Management, Strategic Plan and Operational Planning, Statistics and Municipal Indicators, Information and Communications Technology (ICT), Computing; and Formulation and Execution of Projects.

6.1 Theoretical Model

For research purposes and according to the established theoretical framework, a basic theoretical model is postulated for the relationship between capacity constraints, local spending and human development. Specifically, there are two equations. The first equation corresponds to the executed public investment (GKE), whose specific mode responds to the budget (PIM) and capacity restriction (C), as established in the following equation, based on Aragón & Casas (2009).

$$GKE_{it} = f(PIM_{it}, PIM_{it} * C_{it}) \quad (1)$$

(+) (-)

Therefore, the total impact of capital expenditure limited by the capacity constraint (C), which is measured through a dichotomous variable as follows: 1 if the reporting municipality in RENAMU reported training requirements and 0, in the opposite case. Likewise, for research purposes and based on the availability of information, the capacity constraint (C) was analyzed in administration, accounting, and finance, municipal policy and management, strategic Plan and operational planning, statistics and municipal indicators, information technology and communications (TIC), computing, and formulation plus execution of projects.

The second equation shows the link between executed public investment (GKE, Executed Capital Expenditure) and the human development index (HDI). In general, the expected impact is positive as established in CPRGS (2003). Additionally, the number of years of average education of the individual (NAE) and temporal effects are included as an additional explanatory variable, in order to evaluate the robustness of the estimator obtained.

$$HDI_{it} = f(GKE_{it}, NAE_{it}) \quad (2)$$

(+) (+)

6.2 Econometric Model

Considering the above, a static panel data model is used. Likewise, fixed effects by district and time horizon (2010-2012) are included. Being the econometric specification, with, and $\lambda > 0$ and < 0 , as follows:

$$GKE_{it} = \theta + \gamma * PIM_{it} + \varphi * PIM_{it} * C_{it} + \varpi_i + \phi_t + \varepsilon_{it} \quad (3)$$

$$\ln(HDI_{it}) = \alpha + \beta * GKE_{it} + \lambda * NAE_{it} + \alpha_i + \varphi_t + e_{it} \quad (4)$$

As established in various texts on panel data econometrics (Wooldridge, 2002; Hsiao, 2003; Arellano, 2004; Frees, 2004; Cameron & Trivedi, 2005; Baltagi, 2005, 2006; Baum, 2006; Mátyás & Sevestre, 2008; Green, 2012), in static panel models, the main problem is the possible existence of correlation between unobservable heterogeneity by individual, in this case local governments (districts), and the regressors of the model. Consequently, this would generate a bias in the estimators obtained. Using fixed effects is adequate since it allows controlling the unobservable heterogeneity by individual (in this case local or district government).

Finally, to measure the contribution of the capacity constraint on human development of the local governments of Ayacucho, the marginal impact derived from equations (3) and (4) as follows:

Marginal impact derived from equations of (3) and (4):

$$\frac{\partial \ln(HDI_{it})}{\partial C_{it}} = \left(\frac{\partial \ln(HDI_{it})}{\partial GKE_{it}} \right) * \left(\frac{\partial GKE_{it}}{\partial C_{it}} \right) = \beta * \varphi * \overline{PIM} < 0 \quad (5)$$

Con β , $\gamma > 0$ y $\phi < 0$. Likewise, \overline{PIM} : PIM Average.

In general, the impact obtained through this measure will reveal the average annual contribution of the capacity constraint in the HDI of the Ayacucho districts during the 2010-2012 period.

6.3 Delimitations of the Research

This research has, as scope of study, the local governments of the department of Ayacucho during the period 2010-2012. This is justified for two main reasons:

1). During the period 2010-2012, the Human Development Index (HDI) of the department of Ayacucho, including its local governments, experienced a negative trend, while in the other departments of Peru it showed a positive trend. Additionally, the levels of execution of public investment (GKE) did not reach 100% of total public investment (budget, PIM) in the vast majority of local governments in the department.

