

Assessing the Human Capital Emergence, Performance and Effectiveness in a Brazilian Retail Bank

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Abstract

To assess the human capital (HC) effectiveness on the operational results of a major Brazilian retail bank (Bank), a HC inventory of the Bank's employees with information on 25 attributes of HC and six operational performance measures of the Bank in the period of 2006-2008 is used. Thus, this study relies on proven information of all the Bank's staff and not on surveys as often used in the literature. The empirical results show that the effectiveness of the HC is related to the establishment of an optimal construct of HC attributes and to the improvement of specific skills. Furthermore, the turnover has a negative impact in maintaining high HC employees into the branches with negative effects on the credit control process and the Bank's profitability. Lastly, the staff size into the branches as well as the economic conditions surrounding them play also an important role for the HC effectiveness.

Keywords: human capital performance, retail bank human capital inventory, operational results, factorial analysis, panel data models

JEL Codes: J24; M5; G2.

1. Introduction

The theory of the Resource-Based View (RBV) of the firm (Barney, 1996; Lippman & Rumelt, 1982) only slightly advanced the understanding of competence and its mechanisms of development. Despite its emphasis on the company's internal resources. To overcome these shortcomings, the competence-based competition theory emerged. The theory of competence-based competition offer a relevant information for understanding the dynamics of HC formation in organizations.

The theory starts with the concept of core competence from Prahalad and Hamel (1990), which specified an organization's essential, unique, and distinctive competences that offer an intrinsic competitive advantage and are therefore key factors in differentiating a company from its competitors. The authors described essential competences as a set of skills and technologies that provide advantages for a company to compete and constitute its most valuable resource. Competence-based competition allowed an analysis of competition as a dynamic contest between competences, i.e., between competing firms (Sanchez & Heene, 1997).

Although the theory of competence-based competition has driven companies to understand the importance of essential competences in organizations, it does not explain how learning occurs or how knowledge is created and managed. The most recent theories regarding the management of intangibles help with this understanding.

In this way, the objective of this work is to establish the human resource management (HRM) practices that are most suitable for improving the performance of the 3,603 branches of a Brazilian retail bank, the study examined the effectiveness of the Bank's human capital (HC) resources. Therefore, a HC inventory conducted on all of the Bank's employees who worked in the bank's branches during the period from 2006 to 2008 is used. At the time of the study, the Bank had 3,603 branches established in every state in Brazil and 55,550 employees in these production units.

This study examine the emergence and performance of the Bank's human capital by configuring a case study. Unlike others studies on HC, based on survyes, this paper uses proven information mined from 55,550 bank

employees curricula and operating results from 3,603 branches of the Bank. The database includes information on twenty-three human capital characteristics, four control variables, six operational performance measures related with profitability and credit for each branch of the Bank over five semesters.

Three multivariate analysis techniques were applied to this empirical study: factorial analysis, fixed effects and random effects panel-data models, and a tobit panel-data model. The study enabled the confirmation of relevant empirical studies while offering new contributions to the literature. In particular, the study aimed to understand the relative impact of various human capital resources on corporate performance, the system of high-performance HRM practices, the impact of specific and generic competences of the Bank's performance, the set of HC resources most appropriate for each type of operational performance desired by the Bank, the durability of HR practices, the problem of turnover and appropriate workforce size to achieve high performance, and the impact of the external economic context on the emergence and effectiveness of the Bank's human capital. The study therefore presents objective benefits for strategic HR management for the Bank, establishes the importance of a human capital inventory for contemporary organizations, outlines the properties of corporate human capital, and identifies the study's limitations, encouraging new research in the field.

This article is divided into six sections including this introduction. The second section presents the theoretical basis of the work and the research hypothesis. The third section deals with the research method. The fourth section presents the results and their analysis. The fifth section provides a discussion of the results and the sixth presents some concluding remarks.

2. Setting the Hypothesis

2.1 Management of Intangibles: Knowledge, Competency and Intellectual Capital

Researchers have considered the knowledge incorporated into corporate human capital as belonging to the most universal resource that meets the criteria for creating a sustainable competitive advantage (Crook et al., 2011; Grant, 1991; Kogut & Zander, 1992). Supported by the theories of the RBV and competence-based competition, several theoretical and methodological perspectives emerged to qualify knowledge as the most important production factor, especially the theories of *knowledge creation* (Nonaka & Takeuchi, 1997) and *learning organizations* (Argyris & Schon, 1978; Senge, 2003). Both of these theories consider knowledge an individual and social creation that is expanded by an organization through forming networks of knowledge that qualify and enrich the company's human capital. The theory of *intellectual capital* also stands out (Edvisson & Malone, 1998; Kaplan & Norton, 2004; Stewart, 1998; Sveiby, 1998). It proposed monitoring intangible assets, mainly human capital, along with *management by competencies* (Brandão et al., 2008; Brandão, 2009; Carbone, Brandão, Leite, & Vilhena, 2005; Ienaga, 1998; Le Boterf, 1999; Whiddett & Hollyforde, 1999; Zarifian, 1999), which proposed permanently mapping human capital through identifying organizational, professional (desired for functions), and personal competencies. Mapping was performed to understand the possible competency gaps for each employee or work group that may prevent the organization from reaching desired performance levels. In their own way, each of these four perspectives argue in favor of knowledge and state that knowledge is ultimately the only true source of a sustainable competitive advantage once it is incorporated by employees and appropriately shared.

A particular HR practice of the studied Bank studied can train educators of the employees of the branches to spread specific knowledge within their network of branches. Therefore, it can be argued that the Bank's branches with a higher percentage of corporate educators will have a greater ability to share knowledge internally, develop better HC, and achieve superior performance. Thus,

Hypothesis 1 – The existence of corporate educators is positively correlated with the performance of the branches.

In addition to these considerations, a focal point in this study's approach is that research on HC in companies has developed from assumptions of the classical theory of human capital. However, this understanding has only been possible based on studies of the cause-and-effect relationship between HR practices and performance. The subject of the process, HC, has often been only marginally evaluated, most likely because of the intrinsic difficulty of gathering exhaustive information from companies on their employees. Different authors (Batt, 2002; Jiang et al., 2012; Marimuthu, Arokiasamy, & Ismail, 2009; Ramsey, Scholarios, & Harley, 2000; Takeuchi et al., 2007; Yound & Snell, 2004) have argued that HC is understood as a mediator between HR practices and company performance, and these authors understand that a consensus is emerging among scholars of the subject.

In proposing this hypothesis of mediation, the authors make explicit the importance of measurement mechanisms tied to the phenomenon. Nonetheless, it can be assumed that a more particular understanding of a company's HC

phenomenon is an important condition for uncovering the most effective HRM practices. Thus,

Hypothesis 2 – Detailed knowledge about an organization's HC as well as its consequences for performance enable identification of the most and least effective HR management practices.

