

LATENT FACTORS OF HUMAN CAPITAL AND BUSINESS PROCESSES OPTIMISATION AS A MEANS OF VALUE CREATION IN BRAZILIAN ORGANISATIONS

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ARTICLE INFO

Article details

Submitted by authors 16 Nov 2022
Accepted for publication 18 Apr 2023
Available online 26 May 2023

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DOI

<http://dx.doi.org/10.7166/34-1-2835>

ABSTRACT

This study aims to identify the latent dimensions of human capital and of business process optimisation that affect value creation in organisations. As a method, an exploratory factorial analysis was applied to identify the latent dimensions. The article shows that the correlation between human capital and process optimisation is not noticeable. Moreover, the article reveals the original aggregation of 15 variables in four latent factors by factorial analysis. Finally, it shows a negative correlation between the 'earnings management' factor and the other factors; and this confirmation highlights the need to practise a systemic view of organisations.

OPSOMMING

Hierdie studie het ten doel om die latente dimensies van menslike kapitaal en van besigheidsproses-optimering te identifiseer wat waardeskepping in organisasies beïnvloed. 'n Verkennende faktorale analise is toegepas om die latente dimensies van die oorspronklike veranderlikes te identifiseer. Die artikel toon dat die korrelasie tussen menslike kapitaal en prosesoptimering nie betekenisvol is nie. Tweedens, openbaar die artikel die oorspronklike samevoeging van 15 veranderlikes in vier latente faktore deur faktorale analise. 'n Negatiewe korrelasie tussen die "verdiensbestuur"-faktor en die ander faktore word ook aangedui, en hierdie bevestiging beklemtoon die behoefte vir 'n sistemiese siening van organisasies.

1. INTRODUCTION

With the increasing complexity of corporate structures, the need has arisen to revisit the strategic processes frequently that support the achievement of the proper performance of these structures [1]-[5] and to engage human capital with those strategic processes [6]-[8].

Human capital is essentially what people take home when they leave work - for example, knowledge, skills, and experience [9]. Regarding the use of holistic vision as a tool for analysing the interrelationships of organisational processes, people cannot see how their actions affect other company processes [10]. There is a misalignment between processes, goals, and human resource competencies.

As an exploratory study, the article aims to explore a wide variety of sectors in order to identify the variables that better reflect methods of optimising processes and initiatives of human capital that could be used by organisations in the pursuit of generating value.

Despite the literature presenting methodologies that purport to be in the vectors of performance improvement processes, a literature review shows that, in most cases, the approaches are incomplete in the sense that emphasis is given either to conceptual or to technical-operational aspects. So an explanation

of the factors that influence the optimisation of processes that are aligned with human capital factors might be valuable in both the academic and the corporate fields.

This study could be considered original for several reasons. First, the article shows that the correlation between human capital and process optimisation is not noticeable. Second, the article reveals the original aggregation of 15 variables in four latent factors by factorial analysis. Finally, it shows a negative correlation between the 'earnings management' factor and the other factors; and this confirmation highlights the need to practise a systemic view of organisations.

2. LITERATURE REVIEW

2.1. Process optimisation variables

One finding from the literature review was the diversity of methods that aim to optimise processes in the most diverse areas. In the supply chain field, one software program was proposed and designed to overcome stress caused by increased transport distances, greater complexity, and the vulnerability of international supply chains [11]. The problem is based on an adaptation of exact or heuristic classical algorithms for the shortest path problem (SPP).

The reduction of loss and waste has been addressed [12], considering food waste and loss (FW/L) as an intrinsic characteristic of a supply chain (SC), and suggesting the use of holistic adaptive forecasting methods, such as the autoregressive integrated moving average (ARIMA) and seasonal ARIMA (SARIMA) models.

To evaluate and select third-party logistics service providers, various individual and integrated multi-criteria decision-making approaches could be considered [13]. [13] developed an integrated approach that combines quality function deployment (QFD), fuzzy set theory, and an analytical hierarchical process (AHP) to select an outsourced service strategically. Also, house of quality (HOQ), a QFD technique, is responsible for translating the company's stakeholder requirements into evaluation criteria.

