

CANDIDATE SELECTION CRITERIA POSTGRADUATE PROGRAM AND THE ACADEMIC PRODUCTION OF THEIR SUPERVISORS: AN EXPLORATORY STUDY

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1 ABSTRACT

The candidate selection process of a PostGraduate Program involves several steps. One of these steps refers to the candidate selection made by a candidate's potential supervisor. An exploratory study was conducted having the Strictu Sensu PostGraduate Program of the Instituto de Pesquisas Energéticas e Nucleares (IPEN) as an analysis unit in order to better understand the objective and subjective criteria used by supervisors before accepting a candidate as their student and possible consequences of their decisions. The central objective of the study was to identify if there is any association of these criteria and the scientific production of these supervisors and/or the dropout rate of these candidates after their approval. For the purpose of this study we assumed that a criteria is considered objective when analyzing a particular item selection is based on considering only verifiable evidence (documents, indicators) and a criteria is considered subjective when it is based on personal interpretations of verifiable information or not. A study was carried out in order to identify what those criteria are considering master's and doctoral candidates selection and analyzed if there is any association of these criteria with the scientific production of these supervisors and the dropout rate of these candidates after being selected. This study was organized into the following steps: (1) Development of conceptual research model representing the independent variables (objective and subjective criteria), the dependent variables (scientific production and evasion) and control variables (demographics advisers data, program area and other qualitative issues). (2) Preparation of a semi-structured interviews protocol. (3) Identification and selection supervisors among those having the greater and lesser scientific production. (4) Application of the interview protocol to the seven of the previously selected supervisors. (5) Qualitative analysis of interviews to identify the selection criteria. (6) Classification of these criteria into objective and subjective ones. (7) Construction a questionnaire with closed and open questions based on the criteria identified during an interview step. (8) Pre-test of this web-questionnaire with eight supervisors. (9) Forwarding the questionnaire to the 136 Post-Graduation Program active supervisors. The data was collected between March and May 2015. 92 supervisors answered the web-questionnaire. For the purpose of this paper we analyzed 33 closed questions (research variables). These closed questions were organized into eight factors where some of them pre-defined as objectives (Training and Reference); others as subjective (Availability) and others partially objective and partially subjective (Affinity, Performance, Experience, Ability and Motivation). The main conclusions of the research were: (1) exists, however small, an association between the selection criteria of candidates of IPEN's PostGraduate and academic production of their supervisors; (2) it was found that there is a difference ranging from small to moderate difference in criteria for selecting between supervisors with greater or lesser 20 years of Postgraduate experience (3) it was found there is a moderate difference in of the supervisors selection criteria depending on which area they are linked and (4) We did not observe the existence of an association between evasion advisees and the candidates selection criteria.

2 INTRODUCTION

All decision-making process involves conscious or unconscious selection of certain possible actions within a certain context, which are expected to lead to positive results. Thus, decisions made by supervisors in selecting their advisees in *Strictu Sensu* Postgraduate Programs, although recurrent, can and should be like any other selection stage of a postgraduate system analyzed and treated as a significant part of a process that accounted for placement in academic and professional market in 2013 for about 15,000 doctors and 50,000 masters, placing the country in the international spotlight.[1]

Despite this prospect of success, the accomplishments of the PostGraduate Programs should be analyzed and problematized because when we analyze evasion at the 2012 year of the Masters and PhD programs in Brazil, we reached a number of 9,926 students who did not complete their courses, for various causes, not always declared. In percentage terms that equals 4.9% of the students enrolled in 2012 [2].

The form of admission the Postgraduate Programs can range from tests of specific knowledge, proficiency in languages, analysis of resumes, interviews by groups of teachers or acceptance by a supervisor. However, from our bibliographic research, we identified an aspect that seems to have not been properly explored - the decision to accept or not a candidate for these PostGraduate programs by the supervisor - as stage of candidate selection process for these programs. The decision to accept or not a candidate is taken individually and within the political context, admission requirements and prerequisites established under a PostGraduate program at a higher education institution be it public or private.

Identifying the criteria used in the decision of the supervisor of a PostGraduate program to accept or not advising candidate and to analyzing the relationships with evasion and with his scientific production is the main objective of this research. We believe that by studying how these decisions are taken or might be taken will be possible to identify recommendations that can bring contributions to decrease the evasion problems in the PostGraduate programs of Higher Education Institutions (HEIs) and / or improve the academic production of the supervisors.

