Open innovation in emerging markets: A longitudinal study of the antecedents, micro-foundations, and outcomes of dynamic capabilities

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Abstract

Innovation capability development involves building technological and market processes and skills to produce innovation outcomes. While advanced market MNEs (AMNEs) already possess innovation capabilities at the moment they enter emerging markets, emerging market MNEs (EMNEs) employ specific strategies to build or acquire innovation capabilities e.g. acquisition, alliances, licensing. Yet, these strategies might be insufficient to broaden and deepen EMNEs knowledge in different technological domains which are necessary to identify technological and market opportunities in their own markets. This paper explores how EMNEs build innovation capabilities; its internal and external antecedents; and technology outcomes. Specifically, this paper focuses on open innovation as a dynamic innovation capability. From 2006 to 2017, we report on a longitudinal and retrospective study of the largest Brazilian cosmetics EMNEs - Natura Cosmetics. We find Natura’s open innovation capability developed over three phases: formation, establishment, and consolidation where the micro-foundations include: identification and formulation of technology and customer needs, search for external solutions and managing integration. Second, this paper presents how innovation goals (internal, external and blended) affect the scope of open innovation capabilities from problem solving to opportunity identification. Exploration of the micro-foundations of open innovation enriches previous studies of dynamic capabilities and innovation capabilities in emerging markets.
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Keywords: emerging markets, open innovation, open strategy, innovation capabilities

1. Introduction

Benefiting from inimitable and complex innovation capabilities that might not be available in emerging markets, advanced economy MNES (AMNES) use their technology skills and innovation processes to address the needs of emerging market customers (Tsai & Eisingerich, 2010). On the other hand, frequently, emerging market multinationals (EMNEs) lack innovation capabilities to keep up with rapid global technological changes initiated by AMNEs i.e. launch products or technologies for emerging market customers (Awate, Larsen, & Mudambi, 2012). EMNEs build difficult to imitate innovation capabilities (Bell & Figueiredo, 2012) to develop advanced technologies e.g. radical, best for the context using internal or external knowledge sources e.g. building absorptive capacity, acquiring companies, or establishing new alliances with subsidiaries from MNEs (Rui, Cuervo-Cazurra, & Annique Un, 2016). For example, Rui et al. (2016) have
discussed the relevance of acquiring external knowledge, e.g. via internal learning-by-doing managerial process, for capability upgrading in emerging markets.

As documented before (Athreye, Kale, & Ramani, 2009; Figueiredo, 2001), the development of innovation capabilities is a long catch-up process which requires continuous up-grading of technological, scientific, and market knowledge. For AMNEs scholars (Du, Leten, Vanhaverbeke, & Lopez-Vega, 2014) pointed out collaborative research i.e. open innovation advances scientific and market knowledge as well as speed up the innovation process. However, for EMNEs previous research does not suggest whether open innovation could help build innovation capabilities necessary to upgrade technological, scientific or market knowledge at EMNEs (Athreye et al., 2009).

David Teece suggests innovation capabilities are dynamic and intertwined with “an open economy with rapid innovation and globally dispersed sources of invention, innovation, and manufacturing capability (Teece, 2007 p. 1319)”. Moreover, the antecedents of dynamic capabilities are not only internal but also external (Eriksson, 2014). Until now, the connection of open innovation with dynamic capabilities remains an uncharted field (Vanhaverbeke & Cloodt, 2014). Moreover, while understanding the implementation paths of open innovation is the sine qua non of the organization's success in emerging markets, a first step is to highlight the micro-foundations of dynamic capabilities for open innovation during different technology development phases. Focusing on the study of micro-foundations helps to disentangle collective organizational concepts to study their connections and organizational outcomes (Linder and Foss, 2018). One relevant organizational concept is organizational goals which influence firm behavior through process of satisfying, search, adaptive learning and sequential attention (Cyert & March, 1963). More recently, Gagne (2018) suggested dynamic capabilities are the operationalization of organizational goals because of the multifinality of goals e.g. use of limited resources, hierarchies, internal and external focus. Also, Linder and Foss (2018) suggest the micro-foundations of organizational goals are affected by external and internal conditions over time.

Previous studies do not pay enough attention how alignment of innovation goals –internal, external, or combined – helps to build and upgrade open innovation capabilities of

\[1\] Hereafter open innovation capability.
EMNEs. In this paper, we seek to address this theoretical gap by answering the following questions: 1) What are the micro-foundations of open innovation capabilities in EMNEs?; 2) How do internal and external innovation goals guide the renewal of open innovation capabilities? and 3) how technology development is intertwined with open innovation capability building by EMNEs? To answer these research questions, we draw on a single longitudinal case study of the largest Brazilian cosmetic company – Natura Cosmetics – with global presence through its acquired brands Body Shop (British) and Aesop (Australian). From 2006 to 2016, Natura has adopted open innovation as part of their innovation strategy, this article illustrates how this EMNE builds its open innovation capability using external knowledge sources e.g. universities, research centers, customers.