2.2 Human Capital and Individual KSAOs as Isomorphic Elements

The term HC refers to people's knowledge, skills, and attitudes (KSA) (Coff, 2002). Ployhart and Moliterno (2011) defined HC as a resource within the unit that is created from the emergence of knowledge, skills, attitudes, and other personal characteristics (KSAOs). KSAOs are divided into the cognitive and the non-cognitive. Cognitive KSAOs refer to those that a person "can do", and non-cognitive KSAOs are those that a person "will do" (Cronbach, 1949). It is important to note that HC resources and individual KSAOs are partially isomorphic (Ployhart & Moliterno, 2011).

Therefore, it is important to recognize that the determinants that create HC resources are different from those that create KSAOs. The determinants of individual KSAOs are generic and are tied to the environment experienced by the person (Lubinski, 2000), while the determinants of HC resources are, by their very nature, contextual and linked to the company's needs. KSAOs are inducers of HC. For Kozlowski and Klein (2000), a phenomenon is emergent when it originates in individual cognition, emotion, and behaviors, and it is amplified by its interactions and manifests itself at the highest level as a collective phenomenon.

The emergence of HC is a process of assembling a valuable resource within a unit, whether it is individual or collective (Ployhart & Moliterno, 2011). Therefore, organizations create value by assembling exceptional assets, such as HC, that are intended to achieve the desired performance and customer satisfaction. There is no other reason why the management by competencies model focuses on the competency gap, i.e., evaluates an individual's personal competency developed throughout life compared with the professional competencies needed to reach organizational goals (Ienaga, 1998). This measurement strategy helps to understand the differences between personal competencies (KSAOs) held by individuals and those needed to achieve a company's goals, ultimately aligning the employees' KSAOs and the company's HC. In this way, because the studied Bank applies the *360-degree competency assessment*, it determines the *competency gap* for each employee.

The following hypothesis can be tested for the 360-degree competency assessment system, starting from the premise that the Bank has a measurement system that determines with a certain accuracy the approximation between an individual's KSAOs and the professional competencies desired by the company. It must be noted that according to Edwards and Ewen (1996), a 360-degree competency assessment consists of a network of professionals who register and receive feedback from different assessment sources (superiors, peers, subordinates, and customers). Thus,

Hypothesis 3 – The Bank's result in the 360-degree competency assessment is positively related to the branches' performance and ability to identify high-performance employees and teams.

2.3 The Productive Value of Experience

For Becker (1964) and Mincer (1958), workers are heterogeneous due to differences in useful productive capacity in the labor market. Mincer (1958) went further and introduced the notion of investing in professional experience. With this approach, the author admitted that individuals acquire new productive skills after formal education, and professional experience is an important resource for acquiring competencies. However, it is often difficult to directly observe this investment. For Cart and Toutin (1998), professional experience develops competencies at work, but the competencies are determined by the variability of the jobs or occupations performed. In this sense, variation of professional activity has a fundamental role in the process of building competencies. To measure the effect of professional experience in this study, two indicators were created: average time employed at the Bank for all of the employees from the branches, and average time in a managerial role, with the latter capturing the variability in the functions performed. Thus,

Hypothesis 4 – The experience of employees in the Bank's branches is positively related to the performance of the branches.

2.4 Specific Competences or Generic Competences: Where Is It Better to Invest?

The concept of *path dependence* suggests that the value of resources such as human capital increases as soon as it becomes idiosyncratic to resolve problems that are intrinsic to a company's competitive context (Grant, 1996; Penrose, 1959). Based on this premise, recent studies argued that the value of HC increases as it becomes more specific to the firm (Dutta, Narasimhan, & Rajiv, 2005). Unlike the generic competence that all competitors need,

a firm's specific competence is almost inextricably linked to the firm. Thus, it is very difficult to negotiate or change it without losing value (Chi, 1994). Conversely, when competence is naturally generic, salaries and turnover are higher because the labor market is more competitive. Thus, one can weave new hypotheses tied to the Bank's HR practices that are focused on the development of specific and generic competences.

Hypothesis 5 – The relationship between human capital and the Bank's performance is more positive for specific competences than for generic competences.

Hypothesis 6 – Regarding the ability of higher education (undergraduate and graduate) to develop generic competences: Higher education is positively related to the branches' performance.

Hypothesis 7 – Concerning the training programs developed by the Bank's Corporate University for training specific competences: The Bank's training focused on developing specific competences is positively related to the branches' performance.

Hypothesis 8 – Concerning the system of knowledge certification focused on developing specific competences at the Bank: Internal certifications of specific knowledge are positively related to branches' performance.

2.5 Interference of Context on Human Capital Effectiveness

The degree to which different contexts condition the creation and encourage or discard the use of HC depends largely on the specific characteristics of each locality. Thus, the determinants of HC resources are, by their very nature, contextual and tied to market circumstances and the needs of the company (Ployhart & Moliterno, 2011). Dealing with the internal context Gilbert (1978), established three factors that support the full exercise of competence at work: *information* (feedback, directional guidance, and priorities, among others), *instruments* (equipment and tools, among others), and *incentives* (monetary or non-monetary). These factors positively or negatively contribute to the full exercise of competence at work, depending on the form of management or technology. The same reasoning can be used for the external context, although considering different categories of analysis.

However, unlike the internal context, the external context is not always manageable. In this sense, it is suspected that the economic differences between regions in Brazil where the Bank operates may interfere with the applicability of the branches' HC, making it effective in certain situations and ineffective in others. For the Bank's internal context, we start from the premise that the internal environment tends to be relatively homogenous given the institutional power of HRM policies and practices. The premise, therefore, is that the *profitability* of the branches also depends on the external context and that *good performance* can only be achieved when both conditions are met: the existence of appropriate HC in the branch and a favorable external economic context. Therefore,

Hypothesis 9 – The external economic context where the bank branches operate is a determinant of the effectiveness of the Bank's HC. More precisely, the impact of HC in the bank branches on the profitability of their portfolios will vary depending on specific economic contexts and considering the size and power of interference from each external context.

3. Methods

3.1 Population Studied and Form of Data Collection

Longitudinal data were used for the population of a large Brazilian bank (N = 3,603). The study included 3,603 bank branches with a total of 55,550 employees. Only branches that showed incomplete data were excluded from the study, representing a negligible portion of the population. All of the branches studied can be considered relatively homogeneous production units with a concentration of activities in retail banking, although the Bank also has wholesale operations. The study was conducted with objective information about employees' KSAOs taken directly from the employees' personal resumes located in the Bank's database. Thus, it was not necessary to use questionnaires or determine the sample because the study was operated directly with the population of the branches and the company's employees.

