

Relevant Competences Needed for a Project Manager to Succeed in Innovation Projects

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Abstract— What does Peru need in order to improve its innovation index? With that in mind, what benefits might innovations bring to its entrepreneurs and citizens? If it succeeds in improving its index, would Peru be considered as an innovative country?

In 2014, Peru earned the title “Least innovative country in the Pacific Alliance,” according to the Global Innovation Index developed by the World Economic Forum. While average expenditure on innovation in Latin America is 0.7%, Peru spent close to 0.5% of its GDP on R&D. To overcome this situation, one of the ways in which the Peruvian government has sought to improve the competitiveness of their companies (99.6% are micro, small and medium) is to develop and promote contest financing sources, grouped today under the National Program for Innovation for the Productivity and Competitiveness umbrella, known as INNOVATE PERU, creating Government-University-Company alliances. The way and amount that we innovate will directly impact upon Peru’s commitment to join a developed world. However, the necessary success that would allow it to join global competitiveness depends on the competences of project managers.

This study determines the relevant competences that a project manager needs in order to achieve success in innovative projects. We performed a quantitative analysis of twelve project managers of projects developed by the Universidad de Piura (UDEP) over the last five years.

The results showed that the main competences of UDEP’s project manager are behavioral, which covers their attitudes and skills in a wide spectrum of elements.

Index Terms—Competences, Innovation, Project Managers, Peru.

I. INTRODUCTION

PERU financially supports innovation, to improve the country’s competitiveness, in companies with developmental projects in technology, innovation and entrepreneurship, through its Science and Technology Program, its funds FINCYT, FIDECOM, and, currently, INNOVATE PERU. It also finances scientific, technological and applied research, to contribute to the development of scientific knowledge in the country. Therefore, contest calls are addressed to the academic, scientific and entrepreneurial community, which creates synergy between the Government-University-Company. This study has been applied to the project managers of those projects developed by Universidad de Piura (UDEP).

The success of a project for an institution such as ours should not be measured only by the deliverables or work packages, but the impacts it generates to increase institutional competitiveness. For this reason, the purpose of the study was to identify the most relevant competences of a UDEP project manager of research, for innovation projects to be effective.

For the analysis, we used a quantitative survey methodology based on representative features of efficient and experienced managers, which measures the level of achievement of each competence. We analyzed the relationship between management competences proposed by Hellriegel, Jackson and Slocum (2009) [1], compared with those of the International Project Management Association (IPMA).

II. FRAMEWORK

According to the IPMA, “a project is a limited action in time and cost to realize a set of defined deliverables in accordance with some requirements and quality standards” (NBC, 2009) [2]. What is more, the Project Management Institute (PMI) defines a project as “an effort that is carried out to create a unique product, service or result, and has the feature of being naturally temporary” (PMBOK, 2013) [3].

Reviewing the literature on the classification of projects, the author Blake (1978) [4] classified projects based on a normative distinction between minor change (alpha) projects, and major change (beta) projects. Another classification depends on the degree to which projects change the company’s product portfolio: derivative, platform, breakthrough and R&D projects (Wheelwright, 1992) [5]. A more recent piece of research, classifies new product development and R&D projects based on the nature of technology (low, high), the innovation (incremental, radical) and the market (new, existing) (Balachandra & Friar, 1997) [6]. Also, Dvir, Lipovetsky and Shenhar (1998) [7] state that the list of project success factors is dependent upon the project type and for that reason, project managers must identify those factors that are critical to their specific project.

Across many different economic sectors, there are currently projects in construction and defense, information technology and communication, organizational development, product development, marketing, product development, research, innovation and social projects (NBC, 2009). To be precise, research and innovation projects are the ones that have a vital importance for the improvement of the innovation and competitiveness of the country.

The authors Maffioli and Giuliano (2003) [8] note that technical competences are not enough in today’s world. This accounts for the need to develop technical, contextual and

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behavioral competences (NBC, 2009), to achieve project success. But, do we all know what a competence is? In its present meaning, the term can be traced to David McClelland’s “Testing for competence rather than for intelligence,” which triggered a shift in the evaluation of human resources. According to the IPMA, competence is “a collection of relevant knowledge, personal attitudes, skills (abilities) and experiences necessary to have success in a certain function”. Competent project management is divided into in three different areas: technical competence, personal competence and competence in the context (NBC, 2009).

