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From Human Capital to Circular Capabilities: Digital Transformation and Inclusive Growth Tensions in a Brazilian SME

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Introduction

The circular economy (CE) was popularized by the Ellen MacArthur Foundation (2013) as an alternative to the linear model of extraction, production, and discharge of resources, emphasizing the circularity of products and materials and the regeneration of natural systems. CE models can also be considered as a complementary strategy toward decarbonization. According to the latest report (Macarthur & Heading, 2019), the energy transition can address 55% of global greenhouse gas (GHG) emissions, while the remaining 45% are associated with the production of goods and land use. However, CE has primarily been framed in terms of its economic and environmental aspects, and social benefits are usually presented as expected outcomes rather than being systematically investigated. In their analysis of 221 CE definitions in the literature, Kirchherr et al. (2023) found that approximately one-quarter of these definitions contemplate social equity or related concerns such as human well-being, socioeconomic development, and employment.

Similarly, when the social dimension is embraced, job creation is the main approach, including European Union policy discourse (Schöggl et al., 2020). Nevertheless, circular transitions can redistribute employment among sectors and skill levels instead of necessarily increasing the number of positions (Burger et al., 2019; Repp et al., 2021). Moreover, job quality and social inclusion have received comparatively less attention than economic and environmental outcomes (Pansera et al., 2024; Piao et al., 2023; Valencia et al., 2023). These limitations raise questions about employment opportunities, skill requirements, and whether circular transition benefits can be spread among different worker groups.

In Brazil, the political CE fundamentals can be traced to the National Solid Waste Policy (*Política Nacional de Resíduos Sólidos* - PNRS in Portuguese), which establishes shared responsibility (including every actor involved in a product's lifecycle) and reverse logistics (Brazil, 2010). More recently, the Circular Economy National Strategy (*Estratégia Nacional de Economia Circular* – ENEC, in Portuguese) has expanded the political agenda for innovation, competitiveness, and social inclusion (Brazil, 2024), and the National Circular Economy Plan 2025-2034 (PLANEC) has identified professional education, technological development, and coordination among business models as priorities (Brazil, 2025).

Although these initiatives signal a broader political orientation beyond waste management and recycling, their translation into organizational practices and workforce development remains a key area for research improvement. In this sense, limited attention has been paid to how employees' qualifications jointly support circular, digital, and international competitiveness in SMEs in emerging economies such as India.

This study investigates a Brazilian small business engaged in internationally connected packing and logistics activities, addressing the following research question: *How do human capital development and workforce qualification underpin the sensing, seizing, and transforming capabilities through circular, digital, and international integration?*

Theoretical Frameworks

This section posits the DCV as the main theoretical lens to examine how an organization mobilizes and reconfigures its resources in response to circular, digital, and international transitions, complemented by Human Capital and Institutional Theories.

Circular Economy as Systemic Organizational Transformation

Circularity changes the way in which organizational activities are conceived and performed. Beyond material substitution and resource-use efficiency, a greater circular transition could employ product redesign (based on ecodesign principles), process reconfiguration, collaboration with clients and suppliers, and the development of new business models (Bocken et al., 2016; Geissdoerfer et al., 2017; Korhonen et al., 2018).

These modifications require more than just technical expertise. Exploring alternative materials and their potential applications, interpreting operational data, coordinating reverse logistics, and adapting existing practices depend on employees' ability to learn and collaborate across organizational profiles. Nevertheless, individual competencies do not automatically become organizational capabilities because the contribution depends on how knowledge sharing is integrated and incorporated into collective routines (Crossan et al., 1999; Ployhart & Moliterno, 2011). From this point of view, human capital may contribute to a circular transition not only through operational efficiency but also by detecting opportunities and reconfiguring management practices (Teece, 2007).

Circular Transition in Emerging-Economy SMES

The proximity and flexibility of SMEs with their customers may promote experimentation, but this coexists with financial constraints and dependence on external actors (Malik et al., 2022; Takacs et al., 2022). Capital, technical experience, and certification capacity shortages remain recurring and interdependent barriers to adoption (Fontoura et al., 2024; Gennari, 2023). This situation could be amplified in emerging economies and in the Latin American context, where higher-value strategies remain underdeveloped (Gallego-Schmid et al., 2024).

Human capital limitations are central: higher-quality human resource development requires coordinated investment in education and institutional support (Kucharčíková et al., 2023; Ngoc & Tien, 2023), but qualified employees alone do not ensure transition without absorptive capacity built on prior knowledge and experimentation (Marrucci et al., 2022).

Regarding internationally connected SMEs, external requirements for traceability and certification can stimulate upgrading. However, the literature investigating global value chains shows that economic actualization does not necessarily translate into social actualization, as observed in better opportunities for the workforce (Barrientos et al., 2011). The present study thus distinguishes inclusive growth from international integration by examining it through seven dimensions: qualification, employability, professional mobility, autonomy, participation in decision-making, job quality, and distribution of circular-economy benefits. Moreover, this leads to the exclusion of resource-poor firms, a tension developed in Section 2.6.

Dynamic Capabilities and Circular Organizational Change

Dynamic capabilities are an organization's ability to integrate, build, and reconfigure internal and external competencies to address environmental changes (Teece et al., 1997). From an RBV perspective, valuable resources alone do not necessarily generate value for the firm because they must be noticed, activated, and recombined. Teece (2007) divides dynamic capabilities into three interrelated processes that explain how a firm shifts from merely possessing resources to actively mobilizing them.

Sensing involves identifying and interpreting environmental changes, such as clients' new demands, new technologies, or regulations, and determining which resources may gain or lose value. Seizing involves deciding where to deploy resources to capture these opportunities by adjusting the business model, financial decisions, and the definition of enterprise boundaries. Transforming comprises the reassembling of resources, routines, and existing structures to make them part of the regular operation of the firm. These are iterative processes; reconfiguration generates new information that nurtures another identification and decision cycle.