Organizational performance is in essence an aggregate construct (Richard, Devinney, Yip, & Johnson, 2009), and overall measures of firm performance may not capture the real impacts of different resources such as HC (Ray, Barney, & Muhanna, 2004). This problem does not occur with operational indicators, which are more likely to capture the real competitive advantages created by HC (Crook et al., 2011). Because the measures of operational performance in this study capture performance in activities with a specific value for the Bank's network of branches, the implications of HC on performance can be seen with fewer distortions. The dependent variables used, listed below, were measured from an internal operational indicator that compared performance between the

branches on a scale from 0 to 60. The lower limit “0” means a null standard of performance, while the upper limit “60” establishes the highest expected performance level for a bank branch. Thus, the *dependent variables* include 1) *profitability of client portfolios (profitability)* – this variable for operational performance measures the expected return on operations with clients; and 2) dependent variables in the *credit process*, here also called *credit performance variables*, namely: a) *Individual timely payments* – payment of financial commitments by the Bank’s individual clients before the due date; b) *Corporate timely payments* – payment of financial commitments by the Bank’s corporate customers before the due date; c) *Credit limit and record* – percentage of failures in preparing the records or granting credit limits; d) *Loans contracted* – volume of operations without operational risks that may affect the loans contracted; e) *Advances to depositors* – form of special lending to cover for checking account overdrafts.

Independent variables - 23 independent variables, called here HC resources or HC variables, were collected for the study. Four of the independent variables measure the level of *higher education* (undergraduate, MBA in corporate finance, MBA in management, Master’s and PhD), two measure *professional experience* (years at the Bank and years in a managerial role), six measure *competencies* (customer service, finance, internal processes, social responsibility, behavioral, and managerial), six measure *certifications of specific knowledge* (credit, management, agribusiness, finance, marketing, and internal controls), three measure *specific training (financial investment, credit and finance analysis, and marketing and customer service)*, and two measure *corporate educator* (educator employees and educator managers). The structuring of the database for human capital considered the measurable dimensions of human competence at work, or the KSAOs - *knowledge, skills, abilities, and other characteristics* (Ployhart & Moliterno, 2011). For the dimension *knowledge*, the independent variables *higher education, specific training, and certification of specific knowledge* were chosen; for the dimension *skills and abilities*, the variables *professional experience* and *competencies* were used; and for the dimension *other characteristics*, the variable *corporate educator* was employed. It is important to note that the variable *higher education* is linked with the development of *generic competences of employees*, and the variable *corporate educator* develops both *generic* and *specific competences*. The other independent variables listed above are tied to the *specific competences* of employees.

Control variables – By focusing on a specific production process that is replicated in thousands of the Bank’s branches and is based on universal and standardized indicators, this study eliminates most sources of heterogeneity in productivity or performance between the production units. Nevertheless, one cannot say that the production lines are absolutely identical, mostly because the contexts and customer bases change. To control for the sources of variation in performance, the variables that would most impact the performance of a large network of bank branches in Brazil were chosen. It is known that a firm’s size and environment may influence its performance (Keats & Hitt, 1988; Razin, 1998, 1999; Skaggs & Youndt, 2004). To control for the effects of size, a continuous control variable was introduced that represents the number of individuals employed in each bank branch (Huselid, 1993; Normann, 1984). A control variable was also used that controls for the economic environment of the banking industry by including a dummy for the branches’ economic level. This dummy takes into account the economic indicators of the local economy and the customer base to classify the branches. To control for the economic environment, we also used a dummy for locality because the banking operations in a country such as Brazil may be impacted by the region where the branch is located. This control variable shows whether the branch is located in a metropolitan area or in a non-metropolitan city. Last, the continuous variable *turnover* was used because excessive movement of employees could occasionally hinder certain operations and the retention of good customers (Huselid, 1995). The control variables used include the following: *Workforce* – this continuous variable reflects the number of employees in each branch. The number of employees is directly related to the budget, volume of operations, number of clients, characteristics of the work process, and the economic potential of the locality where the branch is located. *Level of branch* – this discrete variable depicts the classification of the branch adopted by the bank. It considers different economic and market factors such as the economic potential of the locality, the municipality’s GDP, the historic results of the unit, the population, the number of clients, and the highest selling products at the branch, as well as the volumes of loans and borrowing. This variable is based on a scale with five levels, from 1 to 5. The branches classified at Level 1 are the most promising in terms of local economic potential. At the opposite end of the scale, branches at Level 5 have the lowest local economic potential. The frequency distribution of this variable is as follows: 411 branches at Level 1, 612 at Level 2, 1,276 at Level 3, 963 at Level 4, and 341 at Level 5, totaling 3,603 branches. *Locality where branch is established* – this dichotomous variable (0 or 1) indicates the locality where the branch is established, whether in a metropolitan region (1) or a non-metropolitan region (0). Per region, the branches are distributed as follows: 847 metropolitan and 2,756 from no-metropolitan areas, totaling 3,603 branches. *Turnover* – this continuous variable indicates the percentage of movement of employees during the periods studied, resulting

from internal transfers between the branches, hiring, or firing.

3.2 HR Management Practices of the Bank and Database Specifications

The Bank mainly uses seven HRM practices implemented between 1960 and 2005, as described in Table 1. The third column includes the HC resources tied to each HR practice. The fifth column relates the hypotheses studied in this study to the existing HR practices. The question of the relative effectiveness of the HR practices and HC resources, shown in Table 1, will be discussed later in the paper.

Table 1. Relative effectiveness of HR management practices in the bank studied

| HR Management Practices in the Bank | Year when HR practice was implemented | Related human capital resources (independent variables) | Index of effectiveness of human capital resources on performance ^a | Related research hypotheses | Relative effectiveness of HR practices ^b |
|--|---------------------------------------|---|---|-----------------------------|---|
| 1. Internal system for certification of specific knowledge ^c | 2005 | Certification of specific knowledge | 100% | Hypothesis 9 | Very effective |
| 2. 360-degree competency assessment system | 2004 | Specific competences | 83% | Hypothesis 4 | Very effective |
| 3. Professional advancement based on merit ^d | 2005 | Specific competences, certification of specific knowledge, and experience | Competencies (83%); certifications (100%); experience (50%) | Hypotheses 4, 5, and 9 | Very effective |
| 4. Variable remuneration based on certifications of specific knowledge and performance | 2005 | Certification of specific knowledge | 83% | Hypothesis 9 | Very effective |
| 5. Training to develop specific competences | 1960 | Specific trainings | 50% | Hypotheses 6 and 8 | Effective |
| 6. Development of generic competences through incentives for higher education | 1990 | Higher education | 50% | Hypothesis 7 | Effective |
| 7. Sharing knowledge through corporate educators | 1960 | Corporate educator | 40% | Hypothesis 2 | Little effective |

Note. ^aMeasured by the percentage of positive impact of the HC resource on the set of dependent variables, taken from the last row of Table 3.

^bThe author's scale of relative effectiveness is arbitrary and considered: very effective above 80 percent; effective between 50 and 80 percent; and little effective between 20 and 49 percent. The HR practices 1 to 6 are therefore a system of high-performance HR practices. ^cFrom 2006 to 2008, most of the Bank's employees were trained and took exams for certification of specific knowledge offered by the Bank. The program, which certified approximately 60,000 employees, charted the cognitive domain of the employees in the specific competences need for the work. ^dMerit, in the Bank studied, signifies meeting the requirements for competencies, certifications, experience, and job performance.

To develop this study, four databases were used for the HC variables (independent variables), control variables, and operational performance variables (dependent variables), separated by the periods available (up to five semesters) and the number of HC variables used, as shown in Table 2.