Sergio Tobón (2006) [9] affirms that Greek philosophy, modern philosophy and sociology, changes in the work world, education for work, cognitive psychology, and finally, industrial organizational psychology, are the various stages that constructed the concept of competences. On the other hand, Dante Guerrero (2012) considers the concept of professional competences, and its various historical contributions, from an open, flexible, and trans-disciplinary perspective (Guerrero & De los Ríos, 2012) [10].

Regarding the classification of competences, Hecker classifies competences as cognitive, technical and methodological, which are then utilized effectively, when necessary, in different situations and contexts (Hecker, 1997) [11]. Andrew Gonczi and James Athanasou (2004) [12] indicate that competences can be categorized in three groups: competences as a list of tasks, competences as a collection of attributes, and competences as a holistic or integrated relationship. Both Hutmacher (2003) [13] and the European Study (2007) [14] have identified the core competences for permanent learning as comprised of knowledge, skills and attitudes, adequate to the context. These competences are: linguistic communication competence, foreign language competences, mathematical competence, competence in knowledge and the interaction with the physical world, information processing and digital competence, social and civic competence, cultural and artistic competence, learning to learn competence, and autonomy and personal initiative. In the same way, Guerrero and De los Ríos (2012) explain that “the components of professional competences are a composite of personal attributes which complement and integrate themselves in conjunction with other elements that are related to contexts of work,” and that, nowadays, the evaluation of competent professionals is an actual challenge.

What importance has innovation? The Ministry of Production of Peru (2015) [15] states that innovation is very important, in order for companies to achieve growth, in both the medium and long term. The competitiveness of the country will improve, as a consequence of companies’ innovation.

On the other hand, the Ministry of Production of Peru (2015) also states that establishing an organizational culture is the current challenge that companies must face, if they want to lead in innovation, because it is not enough to devote efforts to create new products and/or new production processes. For this reason, project managers of innovation projects, developed under the auspices of the Government-University-Company approach, need to develop more soft skills than hard ones. This means giving greater weight to behavioral competences, followed by technical and contextual competences.

According to the Global Innovation Index in 2014 [16], Peru obtained the position 73 from 143 with a score of 34.73

making it the “least innovative country in the Pacific Alliance”; also according to the 2014 Global Competitiveness Index, Peru is in 7th position, out of 44 countries. These results show that we need to innovate far more in our country. The Ministry of Production of Peru (2015) has stated that the current main concern is not the capital, but rather the creativity and innovation that go hand in hand with the support that the Government provides. In addition, universities that are, amongst other things, vigilant to societal problems, are encouraged to study these issues in scientific depth, looking for different solutions for the common good, and the company that contributes the most dynamism and creativity.

III. METHODOLOGY

This study considers competences indicated by Hellriegel, Jackson and Slocum (2009) (HJS) [17], related to the elements from the IPMA competences, and proposes the following initial considerations of research (See Table 1):

TABLE I
INITIAL CONSIDERATIONS FROM THE RESEARCH

Factor	Initial consideration
<i>General objective</i>	Identify what the most relevant competences of a Project Manager FINCyT are for investigation or innovation projects to be effective.
<i>Specific objectives</i>	a) Relational analysis of the features between the HJS managerial competences and the elements of technical, behavioral and contextual competences from the IPMA project management, validated with expert judgment. b) Link and compare the results from surveys on managerial competences from HJS, and the elements of technical, behavioral and contextual competence from the IPMA project management.
<i>Type of methodology</i>	Analytical
Object of study	- General coordinators of innovation or research projects funded by Innovate Peru – FINCyT and FIDECOM at the University de Piura.
Comparative features	HJS managerial competences and the elements of technical, behavioral and contextual competence from the IPMA Project Management.
Information gathering tools	- Surveys

Source: self-made

A. Surveys

Peruvian State policies to promote research and innovation have focused on generating contest funds, but it is also extremely important, in order to achieve success that would allow for integration with global competitiveness that it depends on the project manager’s competences. This fund supports innovation in companies through financing technological, innovative and entrepreneurial projects that will improve the country’s competitiveness. It also funds scientific, technological and applied research that contributes to the development of scientific knowledge in the country.

That is why this study seeks to identify the relevant managerial competences that guaranteed the success of innovation and research projects from the University de Piura. Our study carried out 12 surveys among the general coordinators of projects that were formulated, funded and implemented by the Peruvian Government, through its

Science and Technology Program, with FINCyT and FIDECOM funds, during the years 2009 – 2014. The survey population was small, so there was no need to select a sample.