Circularity is therefore a dynamically developed capability. In CE transition, this reconfiguration is more than adopting one sole circular practice because it can reach material flux, business model, and even supply-chain relationships (Saari et al., 2024; Santa-Maria et al., 2022). For SMEs with limited resources, using existing is more viable than acquiring new ones (Malik et al., 2022; Takacs et al., 2022), highlighting the role of humans at each step. They are the microfoundations of these outcomes: capture signals (sensing), assess and implement alternatives (seizing), and convert knowledge into routines (transforming). The next section examines this role in detail.

Human Capital as a Micro foundation of Circular Dynamic Capabilities

Human capital theory partially supports CE transitions because education, experience, and skills expansion improve individual knowledge and labor-market opportunities (Becker, 1964). Accordingly, Ployhart and Moliterno (2011) conceptualize human capital resources as a multilevel process, while Felin (2012) draws attention to the individual and organizational mechanisms aligned with these capabilities. Staff development practices can enhance human and social capital when knowledge management links individual learning to some organizational processes (Al-Tit et al., 2022). In addition, proficiency-based HR routines are intrinsically bound to intellectual capital and innovation (Kianto et al., 2017). Kucharčíková et al. (2023) show that investments in workers' qualifications increase productivity, especially as career development and intellectual capital antecedents influence outcomes through collaborators' engagement and organizational processes (Bontis & Fitz-enz, 2002; Yang & Lin, 2009).

Based on these perspectives, the present study argues that workforce qualification subsidizes the circular dynamic capabilities of SMEs, not only because they increase technical competence but also by enabling operational opportunity recognition, qualified participation in resource allocation, and the proposal of organizational process improvements. These contributions correspond to perception, apprehension, and transformation, respectively. Nevertheless, their realization depends on organizational conditions that allow individual knowledge to influence collective actions.

Moreover, the effect of employees' qualifications is not equivalent to professional mobility or employment, as specific training for restricted tasks increases short-term efficiency (without necessarily adding value), whereas interdisciplinary or certified competencies could amplify both organizational capabilities and long-term professional perspectives.

Digital Transformation, Organizational Learning and Horizontal Governance

Most current digital technologies (sensors, IoT, business analytics, AI, and Customer Relationship Management (CRM) systems) are critical enablers of circular business models by improving visibility and coordination (Kristoffersen et al., 2020; Ranta et al., 2021). Results from SMEs in emerging economies show that digitalization and circularity can jointly improve resource exploitation, although higher investments in training and infrastructure limit their implementation (Despoudi et al., 2025; Paredes-Carrasco et al., 2026). However, digital transformation success also relies on complementary human and organizational capabilities rather than the exclusive acquisition of technology (Kristoffersen et al., 2020; van Eechoud & Ganzaroli, 2023).

Organizational learning can reduce the gap between personal capabilities development and company practices (Crossan et al., 1999) because it improves firm performance by promoting human capital improvement (Hsu, 2008), increasing intellectual capital (Kianto et al., 2017; Wang et al., 2014), fostering a horizontal culture by decentralizing ownership (Cardoso & de Andrade Baptista, 2015), enhancing leadership by relations (Ferreira et al., 2025), and easing communication mistakes (Edmondson, 1999).

Institutional Pressures and Organizational Responses

Dynamic Capabilities View (DCV) and Human Capital Theory explain how firms mobilize internal resources and competencies; however, they inadequately address the external regulatory and normative pressures that shape circular decisions in emerging economies. Institutional Theory fills this void. DiMaggio and Powell (1983) identified coercive, normative, and mimetic pressures as mechanisms of organizational isomorphism. Scott (2014) consolidates Institutional Theory by arguing that organizations are shaped by economic efficiency, along with social, cultural, and legal pressures.

Instead of acting in segregation, these institutional pressures dynamically interact with supply-chain integration (Calzolari et al., 2023). Brazil has codifying demands gradually by a most comprehensive agenda, notably by PNRS, ENEC, and PLANEC (Brazil, 2010, 2024; Brazil, 2025). Yet, as noticed by Guarnieri et al. (2025), the real change toward circularity depends more on operational execution than legislation. This situation was debated in the study of (Mont Alverne & Holanda, 2025) where a vulnerability of weak implementation contrasts with increasing legal mandates.

Expectations regarding international certification and supply chains may speed up CE adoption by reducing uncertainty (Berrone et al., 2013; Calzolari et al., 2023; Delmas & Toffel, 2008), but is a relevant burden for SMEs. Oliver (1991) categorized the responses ranging from acquiescence to manipulation, consolidated here into four types (Frame 1). This is consistent with the distinction between policy-practice and means-ends decoupling (Bromley & Powell, 2012).

Frame 1: Typology of organizational answers to institutional pressures for circular transition

Response	Organizational manifestation
Substantive transformation	Circular requirements are integrated into strategy, investments, routines and business models
Selective or partial compliance	Some requirements are implemented, but their scope or organizational coverage remains limited
Symbolic or ceremonial adoption	Policies, certifications or sustainability terminology are adopted without corresponding operational change
Resistance or avoidance	Requirements are postponed, circumvented, negotiated or rejected

Source: Developed by the authors based on Oliver (1991) and Bromley and Powell (2012).

The seven analytical dimensions adopted in this study (Frame 2) serve as criteria to distinguish organizational compliance from inclusive circular transformation, which are qualification, employability, professional mobility, autonomy, participation in decision-making, employment quality, and distribution of benefits.

Responses are shaped by internal interpretation and capabilities as much as by external pressure (Castro-Lopez et al., 2023; Delmas & Toffel, 2008), and compliance can remain superficial rather than substantive (Testa et al., 2018). The seven dimensions in Frame 2 provide the criteria for distinguishing compliance from inclusive transformation.