A strategy based on the Stackelberg games has been proposed [14], aimed at increasing profits resulting from advertisements distributed on internet platforms, and reducing the environmental impact. [15] established an eco-efficiency portfolio from BASF, under the rules of ISO 14040, by aggregating aspects of the life cycle of products with ecological results.

In the field of behavioural interventions, while optimising behavioural interventions offers the potential for public health and research benefits, there is currently no widely accepted procedure for this [16]. [16], therefore, suggest a multiphase optimisation strategy to achieve the dual objectives of programme optimisation and programme evaluation in the field of behavioural intervention.

Speed and the accuracy of results were the objectives of a study [17] for the validation of bio-analytical methods to quantify the drug Elvitegravir in human blood plasma. They used design of experiments (DoEs) and quality by design (QbD) to achieve quality standards, observing the entire development system and product life cycle.

Regarding traditional predictive models, there are limitations when the number of variables to control becomes large [18]. [18] state that predictive control models are typically studied from a centralised point of view, in which all manipulated control system inputs are optimised concerning the objective function in a single optimisation problem. [18] state that, in the design of distributed model predictive controllers, Lyapunov-based predictive control techniques are used.

Table 1 presents all of the management process optimisation variables that emerged from the literature review, showing their values, descriptions, and which authors support each one.

Table 1: Descriptions of process optimisation variables. Source: Authors' elaboration.

Variable	Description	Authors	Values
VAR 1	Improvement in performance of strategic processes - industrial and service	[19], [20], [13], [21], [22], [23]	<ul style="list-style-type: none"> • Improvement of productivity of the organisation • Improvement of performance of strategic processes • Resource optimisation
VAR 2	Income optimisation (revenue increase, profit increase, cost and expense reduction)	[24], [25], [14], [13], [26]	<ul style="list-style-type: none"> • Revenue maximisation, profit increase, cost and expense reduction • Employee engagement in new processes
VAR 3	Logistical efficiency as a vector for value creation in organisational strategy	[24], [25], [11]	<ul style="list-style-type: none"> • Revenue maximisation, profit increase, cost and expense reduction
VAR 4	Speed and accuracy in the implementation of strategic processes.	[17], [21],[27]	<ul style="list-style-type: none"> • Increased speed and accuracy of strategic processes • Achieving quality standards
VAR 5	Waste and loss reduction in strategic products' supply chain	[12], [28],[29]	<ul style="list-style-type: none"> • Waste and loss reduction
VAR 6	Reduction of environmental impact from industrial activities	[30],[31],[15]	<ul style="list-style-type: none"> • Preservation of the environment
VAR 7	Compliance with technical requirements of strategic processes	[26], [22], [15]	<ul style="list-style-type: none"> • Guaranteed compliance with production and operation requirements
VAR 8	Information reliability for better strategic decision-making	[32], [15],[13]	<ul style="list-style-type: none"> • Assurance of information reliability • Improved decision-making process
VAR 9	Optimisation of experiments as a vector for value creation in public and private health strategies	[16]	<ul style="list-style-type: none"> • Optimisation of behavioural interventions • Welfare promotion • Expense reduction
VAR 10	Anticipating threats or opportunities in strategic processes	[18], [26], [29]	<ul style="list-style-type: none"> • Avoid future harm to organisations and tailor processes to capture future opportunities

2.2. Human capital variables

Process optimisation methods are driven by people. Therefore, it is also necessary to identify the human capital variables that influence value creation in organisations. People are the only source of long-term competitive advantage, and companies that fail to invest in employees put their success at risk [33]-[40].

However, such a competitive advantage is sustainable only if there are mechanisms that restrict employee mobility to rival companies. One of the most critical tools of mobility restriction is the specific human capital of the firm or the knowledge and skills embedded in individuals that cannot be easily applied in other companies [37], [41]-[43].