B. Relational Analysis

IPMA defines the project management discipline as the planning, organization, monitoring and control of all aspects of a project, as well as the motivation of all of those involved in it to reach the objectives of the project in a safe way, and satisfying the defined specifications of term, cost and performance. That also includes the set of leadership, organization, and technical management tasks of the project necessary for their correct development.

The administrative process, or the administrative roles, includes planning, organizing, directing and controlling (the task of every manager), which depend, in greater or lesser degree, on the necessary position for a manager to be effective. However, Hellriegel, Jackson and Slocum (2009) emphasize that, in order to be efficient, six managerial competences are particularly necessary for organizational success: communication, planning and administration, strategic action, self-administration, knowledge of the global environment, and teamwork. They also define managerial competences as “a combination of knowledge, skills, behaviors and attitudes that [are needed for] a manager to be efficient in a wide range of management tasks, and in different organizational environments” (Hellriegel, Jackson & Slocum, 2009).

For conducting this research, the following questions are formulated:

- Is there a relationship between the management competences proposed by HJS and the IPMA?
- If there are relationships, how are those competences linked?

In order to resolve these questions, a relational analysis between the features of management competences from HJS and those from the IPMA was performed, which was validated by expert judgment.

IV. RESULTS

A. Analysis of Competences According to HJS

The tool allowed defining the degree of attainment or achievement of a management competence defined by HJS, developed and practiced in the work of the Project Manager according to the following scale showed in Table 2.

TABLE II
GENERAL INTERPRETATION

Score	Meaning
20 – 39	It has little experience and a very low level in this competence.
40 – 59	It has a low general level in this competence, but it performs satisfactorily or better in some features.
60 – 74	In general, it is like the average in this competence and above the average or better in some features.
75 – 89	In general, it is above the average in this competence, and excels in many features.
90 – 100	In general, it excels in this competence.

Source: Hellriegel, Jackson and Slocum (2009) “Administración: Un Enfoque Basado en Competencias” (Administration: An Approach Based on Competences), p. 36.

The results of the surveys (See Table 3) show that the most relevant management competences are the self-management competences and teamwork; these results reflect those obtained by HJS, applied to hundreds of experienced managers (Hellriegel, Jackson & Slocum, 2009).

The project managers from the UDEP are above average in terms of self-administration or personal management competence (79%), and excel in many features of it. It requires “responsibility for one’s life in and out of work”. According to Dee Hock, the man behind the success of VISA, “If you look to lead, invest at least 40% of your time managing yourself - your ethics, character, principles, purpose, motivation, and conduct. Invest at least 30% managing those with authority over you, and 15% managing your peers” (Waldrop, 1996) [18].

With regard to teamwork, the project managers are above the average in this competence (76.73%), and they excel in many features of it. As Dee Hock puts it:

You will see incredible events in which a team produce much more than the sum of their individual talents. It is easy to recognize and impossible to define. It cannot be achieved without great effort, training and cooperation, but the effort, training and cooperation by itself rarely generate it. It is necessary to rely on the sum of talents and team strength. (Cited in the PCO’s International Events, C.A.).

In teamwork, leaders are forged; “Leadership set a common goal, the integration attitude and efficiency – achieve the objective- constitutes the backbone of a working team” (Bager, 2005) [19].

On the other hand, the results showed that project managers had average, or better than average, competences in communication, planning and management, strategic action and multiculturalism.

TABLE III
OUTCOMES OF THE HJS MANAGEMENT COMPETENCES IN COORDINATORS OF INNOVATION PROJECTS

HJS Competences	Communication	Planning and Management	Teamwork
<i>Arithmetic mean</i>	73	73.17	76.33
<i>Estimated error</i>	2.33	2.21	1.59
<i>Median</i>	76	72	77
<i>Maximum</i>	82	86	84
<i>Minimum</i>	60	62	68
<i>Standard deviation</i>	8.07	7.65	5.52
HJS Competences	Strategic Action	Multicultural	Self-administration
<i>Arithmetic mean</i>	74.33	74	79
<i>Estimated error</i>	1.92	3.23	1.95
<i>Median</i>	75	71	79
<i>Maximum</i>	84	94	94
<i>Minimum</i>	66	60	70
<i>Standard deviation</i>	6.651	11.18	6.74

Source: self-made

B. Relation Analysis of Competences According to IPMA and HJS

Each element of the IPMA areas of competence was analyzed, after a general comparison with the HJS management competences features; their relationship revealed the following results, shown in Tables 4, 5 and 6.