Frame 2: Analytical dimensions and indicators of inclusive circular transformation

Dimension	Evidence of a substantive and inclusive response	Evidence of a limited or symbolic response
Qualification	Employees receive relevant and continuous learning opportunities	Training is occasional, restricted or directed only towards obtaining certification
Employability	Developed competencies are transferable to emerging circular or digital functions	Learning remains limited to narrow operational tasks
Professional mobility	Employees gain access to new roles, responsibilities or career progression	Responsibilities increase without corresponding recognition or progression
Autonomy	Employees can apply knowledge, propose solutions and adapt work practices	Decisions remain concentrated despite nominal empowerment
Participation in decision-making	Employees influence indicators, alternatives and implementation decisions	Participation is restricted to receiving information or being consulted
Employment quality	Circular transition supports recognition, appropriate working conditions and sustainable professional development	Efficiency gains are accompanied by work intensification, insecurity or deterioration of working conditions
Distribution of benefits	Opportunities, recognition and gains reach different occupational groups	Benefits remain concentrated among managers or specialized employees

Source: authors.

Integrated Analytical Framework

The theoretical perspectives reviewed above address distinct but interrelated aspects of circular organizational transformation. This study assigned different analytical roles to these factors (Figure 1). The Dynamic Capabilities View (DCV) provides the principal explanatory lens for examining how resources are mobilized through sensing, seizing, and transforming. Institutional Theory complements this by explaining the external pressures and expectations, particularly those arising from international relationships, that bring circularity to the organizational agenda. Human Capital Theory offers a potential microfoundation by identifying how employees' knowledge, skills, and experience may underpin these capabilities.

Aspects such as organizational learning, digital technology adoption, and horizontal governance can act as conversion mechanisms, enabling or restraining the translation of individual resources into collective capabilities, and ultimately promoting circular change. Four propositions are derived from this integration. These are orienting statements for the exploratory case analysis and not hypotheses to be tested.

Instead of viewing this as organizational learning, digital technologies, and horizontal governance are not isolated issues. They can facilitate or constrain the transference of individual resources into the organization workforce and consequently into the circular transition, although inclusive growth is not always guaranteed. From this integration, four propositions are derived. They are not hypotheses to be tested but orienting statements for the exploratory case analysis:

- P1. Institutional pressures and international relationships shape opportunities for circular transformation; however, their effects depend on how the firm interprets and incorporates external requirements.
- P2. Human capital and organizational learning underpin sensing, seizing, and transforming, as individual knowledge and competencies inform decisions and routines.
- P3. Digitalization and horizontal governance condition the mobilization of these capabilities by enabling or restricting the communication, coordination, and participation of the actors involved.
- P4. Competitive and inclusive outcomes are distinct and not necessarily coincidental. Circular change may enhance competitiveness without broadening qualifications, employability, mobility, autonomy, participation, employment quality, or the distribution of benefits.

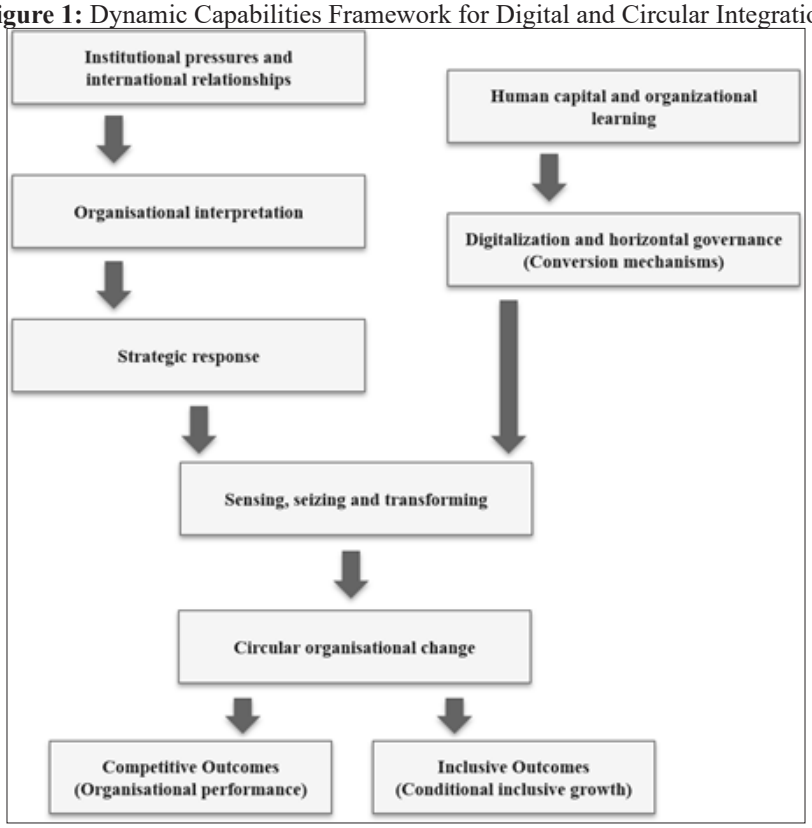
It should be noted that, the last one (P4), is central to the framework because it prevents equating organizational efficiency with inclusive growth. Therefore, the analysis therefore asks how human capital contributes to circular, digital, and international integration. It also asks who develops competencies, gains opportunities, and benefits from the resulting changes.

Figure 1 integrates these perspectives, proposing that institutional and human/digital pathways converge in sensing, seizing, and transforming, producing distinct organizational and inclusive-growth outcomes.

As indicated (Figure 1), institutional pressures and organizational resources do not automatically produce a circular transition because the effects depend on how the requirements are interpreted, the active mobilization of resources, and the conversion of knowledge into collective capabilities. The framework distinguishes the organizational performance of inclusive growth, as the latter is a conditional outcome. Circular change can improve competitiveness without expanding job quality, professional opportunities, or shared benefits.