In order to pursue these recommendations we have chosen as our empirical field of research the Instituto de Pesquisas Energéticas e Nucleares - IPEN, which has a PostGraduate Program in nuclear energy, graduating Masters and Doctorates almost 40 years, is linked to one of the main universities in the country, the University of São Paulo - USP, and has note 6 in the evaluation of Higher Education Personnel Improvement Coordination (CAPES). For data collection, we developed a web questionnaire and addressed it to 136 supervisors linked to this program.

In order to achieve the explicit goal, the present paper work is organized into seven sections as follows: after this introductory perspective we discuss the research problem; in the second section we briefly present the theoretical fundamentals; in the third section we present the research problem; in the fourth section we briefly describe the research methodology; in the fifth section we present the results, in the sixth section we present our the conclusions and in the seventh is located the bibliographic references.

3 BRIEF THEORETICAL FUNDAMENTS

The PostGraduate has been identified by several authors as the most successful sector of the entire Brazilian educational system. [3, 4, 5, 6, 7, 8, 9] By examining on the evaluation system, we note that the assessment imposed by the criteria established by the funding agencies, has generated an unprecedented expansion of productivity and competitiveness in the PostGraduate Programs. As a result of high productivity there is an extension and intensification of the workday by researchers, with serious consequences for health and science itself; a fact already noted by Bianchetti and Machado [10]. According to Wassem [11] among the criteria set by the agencies, "one of the evaluation of the determinants indicators is the intellectual production of the programs." All this pressure suffered by the institutions and supervisors, is reflected in the advisees, who are under pressure by the end of the research and publishing, such a situation may result in discouragement and consequently in evasion. The evasion in Postgraduate Programs is a problem that deserves to be investigated in depth because, in addition to the economic consequences highlighted by Kassai et all [12], the evasion also brings consequences for the scientific production because, by not completing the course, the student fails to contribute to the advancement of science, impacting on society and the academic production of the advisor - besides there's a waste of public money, when it comes to public education.

In order to treat the advisor's decision as a candidate of the acceptance process, and its implications for scientific production, it is necessary to conceptualize evasion and decision: - Evasion to be a possible consequence of their decision, as pointed out by Velho (2005) "The most important single factor the decision of students to complete a thesis or never finish it was identified as the student's relationship with the supervisor "[6, p. 2]. On the concept of avoidance, the Ministry of Education - MEC, states that evasion is the "definitive exit the course without completion of origin, or the difference between freshmen and, after a full generation".[12, p. 19]. In this study we treat evasion as dismissal or removal process, considering that the report of 2006-2009 PostGraduate management USP, in which, for statistical purposes the evasion occurs at the request of the student or by an administrative act (Jubilee).[13, p. 239] - we can define "decision", under the gaze of Nutt, the essence of a decision can be defined as a "process of selecting a particular alternative for implementation" [15]. However, from a broader perspective, it is understood that: "A decision is part of a context and can develop as a process - explicit or not traceable or not, subject to the influence of expectations, the excitement and the occurrence of sudden ideas - and after a evaluation process towards achieving a goal, a particular course of action - resulting from multiple alternatives or not and whose consequences can eventually be assigned to a value - is chosen". [16, p. 22]

This discontinuity of research may be related to different reasons at different stages involving the process of selecting a PostGraduate Program. Generally speaking, it may be a result from the following factors: deficiencies in standards formally established in PostGraduate Programs [17, p.28]; problems in subsequent steps ranging from the acceptance or not the candidate by the supervisor of choice; conflicts in oriented-supervisor relationship after the start of orientation. [18, 19, 20, 8]

4 RESEARCH METHODOLOGY

According to Torres "method is not autonomous and abstract to the point of being grasped or decided a priori, but is mediated by the researcher and his theoretical choices made in an

articulated way to the design of the object and his questioning”. [21, p.27] In order to address the issue of decision making of supervisors regarding the selection process of the mentees given the virtual absence of previous studies that deals with the decision by a supervisor to accept or not a particular student to orientate the study had an exploratory character. Operationally, the research was carried out in a first stage taking into account qualitative methods aimed at the capture of choice identified criteria from a pre-selected specific group of information sources, followed by a second phase of quantitative data collection across a unit of analysis was investigated. The practical part of the research briefly involved the following stages of work: (1) Definition of the unit of analysis and information sources; (2) Preparation of semi-structured interviews protocol. (3) Instrument development for the quantitative phase data collection. (4) Definition of the method of quantitative data analysis. (5) Data collection and the profile of respondents. (6) Considerations on Validity and Reliability. (7) Classification of these criteria into objective and Subjective ones. Each of these steps is explained below.