Investment in training and education can improve the knowledge, skills, and experience of an employee [44]. [44] states that knowledge and additional information acquired at school are essential in technologically advanced economies. The continuous digitalisation of various industries is reducing dramatically the use time of skills and abilities acquired through formal education [45]. Therefore, [46] maintain that an increase in training investments is significantly linked to an increase in revenue per employee. Educational diversity among employees is positively associated with openness at the company level to external knowledge [46]. More education and consequently higher human capital can promote health, increase the propensity to vote, and improve knowledge about birth control, among other benefits [44], [47].

Research by the Center for Talent Innovation found that organisations with a diverse workforce benefit from a ‘diversity dividend’. According to the 18th annual global CEO survey by PriceWaterhouseCoopers (PwC), 85% of surveyed CEOs whose companies had a formal strategy of diversity and inclusion said that their companies had achieved better performance [48].

Bassi and McMurrer [34] worked for more than a decade to develop a human capital management (HCM) evaluation system to predict organisational performance and to guide investment organisations in dealing with people. The survey revealed a set of drivers that fall into five main categories: leadership, employee engagement, accessibility of knowledge, workforce optimisation, and organisational learning capacity.

Table 2 presents all of the human capital variables that emerged from the literature review, showing their values, descriptions, and which authors support each one.

Table 2: Descriptions of human capital variables. Source: Authors’ elaboration

Variable	Description	Authors	Values
VAR 11	People as the main factor of competitive advantage	[33], [34], [39], [37], [38], [49], [48], [36], [7], [6], [35], [40], [8]	<ul style="list-style-type: none"> • Increased business perpetuity • Reach competitive advantage • Predict organisational performance and guide organisations’ investments in people • Rely on employees who are ready to meet the challenges of a people-centered, intellectual capital, and technology-centric business model • Anticipate customer demand by introducing efficiencies and improved use of technology, and by encouraging a culture of innovation

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Table 2: Descriptions of human capital variables. Source: Authors' elaboration (cont.)

Variable	Description	Authors	• Values
VAR 12	Restriction of employee mobility as a source of increased human capital in companies by increasing specific knowledge	[43], [41], [42], [37], [48]	<ul style="list-style-type: none"> • Sustainability of the company's competitive advantage
VAR 13	Better human capital formation aligned with organisational strategy	[44], [34], [48], [50], [51],[45]	<ul style="list-style-type: none"> • Improvement of employee knowledge, skill, and experience • Predict organisational performance and guide organisations' investments in people • Increased revenue per employee • Rely on human capital as part of the company's strategy
VAR 14	Leadership practices aligned with organisational strategy	[34], [52], [48], [7]	<ul style="list-style-type: none"> • Predict organisational performance and guide organisations' investments in people • Minimise or manage risks and maximise opportunities
VAR 15	Employee engagement with strategic processes	[34], [52], [48], [50], [7], [5], [53], [54], [51], [6], [8]	<ul style="list-style-type: none"> • Predict organisational performance and guide organisations' investments in people • Maximise workforce productivity • Improved performance of strategic processes • Increased employee motivation • Improved decision-making processes
VAR 16	Accessibility of knowledge leads to better performance of strategic processes	[34], [52], [48]	<ul style="list-style-type: none"> • Predict organisational performance and guide organisations' investments in people • Improve business performance and long-term success
VAR 17	Workforce optimisation and rewards for good work as a vector for value creation in organisational strategy	[34], [52], [48], [51], [5], [4]	<ul style="list-style-type: none"> • Predict organisational performance and guide organisations' investments in people • Acceleration of business development
VAR 18	Diversity in workforce composition as a vector for value creation in organisational strategy	[48], [46]	<ul style="list-style-type: none"> • Promote innovation • Open the company to external knowledge • Achieve better performance owing to diversity dividend benefit
VAR 19	Employee well-being as a vector for value creation in organisational strategy	[48], [44], [47], [40]	<ul style="list-style-type: none"> • Health promotion, smoking reduction, increased propensity to vote, improving knowledge about birth control, and encouraging appreciation of classical music, literature, and sport.