The next section presents the methodological procedures used to examine these relationships, including the research design, case selection, evidence sources, and measures addressing researcher positionality.

Figure 1: Dynamic Capabilities Framework for Digital and Circular Integration



Source: elaborated by the authors.

Note: The arrows represent theoretically proposed relationships rather than statistically tested causal effects.

Methodological Procedures

Research Design

This study adopted a qualitative, exploratory, single-case design to examine the circular transition of a Brazilian, internationally connected SME that manufactures and trades flexible bulk bags made from cotton canvas and also operates in import-export and logistics. A case study strategy is well suited to investigate a contemporary organizational process that cannot be separated from its context (Yin, 2014, 2018), and a single case can support theory development when it offers unusual access to the process under study (Eisenhardt & Graebner, 2007; Siggelkow, 2007).

Using a retrospective process approach (Langley, 1999; Langley et al., 2013), this study reconstructed how this transition, shaped by institutional and international pressures, unfolded across several dimensions: business model transformation, human capital development, digitalization, organizational learning, and horizontal governance. Because retrospective accounts are prone to recall bias (Golden, 1992), they were checked against the company records and performance indicators (Bowen, 2009). This study sought analytical rather than statistical generalization, comparing empirical patterns against the constructs and propositions developed above (Eisenhardt, 1989; Yin, 2018).

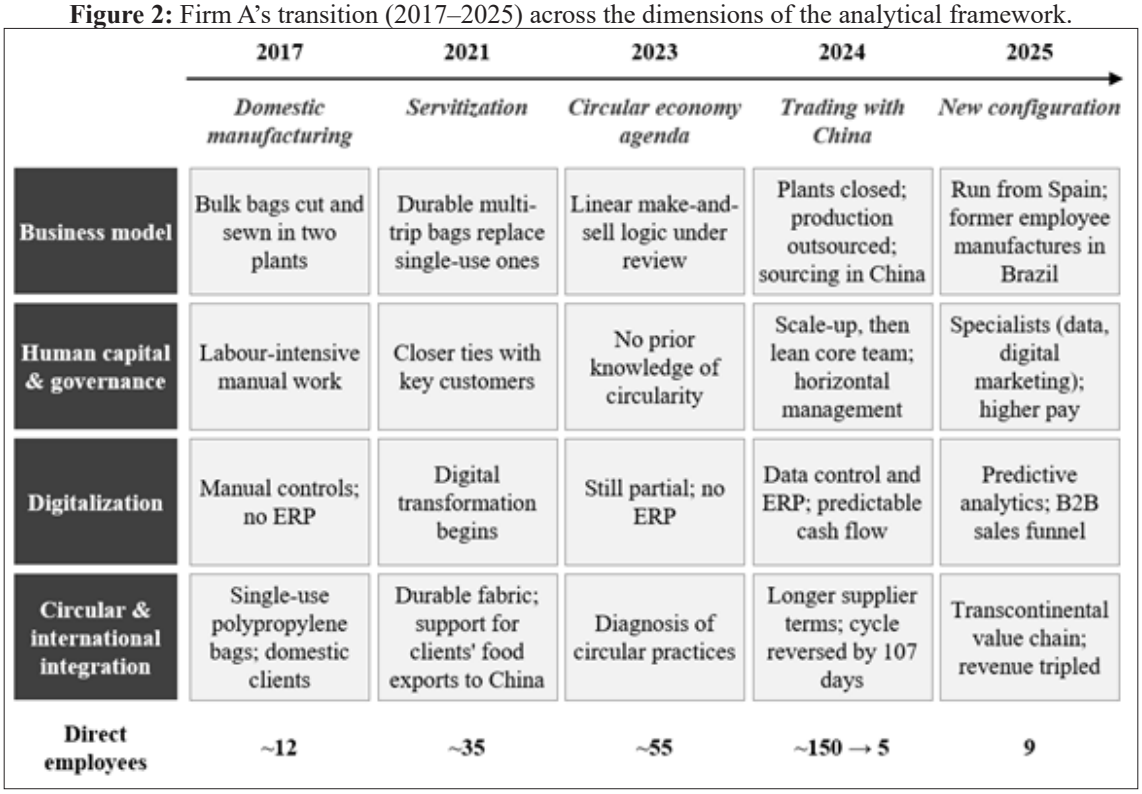
Case Selection and Organizational Context

Firm A underwent a transition from domestic packing manufacturing to servitization and digitalization, which allowed the company to integrate an international supply chain loop with Asia. Furthermore, the company has progressively incorporated traceability, certification, ecodesign initiatives, and other emerging circular practices. The case was accessed through convenience-based selection, as one of the co-authors owns Firm A, knowing that this proximity carries risks of bias, we describe the measures adopted to overcome this in the next section.

Besides accessibility, Firm A met the main selection criteria: substantial business model transformation, participation in international value chains, adoption of digital technologies and circular practices, and changes in workforce composition and governance routines. Therefore, it is an information-rich case (Patton, 2015) chosen for its theoretical relevance rather than its representativeness. Human capital analysis was restricted to a core team of five people formed during the 2024 restructuring process, which serves as Firm A's top management team (TMT). The four professionals hired (in 2025) report to this team and were excluded because their trajectories within the organization are still too short to understand how this individual knowledge enters organizational routines.

Moreover, a prior study within Firm A (Authors, 2025) examined CE transition through a servitization and circular business model lens. Here, we revisit it from a different angle, foregrounding the human-capital and dynamic capabilities microfoundations that underpinned it. Figure 2 traces Firm A's transition from 2017 to 2025 across the four dimensions of the analytical framework. As the firm became more international and digital, the number of direct employees changed sharply.