Our findings respond to recent calls of further research in emerging markets (Cuervo-Cazurra, 2012). Theoretically, we extend existing knowledge about micro-foundations of dynamic capabilities (Teece, 2007), as we study them in an open innovation context during three technology development phases. Moreover, this paper explains how open innovation is implemented in emerging markets which has is underexplored in the innovation management literature. EMNEs that compete in their local market with local and foreign companies, build innovation capabilities that allow them to use internal and external knowledge sources effectively. Second, instead of expanding abroad, making alliances, or licensing to obtain sophisticated technologies (Kumaraswamy, Mudambi, Saranga, & Tripathy, 2012), this paper suggests EMNEs can use open innovation for innovation capability upgrading with national science- and market-based partners. We explain strategic goal orientation is necessary to build innovation capabilities and harness the benefits of unidentified national resources. While initially goal orientation – external and internal – are separated, goal alignment is necessary to develop new products to use country specific resources, benefit from national regulations and address the unique demands of local customers.

The paper is structured as follows: Section 2 presents the previous research on innovation in dynamic capabilities and capability upgrading in emerging markets. Section 3 discusses the research design and data collected. Section 4 describes how Natura’s open innovation capability developed over three distinctive phases and the transformation of the strategic goals into open innovation capabilities. Section 5 discusses our main contributions to the
theories of open innovation, dynamic capabilities and EMNES. Section 6 presents our main conclusions, limitations and suggestions for further research.

2. Literature review

2.1 Antecedents, micro-foundations and outcomes of dynamic capabilities for open innovation

In “an open economy with rapid innovation and globally dispersed sources of invention, innovation, and manufacturing capability (Teece, 2007 p. 1319)”, dynamic capabilities constitute the processes and routines that provide organizations with the competitive advantage to cope or shape changes in the external environment (Zollo & Winter, 2002). Until now, distinct dynamic capability frameworks have helped to explain manager’s involvement in creating and renewing strategic assets such as processes and structures, to achieve congruence with the rapidly changing environment (c.f. Eriksson, 2014; Teece, 2007). Recently, scholars have emphasized that the renewal of dynamic capabilities is enabled by external and internal antecedents and formulated strategic goals (Gagné, 2018).

First, the antecedents of dynamic capabilities include external and internal factors (Eriksson, 2014). External antecedents refer to institutional, technological factors as well as network and relationships with other partners. For example, the technological substitution from the silver-halide chemistry to digital technology affected incumbents’ capabilities in the face of radical technological change (Benner, 2009). Also, institutional changes might inhibit new forms of collaboration e.g. partnerships for complementary assets that affect dynamic capabilities (Athreye et al., 2009). Internal factors refer to organizational routines in the form of structures and resources (Zollo & Winter, 2002), asset selection and creative acts. Routines could take the form of product development routines, technology and knowledge transfer (Eisenhardt & Martin, 2000). An organizational routine is strategic planning e.g. goals, plans which help to align internal resources with market opportunities and threats. Second, as strategic goals help to determine the needed resources, forecast obstacles and identify opportunities, (Gagné, 2018) suggested firms’ strategic goals are the antecedents of dynamic capabilities. Moreover, the nature and content of strategic goals are affected by internal conditions e.g. resources, structure, performance and external conditions e.g. technologies, regulations, markets (Linder & Foss, 2018).
As more firms rely on assets outside their boundaries, a critical competence is their ability to provide organizational enablers that could facilitate technology development (Appleyard & Chesbrough, 2017). Hence, the formulation of innovation goals requires not only to include distinct sources of innovation but also build innovation capabilities (Vanhaverbeke, Roijakkers, Lorenz, & Chesbrough, 2017). Recently, the principles of open innovation have been extended to strategy formulation and implementation i.e. involvement of external stakeholders to benefit from new organizational, societal, cultural and technological changes (Hautz, Seidl, & Whittington, 2017). This new line of research reports inclusion of external actors helps to 1) maintain close contact with external organizations and 2) to develop more complex and radical technologies over time. Combining the antecedents, micro-foundations and outcomes of dynamic capabilities, we propose a framework for firms' dynamic capability evolution (see Figure 1).