This is in a context where both total public investment and training requirements (capacity constraints (C) at the local government level registered a positive trend. In this sense, the present draft thesis essentially seeks to identify whether, in this context of study, the restriction of capacities would have contributed to the reduction experienced in the HDI of local governments in the department of Ayacucho during the period 2010-2012.

2). The most recent database available for the Human Development Index (HDI) at the level of local governments in Peru, at the time of execution of this investigation, corresponds to the Peru Human Development Report 2013, which presents HDI statistics for the years 2003, 2007, 2010, 2011 and 2012. Considering that the information corresponding to the level of local governments in the Portal of Economic Transparency of the Ministry of Economy and Finance (MEF), has been standardized since 2008, the time horizon for the analysis of this investigation corresponds to the period 2010-2012.

7. Analysis of the Results (Note 2):

7.1 Capacity Restriction and Local Public Investment

Table 4 shows the estimation of the relationship between the capacity constraint and limits local public investment and execution. In particular, the six capacity constraints analyzed correspond to municipal policy and management and strategic planning; since the other capacity constraints did not show correspondence, both theoretically and statistically.

Table 4. Restriction of Technical Capacities and Public Investment in the Local Governments of Ayacucho, 2010-2012

Variables	Public Investment Executed		
	Municipal management	Strategic planning	Municipal Management and Strategic Planning
PIM	0.4920*** (0.0275)	0.4826*** (0.0344)	0.4776*** (0.0247)
PIM*C	-0.0932*** (0.0237)	-0.0612** (0.0276)	-0.0835*** (0.0199)
R ²	0.9526	0.9504	0.9531
Observations	333	333	333
Districts	111	111	111

Standard deviations in parentheses.

****p<0,01, **p<0,05, *p<0,10

Note: All estimated models included intercept. However, for the purposes of presentation in the attached table, it was omitted because it only represents a position parameter which is generally not

subject to interpretation. Likewise, temporary effects were included, which were omitted for purposes of simplifying the presentation of the attached table.

Source: Economic Transparency (MEF), National Register of Municipalities (RENAMU) and National Institute of Statistics and Informatics (INEI) and authors' calculations, using Stata 15.0 and Eviews 10.0.

Likewise, the results obtained show that the restriction of technical capacities in municipal policy and management reduced the execution of local public investment by 9.32%. Being under this restriction the average annual execution of local governments in the department of Ayacucho of just 40%. We anticipate the reason for this observation is the limited resources received for public investment would restrict the improvement of the population's development conditions.

On the other hand, the restriction of technical capacities in strategic planning are verified to have reduced the execution of public investment by 6.12%, the local average execution due to this capacity restriction being 42%. In short, it would show that politics, municipal management, and strategic planning at the level of local governments are relevant to explain the performance of public investment budget execution view.

Additionally, an estimate was made that combined the restriction of both capacities, the impact would be a reduction in local capital spending of 8.35%, which in turn would translate into a total execution of local public investment of 39%. This is very worrisome in a context where the priority of local policy makers is to have prompt responds to the execution and improvement of the well-being of the district. In this sense, it can be concluded that the technical capacities are relevant to explain the performance of local public investment.

The results obtained show that confirmed findings by Aragón and Casas (2009), still remain in force, since the average impact of the capacity constraint on the execution of public investment (capital expenditure). This was estimated, by these authors, at 6%. While that was for the specific case of the present investigation, it is shown that the capacity restriction would have deteriorated to a greater extent since the obtained marginal impacts are between 6.12% and 9.32%.

A negative contribution of 8.35% is demonstrated if we consider a combination of the restrictions in strategic planning and municipal management, which clearly demonstrates that the restrictions of technical capacities would have worsened the execution of local capital spending to a greater extent.

7.2 Local Public Investment and Human Development

In relation to the first econometric model, Table 5 shows that the contribution of public investment executed at the level of human development is positive and statistically significant at 1%. In this sense, it can be affirmed that public investment is highly relevant for improving human development results at the local level.

Table 5. Local Public Investment and Human Development in the Local Governments of Ayacucho, 2010-2012

Variables	Ln(IDH)
GKE	2.06x10 ⁻⁹ *** (6.88x10 ⁻¹⁰)
NAE	0.0303*** (0.0003)
R ²	0.9982
Observations	333
Districts	111

Standard deviations in parentheses.