Figure 2: Firm A's transition (2017–2025) across the dimensions of the analytical framework.



	2017	2021	2023	2024	2025
	Domestic manufacturing	*Servitization*	*Circular economy agenda*	*Trading with China*	*New configuration*
Business model	Bulk bags cut and sewn in two plants	Durable multi-trip bags replace single-use ones	Linear make-and-sell logic under review	Plants closed; production outsourced; sourcing in China	Run from Spain; former employee manufactures in Brazil
Human capital & governance	Labour-intensive manual work	Closer ties with key customers	No prior knowledge of circularity	Scale-up, then lean core team; horizontal management	Specialists (data, digital marketing); higher pay
Digitalization	Manual controls; no ERP	Digital transformation begins	Still partial; no ERP	Data control and ERP; predictable cash flow	Predictive analytics; B2B sales funnel
Circular & international integration	Single-use polypropylene bags; domestic clients	Durable fabric; support for clients' food exports to China	Diagnosis of circular practices	Longer supplier terms; cycle reversed by 107 days	Transcontinental value chain; revenue tripled
Direct employees	~12	~35	~55	~150 → 5	9

Source: Prepared by the authors based on company records and research notes.
Note: n/a = data not available.

Data Sources and Analysis

The study covers the period from 2017, when the firm was founded, to 2025. Evidence came from three sources. The first was company documents, including financial and operational records, contracts with suppliers and customers, certification records, and internal reports (around 15 documents). The second was the minutes of the TMT's weekly and fortnightly meetings from 2023 to 2025, which show how problems were raised, discussed, and turned into decisions. The third was six interviews with the owner-coauthor, conducted between 03/2024 and 02/2026, on the stages of the transition, the decisions taken at each stage, and the career paths of TMT members.

Because the interviews relied on a single informant who was also a coauthor, they were used mainly to build the chronology of events and to identify which documents to examine. The owner-coauthor did not take part in coding. The other two coauthors first organized events in chronological order to reconstruct the stages of the transition (Langley, 1999). They then coded the evidence according to the dimensions of the analytical framework (business model, human capital, organizational learning, digitalization, governance, and inclusive growth) and compared the resulting patterns with the four propositions (Yin, 2018). Codes and interpretations were discussed in joint meetings, and a claim from the interviews was kept only when documents or meeting minutes supported it (Miles et al., 2014).

Researcher Positionality and Reflexivity

Since one coauthor owned the firm, we had access to contextual knowledge that external researchers rarely obtained. This dual role, however, carries the risks of selective recall and confirmation bias (Berger, 2015; Brannick & Coghlan, 2007). So, we distributed the roles in the analysis among the other coauthors to reduce unfair judgment. The owner-coauthor was interviewed and supplied company records, but did not take part in coding; the other coauthors coded and interpreted the data. We discussed interpretations together and kept only claims supported by documents (Tracy, 2010). We checked the owner's accounts and perceptions against documents and performance indicators. We also retained findings that contradict a positive reading of the transition, such as the reduction in direct employment. Because we have no longitudinal data on former employees, we cannot conclude how the transition affected them.

Methodological Boundaries

This research has some shortcomings. The interviews involved a single informant, the owner-coauthor. The views of other TMT members, former employees, and partners were captured only indirectly, through documents and meeting minutes. Because the analysis covers only the TMT, it says little about the experience of employees in less senior positions, and as it is a retrospective single-case study, it is not possible to establish causality or separate the effects of human capital and digital technologies from market demand, exchange rates, or legislation (which could be an important driver/enforcement mechanism). In addition, some key indicators are not comparable directly over time.

Volume (and revenue) figures should also be considered carefully. Before the transition, they referred to bags (one-way) that the company itself produced; today, they refer to bags

manufactured in Brazil or China and bags traded through its platform, many of which are designed for multiple uses. This increase shows that the company operates on a larger scale but says little about productivity. In addition, we have no complete longitudinal data on former employees, and environmental outcomes were not independently verified.

Results

Case Background and Business-Model Transformation

The firm began as a domestic manufacturer of bulk bags and gradually became an internationally integrated service provider. It is now building a circular platform based on traceability, certification, eco-design, and component reuse. We describe this path in three stages, which group the phases shown in Figure 2: In the beginning, the firm produced packaging in its own plants (Stage 1, between 2017 and 2023), moving from single-use (polypropylene bulk bags) to durable canvas bags and beginning digital transformation (mainly accounting and management practices and customer support). In Stage 2 (2024), it closed its plants and started importing, selling, and coordinating logistics with Chinese suppliers (trading companies).

In Stage 3 (2025 onward), the firm has been developing a circular platform, supported by AI-based analytics, across a supply network spanning several continents. Servitization, international relationships, staff skills, and digital infrastructure have shaped this path. The product as a service paradigm came before the firm explicitly adopted circular practices, suggesting that the earlier changes helped create some of the financial, technological, and relational conditions that the circular model required.

Human-Capital Reconfiguration

After being restructured in 2024, Firm A kept a central core team of five people (Frame 3), responsible for accounting, control, finance, international trading, logistics, quality and certification, digital marketing, artificial intelligence use and data analysis. Four of them (80% of the workforce) developed their skills within the firm, through training and promotion. The fifth one, a digital specialist, was hired from outside because no one in the firm had the required skills. As business demands grew, the team was expanded to nine (Figure 2).

Two of the internal trajectories show how this development happened. The first employee came from operations, took undergraduate courses in Administration and International Trade, studied foreign languages, and joined professional networks of customs brokers and national and international carriers. The second employee started on the factory floor and moved to a technical role covering pre-sales, after-sales, inspection, and quality certification. This employee now studies Accounting and English, being prepared to manage a new distribution center in another Brazilian state, one of the locations the firm is opening in response to the Brazilian tax reform. The Commercial Director followed a similar path, combining formal education with on-the-job learning. We chose these four cases because their roles changed the most. The Director, who is also the owner-coauthor, holds two undergraduate degrees (one in Law and another in Accounting) and an academic master's degree in "Finance and Accounting". We report his trajectory for completeness but do not use it as evidence of internal development, given his dual role in the study.