Figure 1. Framework of antecedents, micro-foundations and outcomes of dynamic capabilities

![Diagram of Antecedents of Dynamic Capabilities]

2.2 Capability upgrading in emerging markets through open innovation

In EMNEs, innovation efforts involve strengthening: (1) an output capability e.g. manufacturing a product or technology and (2) building an innovation capability e.g. developing or enhancing a technology (Awate et al., 2012). EMNEs catch up to their
emerged market competitors through building and upgrading their innovation capabilities (Figueiredo, 2001). For developing new or enhancing existing technologies or products, firm’s innovation capabilities require a broad and deep understanding of technology fields (Brusoni, Prencipe, & Pavitt, 2001). In emerging markets, this characteristic of innovation capabilities creates a paradox. While EMNES need deep knowledge specialization to build new technologies at the same level of AMNEs, only identifying and accessing knowledge from broad technology fields help to build innovation capabilities that facilitate the identification and creation of new breakthrough technologies. Hence, “by working with unknown and often unrelated technologies, the firms are frequently required to find new partners and develop sophisticated capabilities at working in open innovation systems (Awate et al., 2012) p. 208.”

Previous studies suggested that EMNEs use different mechanisms to upgrade their innovation capabilities e.g. alliances with local and foreign companies, learning by doing (Kumaraswamy et al., 2012; Rui et al., 2016). Yet, little is known about how EMNEs use collaborative forms of innovation to upgrade internal capabilities and, ultimately, produce new products or technologies. To our knowledge only Kafouros and Forsans (2012) reveal that the effect of in-house R&D is stronger when Indian firms use external scientific knowledge. Moreover, they explain that ‘the benefits of in-house R&D are stronger in firms that are more open to foreign knowledge than in firms that are more open to domestic knowledge (Kafouros and Forsans, 2012 p. 368)’. In Latin America, only some examples have shown how Brazilian EMNEs implement open innovation as well as the barriers for its implementation (Ovanessoff, Plastino, & Faleiro, 2015).

On the contrary, the literature about open innovation is abundant. Yet, it primarily covers the analyses of AMNEs using the knowledge based view theories. For example, previous studies have documented the mechanisms AMNEs e.g. FIAT, Philips, GM employ to implement open innovation (Chesbrough & Brunswicker, 2014; Salter, Criscuolo, & Ter Wal, 2014). Moreover, previous studies about open innovation used the knowledge based view of the firm to explain why, how, when and what type of knowledge firms search in technology markets (Lifshitz-Assaf, Forthcoming; Lopez-Vega, Tell, & Vanhaverbeke, 2016). Yet, there is a lack of evidence how organizations create and implement new strategic innovation goals as well as build innovation capabilities to search knowledge.
3. Research setting and methods

3.1 Research setting

Brazil, despite the economic fluctuations and political scandals, shows high economic growth accompanied by an increasing number of different R&D strategies, business models, value creation, and capture initiatives for Brazilian and foreign companies (Fleury & Fleury, 2011). Brazil is considered the largest economy in South America. It has several global multinationals i.e. Embraer, Vale, Natura Cosmetics, Gerdau as well as regional subsidiaries from most American and European firms including General Motors, Scania, Ericsson, and Tetra Pak. Also, Brazil is a representative example of other successful Latin American companies such as Pemex (Mexico), Concha y Toro (Chile), Grupo Gloria (Peru), Totto (Colombia).

Initially, we investigated different Brazilian companies that have adopted open innovation as part of their innovation strategy (Ovanessoff et al., 2015). These included: Braskem, GranBio, Samba Tech, and Natura Cosmetics. Located in Sao Paulo, Brazil, Natura Cosmetics is the largest Brazilian and Latin American cosmetic maker. Natura is present in several Latin American countries. We selected Natura Cosmetics to conduct an in-depth study of the period 2012 to 2016 and retrospective from 2001 to 2012. Natura embarked on an open innovation strategy in 2005 and successfully renewed the scope of its innovation effort. In 2012-2013 and 2015, this company was included in the Forbes top 10 list of The World's Most Innovative Companies List, and in 2015 it won the United Nations Champions of the Earth 2015 Award. In 2017, Natura has acquired from L’Oréal Body Shop for 1 Billion USD and, in 2013, bought the Australian high-end beauty-product retailer Emeis Holdings for US$71.6 million.

The importance of innovation in Natura’s strategy is reflected in its increasing investments and the rates of product release. To support these actions, Natura invests 3% of its net revenues annually in science, technology, innovation, research and the creation of knowledge networks. Also, Natura assesses its innovation index by the percentage of revenue from the sale of products launched in the past two years. This indicator shows the importance given to product innovation in the company and its relation to the commercial performance of the organization. In 2011, Natura invested 78,387 Million USD and the innovation index reached 64.8%. External recognition for these different innovation initiatives came from Forbes Magazine that placed Natura among the 10 most innovative
companies of the World in 2013 and 2015. According to United Nations Organization, Natura Cosmetics was awarded with the prize Champions of the Earth in 2015.