Table 2. Databases

| Database by dependent variable | Number of branches | Number of employees | Number of observations (branches X semesters) | Semesters | Number of HC variables |
|--|--------------------|---------------------|---|---|------------------------|
| <i>Database 1</i> - Advances to depositors | 3,603 | 55,502 | 10,809 | Three (2 nd sem/ 2007 to 2 nd sem/2008) | 19 |
| <i>Database 2</i> - Credit limit record - Loans contracted | 3,598 | 55,195 | 14,392 | Four (1 st sem/ 2007 to 2 nd sem/2008) | 19 |
| <i>Database 3</i> - Individual timely payments - Corporate timely payments | 3,590 | 55,550 | 17,950 | Five (2 nd sem/ 2006 to 2 nd sem/ 2008) | 19 |
| <i>Database 4</i> - Profitability of client portfolios | 3,598 | 55,195 | 14,392 | Four (1 st sem/ 2007 to 2 nd sem/2008) | 20 |

The fluctuation in the number of HC variables in the panel regressions for each dimension of operational performance is explained by the natural link between the measure of performance and the HC variable. For example, it would be unreasonable to link the HC variable *training in marketing* to the variables for *credit performance*. In that case, the HC variable *training in marketing* was tied to *training in credit and finance*.

3.3 Data Treatment: Factorial Analysis

This study includes 23 HC variables, a number that is difficult to fit for regression models. Many HC variables in this study showed strong correlations with each other and more specifically with related variables. There were four factorial analyses performed in this study; each was associated with a database related to a specific operational performance variable (dependent variable). This procedure was necessary because the databases showed differences in the number of periods, amount of branches, and number of related human capital variables, as shown in Table 2. In three of the four factorial analyses, five factors were found: 1. *Formal education*, 2. *Experience/training*, 3. *Certification*, 4. *Corporate educator*, and 5. *Competencies*. In the factorial analysis for the database *profitability*, the same four factors were found except for *corporate educator*. A factor extraction was performed through the principal component analysis and varimax rotation methods, adopting 0.30 as the minimal factor loading in absolute value. The data were suitable for applying factorial analysis because a KMO (*kaiser-Meyer-Olkin*) above 0.82 was observed, and Bartlett's null hypothesis was rejected, indicating good fit. In three of the factorial analyses, the extracted factors accounted for 68.90 percent of the variance, and the extracted factors accounted for 58.60 percent of the variance in the other factorial analysis, meeting the requirements satisfactorily. The factors extracted from the factorial analysis did not show correlations with each other, thus avoiding the problem of multicollinearity.

3.4 Panel Regression Model: Tobit Regression

The data analyzed in this article refer to a period of up to five semesters. The statistical methods suitable for this dataset are panel regression models with fixed or random effects. Because the dependent variables are censored in the lower and upper limits, meaning that they are limited to a range of 0 to 60, we can say that the choice of the tobit model is suitable for this study. The essence of the tobit model is similar to least squares regressions, but it assumes a normal truncated or censored distribution. It is therefore an effective method to estimate the relationship between a truncated or censored dependent variable and other independent variables (Amemiya, 1984). According to Greene (2003), the tobit model can be defined by the expression $y_i^* = \beta'x_i + \varepsilon_i$, where ε_i is a random error in the equation, β is the parameter vector and represents the coefficients to be estimated, x_i represents the explanatory variables, and y_i^* is the estimated dependent variable. The variable y_i^* that is actually observed, i.e., the effectiveness score generated, is defined as follows for this study:

$$\text{if } y_L < y_i^* < y_U, y_i = y_i^*, \text{ if } y_i^* \leq y_L, y_i = y_L, \text{ and if } y_i^* \geq y_U, y_i = y_U$$

Where $y_L = 0$ is the lower limit, and $y_U = 60$ is the upper limit.

The use of the Ordinary Least Squares Method to estimate the parameters of a regression with a censored dependent variable would create biased estimates. In this case, estimating the parameters is generally performed through Maximum Likelihood (Wooldridge, 2002).

The general model to be estimated is:

$$Y_{it} = \alpha_i + \sum \beta_i F_{it} + \sum \lambda_i F_{it}^2 + \sum \psi_i X_{it} + u_{it}$$

where $i = 1, 2, \dots, n$ branches (production units), $t =$ periods (second semester of 2006 to second semester of 2008), $\alpha_i =$ intercept, $Y =$ dependent variable, $F =$ HC factor (independent variable), $F^2 =$ HC factor squared, $X =$ control variable, β, λ and $\psi =$ parameter vectors and coefficients to be estimated, and $u_i =$ error term.

The independent variables for human capital were squared and regressed together with the variables in levels to capture eventual non-linear curves for the relationship between human capital and the outcome. HC variables were also regressed cubically; the results were not significant.

Although the regression model best suited for the characteristics of the data in this study is the tobit model due to the censored data for the dependent variables, this study chose to analyze the results using the three applicable regression models: fixed effects, random effects, and random effects tobit. In general, the comparison between the regression models shows that the models with random effects, fixed effects and the random effects tobit show practically identical results. The estimates were made using *Stata 12 software*. All of the estimates for standard errors are robust, i.e., corrected for both heteroscedasticity and autocorrelation using the *Newey-West* method for regressions with fixed and random effects, while correction was made via *bootstrap* according to Wooldridge (2002) for the random effects tobit model.

4. Results and Hypothesis Check

4.1 Results of the Panel Regressions

The results of the regressions are explained from the relationship curves found between the dependent variables (operational performance measures) and the independent variables (human capital variables). For this purpose, the human capital variables were regressed in level and squared form, which enabled an observation of four types of relationships: 1) *positive linear relationship*, which means that if there is an investment in the HC resource, performance improves linearly and positively; 2) *non-linear relationship*, which means that there are maximum and minimum points. When the non-linear relationship shows a maximum point, it is possible to maximize performance if there are adequate increases in the HC resource. Conversely, when the non-linear relationship shows a minimal point, it is assumed that there is a minimum amount of the HC resource beyond which there is a positive relationship between the resource and performance. 3) *Negative linear relationship*, which signifies that if there is an increase in the HC resource, performance worsens; and 4) *null relationship*, or there is no statistically significant relationship.

Because the volume of regressions in this study is large, *summary tables* that aggregate the results from the regressions are used to present the data.

Table 3 summarizes the results of the random effects tobit regressions between *human capital* and *profitability* and between *human capital* and *credit process* for all of the Bank’s branches. Each cell in Table 3 depicts the four types of relationships between the dependent variables (operational performance) and independent variables (HC) already mentioned: *linear positive relationship*, marked in the table by a *black fill*; *non-linear relationship*, marked by a *gray fill*; *negative linear relationship*, marked by a fill with *horizontal lines*; and the *null relationship*, outlined by the *color white*, meaning that there was no statistically significant relationship. The same procedure is used for the summary Tables 4, 5, and 6.