4.1 Definition of the unit of analysis and information sources

The unit of analysis was the supervisors of the graduate program Institute of Energy and Nuclear Research (IPEN) in the state of São Paulo, Brazil. The choice of this is because this organization has a PostGraduate program which has a grade six on the CAPES evaluation process in recent years in masters and doctorate, has an association with the University of São Paulo and has granted almost 2000 masters and PhD titles since its creation in 1976. Also weighed in choosing this Postgraduate Program, ease of access to supervisors this study. The source of information for this study were the supervisors themselves - information obtained by these two great rounds of data collection - one with a qualitative approach and another one with a predominantly quantitative approach.

4.2 Preparation of a semi-structured interviews protocol

The construction of the questionnaire began by research bibliography and literature review in order to identify evidences of the criteria used by supervisors in their decision for guiding or not a candidate. Among the material researched identified that there is little information available, such as empathy [22, p. 61]; technical characteristics, affective and personal candidates [19], autonomy and heteronomy [18, p. 143].

Having such limited information as a starting point, we developed a interview script with 24 open questions organized into five distinct parts: In the first block, the Selection process, we seek to identify how was the process of choosing candidates by the supervisors. In the second block, Selection criteria, we wanted to identify the criteria used by supervisors to select candidates. In the third one, The applicant's skills, we seek to identify which features are valued by the advisors, In the fourth one, Motivations that led to evasion, we seek to identify the supervisors opinion of what were the motivations that perhaps led the advisees not complete the course. In the fifth and last block we draw the Supervisors profile: age, gender, orientation of time in the PostGraduation Program of IPEN and others.

Then the supervisors were chosen "whose prospects seem most instructive to analyze and thus have been defined in advance”. [23, p. 197] Eight supervisors were pre-selected considering the compliance with the following criteria: have over ten years of experience in guidance at the Postgraduate program; have guided masters and doctors; had occurred evasion (program shutdown before the completion of regulatory term) at two of its oriented; have provided

scholarships for their advisees. These advisors were distributed in three areas of the IPEN's PostGraduation as follows¹: TNA: 2, TNM: 3 and TNR: 3. Of these, seven actually effectively agreed to participate in the interviews.

4.3 Instrument development for the quantitative phase data collection

The answers from the interviews were analyzed based on an adaptation of the thematic coding method that instead examine a single case in depth, it sought to analyze eight cases and from them establish what Uwe Flick calls thematic structure. [23, p. 197]

The main product of this qualitative analysis was the identification of key elements that were used in the construction of the questionnaire with 67 closed questions and 9 open questions. These questions were then organized into six Sections: 1. Selection Criteria; 2. Motivation in cases of dismissals; 3. Lessons learned; 4. Profile of the Advisor; 5. Academic Production; 6. Evasion and end 7. Considerações. Once built the questionnaire due to the ease of use and availability, we chose as a tool for data collection Google Docs software.

This study aims to present the analysis of the information collected, more precisely the results related to closed questions of section 1 (Selection Criteria) with 33 questions, Section 5 (Academic Production) and Section 4. Profile Advisor. The issues that were the basis of the present study are in Annex 1. It is therefore in these sections we will focus our attention below.

As part of the preparation for the quantitative phase of the research the Section 1 questions were organized around two large groups of criteria: Objective and Subjective Criteria. Objective Criteria were defined as those criteria for which the assessment is made from data and documented information (18 questions of 33 questions) and Subjective Criteria defined as those for which there was no evidence or fact concrete to be analyzed or involving interpretations of data and documented information or not (15 questions of 33 questions). Considering its own process of choosing candidates for the Graduate Program, each supervisor chose the degree of importance each question considering the following scale of importance: (1) no; (2) little or no; (3) little; (4) all; (5) or much (6) highest importance.