3.2 Data collection and Data analysis

The data collection strategy included the following. First, over four years, we conducted 23 interviews with the Natura’s Chief Innovation Officer (CIO), business unit directors, director of innovation management, scientific managers, and open innovation managers. Second, very valuable archival and confidential information was shared with the author to enable an understanding of how Natura Cosmetics progressively had changed elements in its mechanisms i.e. strategic planning, project specification, and project management. Finally, every six months up to October 2017, we interviewed managers responsible for open innovation to understand the changes in the implementation processes and strategic goal setting.

These materials were transcribed and analyzed using NVivo. We grouped the codes for strategy goals and the open innovation capabilities. Finally, the authors and Natura’s open innovation team engaged in ongoing discussions to clarify the implementation of open innovation, and provide feedback on the data analysis. We entered the transcribed interview notes, observation field notes, videos, and archival information into Atlas.ti software for qualitative analysis. This procedure assisted in the data organization and coding, and facilitated analysis and interpretation of innovation goals and dynamic capabilities. The data analysis was conducted into two steps. First, we applied open coding to the information collected from the interactions and archival information with Natura employees, to distinguish the types of innovation goals. In the second step, we open coded the interviews and archival information to identify empirically the open innovation capabilities and technology development phases.

4. Findings: Alignment of innovation goals and dynamic capabilities

This section presents Natura’s open innovation capability developed over three distinctive phases: (1) formation (2006-2009), (2) establishment (2019-2014), and (3) consolidation (2014-2017). Also, appendix 1, presents Natura’s closed innovation phase (2001 – 2005), and Appendix 2, presents the development of a technology in the closed innovation form.
Each phase is presented in two parts, the first part presents Natura’s deliberation of internal and external innovation goals and innovation plans (see Table 1). The second part presents the implementation of the innovation goals into open innovation capabilities. Also, each phase presents the three micro-foundations of the open innovation capability: 1) identification and formulation of technology and customer needs; 2) search for external solutions; 3) managing integration. Thereafter, three distinct technology examples, of the outcome of three micro-foundations of the open innovation capability, are presented (see Table 2).

4.1 Formation phase (2006 – 2009)

During this phase, Natura’s open innovation strategy evolved gradually from a project-wise approach to a structural initiative. For example, Natura’s innovation strategy to adopt open innovation was stated in its decision that by the year 2010 fifty per cent of research projects should be conducted in partnerships with external partners. In the year 2006 during the strategic evaluation and planning, when R&D managing directors of Natura observed early positive results of R&D projects with universities and other scientific partners, top management realized that open innovation might be an additional component of Natura’s innovation strategy. Hence Natura’s director of research and business units outlined two strategic goals and four strategic plans (see Table 1).
Table 1. Natura’s innovation goals and innovation plans

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<td><strong>Innovation goals</strong></td>
<td><strong>Innovation plans</strong></td>
<td><strong>Innovation goals</strong></td>
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<tr>
<td>Internal focus- Build an innovation model that leverages internal and external innovation</td>
<td>Create an open innovation team to collaborate with external partners, universities and funding agencies.</td>
<td>Internal focus- Improve existing innovation model for external collaborations</td>
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<tr>
<td>Internal focus- Improve existing innovation model for external collaborations</td>
<td>Internal focus- Simplification of innovation processes to be more efficient and productive</td>
<td><strong>Innovation goals</strong></td>
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<td><strong>External focus-</strong></td>
<td><strong>Innovation plans</strong></td>
<td><strong>Innovation goals</strong></td>
</tr>
<tr>
<td>Create an infrastructure in Brazil with research satellite offices to advance knowledge in new areas for local markets</td>
<td>Establishment of business area for new strategic products</td>
<td>blended focus – Activities about: science, technology and innovation; socio-biodiversity, productive chain; and institutional strengthening</td>
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<tr>
<td>Creating external innovation hubs to access the latest technological insights</td>
<td>External focus – Institutional strengthening (for weak links) and strengthening of existing institutional relationships (for strong links)</td>
<td>R&amp;D Hub in Boston and creation of an incubator (NINA) in the Amazon</td>
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Table 2. Natura’s open innovation capability building over three technology development phases