Table 3. Summary of the results of the tobit regressions in the relationships between human capital and the dependent variables, in order of relative impact

| HC/Dependent variable | Certification | Competency | Formal Education | Experience/ Training | Corporate educator | Turnover | Workforce |
|--|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------|------------------|
| Profitability | Black | Black | Black | Black | White | Horizontal lines | Horizontal lines |
| HC/Dependent variables for credit process | Certification | Competency | Formal Education | Experience/ Training | Corporate educator | Turnover | Workforce |
| Corporate timely payments | Black | Black | Black | Black | White | Horizontal lines | Horizontal lines |
| Individual timely payments | Black | Black | White | Horizontal lines | White | Horizontal lines | Black |
| Advances to depositors | Black | White | Black | Black | Black | Horizontal lines | Horizontal lines |
| Credit limit record | Black | Black | White | White | Black | Horizontal lines | Black |
| Loans contracted | Black | Black | White | White | White | Horizontal lines | Black |
| Type of related competence | Specific | Specific | Generic | Specific | Specific and generic | | |
| Index of effectiveness or relative impact ^a | In 100% of the variables | In 83% of the variables | In 50% of the variables | In 50% of the variables | In 40% of the variables | | |

^aForm of calculating the index of effectiveness: (number of positive linear relationships + non-linear relationships) / total number of relationships.

-  Positive linear relationship. If there was an investment in the human capital resource indicated, performance improved.
-  Non-linear relationship. May have a maximum or minimum point of human capital. The relationship indicates that one can manage the optimal investments in the branch’s human capital.
-  Negative linear relationship. If there is an investment in the human capital resource indicated, performance worsened.
-  Null relationship, no significance.

As shown in Table 3, it can be concluded that the Bank’s HC resources positively impact most of the operational performance measures, especially the HC variables *competency* and *certification*, which have a positive linear relationship with most of the dependent variables studied. *Experience/training* has a positive linear impact on a very important dependent variable, *profitability*, in addition to a non-linear relationship with *corporate timely payments* and *advances to depositors*. Regarding the impact of the *experience/training* resource on *individual timely payments*, the result is linear and negative, which indicates that improvements in this HC resource may increase *individual defaults*. This negative relationship, unlike what was shown in the hypothesis, may have occurred because the performance levels for *individual timely payments* have a direct relationship with the

particular experience of employees in the branch with individual client portfolios. This experience may be decreasing because of the greater rate of employee turnover observed with this type of client portfolio, as shown in Table 6 below. The *experience* indicator used in this study is an aggregate indicator that is non-specific for each process, hence its negative impact on individual loans. To reduce this effect, it might be appropriate to inhibit the turnover of individual client portfolios, thereby preserving employees' experience and specific competences in this work process as much as possible. *Formal education*, in turn, is a reasonable HC variable, showing a positive linear impact on the dependent variable *corporate timely payments* and a non-linear relationship with *profitability* and *advances to depositors*. *Formal education* does not seem to have an effect on the other operational performance variables. *Corporate educator* does not appear to be a strong HC resource because it positively impacts only two operational performance variables (*advances to depositors* and *credit limit record*).

The last row of Table 3 shows that the index of relative effectiveness of the HC resources *certification*, *competencies*, *formal education*, and *experience/training* is significant, ranging from 50 to 100 percent. This result appears to indicate that these resources are effective at generating good performance levels. Thus, Hypotheses 3, 4, 5, 7, and 8 can be accepted. It should be noted that the resource *certification of knowledge* is a new HR practice that is focused on the service industry, and it appears to be promising and revealing. Similar to the *competencies* variable, the data show that *certification of knowledge* is an HC variable that has a positive linear impact on half of the dependent variables in the study and a non-linear relationship with the remaining variables. *Certification of knowledge* is therefore projected to be a new *high-performance* HR practice for the service industry. Hypothesis 1 – *The existence of corporate educators is positively correlated to the operational performance of the branches* – is partially confirmed. The isolated positive impact of this HC variable in only two of the operational performance measures analyzed (*advances to depositors* and *credit limit record*), according to Table 3, is not sufficient to fully accept the hypothesis. Similarly, Hypothesis 6 – *The relationship between HC and the Bank's performance is more positive for specific competences than for generic competences* – is confirmed. The human capital resources tied to *specific competences* (*certification*, *competency*, and *experience/training*) are more effective than those tied to *generic competences* (*formal education*) in increasing operational performance (see the last two rows of Table 3). On average, there is a positive linear relationship, or at least a non-linear relationship, between *specific competences* and the dependent variables in 77 percent of the variables, allowing for the optimization of operational performance. *Generic competences*, in turn, show a lower percentage of positive linear and non-linear relationships, at approximately 50 percent. Therefore, Hypothesis 6 can be accepted. Hypothesis 2 - *Detailed knowledge about an organization's human capital as well as its consequences for performance enable an identification of the most and least effective HR management practices* – can be accepted as a natural consequence of the hypotheses tests conducted in this study on the effectiveness of the Bank's HC. Now that it is known which hypotheses could be accepted, it is possible to infer the Bank's most and least effective HR management practices to obtain optimal levels of operational performance. The last column in Table 1 seeks to portray the relative effectiveness of each of the Bank's HR practices. Therefore, it can be said that HR practices 1 to 6, listed in Table 1, compose a system of *high-performance* HR practices, meaning an internal incentive system that creates effective corporate HC.

Hypothesis 9 refers to the interference of external context in the relationship between human capital and operational performance. In this hypothesis, the important question is whether the external economic contexts where the bank branches operate are a determinant factor in the effectiveness of HC. For this analysis, the operational performance variables were separated by the level of sensitivity to the external context. Based on their characteristics, *profitability* was chosen as the variable that is most susceptible to local economic power. It is assumed that in consolidated economic regions with high economic potential and purchasing power, the HC in branches will be more effective, creating higher *profitability* than the same HC located in regions with less economic power. If this hypothesis is confirmed by segregating the regressions based on the economic levels of the regions where the branches are located, it will be possible to demonstrate the phenomenon if there is a progressive decrease in HC effectiveness when the regressions turn to economically unfavorable regions.

Therefore, as explained above, the population of the branches was divided into seven economic clusters that translate to the economic potential of the regions where the branches are located. The tobit panel regressions between human capital and *profitability* were run separately according to the branch's cluster by considering the entire population of the branches within the cluster. If this line of reasoning is correct, human capital better explains the operational performance achieved in the metropolitan branches and the branches classified as Level 1, which are regions with high economic power. Conversely, in the branches in regions classified as Levels 4 and 5, with low economic power, human capital would not adequately explain the performances achieved. The

results mostly confirm this hypothesis, both in the regressions based on the tobit panel model which is considered the most appropriate for the data in this study, and in the fixed effects panel model. As observed in Table 4, human capital better explains the levels of *profitability* reached by the metropolitan and Level 1 branches than the *profitability* obtained by branches in Levels 4 and 5. Table 4 summarizes the tobit regressions, showing the influence of the effectiveness of HC variables on *profitability* by branch level. Table 4 is designed to allow a comparison of the results from the tobit panel and fixed effects panel regressions. Through the color filling of the cells in Table 4, the concentration of the colors gray and black on the left side and the color white and the fill with horizontal lines on the right side is evident, confirming the phenomenon that human capital explains the operational performance of branches with high economic potential and does not adequately explain the performance for those branches with low economic potential. Thus, based on the results found for the external context, Hypothesis 9 can be accepted.