***p<0.01, **p<0.05, *p<0.10

Elaboration: The Authors

It is important to point out that given the endogeneity presented by local public investment in this equation, the two-stage least squares method was used, considering as instruments all the exogenous variables inside and outside the model. The considerations included the restriction by capacities in municipal policy and management, as well as planning, in addition to the PIM and NAE variables. In this sense, the estimator obtained for public investment is adequate.

Additionally, the result of public investment in the HDI highlights the role of education, measured by the number of years of average education of the individual. In particular, it is observed that for each additional year of average education of the individuals in the local governments of Ayacucho, the HDI increases on average per year by 3.03%. This impact being in turn statistically significant at 1%, which then also allows us to conclude that it is a highly relevant variable to explain levels of human development at the local level, as verified in Jiménez (2007) for the particular case of Veracruz municipalities, specifically: Córdoba and Orizaba.

An important aspect to keep in mind is that, although public investment is relevant to human development, its marginal impact compared to the years of study is relatively small, since for each additional amount of public investment executed, the HDI increases at 0.000000206%. However, this does not validate the premise of the importance of public investment for development since its contribution is positive and highly significant. This result is in accordance with the findings reported by Correa and Morocho (2015), authors who, in the case of the department of Piura, identify that the average impact of resources from the oil canon and oil surcharge at a social level (considering the HDI and its components), it would have been limited and even concentrated in the least vulnerable districts.

7.3 Capacity Restriction and Human Development

Having already verified the contribution of restrictions of the technical capacities in local governments at the level of public investment executed, in addition to the contribution of the latter variable in the human development index, registered during the period 2010-2012, in the latter, Part examines the marginal impact of the restriction of technical capacities on human development, combining equations (3) and (4). It is identified that, in the case of the restriction of technical capacities in municipal politics and management, strategic planning, in addition to their combination as a whole, the estimated marginal impacts are:

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$$\frac{\partial \ln(IDH_{it})}{\partial C_{it}} = (2,06 \times 10^{-9}) \times (-0,093188) \times (4,953,168) = -0,10\% < 0$$

Strategic planning

$$\frac{\partial \ln(IDH_{it})}{\partial C_{it}} = (2,06 \times 10^{-9}) \times (-0,061187) \times (4,953,168) = -0,06\% < 0$$

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$$\frac{\partial \ln(IDH_{it})}{\partial C_{it}} = (2,06 \times 10^{-9}) \times (-0,083544) \times (4,953,168) = -0,08\% < 0$$

Thus, it is found that during the 2010-2012 period, the restrictions of technical capacities in municipal politics and management, strategic planning reduced the HDI on average annually by 0.10%, 0.06% and 0.08%, respectively. On the other hand, the results obtained are not in accordance with what was reported by Steiner (2010), who in the case of Uganda found a positive contribution of technical capacities in household well-being. However, in the Peruvian case, a negative contribution is reported. Likewise, the results obtained do not show correspondence with respect to the findings reported by Piña and Avellaneda (2017), who find that municipal effectiveness is positively influenced by administrative capacity in the Chilean case.

Thus, the results obtained reveal that the problems diagnosed in the Peruvian case by Aragón and Casas (2009), Arnao (2011), Comptroller General of the Republic (2014), Palomino, Cerna & Rios (2013), National Civil Service Authority-SERVIR (2016), Casas (2017) and Gómez and Vera (2014). In addition to the findings reported internationally by UNDP (2008), UNDP (2009) and Barcelata (2015); it allows us to conclude that in the Latin American countries (and in the specific case of analysis, Peru), technical capacity gaps, at the local level, limit the favorable evolution of the Human Development Index.

In summary, the results obtained in the research corroborate the evidence in favor of the research hypothesis, that is, the restriction of existing technical capacities in the local governments of the department of Ayacucho, have limited the execution of public investment, thus reducing the levels of human development recorded during the period 2010-2012. Therefore, it is necessary to strengthen the

human capital of local governments in order to guarantee sustainable human development. In the next section, we propose a solution to the problem identified in this research.