Frame 3: Human-capital profiles and their contributions to dynamic circular capabilities

Role or profile	Initial knowledge or experience	Qualification and development	Contribution to dynamic capabilities (DCV)
Director	Management and strategic experience	Master's degree in Accounting, Controllership and Finance	Financial interpretation, strategic coordination and international transition
International trade and logistics professional	Former employee with operational knowledge	Undergraduate studies in Administration and International Trade, English courses and participation in logistics networks	Identification of suppliers, customs requirements and international logistics alternatives
Commercial director	Commercial experience	Foreign-language and AI-for-business training; development of a proprietary sales-funnel methodology	Market sensing, customer acquisition and commercial scalability
Technical, quality and certification professional	Former factory-floor employee	Currently studying Accounting and English	Technical pre-sales, after-sales, certification, inspection and development of distribution centres
Newly recruited digital professional	E-commerce, digital marketing and data-science experience	Integration into the company's commercial and digital routines	Automated marketing, CRM analytics and AI-supported customer qualification

Source: authors.

These career paths show qualification, role expansion, and professional mobility. However, their value to Firm A came from how individual knowledge was translated into daily routine improvements. The first employee's network of customs brokers and carriers was the foundation of coordinated bulk bag logistics for international trade. The experience of the second employee in inspection and certification defined quality-control and traceability procedures that support the reuse of bags. Therefore, human capital worked as a microfoundation of the firm's circular dynamic capabilities: it mattered once it was built into shared routines.

Horizontal Governance, Organizational Learning and Digital Transformation

The TMT works without a rigid hierarchy. Each member has defined responsibilities, but all have access to commercial, operational, and financial information. Short daily meetings deal with immediate issues. A longer meeting on Fridays looks at problems that keep coming back, and this is where much of the team's learning happens. Every two weeks, the team reviews key performance indicators (KPIs), financial results and strategic priorities. This routine allows errors to be corrected quickly and makes each member accountable to the others. Learning in the TMT takes three forms, which follow the mechanisms described by Zollo and Winter (2002). The first is experience: members often move between tasks, so that the person handling an import one month may be dealing with certification or customer service the next, and each of them ends up knowing how the different parts of the operation depend on each other. The second is discussion. When a problem appears more than once, it goes to the Friday meeting, where the team looks for its cause and agrees on a new way of working; (example: a recurring delay in customs clearance led to a checklist shared with the brokers). The third is codification. Much of what the team learned in the early years with Chinese suppliers, especially about the gap between paying for imports and collecting from customers, was later built into the firm's digital tools. In this sense, the AI modules described below are partly a record of what the team has learned.

The same five people also acted as a digital transformation committee. They developed their own AI-supported modules for automated marketing, customer analysis, customer relationship management (CRM), financial control, logistics, and the management of quality certificates. No output was acted upon before someone on the team reviewed it. The committee also built predictive tools to estimate how much cash the firm will need between paying for imports and being paid by customers. Digital tools thus serve two purposes: they automate routine work and help the team judge financial and operational risks.

Performance Outcomes and International Integration

Frame 4 shows how the firm's scale and efficiency changed over the last two years. The volume figures need some care. Before the transition, they referred to bags the firm produced itself; today they refer to bags traded through its platform. The increase shows that the firm now operates on a larger scale, but it tells us little about productivity. The cash cycle fell from 107 to 70 days, a reduction of approximately a third.

Much of this came from the relationship with the Chinese supplier. The supplier contributed manufacturing capacity and financing, and the Brazilian team contributed commercial, logistics, and certification skills. As trust grew, the supplier extended payment terms, which reduced the firm's need for working capital. Requirements from international buyers and the European Union (EU) shaped other changes, including traceability, packaging certification, and planned changes in product design. The business model is still only partially circular. Eco-design, component reuse, and closed-loop flow are still under development.

Frame 4: Before-and-after indicators of organizational transformation

Indicator	Before transition	Current situation	Change
Direct workforce	Approximately 150 employees	Five (TMT, after 2024 restructuring)	Reduction of approximately 97%
Bag volume (monthly)	18,000–20,000 bags (own production)	Approximately 50,000 bags (traded)	Increase of 150%–178%
Operating or cash-flow cycle	107 days	70 days	Reduction of 37 days, (34.6%)
Business model	Domestic manufacturing	Internationally integrated service platform	Structural transformation
Circularity	Mostly linear	Partial and under development	Progress in traceability, eco-design and reuse
Digital capabilities	Limited	Proprietary AI and analytics tools	Substantial expansion
International credibility	Primarily domestic relationships	Strategic relationship with Chinese supplier	Increased access to commercial and financial support

Source: Prepared by the authors from company records.

Frame 4 also shows the cost of these gains: the firm now handles more than twice as many bags with a small fraction of its former workforce, which raises the question of who benefits from the transition.

Inclusive-Growth Outcomes And Tensions

Frame 5 sets out what the evidence shows, and what it does not, for each dimension of inclusive growth. Apart from the owner-coauthor, three of the four TMT members came from the firm's own workforce, including one who started on the factory floor and now manages a distribution center (Section 4.2). Only one TMT position, a digital specialist, was filled from outside, as no one in the firm had the required skills. Most of the qualifications these members gained were degrees in administration, international trade, and accounting, foreign languages, and knowledge of customs and international logistics.