3. RESULTS

3.1. Latent factors of optimisation processes and human capital

A factorial analysis was performed. The factor extraction method used in the research was the common factor analysis method, since the primary objective was to identify the latent dimensions or constructs represented in the original variables [55]. The initial criterion for determining the number of factors to extract was the latent root criterion, in which only factors that have latent root or eigenvalues greater than 1 are considered significant and so are retained for interpretation [55]. The number of factors extracted must be sufficient to meet a 60% level of explained variance [55]. In the present study, the total variance explained by the four factors extracted was 67.9%, as shown in Table 3. Regarding rotation, the oblique rotation method was used, because is the most appropriate method to obtain several theoretically relevant factors; realistically speaking, few constructs in the world are uncorrelated [55].

Table 3: Total variance explained

Factor	Initial eigenvalues			Sums of squared loads extraction			Shipments of rotation amount to square ^a
	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)	
1	4.4	29.5	29.5	4.0	26.8	26.8	3.9
2	3.5	23.2	52.7	3.0	20.3	47.1	2.2
3	1.2	8.2	60.8	0.8	5.1	52.2	2.0
4	1.1	7.0	67.9	0.7	4.8	57.0	2.0
5	0.7	5.0	72.8				
6	0.6	4.2	77.0				
7	0.5	3.6	80.5				
8	0.5	3.5	84.0				
9	0.5	3.1	87.2				
10	0.4	2.9	90.1				
11	0.4	2.5	92.6				
12	0.3	2.3	94.9				
13	0.3	1.9	96.8				
14	0.2	1.6	98.4				
15	0.2	1.6	100.0				

Extraction method: Main axis factorisation

a. When factors are correlated, the sums of squared loads cannot be added to obtain a total variance.

From the optimisation of processes, three important factors were identified: logistical efficiency and environmental impact; earnings management; and decision support. The logistical efficiency and environmental impact dimension aggregates variables related to the company's efficiency in receiving and sending its products, and the impact that business activity has on the environment. Earnings management is made up of variables that relate to the best execution of organisational activities, without losing sight of the financial issues. It was observed that the variables that formed this factor had negative factor loads. The negative sign did not affect the qualitative assessment of the factor, but it did indicate opposition to the behaviour of the variables from other factors. The factor decision support had characteristics related to the reliability of the information. Finally, concerning human capital, the variables were aggregated around a single dimension that was called 'human capital', as shown in Table 4.

Table 4. Patteern Matrix^a

	Factor			
	Human capital	Logistical efficiency and environmental impact	Earnings management	Decision support
Employee well-being as a vector for value creation in organisational strategy	0.807			
Accessibility of knowledge, leading to better performance of strategic processes	0.801			
Better human capital formation, aligned with organisational strategy	0.763			
Workforce optimisation and reward for good work as a vector for value creation in organisational strategy	0.732			
Leadership practices aligned with organisational strategy	0.715			
Employee engagement with strategic processes	0.695		-0.346	
Diversity in workforce composition as a vector for value creation in organisational strategy	0.644			
Logistic efficiency as a vector for value creation in organisational strategy		0.755		
Waste and loss reduction in strategic products' supply chain		0.569		
Reduction of environmental impact of industrial activities		0.530		0.358
Improved performance of strategic processes -industrial and service			-0.709	
Income optimisation (revenue increase, profit increase, and cost and expense reduction)			-0.539	
Speed and accuracy in the implementation of strategic processes			-0.512	
Information reliability for better strategic decision-making				0.861
Compliance with technical requirements of strategic processes		0.312		0.582

Extraction method: Main axis factorisation.
 Rotation method: Oblimin with Kaiser normalisation.
 a. Converged rotation in 15 iterations.

Among the process optimisation factors, it could be observed that logistical efficiency and environmental impact had a positive and moderate correlation with decision support (0.354). However, earnings management had a negative correlation with logistical efficiency and environmental impact and decision support, with respective values of -0.299 and -0.294. The negative correlation indicated that a policy of exacerbated valuation of earnings management was associated with a reduction in the sustainability of the supply chain, as well as a worsening in the decision-making process.

Table 5. Factor correlation matrix

Factor	Human capital	Logistical efficiency and environmental impact	Earnings management	Decision support
Human capital	1,00	0,054	-0,077	0,023
Logistical efficiency and environmental impact	0,054	1,00	-0,299	0,354
Earnings management	-0,077	-0,299	1,00	-0,294
Decision support	0,023	0,354	-0,294	1,00

Extraction method: Main axis factorisation.