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<tr>
<td><strong>Identification and formulation of technology and customer needs</strong></td>
<td></td>
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<td>Customer, university and internal problem or opportunity identification</td>
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<tr>
<td>Problem identification</td>
<td></td>
<td>Request of non-confidential scientific proposals from universities through an online platform</td>
<td>(1) Innovation challenges; (2) scientific proposals; (3) co-creation</td>
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<tr>
<td>Problem formulation</td>
<td></td>
<td>Not a necessary activity as Natura was receiving external technologies</td>
<td>1) sustainable surfactants, packing and insoluble ingredients; (2) For Amazonian researchers and the rest of Brazil; (3) company transparency, mother-baby relationship</td>
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<tr>
<td><strong>Search for external solutions</strong></td>
<td></td>
<td><strong>Search mechanisms</strong></td>
<td></td>
<td>Joint problem formulation and co-development activities with the help of external consultants and universities</td>
</tr>
<tr>
<td>Project management</td>
<td></td>
<td>Platform to receive external proposals and university roadshows</td>
<td>Natura Campus platform and co-creation platform</td>
<td></td>
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<tr>
<td>Knowledge matching</td>
<td></td>
<td>Initial attempt to create a guideline for partnerships</td>
<td>Occurred in early phases</td>
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<td></td>
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<td>Different skills were combined to produce radical innovations</td>
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- **Microfoundations** refers to the initial stages of innovation development.
- **Intermediate technology development (2006-2009)** involves the initial formulation of technology and customer needs, followed by the search for external solutions.
- **Advanced technology (2010 – 2014)** includes the detailed formulation of problems and co-development activities.
The first internal innovation goal was to ‘build an innovation model that leverages internal and external innovation’. The first innovation plan involved creating an open innovation unit with three dedicated employees who focus on university collaborations and funding agencies. As part of this strategic plan, the initial activities involved: (1) formalizing open innovation as the mechanism to collaborate with external partners; (2) new innovation managers started developing their strategic plans considering possibilities to access knowledge outside Natura; and (3) Natura’s open innovation unit started to select research topics to promote them in roadshows at universities with the objective to engage external researchers. The second innovation plan involved building an internal and external processes for conducting open innovation. Here, in collaboration with an external consultancy firm, a Natura’s multidisciplinary team from product development, supply, technology development and intellectual property was formed to build Natura’s open innovation processes and skills to launch an open innovation area.

The second external innovation goal involved ‘create an infrastructure in Brazil with research satellite offices to advance knowledge in new areas for local markets”. Here, the first innovation plan involved the establishment of a business area for new strategic products i.e. new product line EKOS which would link Amazonian unexplored natural resources, legacy and traditions, and new innovation activity. The second innovation plan focused on creating external innovation hubs to access the latest technological insights. In line with this externally focused innovation goal, Natura started to include societal factors as part of its innovation goals. For example, Natura decided to implement a materiality matrix with themes that were relevant to Brazilian society and Natura’s future strategy. These themes included water, education, disposal, biodiversity, and entrepreneurship. In connection with the Open Annual Report, this matrix was embedded in corporate level documents such as Natura’s Sustainability Directory, the stakeholder relationship strategy, and the Corporate Affairs Directory.

Intermediate technology development (2006-2009)

Initially, the micro-foundation of problem identification did not receive the organizational support e.g. provide or formulate technology or science problems from the research department or business units. The newly established open innovation team decided to create Natura Campus program to facilitate the inflow of scientific proposals from
Brazilian research institutions. Periodically, the proposals were presented to the research board, and came to represent a continuous source of ideas and incremental improvements for Natura’s product portfolio and opportunities to foster R&D projects with Brazilian research institutions.

The micro-foundation of search for external solutions was performed using an online platform designed to receive non-confidential research proposals from Brazilian research institutions. To encourage the submission of proposals, the open innovation team visited potential research institutions to present Natura Campus, and inspire researchers to submit projects. Moreover, the initial version of the managing knowledge integration micro-foundation entailed the establishment of guidelines for partnerships which followed the Brazilian innovation law and established patterns for intellectual property ownership, and payments for the use of joint venture technologies. Finally, during this phase, Natura began to establish more complex models of collaboration taking account of different types of organizations and collaboration themes. For example, Natura collaborated with the innovation intermediary –NineSigma – for solutions to two internally identified technological needs. This collaboration provided an understanding of the value of identifying and formulating technology needs.

*Example: New Ingredients from the Brazilian Biodiversity: The case of Ucuuba*

In 2002, Natura launched the Ekos brand establishing an important milestone for the sustainable use of biodiversity and vegetalization as product attributes. From there on, it was essential to keep up with innovation to launch new products to expand the brand as well as scale up vegetalization to lower the environmental impact. The latter challenge was related to the launch of a production factory – the Benevides – for vegetable based soap in the Amazonian region. When Natura decided to produce all its soaps with vegetable based ingredients, the main raw material was palm oil. It was a questionable material as it is obtained using a plantation method which is in not aligned to the sustainable use of biodiversity and vegetalization. Therefore, the director of the EKOS product line requested the identification of alternative oil sources to substitute the palm oil. The Bioagriculture and Ingredients research groups identified other oil plans from the Amazonian region could be used in a sustainable manner. Yet, different skills were needed to develop those oils, for example, localizing the plants in the Amazon, monitoring the plant cycle, weather and soil conditions, productivity, quality of the crops.
Natura Campus program was the enabler to create a multidisciplinary team with participants from Amazonian communities, research institutions, specialists and Natura’s research groups. For example, the knowledge of the localization of plants was in the hands of the community and there were skilled research partners that could monitor and preserve the species. Natura’s researchers would bring the knowledge related to treating the seeds and extracting the oils. As a result, thirteen oils were identified but few of them were economically viable for soap base. Following, a new research project was initiated to seek for plant oils and butters with high potential for cosmetic products. One of these Amazonian plants was Ucuuba that became the main raw-material to start a new product line for the Ekos brand.