8. Implications of Public Policies

From the results obtained, the following public policy implications can be derived; first, the objective of the execution of resources for public investment is to improve the quality in the provision of public goods to the nation. The results obtained suggest that for this to happen, it is not a sufficient condition to transfer more resources, but also that such transfer must be accompanied by a serious training effort, which allows closing the existing gaps at the level of the interior of the country with regards to the human capital available to the local governments, while guaranteeing a permanent career line for the human resources that work within them.

Secondly, the results obtained suggest that the government should implement a new reform to modernize national, regional, and more specifically local public management. This is because, as it is known, the human capital available in local governments is not stable and staff turnover is high due to the change of government. Thus, development, which is a very long-term issue, can hardly be achieved in a context where the institutions, authorities and officials that direct the destinies of the locality are not permanent in time.

Third, it is necessary to strengthen the training efforts provided with the respective facilities so that the public officials can be trained in a timely manner without interfering with their work activities, since with more qualified human capital, better results are expected to achieve in the management of local development. However, in a context where a permanent line of facilities for the training of public officials, especially local governments in the interior of the country, is unclear, it would be difficult to close the existing gaps.

Fourth, the National Registry of Municipalities (RENAMU) of the National Institute of Statistics and Informatics suggests greater support from the government for the collection of information by a public official than each local government. This is key to accompany the assignment of functions of a meritocratic system given the knowledge of the true capabilities of existing human capital in a local government.

Finally, the generation of more information regarding socioeconomic factors of the local government at the district level is required in order to justify the right allocations of resources to improve economic and social development of the nation.

When evaluating the socioeconomic evolution at the local space level, this information is important to evaluate the performance of local spending against the main socioeconomic indicators of a locality. In conclusion, it should not be forgotten that development is territorial considering a joint interaction of its aspects: economic, social, environmental and institutional. In the last aspect is the human capital of local governments, in which previously qualified would allow the future to improve the development conditions of the population, both locally, regionally and nationally.

9. Concluding Remarks

The present investigation analyzes the relevance of the restrictions of technical capacities on human development of the local governments of the department of Ayacucho during the period 2010-2012, taking as a basis, the transmission channel capacities plus local spending and human development. There is evidence in favor of the research hypothesis since it is verified that the lack of technical capacities in municipal policy, management, and strategic planning negatively affect the ability of local governments to increase public investment executed and consequently negatively affect the levels of human development at the local level.

Our research also corroborates the need to complement the fiscal decentralization policy with the development of technical capacities at the local level. However, fiscal decentralization implies transfer of income to sub-national governments with the explicit mandate of increasing local spending. Our research demonstrates that this objective may not be achieved due to limitations in the capacity of local governments. Finally, the lack of technical capabilities can create economic inefficiencies because the resources accumulated at the local level can also be used to finance projects at the national level or reduce distorting taxes. In particular, the inefficiency could deteriorate the living conditions of the population, both economically and socially.

In short, during the period 2010-2012, restrictions on political and technical capacities in municipal management; strategic planning and as a whole (combination), reduced, on average per year, the execution of public investment by 9.32%, 6.12% and 8.35%, respectively. Likewise, said restriction reduced human development levels at the local level on average per year by 0.10%, 0.06% and 0.08%. We emphasize the importance of strengthening the professionalization of governance at the local level in order to train qualified human capital and permanent local governments in the country to contribute positively to human development levels of the population.

The main limitation of the research corresponds to the fact that the results obtained only cover the 2010-2012 time period horizon. This is because the availability of the most recent HDI information lies in the Peru Human Development Report 2013, in addition to considering that public investment at the local level in the Economic Transparency Portal of the Ministry of Economy and Finance (MEF) and has been standardized since 2008. Thus, considering these two aspects; the analysis period corresponds to the 2010-2012 time horizon.

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Notes

Note 1. Currency of Peru.

Note 2. In this section, all models include intercept and fixed effects by local government (district) and time horizon (by year). However, for presentation purposes, the variables involved in the technical capabilities, local public investment and human development nexus are mainly shown.