To represent the Section 5 (Academic Production) the following information about the supervisor were asked: (1) number of completed master's orientations. (2) number of completed doctoral orientations. (3) number of articles published in international journals. (4) number of articles published in international journals having an advisees or former advisees as co-author. (5) number of articles published in national magazines; (6) number of articles published in national magazines having an supervised or former student as co-author. (7) with how many former advisees hold any partnership research. (8) number of national patent applications in appearing as an inventor and (9) the number of international patent applications in appearing as an inventor. (10) number of national patent applications contained the participation of their advisees and (1) the number of international patent applications contained the participation of their mentees. In Section 6 (Evasion) we asked the number information of Master and or PhD advisees who did not complete the course. To answer these

¹ Nuclear Technology Application - TNA; Nuclear Technology Materials - TNM; Nuclear Reactor Technology - TNR.

questions (Section 5 and 6) the supervisor could chose on from the following answers: (1) none; (2) from 1 to 5; (3) 6 to 10; (4) 11 to 15; (5) from 16 to 20, or (6) more than 20.

4.4 Definition of the method of quantitative data analysis

For quantitative data analysis stage it was decided to use a multivariate data called structural equation modeling (SEM). This choice was due to the fact that this technique has two distinct features of interest to this investigation: (1) multiple estimation and interrelated dependence relationships and (2) ability to represent unobservable concepts in these relationships (in this case, the latent variables shown above) and (3) measurement error of explanatory power in the estimation process. [24, p. 470]

The estimation method of the ESM was based on components (PLS-PM: Partial Least Squares Path Modeling)². Among the main reasons for using this method in this research we highlight the following: (1) greater flexibility in terms of theory under investigation requirements (ie is appropriate for exploratory studies); (2) there is no need to supposition on the distribution of data; (3) may be either reflective formation indicators such as the measurement model, and (4) requirements in terms of small sample size when compared with other estimation methods. [25, p. 4]

Once defined the analysis of technical data each of the 33 questions was organized and associated with latent variables that could be totally objective, totally subjective and partly objective and subjective as the definition of objectivity and subjectivity previously mentioned. The following latent variables were then defined: Affinity, Performance, Availability, Experience, Education, Skills, Motivations and Reference. The 1 table is how the 33 questions representing the selection criteria were distributed:

Table 1: Objective e Subjetive Latent Variables

Variável	Objective	Notation	Questions	Subjective	Notation	Questions
Affinity	4	O_Afin	6, 8, 10, 18	4	S_Afin	21, 28, 29, 33
Performance	2	O_Desemp	5 e 11	3	S_Desem	26, 27, 34
Availability	0	-	-	2	S_Disb	24, 25
Experiencia	3	O_Exp	16, 17, 19	2	S_Exp	2, 31
Education	4	O_Form	3, 4, 7, 9	0	-	-
Skills	1	O_Habil	1	2	S_Habil	30, 32
Motivation	1	O_Motiv	15	2	S_Motiv	22, 23
Reference	3	O_Ref	12, 13, 14	0	-	-
Total	18			15		

² We appreciate the valuable collaboration of Dr. Diogenes de Souza Bido, in the data analysis.

4.5 Data collection and the profile of respondents.

The IPEN Postgraduate Program at the time of conducting the survey had 136 active advisors. The questionnaire was sent via email to all these advisors and the data collection period was the months from March to May 2015. We obtained 92 responses.

4.6 Considerations on Validity and Reliability

The validity refers to the degree to which they measure what they should effectively measure. Reliability aims to assess the internal consistency of a set of latent variables indicators.

The validity of a construct is comprised of four components: face validity, nomological validity, convergent validity and discriminant validity. The face validity demonstrates the consistency of the contents of each item with the measuring construct it. In the present study this validity was ensured by pre-testing the questionnaire during the construction process. [24]

The convergent validity is one measure of the relationship between two measurements of the same construct. A high degree of convergent validity proves that two of the same construct measures are related and therefore are suitable conceptualization. Highest extracted variance values occur when the indicators are representative of the latent variable. Orientations suggest that the extracted variance should exceed 50% for a latent variable. [26, p. 490]

The discriminant validity exists if we can show that the constructs are correlated but are different constructs, ie, the correlation between them does not become equal to 1, and the items have high factor loadings in their constructs and lower the other constructs (load cross) [26]

A measure used to assess the internal consistency of the indicators of a latent variable is the composite reliability. A benchmark for acceptable reliability is 0.70.

The nomological validity checks if the correlations between the constructs relate to each other according to the predicted by theory. At the present study, this validity was analyzed from the relationships tested in the structural model.

5 RESULTS

This section presents the results for the measurement model (convergent validity, discriminant and reliability) and the structural model (structural coefficients and R^2 values).