Rotation method: Oblimin with Kaiser normalisation.

4. DISCUSSION AND IMPLICATIONS

The strategic processes are the pillars that support a company's strategy [56], and the strategic resources of human capital can be decisive achieving sustainable competitive advantage [49]. The main objective of this article has been to propose factors to optimise the processes and the human capital in order to generate value in organisations. Therefore, the study's findings identified the factors of process optimisation and human capital that could contribute to increased value in organisations as the following: human capital, logistical efficiency and environmental impact, earnings management, and decision support.

4.1. Human capital

Human capital is the stock of 'economically productive human resources' to solve business problems [37], [41], [48], [57], [58], and it must be managed and leveraged to create value [59].

Thinking about the role of human capital has been updated over time. In the 1950s, the value of the employee was in their production capacity [1]. There were no major issues involving the preservation of employees' health, participatory management, or the impact of companies on the environment, as would be seen during the two decades that followed [2], [3].

Beginning in the 1970s, transformations in companies and markets became faster and more complex, placing human capital as the main pillar of organisations' competitive advantage [33], [34], [36], [38], [39], [48], [49]. For 97% of the experts interviewed, it was the role and responsibility of human capital to consider people as the main factor in competitive advantage. Making people part of the business strategy would increase the company's longevity, enable an alignment between future performance and the present investment in employee training, prepare the company for the future, improve the use of technology, and encourage a culture of innovation.

The reaction of some organisations in preserving this competitive advantage is to try to restrict the mobility of employees to other companies by encouraging the development of specific knowledge and skills that would be difficult to apply in other organisations, but to the detriment of general knowledge [37], [41]-[43], [48], [60]. For 89% of the specialists, it was the role and responsibility of human capital to encourage specific knowledge about the company (training, courses, lectures), to reduce employees' moving to the competition, and to increase the company's specific human capital.

Rapid changes in the dynamics of the market demand an increasingly frequent recycling of employee knowledge. Investing in the best training of human capital, in line with the organisational strategy, contributes to increasing the revenue per employee and improving their knowledge, skills, and experience [34], [44], [45], [48], [50], [51], [60], [61]. Ninety-eight per cent of the respondents considered it relevant to invest in the formation of an organisation's human capital.

Actions must be taken to ensure the accessibility of knowledge, with ways to improve organisational performance and obtain long-term success [34]. Thus information about work and training must be readily available, teamwork encouraged, good practices shared, and information systems readily available. This was an action that 98% of the respondents considered relevant.

All organisations are made up of leaders and followers. For 97% of the experts, it was important that organisations practised open communication and collaborative leadership, thus promoting feedback and inspiring confidence. Adopting leadership practices aligned with the organisational strategy could contribute to minimising risks and maximising opportunities [48], [52]. According to the Human Capital Management (HCM) evaluation system [34], leadership is one of the drivers that help organisations to predict their performance. Therefore, to get a good performance of leadership practices, [34] state that it is necessary to develop the following: communication, inclusion, supervisory skills, executive skills, and transactional systems that support leadership.

Nevertheless, the role of the leader must go beyond directing the team to achieve strategies, and ensure an alignment between capabilities and challenges. The leader must provoke the team's engagement with the strategic processes, developing a sense of purpose in the team, thus increasing the employees' motivation, maximising the productivity of the workforce, and improving the decision-making process [50]-[54], [62], [63]. Ninety-four per cent of the specialists saw employee engagement in strategic processes as a necessary component in generating value for human capital in organisations.

An organisation's workforce needs to be optimised, and both leaders and followers need to be rewarded for doing a good job. Such attitudes accelerate the company's development, generating value for the organisation [4], [5], [34], [51], [52]. For 94% of the consulted specialists, organisations must provide working conditions that support the achievement of high performance, which must be rewarded.

A subject that has been much debated in organisations is the diversity factor. Eighty-eight per cent of the experts who were interviewed considered that the practice of diversity in the workforce would create value in organisations. The practice of diversity promotes innovation, and opens the company up to external knowledge, in addition to improving organisational performance because of the benefit of the diversity dividend [46], [48], [64].