The integration of this plan as part of Natura’s new product line involved three complementary projects: a technology project for thirteen different ingredients; a conservation project developed in partnership with Federal University of São Carlos involving 6,000 preserved trees; and a product development project that resulted in 3 patent applications and 6 products. These results were positive in terms of sustainable practices, high performance on skin hydration, fragrancy and soft sensory. For Natura, this project represented an important progress in addressing internal business unit needs, coordination with external business and research networks, raising governmental funding and maintaining sustainability values.

4.2 Establishment phase (2010 – 2014)

The earlier success of the Natura Campus program facilitated Natura’s R&D challenges to be linked to external research groups. Indeed, the target set in 2005 to have at least 50% of the research projects building on external collaborations was achieved in 2008. However, an evaluation of the innovation goals from 2005, showed that many of the proposals from Brazilian research institutions were beyond the scope of Natura’s technological competencies and needs, or were early-stage and required a long period before implementation.

Hence, the new Natura’s innovation strategy was based on three innovation goals. The first internal innovation goal was to ‘improve existing innovation model for external collaborations’. The innovation plans included ‘extension of the strategic innovation management area to adopt a transversal and strategic role for innovation as well as
mapping external technology competences and identifying internal organizational needs’

In 2010, during the strategic discussions, a new Chief Innovation Officer decided that the open innovation unit’s role should be transversal and strategic to identify internal organizational needs. This meant a change, from a supportive role for Natura’s technology development, to becoming a mechanism to strengthen R&D. In addition to expanding its activities beyond Brazilian universities and researchers, Natura’s innovation team had to support product development, consumer safety, and consumer trends.

The second blended innovation goal was a program for socio-biodiversity in the Amazon region. For this, Natura’s Amazon program aimed at bringing other companies to operate in the region: (1) by showing the region’s technological potential in cooperative projects with local institutions and researchers, (2) by locally producing goods, optimizing local raw materials, and focusing on reducing environmental impact, and (3) by linking the supply chains of different industries. In combination with the first innovation goal, Natura Campus was the chosen mechanism to foster collaborations across the region by reaching out to different organizations in the regional ecosystem such as state funding agencies, universities, and research institutes.

The third external innovation goal was ‘Institutional strengthening (for weak links) and strengthening of existing institutional relationships (for strong links)’ to address the innovation opportunities of the Amazon region, from where most Brazilian raw materials originated. Missions to visit the region and its communities demonstrated the need for a corporative program. This initiative was called NINA. Also, Natura decided to open a research hub in Boston to identify new innovation opportunities.

**Advanced technology (2010-2014)**

First, in 2010, Natura learned that in addition to setting up an open innovation platform (Natura Campus) it needed to promote relationships with external actors. In this phase, the micro-foundation of problem identification and problem formulation focused on promoting spaces for interaction and relationships (on-line and off-line). Natura’s open innovation team set up an interactive environment to communicate the interests of different business units, and to recognize partners’ objectives and competences. Three particular mechanisms were used to identify technology problems and customer needs: Natura campus challenges, calls for proposals, and co-creation.
Three main activities were organized to improve the micro-foundation of search for external knowledge. First, *Natura Campus challenges* were designed to solve problems in three technological areas: sustainable surfactants, flexible packaging recycling, and insoluble ingredients. These challenges were formulated scientifically and disseminated through the Natura Campus platform and roadshows. To address these problems, Natura sought partnerships to collaboratively address the specific technology need with Natura. Second, in 2012, Natura published two *calls for proposals* with different research objectives and outcomes. One sought to establish connections with Amazonian research institutions, and other was aimed at connections with the rest of Brazil and foreign scientific institutions. In total, from a pool of 327 research proposal submissions, 12 projects were approved and thematically validated through face-to-face interactions between Natura’s multidisciplinary team and external researchers. This method increased the involvement of potential external organizations, assertiveness over the content of the research proposals, and confidence in the scientific evaluation process conducted by Natura’s research board.

Third, Natura felt that direct insights from customers were lacking in the development of future products. It designed a new open innovation program to allow online and offline interaction with consumers that believed in Natura’s value proposition. In 2013, a *co-creation pilot* was implemented with four challenges related to identifying opportunities with consumers in the following areas: company transparency, mother and baby relationship, concept of contemporary Brazil, and gift concepts. The main characteristic of Natura’s co-creation program is its proximity and ability to contribute to marketing and business challenges, concepts, and user experiences. End-users were the main targets of the program which brought new possibilities to understand and integrate market ideas, technologies, and products across other open innovation programs. In 2010, in line with Natura’s mission to increase its interaction with potential international universities, science and technology centers, and private research companies to identify advanced and radical external technology solutions, the Natura Campus program was re-launched nationally and internationally.