Table 4. Summary of the results of the tobit and fixed effects regressions, by branches level, in the relationships between human capital and profitability

| Type of branch | Branchs Economic Level 1 | | | | Branchs metropolitan | | | | Branchs Economic Level 2 | | | | Branchs no-metropolitan | | | | Branchs Ecomic Level 3 | | | | Branchs Economic Level 4 | | | | Branchs Economic Level 5 | | | | | | | | | | | |
|---|--------------------------|---|---|---|----------------------|---|---|---|--------------------------|---|---|---|-------------------------|---|---|---|------------------------|---|---|---|--------------------------|---|---|---|--------------------------|---|---|---|---|---|---|---|---|---|---|---|
| Economic potential | Very High | | | | High | | | | Medium High | | | | Medium | | | | Medium Low | | | | Low | | | | Very Low | | | | | | | | | | | |
| Variables of Human Capital ^a / Profitability | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D | | | | |
| Profitability (Tobit Regression) | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Profitability (Fixed effects Regression) | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |

^aA = Experience/Training; B = Certification; C = Competency; D = Formal Education

- █ Positive linear relationship. If there was an investment in the human capital resource indicated, performance improved.
- █ Non-linear relationship. May have a maximum or minimum point of human capital. The relationship indicates that one can manage the optimal investments in the branch's human capital.
- ▤ Negative linear relationship. If there is an investment in the human capital resource indicated, performance worsened.
- Null relationship, no significance.

4.2 The Importance of Context in the Relationship between Human Capital and Performance in the Credit Process

An analysis was also conducted for the regressions between HC and the five dependent variables for the *credit process* (individual timely payments, corporate timely payments, advances to depositors, loans contracted, and credit limit record) separately for each of the seven economic clusters. The aim was to verify whether economic and regional differences interfere with the effectiveness of HC for performance in the *credit process*.

The classification of the branches by economic levels imposes a specific work organization and a particular customer base that impact the branches' internal processes and labor relations. Thus, this study aims to understand whether the dynamic of classifying branches by economic levels interferes with the Bank's performance in the *credit process*, an essential activity for any banking institution. The results obtained from these regressions are particularly surprising and help explain the nature of the Bank's human capital. To demonstrate the relevant phenomena, Table 5 summarizes the results of tobit panel regressions between HC variables and the dependent variables for *credit process*. Table 5 also include the relationships between HC and the dependent variable *profitability* to enable a comprehensive analysis of the question. The most important phenomena and impacts observed in Table 5 are discussed below.

Table 5. Summary of the results of the tobit regressions, by branches level, in the relationships between human capital and dependent variables

| Human Capital/ Dependent Variables | Competency | | | | | Certification | | | | | | Formal Education | | | | | | Experience/ Training | | | | | | Corporate Educator | | | | | |
|---------------------------------------|------------|---|---|---|---|---------------|---|---|---|---|---|------------------|---|---|---|---|---|-------------------------|---|---|---|---|---|--------------------|---|---|---|---|--|
| | 1 | 2 | 3 | 4 | 5 | N | M | 1 | 2 | 3 | 4 | 5 | N | M | 1 | 2 | 3 | 4 | 5 | N | M | 1 | 2 | 3 | 4 | 5 | N | M | |
| Individual Timely Payments | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | |
| Corporate Timely Payments | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | |
| Advances to Depositors | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | |
| Loans Contracted | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | |
| Credit Limit Record | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | |
| Profitability | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | |

²Branches level 1 to 5 (Economic potential of the area); N - no-metropolitan area; M – metropolitan area.

- █ Positive linear relationship. If there was an investment in the human capital resource indicated, performance improved.
- █ Non-linear relationship. May have a maximum or minimum point of human capital. The relationship indicates that one can manage the optimal investments in the branch's human capital.
- █ Negative linear relationship. If there is an investment in the human capital resource indicated, performance worsened.
- █ Null relationship, no significance.

a) *Relative impacts of each HC resource on the Bank's performance* – Table 5 enables numerous insights into the relative impact of each HC resource on performance in the credit process. A relevant example is the improved performance in the credit process for the Bank's main branches (Level 1, Level 2, and metropolitan). For this result to occur, it is necessary to increase the HC resources *competency* and *certification* for individual timely payments; the resources *formal education*, *competency*, and *experience/training* for corporate timely payments; the resource *certification* for advances to depositors; the resources *certification* and *experience/training* for loans contracted; and the resources *competency*, *certification*, and *corporate educator* for credit limit record. Profitability, in turn, increases in the Bank's main branches that invest in the *experience/training* binomial.

b) *Effectiveness of HC resources on performance in the credit process* - Table 5 shows the human capital resources in order of effectiveness on credit process performance. *Competency* and *certification* are the HC resources that best explain credit process performance. The predominance of black-filled cells signifies a positive linear relationship between these independent HC variables and most of the dependent variables analyzed for the credit process. Next in order of importance are *formal education*, *experience/training*, and *corporate educator*. The results shown in Table 5 allow the Bank to guide its direction, location, and intensity of investments in HC resources in the different branch clusters researched to obtain good overall performance in the credit process.

c) *Temporal durability of HR practices and the importance of specific competences for corporate results* – Also in Table 5, it is interesting to observe that the two HC resources *competency* and *certification*, developed through the HR practices implemented most recently (2004 and 2005), are noticeably more effective in creating good performance in credit processes. *Corporate educator*, *training*, and *valorization of experience* are linked to older HR practices that were implemented in the 1960s and are seen as controversial HC resources and less effective at explaining this type of performance. *Experience/training*, which is very effective in creating profitability, is less effective at achieving performance in credit processes, except for corporate timely payments. This result shows that the effectiveness of certain HC variables can vary significantly within the company's work process. Another significant result is that the three main HC resources in terms of effectiveness (*competency* and *certification* for performance in the credit process and *experience/training* for profitability) are tied to the Bank's specific competences, confirming the findings of Grant (1996), Dutta et al. (2005), Kor and Mahoney (2005) and Crook et al. (2011).

d) *Optimal set of HC resources for each type of performance desired by the Bank* - Table 5 enables a visualization of the most appropriate set or "optimal set" of HC resources for each type of performance desired by the Bank. The set of HC resources will only be "optimal" if it attends to all, or at least a large majority, of the branch clusters to cover the Bank's service system. Performance in corporate timely performance, for example, is positively impacted by the resource *competency* in Levels 2, 3, 4, 5, no-metropolitan, and metropolitan branch clusters. This phenomenon does not occur in Level 1 branches. However, the resources *experience/training* and

formal education have a positive linear impact on performance in *corporate timely payments* in the Level 1 cluster. Together, the three HC resources reach the complete set of bank branches in the organization and can be considered an “optimal set” of resources or the best set possible to achieve exceptional performance levels in *corporate timely payments*. Thus, the “optimal set” of HC for *corporate timely payments* is formed by *competency, formal education, and experience/training*. For *individual timely payments*, the optimal set of HC is formed by *competency and certification*. For *advances to depositors*, the optimal set consists of *certification and formal education*. For *loans contracted*, the set consists of *competency, certification, and experience/training*. For *credit limit record*, in turn, the ideal set is *competency, certification, and corporate educator*. Last, to reach good levels of *profitability*, the set of HC resources appears to be limited to *experience/training*. The combination of the most appropriate HC resources for each type of performance is not the same, indicating that the optimal resource(s) may be different within the same company, depending on the type of performance desired. The differences observed between the optimal sets of HC resources for each type of desired performance project means that an HC resource must be contextualized to the work process because it needs to adhere to the specificities to which it is linked.