5.1 Analysis of the measurement model

Once collected the answers, each of the three blocks of the search - Selection Criteria, Production and Academic Advisor Profile - have been restated so that the answers could be examined under the SmartPLS software. Thus the response categories representing the degree of importance of objective and subjective criteria were recoded on scales that could range from 1 to 6 depending on the response. A similar procedure of recoding was made to the answers related to Academic Production and Advisor profile. For empty cells (no response) was assigned the value -1 for that were later recognized by the software as such.

The first step of data analysis was the development of a Confirmatory Factor Analysis (CFA). Here the main objective was to evaluate the measurement model, which refers to the link between indicators (research questions) and the latent variable searched. The correlations were analyzed between all VL's, the composite reliability, average variance extracted (AVE) and discriminant validity. Considering that the correlations between all VL's in Table 1 were analyzed, it was found that: (1) the extracted average variance (AVE) of VL's O_Afin, O_Form, S_Afin and production were below 50 % despite this fact we decided to maintain this VL's at that stage of the analysis; (2) there was a correlation between S_Desemp and O_Desemp above 0.6 indicates that the existence of a correlation between subjective and objective criteria for assessing candidates.

6 ANALYSIS OF THE STRUCTURAL MODEL

In order to simplify the analysis of the structural model, we proceeded to a reorganization of the measurement model. Instead of having first order independent VL's pointing directly to the dependent VL's Production and Evasion, we defined two VL second order - Objective and Subjective - to represent in aggregate all of the first order objective and subjective VL's. The VL Objective indicators would have as indicators the VL's O_Afin, O_Desemp, O_Exp, O_Form, O_Habil, O_Motiv and O_Ref and VL Subjective would have the VL's would have as indicators S_Afin, S_Desemp, S_Disp, S_Exp, S_Habil and S_Motiv. This change brought benefit as a reduction in the size of the sample for analysis processing of the measurement due to the reduction in the number of indicators used in the model.

The implementation of this reorganization involved the execution of the following steps: (1) the factor scores of each independent VL (7 Objectives VL's and 6 VL's subjective) obtained by a new CFA were saved and then (2) copied so aligned with results and original profiles of the respondents. At first, it was considered all VL's, including the four who had low AVE.

In the figure 1 we have a new representation of the structural equation model. In this model, we have left the VL independent second order's Objective and Subjective, each having independent VL's first order as their indicators and right VL's dependent on having the original survey responses as indicators.

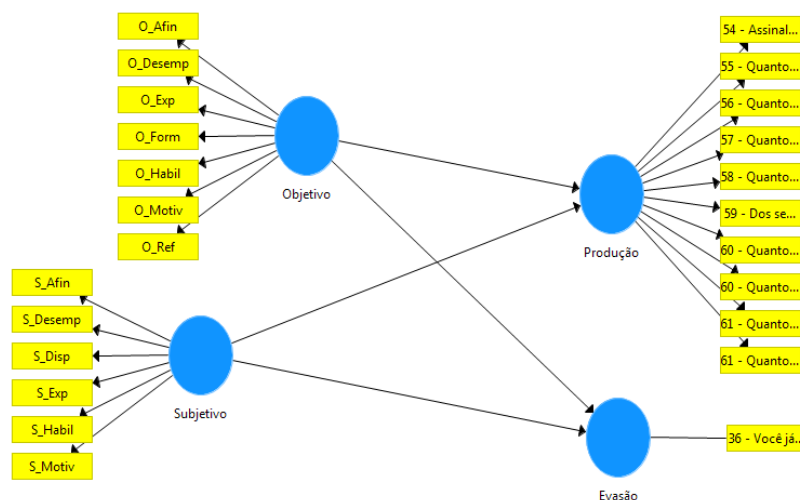


Figure 1: Measurement model and structural model that relates the independent and dependent variables of research

Then considering this simplified model we reanalyzed the correlation between VL's, the result is presented in the table 2.

Table 2: Correlation analysis of VL's structural model

	Evasion	Objective	Production	Subjective
Evasion	1			
Objective	-0,128	1		
Production	0,195	0,337	1	
Subjective	-0,03	0,719	0,375	1
Reliability Composite	1	0,828	0,815	0,808
AVE	1	0,416	0,337	0,417
Discriminant validity	1	0,645	0,581	0,645

Note: Correlations above | 0,205 | are significant at 5%, and correlations above | 0,267 | are significant at 1% (n = 92).