Finally, the micro-foundations of managing the integration of external solutions and matching the capabilities of external sources with Natura’s technology needs. In 2012, Natura launched iQlicar as a recognition and relationship program. The main objective was
to measure and improve the performance of partnerships, position Natura as the partner of choice for strategic partners, leverage its open innovation practices, and disseminate its achievements obtained through partnerships. This new form of managing relationships strengthened existing relationships and increased the participation of new partners. By 2013, the number of partnerships reached 223 (190 with Brazilian partners): 162 companies, 34 public and private research centers, 21 partnerships with experts, 5 NGOs, and 1 regulatory agency.

Example: New insoluble ingredient in Water and oil

In 2012, Natura’s open innovation team launched a call for challenges to identify solutions devoted to obtain a friendly environment surfactant to be applied in its products focused on skin and haircare. This challenge was developed to foster sustainable innovation. The molecule proposed by the candidates should reduce surface tension, with high emulsifying capacity and/or cleaning power obtained from renewable resources and technology routes of low environmental impact. The main goal was to find technological solutions related to use of renewable and raw materials in order to substitute current mineral-based products still used in cosmetic formulas. In order to be more assertive in finding feasible solutions, proposals should contain at least one test that proves the effectiveness and certifying safety of the ingredient.

Using the innovation challenge mechanism, Natura received 16 project proposals from national and international research institutes and companies with R&D operations. The evaluation process included the following aspects: benefits and maturity of the technology presented, surfactant application potential, and effectiveness of submitted tests. A large Brazilian company won the challenge proposing a derivative of palm and sugarcane oil. This surfactant combined performance and low-cost benefit with the use of renewable resources and care for the environment. The integration of the proposed solution, into the technology pipeline, begun signing a project partnership with winning company. This agreement addressed issues such as the next steps for product development and the transfer of the solution to multiple products.

4.3 Consolidation phase (2014 – 2016)
At the end of 2014, although the Natura’s open innovation program had been consolidated, the program did not achieve the expected research results for the business units which were pushing for faster processes and clearer delivery times from the open innovation unit. The initiatives of “call for proposals” and “call for challenges” did not contribute to the orientation of the innovation portfolio and the research results. For example, project results were not implemented in market products, and new research projects incorporating digital and electronic technologies were either not initiated or were discontinued. For the new strategy formulation, the open innovation team decided to focus on the integration of different open innovation programs, and address the implementation challenges proposed by the business units, product brands, and corporate strategy. The innovation goals were:

1. Internal – be the leader in the management of open and collaborative innovation
2. Blended – become the Brazilian leader in areas related to well-being and sustainability.

For the first innovation goal the two innovation plans were ‘Simplification of innovation processes to be more efficient and productive’ and ‘Speed up the identification of opportunities through customer insights’. Through this two innovation goals, Natura’s open innovation unit planned to create a stronger synergy among open innovation programs with more integrated initiatives, and to identify alternative forms of conducting open innovation. It aimed also at closer collaboration with entrepreneurs, ecosystems, and universities to increase the effectiveness of research outputs i.e. transversal innovation management, time-to-market, global technology transfer, speed up innovation outputs.

Across Brazil, the entrepreneur ecosystem was flourishing, presenting an opportunity to connect and learn from startups. Hence, the research and innovation department decided that Natura should launch a new open innovation program focused on developments and relationship with startups and ecosystems. This decision implied the development of new innovation mechanisms to interact with ecosystems since these new actors would have unique demands but potentially would leverage Natura’s innovation. The program was completed by an internal and external team of selected actors representing the ecosystem including a founder and manager of an accelerator, an incubator manager, a digital innovation manager, a corporate venture expert, and a venture capitalist.

World Leading Technologies (2014 – 2016)

In this phase, the problem identification and problem formulation micro-foundations were two interwoven activities, Natura joined the MIT Media Lab consortium with the objective
of exploring new innovation opportunities as part of a global network of diverse industries, and to learn about novel paths to conducting collaborative research projects. Natura decided to organize its largest innovation initiative – the first Hackathon Natura Campus – in collaboration with MIT media lab. This innovation initiative used a rapid prototyping process to speed up the start of new innovation projects. It was expected that this new open innovation mechanism would allow the open innovation team to contribute to Natura’s innovation pipeline with new consumer driven proposals and early prototypes.

As an integrated approach, co-creation was developed prior to the Hackathon, a co-creation journey was used to collect consumer insights which served as inspiration for the Hackathon participants to develop their projects. While during the formation and establishment phases Natura Campus Program published a call for external proposals, in this phase the objective was to find high quality Hackathon participants, and relevant research proposals connected to digital and electronic technologies, and experience in prototyping. The mechanisms to identify technology and customer needs facilitated the integration of different innovation programs, and received a higher level of results from the open innovation initiatives.