4.3 Relative Impact of the Workforce and Turnover on Profitability and Credit Process Performance by Branch Level

Table 6 shows a summary of the regression results for the relationships between *control variables and dependent variables for the credit process*, and *control variables and the dependent variable profitability*, both by branch level. Table 6 shows that high turnover can hinder performance in terms of *profitability* in most branches (Levels 1, 3, 5, no-metropolitan, and metropolitan). With regard to the size of the *workforce*, smaller teams appear to have a more positive relationship with *profitability*, unlike what one might expect. The predominance of cells filled with *horizontal lines* indicates that a smaller *workforce* can positively impact *profitability*. It is noteworthy that for the Level 1 branches, which are critical to the overall performance of the organization studied, this logic does not apply.

Table 6. Summary of the results of the tobit regressions, by branches level, in the relationships between control variables and dependent variables

| Control Variables/ Dependent Variables | Workforce | | | | | | | | Turnover | | | | | | | |
|--|-----------|---|---|---|---|---|---|---|----------|---|---|---|---|---|--|--|
| | 1 | 2 | 3 | 4 | 5 | N | M | 1 | 2 | 3 | 4 | 5 | N | M | | |
| Corporate Timely Payments | | | | | | | | | | | | | | | | |
| Individual Timely Payments | | | | | | | | | | | | | | | | |
| Advances to Depositors | | | | | | | | | | | | | | | | |
| Credit Limit Records | | | | | | | | | | | | | | | | |
| Loans Contrated | | | | | | | | | | | | | | | | |
| Profitability | | | | | | | | | | | | | | | | |

Note. ^aLevel branches 1 to 5 (Economic potential of the area); N - no-metropolitan area; M – metropolitan area.

-  Positive linear relationship
-  Negative linear relationship
-  relationship, no significance

When analyzing the relationships between the control variables (*workforce* and *turnover*) and the dependent variables on the *credit process*, several phenomena are observed in Table 6. The first is the importance of the size of the *workforce* to achieve better performance in *individual timely payments*. A large workforce may favor *individual timely payments* in the Bank’s main branches (Levels 1, 2, and metropolitan). *Turnover* is perceived as a problem for *individual timely payments*. High levels of *turnover* generate some level of *individual default*. *Corporate timely payments* are little affected by the control variables and are more affected by the HC variables. In general, the results indicate that the control variable *turnover* appears to be a specific problem for the performance variable *individual timely payments* but does not have a significant impact on the other four dependent variables in the *credit process*.

The dependent variables *credit limit record* and *loans contracted* are also sensitive to the size of the *workforce*. The predominance of the color black in the relationships between the control variable *workforce* and the two operational performance variables confirms this sensitivity. In most of the branch clusters studied, a larger workforce had a positive linear impact on the dependent variables *credit limit record* and *loans contracted*. The likely explanation is that work processes tied to these variables are characterized by intensive labor. The surprise

is due to the negative linear relationship between the control variable size of the *workforce* and the *credit process* performance *advances to depositors*. The explanation from some specialists in this type of operation is that the volume of operations for *advances to depositors* is naturally increasing in the larger branches, although it was not possible to access data that confirmed this assertion. The last two columns in Table 3 depict the impact of *turnover* and *workforce* on all of the Bank's branches combined.

5. Discussion

The results shown in this study confirm the findings of empirical studies on the impact of systems of HR practices on firm performance with respect to three key questions: 1) the positive impact of HC or the HRM practices system on the Bank's performance; 2) the importance of specific competences for the Bank's performance; and 3) the negative impact of *turnover* on the Bank's performance.

Regarding the specific contributions to the literature on HC in companies, three main contributions stand out: 1) this study overcomes the fallacies and potential biases of empirical studies on HC in organizations, as described by Ployhart and Moliterno (2011); 2) the study provides empirical confirmation that the HC inventory is an effective instrument to study the emergence and performance of this capital in the firm's environment; and 3) the study confirms the role of the local economic context on the relationship between HC and organizational performance.

5.1 This Study Overcomes the Fallacies and Potential Biases of Empirical Studies on Human Capital in Organizations

"The more human capital, the better". The first fallacy overcome is the approach "more is better", or the more human capital, the better an organization's performance. The assumption is that there are not decreasing returns for talent. The results of this study show that the relationship between human capital and performance in *profitability* and *credit process* do not necessary function in that manner. At least four elements were found that contradict the approach *"the more human capital, the better"*. *First*, non-linear curves were found, suggesting that in certain situations there are optimal levels of HC in companies to reach certain results. *Second*, it was found that the positive linear curves are more common when they are tied to specific competences. *Third*, in a few cases, some paradoxically negative linear relationships were found, which indicate a costly and incomplete HC resource. *Fourth*, the effectiveness of HC may depend on the external context;

"Some KSAOs are always valuable". The finding described in item above, introduces an important method to evaluate what should be included in the ideal HC (diversity and levels of resources). One can find an optimal set and another non-optimal set of HC resources for each type of performance desired by the firm, which indicates that some KSAOs are not always valuable, as noted by Ployhart and Moliterno (2011). Moreover, the study determined that developing corporate HC in economically unfavorable contexts, for example, may be valuable for the local community as social responsibility actions but are not necessarily valuable for the company from an economic point of view;

"All employees in a company show identical indicators for human capital". Another fallacy overcome in this study is the assumption that generic measures of a company's HC correctly represent the KSAOs of the workers and that all workers in a company show identical indicators for HC. The data collected from the Bank's inventory of human capital show the variance in HC between the branches, which is reflected in the branches' internal environments. From the econometric analyses carried out on the impact of HC on the Bank's performance, it can be inferred that a specific, balanced set of KSAOs in each branch form performance-promoting HC. Rather, to be effective, the Bank's HC needs to be heterogeneous because it is tied to the types of performance intended for each work unit. Therefore, it can be stated that HC emerges when it is effective to achieve performance, and three conditions must be met: 1) *the optimal sets of HC resources must be identified for each type of desired performance* (see Table 5). It is worth noting that defining the optimal sets of HC resources for each branch is the same as setting the level of heterogeneity of HC by the various units and processes in the organization; 2) *the local economic context that favors the emergence of that HC must be evaluated* (see Tables 4 and 5); and 3) *it must be determined whether there is a gap in HC in the team and, if there is, the HRM practices that best develop this optimal set of resources must be applied*. Thus, the formation of specific or "ideal" HC is put in motion for the desired overall performance. From this logic, it can be inferred that the same company needs relatively different sets of KSAOs to attend to the different productive units and obtain several types of desired performance, causing employees and teams to have different types of KSAOs that are oriented toward specific challenges and performances. In fact, it does not appear correct to treat the HC of companies as a homogeneous phenomenon;