According to the firm, TMT members are paid above the sector average and receive performance bonuses or a share of profits, depending on their role. They also take part in decisions that were once reserved for the owner, such as signing contracts with new customers in Africa. In 2025, the firm hired four new employees on formal contracts under Brazilian labor law (CLT). They report to TMT and were trained for specialized roles in digital transformation, circularity, and international operations. Their hiring is too recent to be analyzed here (Section 3.2).

At its peak, the firm employed about 150 people. Much of the fall in direct employment came from outsourcing: approximately one-third of the production stayed in Brazil, taken over by a former employee, and the rest moved to the Chinese supplier. The firm helped dismissed workers find new jobs, and its managers believed that the local labor market was strong for workers with these skills, but we could not verify where they went.

Frame 5 below follows the seven dimensions of Frame 2, merging autonomy and participation and adding three dimensions that emerged from the case: human capital, formal job creation, and entrepreneurship to investigate the challenges.

Frame 5: Evidence and limitations across the dimensions of inclusive growth.

Dimension	Positive evidence	Limitation or tension
Professional mobility	Three TMT members came from the firm's own workforce (including one from the factory floor); only one TMT position was filled from outside	Limited to a small group
Human capital	Gains were mostly general (degrees in Administration, International Trade and Accounting; languages; customs and international logistics) and remain with the workers	Measured through qualifications, not through earnings over time
Qualification	Technical, financial, language and digital skills gained by TMT members; four new employees trained for specialized roles in 2025	Concentrated in a small group
Employability	General skills are valued in international, digital and circular markets; dismissed workers received help with relocation	No data on where former employees went
Participation and autonomy	Daily, weekly and fortnightly meetings; joint TMT decisions on new customer contracts (Africa)	Limits of each member's authority not examined
Employment quality	Pay above the sector average; performance bonuses or profit sharing, depending on role	Based on the firm's account; workload not measured independently
Formal job creation	Four new employees hired on formal contracts (CLT) in 2025, in more skilled positions	Too recent to assess their development
Entrepreneurship	A former employee took over about one third of production in Brazil	No data on the new firm or its workforce
Distribution of benefits	Knowledge and information shared across the TMT; part of production kept in Brazil under a former employee	Effects on the former workforce not verified

Source: Prepared by the authors from company records and information provided by the firm.

Whether a transition of this kind counts as inclusive growth, therefore, depends on whose experience is counted. We return to this question in Section below

Findings in Relation to the Analytical Propositions

The four analytical propositions were examined against the evidence, with attention to the role of human capital in each proposition.

- **P1 is supported.** Requirements from international customers, certification bodies, and EU standards have brought traceability, certification, and eco-design onto the firm's agenda. What the firm did with these requirements, however, depended on how the team read them. Members with experience in foreign trade and certification were the ones who turned external demands into concrete changes in products and procedures.

- **P2 is also supported**, and it is the proposition most closely tied to the objective of the study. The knowledge that TMT members gained through undergraduate study, language training and daily work in trade, finance, logistics and certification helped the firm spot opportunities abroad, decide which ones to pursue and change its operations accordingly. This knowledge mattered to the firm because it entered shared routines, especially the Friday meetings where recurring problems were examined and new ways of working were agreed.
- **P3 is supported.** The AI tools, cash forecasting, and sales-funnel method gave the team better information, and horizontal governance ensured that this information reached everyone. Without daily meetings, shared KPIs, and open access to commercial and financial data, the skills of individual members would have stayed with each of them instead of becoming team capabilities.
- **P4 is confirmed.** The firm became more competitive: traded volume rose and the cash cycle fell from 107 to 70 days, although our data cannot show that dynamic capabilities caused these results. Inclusion followed a different path. Members of the TMT, most of whom came from the firm's own workforce, gained qualifications, autonomy, and better positions, while direct employment fell sharply. Competitive and inclusive outcomes did not move together, as P4 anticipated.

No single investment explains the transition. Human capital, learning, digital tools, and horizontal governance acted together, and the result brought gains for the firm and for the people who stayed, at a cost in jobs. The following sections discuss this tension.

Discussion

This study examined how human capital development and workforce qualifications underpin the sensing, seizing, and transforming capabilities of SMEs moving toward circular, digital, and international integration. Teece (2007) describes these three activities as the core of dynamic capabilities and argues that they rest on microfoundations: the skills, processes, and decisions through which a firm notices change, commits resources, and reorganizes itself. He gives particular weight to managers and entrepreneurs, whose judgment drives much of this process. The case of Firm A supports this view but also extends it. Here, the three activities began with the owner and, over time, came to depend on employees who had gained the knowledge to take part in them. The rest of this section examines how this happened and who benefited from it.

Sensing began with the owner. Comparing the firm's physical operations with e-commerce models, he saw that Chinese manufacturers had spare capacity but could not enter the Brazilian market because of language and cultural barriers, and that the firm could act as their link. Over time, sensing spread to the TMT. Members with experience in foreign trade and certification were the ones who read the requirements of international buyers and the EU, and the team as a whole identified new markets, such as Africa. Seizing depended on financial and logistics knowledge. The firm closed its plants one at a time, used the savings from the first closure to invest in data control and cash planning, and only then closed the second. It also moved to durable multi-trip bags, negotiated longer payment terms with its Chinese supplier, and hired a digital specialist. Transforming involved the entire organization: a smaller and more qualified team, horizontal governance, new information systems, and a business model built around a service platform. These changes came with a larger operating scale and a cash cycle 34.6% shorter, although the earlier and current volume figures do not measure the same activity.

The case confirms that human capital matters, but it also shows that educated employees do not by themselves produce organizational capabilities. The firm built its capabilities in two ways: Most of the TMT came from its own workforce and combined years of practical experience with formal study. One position in digital technology was filled from outside because the required skills did not exist in the firm. In both cases, knowledge became valuable only when it was applied in the firm's processes, as research on intellectual capital has argued (Bontis & Fitz-enz, 2002; Yang & Lin, 2009).