In the area of technical competence, an average of 75% was obtained, which indicates that they excel in some elements, such as success in project management, teamwork and closing.

In the area of behavior competence, an average of 77% was obtained, which indicates that they excel in the elements of creativity, reliability, ethics, commitment and motivation.

In the area of contextual competence, an average of 74% was obtained, indicating that they meet, and sometimes slightly exceeds, the average, in some elements, such as permanent, business and personnel management organizations.

TABLE IV
RESULTS OF THE ELEMENTS OF TECHNICAL COMPETENCE

Elements of IPMA Competence - Technical	Arithmetic mean	Estimated error	Mean	Standard deviation
Success in project management	76.33	1.79	76	6.20
Parties involved Requirements and objectives of the project	75.00	2.88	78	9.96
Risk and opportunity	72.67	2.02	72	7.00
Quality	75.67	2.06	79	7.13
Project organization	73.33	1.57	72	5.42
Teamwork	75.17	1.70	75	5.88
Troubleshooting	77.67	2.81	78	9.72
Project structures	74.67	1.53	74	5.30
Scope and deliverables	73.67	1.81	73	6.26
Time and project phases	73.50	2.20	71	7.63
Resources	74.33	3.28	70	11.37
Cost and funding	73.22	2.11	73	7.29
Provisioning and contracts	72.33	3.92	70	13.59
Changes	75.17	1.90	72	6.58
Controls and reports	75.11	1.64	76	5.70
Information and documentation	74.33	2.56	73	8.88
Communication	74.33	2.70	72	9.34
Release (Startup)	75.00	2.18	75	7.56
Closing	74.47	1.56	74	5.41
Closing	76.17	2.17	74	7.51

Source: Self-made

TABLE V
RESULTS OF THE ELEMENTS OF BEHAVIORAL COMPETENCE

IPMA Elements of Competence - Behavior	Arithmetic mean	Estimated error	Mean	Standard deviation
Leadership	76.83	1.56	79	5.41
Commitment and motivation	79.83	1.71	79	5.94
Self-control	76.11	2.24	75	7.74
Self-confidence	79.67	1.49	79	5.18
Relaxation	74.00	2.76	74	9.57
Open attitude	74.11	2.69	74	9.33
Creativity	81.83	2.05	79	7.11
Focus on results	75.11	2.21	76	7.65
Efficiency	72.33	3.92	70	13.59
Consultation	74.83	1.82	73	6.29
Negotiation	71.67	2.89	76	10.01
Conflicts and crisis	78.00	2.28	80	7.91
Reliability	80.67	1.96	80	6.79
Assessment of values	79.17	1.49	79	5.17
Ethics	80.67	1.96	80	6.79

Source: Self-made

TABLE VI
RESULTS OF THE ELEMENTS OF CONTEXTUAL COMPETENCE

IPMA Elements of Competence - Contextual	Arithmetic mean	Estimated error	Mean	Standard deviation
Orientation to projects	72.67	1.60	71	5.55
Orientation to programs	72.67	1.60	71	5.55
Orientation to portfolios	72.67	1.60	71	5.55
Implementation of projects, programs and portfolios (PPC implementation)	72.67	2.02	72	7.00
Permanent organizations	76.33	2.06	76	7.13
Business	76.33	2.06	76	7.13
Systems, products and technologies	72.67	2.02	72	7.00
Personnel management	74.67	2.43	74	8.41
Safety, health and environment	-	-	-	-
Finances	72.33	3.92	70	13.59
Legal	-	-	-	-

Source: Self-made

V. CONCLUSIONS

In recent years, the Peruvian government has increased its investment in innovation, to improve its level of competitiveness and innovation through contest funds, and thus improve economic development. In this context, the UDEP project manager of innovation projects, under the Government-University-Company approach, develops more soft skills than hard ones, giving greater weight to behavioral competences, which are the cause of good, or excellent, performance in a project. This is followed by technical competences, which refer to the contents of project management. However, the success of a project for an institution like ours is not only measured by the deliverables, but by the impacts it generates in technical, economic, social and environmental terms, with broad humanistic and scientific content.

This study lays the foundation for future investigations, for identifying the competences of project managers of successful projects of innovation and investigation, of contest funds nationwide.

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