"Ignore the non-cognitive profile of the employee". The so-called non-cognitive employee profile was not

ignored in this study, although it is very difficult to measure. The results from analyzing the impact of the 360-degree competency assessment (HC resource *competency*) on the Bank's performance show that this HC resource is an important predictor of corporate performance. It is also one of the most effective HC resources in the whole process of analysis. It is noteworthy that the resource *competency* includes aspects of the employee's non-cognitive profile, such as several types of the technical and behavioral competencies under evaluation;

"Research based on subjective studies and managerial self-reports". Last, this study's form of research moved away from the so-called subjective studies (Ployhart and Moliterno, 2011) and managerial self-reports (Hatch and Dyer, 2004; Wiklund and Shepherd, 2003). This study is a population-based inventory of HC in a large Bank and its thousands of comparable production units, totaling 55,550 employees.

5.2 The Study Provides Empirical Confirmation That the HC Inventory Is an Effective Instrument to Study the Emergence and Performance of This Capital in the Firm's Environment

This finding is linked to the theoretical concept that human capital is a mediator in the relationship between HR practices and performance (Batt, 2002; Jiang et al., 2012; Marimuthu et al., 2009; Ramsey et al., 2000; Takeuchi et al., 2007; Yound & Snell, 2004). By knowing a company's HC, the type or levels of performance to be expected are also known, as are the specific HR practices that will contribute to an effective formation of HC. Thus, mapping the Bank's HC allows one to understand: 1) *the most or least effective HR practices to achieve the various types and levels of performance desired by the Bank as well as the system of high-performance HR practices* (see the last column of Table 1, where the relative effectiveness of the Bank's HR practices is shown); 2) *the impact or effectiveness of the various HC resources on the different types of performance analyzed*, enabling the organization to determine its investments in human capital according to its relative effectiveness (again, see Table 1, fourth column); 3) *the impact of specific competences and generic competences on the Bank's performance* (Hypothesis 6 accepted); 4) *the optimal sets of HC resources for each type of operational performance*. The results revealed that there are objective differences in the optimal sets of HC resources depending on the performance desired, which assumes that heterogeneous human capital is contextualized in the work process. This result suggests that corporate HC should adhere to the specificities and challenges to which it is tied. For example, the regressions performed in this study suggest that *training* and *experience* constitute the optimal set of HC to achieve high levels of *profitability*, while *certification* and *competency* are parts of the most effective set of resources to reach *individual timely payments*. This and other findings not only enable the improvement of HR management practices in the company but also suggest a revelation about the property or character of HC in organizations: depending on the desired goal, corporate HC is not always valuable. Thus, a positive linear relationship cannot be expected between performance and all of the HC resources developed by the company. In fact, one must determine which HC resources are most or least effective for each type of performance and how the relationship curve is established. Therefore, HC is dynamic and contextualized in the work process because it needs to adhere to the specificities to which it is linked. In other words, in terms of level and diversity, HC appears to be specific for each type of performance; 5) *The temporal durability of HR practices for certain types of operational performance*. The Bank's two most recent HC resources (*competency* and *certification*) are notably more effective, particularly in regard to operational performance in the *credit process*. Conversely, the classic, or oldest, HC resources, such as *training* and valorization of *experience*, are almost entirely only effective at generating *profitability*. The first finding is that some HR practices that were effective in the past for all of the organizational goals and challenges are currently limited in terms of effectiveness to specific challenges or types of performance. This phenomenon is what appears to have happened with the practice of corporate training, a development professional methodology that is most likely less appropriate for the demands of certain standardized work processes and more suitable for activities or performances that demand systemic competencies. The second finding is that contemporary HR practices, such as the 360-degree competency assessment and the systems for certification of knowledge, apparently respond well to systematic and standardized processes. Such processes are frequent activities that need to coexist with the more sophisticated control processes, as is the case with banks. These considerations suggest that the HC inventory is a more advantageous method of empirical study than the classical method based on questionnaires and interviews because it enables a practical understanding of the emergence and performance of HC in companies.

6. Conclusion

This study sought to understand two fundamental and inter-related mechanisms regarding HC in the Bank studied: on the one hand the *emergence*, which describes the HR practices that create the optimal sets of HC resources to sustain the company's performance; on the other hand, the *effectiveness* or *relative performance* of each HC dimension addressed. The results show that effective HC mainly emerges because of the creation of an

optimal set of HC resources to achieve each type of desired performance and the development of *specific competences* tied to the Bank's processes and businesses. Thus, effective HC should occur abundantly and permanently, but in a directed manner. The use of a synergistically articulated system for HR practices that identifies, maintains, rewards, encourages, and especially develops both the optimal sets of HC resources and *specific competences* is vital for the emergence of effective HC in the Bank. The development of *generic competences* that focus on higher education and graduate education should be understood as a support or a preliminary basis to improve specific competences and not as an autonomous or main activity in the professional development of a bank's employees.

If there are optimal sets of HC in a company, then non-optimal sets must also exist, which indicates that not all KSAOs are always valuable. These elements enable the establishment of what can be called the character or properties of a corporation's HC. First, HC should be *dynamic* and *heterogeneous*, which are necessary conditions for it to effectively respond to the diversity of contexts and demands, whether by virtue of exogenous forces, such as the local economic context, or due to the magnitude of the goals established in the corporate strategy. Second, HC must be *specific* for the challenge or type of performance desired. Third, as a result of the first two phenomena, HC is not always valuable, depending on the purpose for which it is intended.

Turnover, the size of the *workforce* in the branches, and the impact of the external economic context were examined in this study. The results show that high *turnover* is a problem for the emergence of HC in the *individual credit process* (*individual timely payments*) and also for *profitability*. An appropriately sized *workforce* is vital for the emergence of effective HC in the Bank. Some processes require a larger *workforce* to obtain better performance; others require a smaller and most likely more permanent and qualified *workforce*. Another important phenomenon that can counteract the effectiveness of the Bank's HC is the external environment, or the economic condition of the region where the branch is located. Favorable economic conditions may enhance the effectiveness of a branch's HC; unfavorable economic conditions may counteract the emergence of effective HC.

Regarding the levels of effectiveness for the HC in the Bank studied, the results show that *training and experience* are critical to achieving optimal levels of *profitability*. Conversely, *competency*, resulting from the 360-degree competency assessment, and *certifications of specific knowledge* generally appear to be decisive in achieving better performance levels in *credit processes*.

Subject to these conditions, it can be stated that effective HC in the Bank emerged, producing high overall performance.

Last, it is important to consider the *limitations of this study*. Limiting the scope of analysis to a single company, although a large one with thousands of branches and employees, prevents a generalization of the results. More studies should be conducted on similar companies to develop a theory of HC for the service industry, as relevant in the knowledge society.

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