Most of the human capital the TMT gained was general, not firm-specific (Becker, 1964). Degrees in Administration, International Trade and Accounting, foreign languages, and knowledge of customs and logistics have value in many firms. Becker expected firms to avoid paying for this kind of training, as workers can take it with them. The fact that the firm supported it anyway is relevant to the study's question about who benefits. The gains belong to the workers, and they would keep them if they left, but they can collectively flourish with knowledge sharing supporting the firm's success.

How individual knowledge became collective capability is explained by the firm's learning routines and horizontal governance (P2 and P3). In daily, weekly, and fortnightly meetings, members raised what they had observed, discussed it, and turned it into decisions and procedures. This follows the sequence of interpreting, integrating, and institutionalizing described by Crossan et al. (1999), and it corresponds to what the microfoundations literature calls aggregation, the process by which individual actions add up to a collective capability (Chen et al., 2023). Horizontal governance helped by removing barriers to information between functions, while each member kept clear responsibilities.

According to previous studies, knowledge sharing and employee development are positively related to enhancing intellectual capital and firm performance (Al-Tit et al., 2022; Hsu, 2008; Kianto et al., 2017; Wang et al., 2014), as well as flexible and relational leadership (Cardoso & de Andrade Baptista, 2015; Ferreira et al., 2025).

Digital technology complemented the team's judgment and did not replace it. Every output of the AI tools for customer qualification, marketing, and financial forecasting is checked by a team member before anyone acts on it. The predictive cash tools were not part of a general digital plan. They were

built to solve a specific problem, the gap between paying for imports and receiving payment from customers.

The firm did not become circular through a single environmental project. Circular practices grew out of servitization and international integration, suggesting that these earlier changes created the knowledge and information systems that more advanced circular strategies require. This case also shows that a circular transition can take place across borders (P1). Manufacturing and financing came from China, commercial and certification skills from Brazil, and many of the requirements from the European Union.

On inclusive growth, the case points in two directions, as P4 anticipated. The clearest gain is upward mobility. Of the four TMT members developed inside the firm, three, excluding the owner-coauthor, came from its operational workforce, one of them from the factory floor, and according to the firm, they now earn above the sector average and share in results. In 2025, the firm also began hiring again, on formal contracts and for more skilled roles. These outcomes fit SDG target 8.2 well and target 8.5 United Nations (2015) and Sen (1999). However, the number of people who benefited is small compared with the roughly 150 the firm employed at its peak, and the later careers of those who left, who received help with relocation, remain a question for future research.

Brazil's National Circular Economy Strategy (ENEC) prioritizes bringing vulnerable and historically excluded workers into circular value chains (Brazil, 2024). This case shows how this can happen for workers who stay and are retrained. It does not show it for the wider workforce. In this case, circularity opened a path upward for the workers the firm chose to develop; the open question, for firms and for policy, is how to make that path available to more of them.

Concluding Remarks

This study examined how human capital, digital technologies, organizational learning, and institutional pressures shaped the circular transition of an internationally connected SME in Brazil. The firm did not become circular through a single environmental project. It moved step by step, from domestic manufacturing to servitization, international integration, and digitalization, and circular practices grew out of these changes. The firm is still in transition. Traceability and certification are in place, but eco-design, the reuse of components, and closed-loop flows are still being developed.

The main answer to the research question is that human capital matters when it is shared. The skills that TMT members gained in foreign trade, finance, logistics, certification, and languages helped the firm read external requirements and act on them, but only because regular meetings, open information, and horizontal governance turned individual expertise into team capability.

Our study contributes theoretically to four aspects. First, it supports human capital as a microfoundation of circular DCV: sensing, seizing, and transforming moved from the entrepreneur to the team as employees gained expertise, but only where that knowledge was shared through horizontal governance. Second, it identifies learning routines and horizontal governance as an aggregation mechanism that links individual expertise to collective capabilities. Third, it shows that investments in human capital, normally avoided by SMEs due to their costs, time constraints, or the risk that trained workers leave, could be part of a transition strategy and are a logical path to engage teams in business growth. Fourth, it qualifies the belief that circular transition produces inclusive growth. In this case, inclusion was clearer for those who stayed in the firm, although the number of employees decreased.

For managers, the case suggests that circular and digital change requires investment in three areas simultaneously: technology, employee development, and routines that spread knowledge across the team. Promoting from within can build a management team that knows the operation from the inside, and outside hires work best for gaps that internal training cannot fill. Managers should also ask whether gains in productivity come with better jobs and a fair distribution of benefits. For policymakers, programs that promote circularity in SMEs should go beyond financing equipment or meeting regulations. They should also support technical education, digital skills, certification, and knowledge of international trade. Policies aligned with ENEC should include support for workers affected by restructuring, as circular innovation does not by itself create inclusive employment.

The limitations of the study are set out in Section 3.5. In short, the evidence comes from one firm, relies largely on the firm's own account and on an owner who is also a coauthor, and cannot isolate the effect of human capital from that of markets, exchange rates, or regulation. We also have no data on the later careers of former employees and no independent environmental measures.

Future research could compare SMEs in different economic sectors and geographic regions and develop longitudinal studies in the logistics sector to examine whether traceability and certification are enablers of eco-design and circularity. Furthermore, studies including multiple actors, such as former employees, suppliers, and policymakers, could deepen the understanding of who wins and who loses in a transition such as the one described here. Finally, quantitative studies could test whether learning routines and horizontal governance mediate the link between human capital and circular dynamic capabilities, as this case suggests.

Conflicts of Interest

The authors declare no conflicts of interest.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the authors used Grammarly and Paperpal solely to improve the language, grammar, and readability of the text. These tools were not used to generate original content, analyses, or interpretations. After using these tools, the authors reviewed and edited the resulting

text as needed and took full responsibility for the content of the publication.

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