Finally, organisations must promote well-being. Employees need to feel safe and happy if they are to do jobs well and sustainably and to preserve their health. For 93% of the specialists, it was the role of human capital to provide for the well-being of employees. Among the benefits of this practice are health promotion, reducing smoking, improved knowledge about birth control, and even encouraging the appreciation of literature and sport [44], [47], [48].

4.2. Logistical efficiency and environmental impact

Logistics is a strategic area in many organisations. The search for logistical efficiency promotes maximised revenue, increased profit, and reduced operating costs [11], [24], [25]. Ninety-five per cent of the respondents considered that logistical efficiency contributed to the generation of value in organisations.

Regarding the supply chain, 94% of the interviewees considered that the optimisation of processes was necessary to leverage a reduction in the loss and waste of strategic products. Loss and waste are intrinsic characteristics of the supply chain, but they can occur even in processes from other areas, such as information technology [12], [28], [29]. However, regardless of the area in which they occur, loss and waste must be combated.

Any business activity must consider the environment. Business activity can cause irreversible changes in the ecosystem in which they operate. It is possible to reduce the environmental impact of activities in the most diverse segments, such as steel, agriculture, power generation, and chemical products [15], [30], [31], [65]. For 72% of the specialists, the impact of industrial activities could be reduced through process optimisation.

4.3. Earnings management

Earnings management is fundamental to the sustainability of an organisation. Working for the achievement of a company's strategic goals and sustainability is the task of all employees. Defining its 'feasible strategic goals' helps an organisation to work towards the achievement of its strategic objectives. The establishment of goals plays a crucial role in an organisation's decision-making, because its level of performance is evaluated against its goals [5].

For 99% of the specialists, it was important to improve the performance of the company's strategic processes. Such an initiative would lead to increased productivity and the optimisation of the organisation's resources [19], [20], [22], [65].

Similarly, 99% of the experts believed that process optimisation would make income optimisation viable. Income optimisation acts as a way to maximise revenue, increase profit, and reduce costs and expenses, as well as promote employee engagement in new processes [14], [24], [25], [65].

Earnings management also promotes precision and speed in implementing strategic processes, enabling the organisation to reach high standards of quality [17], [21], [27], [66]. Of the experts, 92% stated that it was important to provide speed and precision in the implementation of strategic processes.

The earnings management factor showed a negative correlation with the other factors and the added variables of a financial, operational, and performance-improvement nature. Several organisations fail to practise earnings management, and so are misaligned from the many interactions that companies have with the market, the environment, and even between their internal departments [10]. For instance, considering only financial results as an organisational strategy without considering the well-being and development of employees, the environment, and the reliability of processes and information can hinder the sustainability of the company's results.

4.4. Decision support

Strategy is about making decisions, and good decisions are made from a combination of acquired experience and reliable information. Ninety-three per cent of the experts believed that process optimisation would favour information reliability for better decision-making [13], [15], [32], [67].

Finally, for 86% of the specialists, process optimisation must ensure compliance with the technical requirements of the strategic processes, thus ensuring compliance with production and operation requirements [15], [22], [26], [65], [68].

5. CONCLUSION

This article has presented a range of possibilities for process optimisation in the most diverse business segments. The objective has been to show that there is the possibility of improving how a service is provided or a product is manufactured, regardless of the sector in which the company operates.

This research updates the variables that are considered relevant to human capital and business process optimisation as a way to create value in Brazilian organisations. Moreover, the analysis has shown that experts do not perceive a correlation between human capital and process optimisation. Therefore, organisations must work on both themes to enable the generation of value.

Another finding of this research was the original aggregation of 15 variables in four latent factors, generated according to the nature of each of the variables, to help organisations target their investments.

The negative correlation between the result for the earnings management factor and the other factors was another finding. This highlights the need to practise a systemic view of organisations and to manage the risk of a strategy being negatively impacted by other actions from the same organisation. Finally, future research should try to measure the impact of process optimisation and human capital on a company's tangible and intangible assets.

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