The results of Table 2 indicate that the AVE of the Subjective and Objective VL's Production is below 0.5 suggesting the need to adjust the model. To make the adjustment, they were gradually excluded VL 's first order and indicators VL production until they get to an AVE value 0.5.

Figure 1 illustrates this new model after the adjustments and Table 2 the results of the new analysis of correlation between the VL's of the adjusted model.

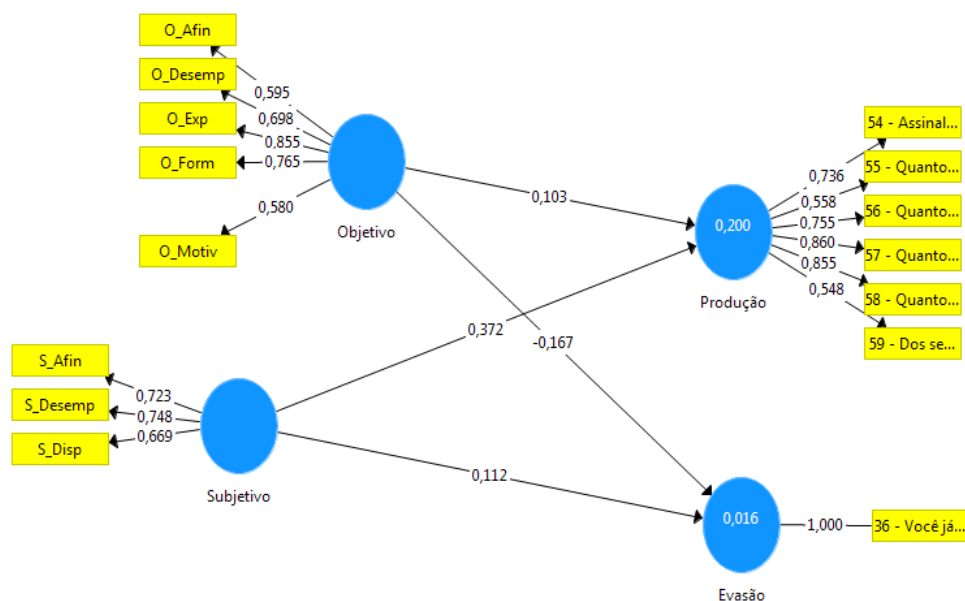


Figure 2: measurement model and structural adjusted indicating the internal and external coefficients and R² for Production and Evasion

Table 3: Correlation analysis of VL's the adjusted model

	Evasion	Objective	Production	Subjective
Evasion	1			
Objective	-0,093	1		
Production	0,227	0,351	1	
Subjective	0,001	0,665	0,441	1
Reliability Composite	1	0,83	0,869	0,757
AVE	1	0,499	0,532	0,51
Discriminant validity	1	0,706	0,729	0,714

In order to achieve the validity criteria, it was necessary exclude from the original model the O_Hab, O_Ref, S_Exp, S_Habil, S_Motiv VL's and from the production VL, thefour indicators related to the production of patents.

In the next block our answers for the research questions will be presented. To analyze the results, the intensity correlation coefficients of the structural model were classified as mild (0.01 to 0.20); small (0.21 to 0.40); moderate (0.41 to 0.70); strong (.71 to .90) and very strong (0.91 to 1.00) [27, p. 312] R^2 have the correlation coefficient will for guidance Cohen's suggestion (1997, p.413) where $R^2 = 0.02$ the effect is small; $R^2 = 0.13$ the effect is medium and $R^2 = 0.26$ the effect is great.

7 ANSWERING THE RESEARCH QUESTIONS

Question 01: Is there any association between the Choice Criteria for Postgraduate candidates by a supervisor with the production of this supervisor and the evasion of his advisees?

Answer: Analyzing the Figure 2 we observed a mild positive coefficient between Objective Criteria and Production as well as positive effect of low intensity between Subjective Criteria and Production that, in combination, result in a medium to large effect on production. Put in other terms, the results suggest that advisors who attach more importance to the Subjective Criteria (Affinity, Performance and Availability subjectively analyzed) have an association with a higher production in terms of publications. We also observed that there is an association with the Objective Criteria (Affinity, Performance, Experience, Training and Motivation, objectively analyzed), but with less intensity than with Subjective Criteria. In the case of the Evasion, we did not found any relevant association between the choosing a candidate criteria and the candidate Evasion. Because of this finding, we will disconsider this latent variable in the next research questions answers.

In order to help answer the questions 2-5 we analyzed the values of coefficients between dependent and independent variables, R^2 , AVE, reliability composed for each of the subgroups that were investigated and to answer whether there are significant differences between the groups we analyzed whether the differences are significant. The results of these analyzes are tabulated lies in the X and Y tables presented below.

Table 4: Results of structural equation model for each subgroup investigated

Question	02		03		04		05		
	PhD	Master	Male	Female	< 20 years PG	> 20 years PG	TNA	TNM	TNR
Number of answers	83	92	100	78	133	42	88	78	16
path	Coefficient								
Objective -> Production	0,1	0,117	0,1	0,172	0,107	-0,419	-0,129	0,222	0,799
Subjective ->	0,348	0,406	0,352	0,41	0,405	0,133	0,614	0,243	-0,025
Dependent variable	R2								
Production	0,178	0,242	0,181	0,283	0,23	0,152	0,272	0,184	0,606
Independent variable	AVE								
Objective	0,5	0,484	0,442	0,527	0,489	0,37	0,518	0,451	0,394
Production	0,577	0,519	0,54	0,539	0,448	0,529	0,585	0,425	0,467
Subjective	0,533	0,476	0,503	0,495	0,471	0,577	0,592	0,434	0,469
Independent variable	Composed reliability								
Objective	0,83	0,821	0,796	0,845	0,824	0,737	0,84	0,79	0,669
Production	0,889	0,861	0,868	0,872	0,825	0,868	0,892	0,774	0,79
Subjective	0,773	0,73	0,751	0,746	0,725	0,725	0,812	0,651	0,553

Table 5: Results of differences in coefficients between pairs of subgroups investigated

Question Research	02		03		04		05					
	Difference factor loadings D x M	Signif.	Difference factor loadings M x F	Signif.	Difference factor loadings < and > 20 years PG	Signif.	Difference factor loadings TNA x TNM	Signif.	Difference factor loadings TNA x TNR	Signif.	Difference factor loadings TNM x TNR	Signif.
Objective -> Production	0,017	0,527	0,072	0,551	0,527	0,039*	0,351	0,093**	0,928	0,002*	0,577	0,065**
Subjective -> Production	0,058	0,613	0,058	0,62	0,272	0,133	0,371	0,041*	0,639	0,072**	0,268	0,29

* Significant at 5% ** significant at 10%

Question 02: Is there a difference between the selection criteria of the candidates Graduate by a supervisor for candidates of master's and doctorate?

Answer: There were no differences found between the criteria for choice of doctoral and master students.

Question 03: Is there a difference between the selection criteria for PostGraduate candidates for supervisors of different genres?

Answer: There were no differences identified in the criteria for choosing candidates of IPEN's PostGraduation Program between male and female supervisors.

Question 04: Is there a difference between the selection criteria for PostGraduate candidates for supervisors with different linking time to IPEN's PostGraduation Program?

Answer: The results from the table above that are worth mentioning suggest that: (1) the supervisors above than 20 years with the greatest production are associated with supervisors moderately decreasing importance they attach to objective criteria while supervisors under 20 years have increased production They are associated with supervisors that attach small but growing importance to objective criteria; (2) supervisors under 20 IPEN guidance on the PG with the greatest production attach a small but most important most subjective criteria of the instructors then those supervisors above 20 years of guidance in PG IPEN.

Question 05: Is there a difference between the selection criteria of PostGraduate candidates for supervisors from different PG Areas?

Answer: The results suggest that supervisors of the three areas of IPEN's Postgraduate Program are somewhat different criteria for choosing their candidates. The differences are strong on the objectives and moderate on the subjective criteria among advisors from TNA and TNR areas; these differences are moderate on objective criteria between the supervisors of TNM and TNR areas and are small in objective and subjective criteria supervisors between the TNA and TNM areas.

8 CONCLUSIONS

The analysis of the importance attributed to the selection criteria for candidates of IPEN's PostGraduate by the supervisors and the production of these supervisors led us to the following conclusions: (1) exists, however small, an association between the selection criteria of candidates of the Graduate IPEN and academic production of these supervisors; (2) it was found that there is a difference ranging from small to moderate difference in criteria for selecting between supervisors with greater and lesser 20 years of Postgraduate experience - was noted for supervisors with less than 20 years of experience of PostGraduation a positive association between importance to subjective criteria and academic production and supervisors with over than 20 years of experience a negative association objective criteria and academic production; (3) we find there is a moderate difference in supervisors the choice of criteria depending on which area they are linked - there was to be a strong positive association of objective criteria and scientific production for the supervisors of TNR area, moderate for supervisors the area TNM and negative and small in the case of supervisors the TNA area; it was observed also an association between moderate between subjective criteria and scientific production for supervisors the TNA area; (4) not observed the existence of an association between evasion of advisees and the selection criteria of these candidates.

First, these results are limited to the case of IPEN's PostGraduate Program and may not be generalized. Second, the AVE level is within the acceptable limit of 50% and in some results

below. Third, there is a need for a more qualitative evaluation of the results obtained here: why we did not observe differences in criteria for selecting between candidates of doctoral and master's students? Should these differences be expected?

This study also makes room for new questions. If greater academic production is associated with the adoption of different criteria for choosing candidates from different areas of knowledge, why not encourage this freedom instead of "pasteurize" these criteria? How to achieve this flexibility combined with equality of access?

This study opens the possibility to better understand the processes of selecting candidates for the PostGraduate Programs and thereby to contribute to an improvement postgraduate course in Brazil.

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10 ANNEX

01 - QUESTIONNARIE

Questions	[M] = Master candidate [D] Doctorate candidate
01 - The candidate is fluent in english. [M][D]	
02 - Curriculum Vitae analysis. [M][D]	
03 – Graduate or PostGraduate candidate from a public institution in a well evaluated by MEC/CAPES. [M][D]	
04 - Graduate or PostGraduate candidate from a public institution [M][D]	
05 – Academic performance. [M][D]	
06 - Correlation between academic education and future area of research. [M][D]	
07 - The candidate has executed scientific initiation. [M][D]	
08 - The candidate has executed scientific initiation with you. [M][D]	
09 – The candidate has the Master degree. [D]	
10 - The candidate has the Master degree supervised by you. [D]	

11 - Candidate performance on course taken as a listener or special student. [M][D]
12 - The candidate has been indicated by yours advisees. [M][D]
13 - The candidate was indicated by other supervisors. [M][D]
14 - References from the supervisor indicated that the candidate. [M][D]
15 - Candidates present themselves due to scholarships. [M][D]
16 - The candidate has published in national journals. [M][D]
17 - The candidate has published in international journals. [M][D]
18 - The candidate should be acting in my research area. [M][D]
19 - The candidate should be involved in research projects. [M][D]
20 – Open question
21 - The applicant's profile should be suitable for the research line. [M][D]
22 - The reasons that led the candidate to pursue the Post-Graduate. [M][D]
23 - Interest and the applicant's enthusiasm to develop the proposed research topic. [M][D]
24 - Candidate's time availability to dedicate to research. [M][D]
25 - Applicant's financial sustainability during the research period. [M][D]
26 - Candidate's performance during graduation. [M][D]
27 - Graduation time . [M][D]
28 - Knowledge of the research line of other supervisors. [M][D]
29 - Candidate's knowledge of my research line. [M][D]
30 - Ability to analyze materials related to my line of research. [M][D]
31 - Report on the research that has been developed during the Masters. [D]
32 - Research proposal prepared by the candidate himself. [M][D]
33 - Intuition about candidate. [M][D]
34 - Average number of interviews conducted with the candidate prior to the acceptance decision. [M][D]
35 up to 45 – Open questions
46 – Your age range.
47 - Gender.
48 - How long, in years, do you work at IPEN?
49 – Doctorate area
50 - Orientation area of the PostGraduate Program of IPEN:
51 - How long, in years, do you supervise in the IPEN program?
52 - Currently you supervise candidates to the Doctorate?.
53 - What is the approximate percentage of your advisees who received a scholarship? [M][D]
54 - Number of orientations completed taking you as a supervisor. [M][D]
55, 57 - How many articles in international journals did you publish? [M][D]
56, 58 - How many articles in international journals did you publish with advisees as a co-author?[M][D]
59 - How many of your egressed advisees you hold any partnership research? [M][D]
60 - How many patent applications you are listed as inventor? [M][D]
61 - How many of your national patent applications list the participation of your advisees? [M][D]
61 - How many of your international patent applications list the participation of your advisees? [M][D]
62 up to 66 – Open question
67 – Contact e-mail