The Hackathon Natura Campus Media Lab involved the MIT Media Lab researchers, IDEO, Natura’s employees, Brazilian researchers, and students to identify new customer needs that enhance the customer experience with cosmetics through the use of digital technologies. This initiative also connected Natura’s specialized internal scientists and consumers. Customers brought insights during the prototyping phase, and Natura experts offered support with information for participants on internal R&D processes and products, and markets. Thus, the Hackathon’s outputs linked solutions to existing and future business unit technology needs, and also ideal partners to obtain short-term outcomes from initial prototypes. Finally, the already functioning knowledge matching platform –iQlicar– allowed Natura to establish partnership agreements quickly, to the benefit of all involved. For example, issues such as intellectual property, prizes, and results were discussed during the integration of external results. Following, to further address societal needs, a second Hackathon was organized to connect Natura employees, external organizations, and customers to specific challenges to the Amazon region. This version of the Hackathon was more inclusive than the first one, and was open to all Natura employees and external participants. Different ecosystem actors were invited to participate during the preparation
(e.g. entrepreneurs and FabLabs), duration (e.g. universities, technical experts from public institutions), as well as public institutions (Brazilian funding agencies that supported entrepreneurship).

Other micro-foundation to identify and formulate technology needs referred to a newly established well-being and human behavior applied research center whose objective was to understand and create value for well-being on multiple dimensions such as physical, emotional, social, cultural, and spiritual. This center was the result of a collaboration between Natura and three universities in Sao Paulo (University of Sao Paulo, Federal University of Sao Paulo and Mackenzie Presbyterian University), with a strong focus on positive psychology, neurophysiology, neuroimaging, modeling, and the construction of mathematical indicators. This applied research center employed scientific approaches to better understand the culture, habits, behaviors, and emotions of the Brazilian people in relation to the use of cosmetics, at a neurological level. This center provides new insights and opportunities for the cosmetic industry, develop cutting-edge scientific research, identify an integrated view of well-being and life quality, and stimulate and support start-up companies and other science and technology spill-overs worldwide.

*Example: Hackathon Natura Campus for technology development (2014)*

The Hackathon Natura Campus Media Lab was an ambitious initiative that aimed to involve the MIT Media Lab and IDEO; researchers and students from Brazilian universities to collaboratively create technological solutions; consumers to help in identifying innovative technologies in the use of the cosmetic products as well as to participate in the prototyping phase; start-ups were selected to accelerate the rapid development of initial prototypes; internal Natura employees were necessary to give insights about the internal R&D process and market insights to other actors.

The Hackathon Natura Campus Media Lab initiative was divided in two phases: In 2014 from April to July, university researchers and Natura employees had to provide their ideas about future innovation projects. In parallel, a co-creation activity with consumers was initiated. In July, the best ideas and researchers were selected to participate in the Hackathon. From August 1st to 6th 2014 at Natura’s headquarters, 8 groups composed of 1 Media Lab researcher, 1 Natura employee, 1 Brazilian researcher and his invitee (usually a doctoral student or junior researcher) to learn more about Natura, the cosmetics market,
frame their ideas, prototype and present the created ideas to a Panel formed by leaders of Natura, MIT Media Lab, IDEO, Fablab Brazil. During these five days, for 48 hours, the teams were working exclusively on a challenge at Natura where teams had laboratories for prototyping, selected consumers for testing their ideas and company leaders. After the completion of the Hackathon, projects and collaborations were initiated and two students were selected to continue prototyping their initiatives at MIT Media Lab.

The Hackathon generated immediate and measurable results, but also had great impact on Natura’s innovation culture and connection to new scientific networks. Some of the main measurable results were: 110 submitted projects by 88 researchers and Brazilian students and 22 Natura employees; 8 development prototypes were conducted during the Hackathon; 32 selected participants were active in the Hackathon; the 3 Natura founders were involved in the event; 121 consumers participated in the journey of co-creation, 7 of these consumers participated in the Hackathon.

*Example of a World leading technology: Hackathon Natura EKOS for national development (2016)*

The Hackathon Natura Ekos started in 2015 from an opportunity mapped during an interaction of the open innovation team and business unit teams. The brand Ekos Natura was looking for developing an innovative approach to establish and engage a network of people linked to the values of Ekos brand. This goal was aiming to (1) connecting Amazon to the people’s daily routine; (2) Solutions generation to the wellbeing and quality of life; and (3) stimulating transforming attitudes in this network and society. The call for proposals was entitled: Hackathon Ekos hands at the forest: bringing nature to your daily routine. The objective of the hackathon was aligned to the positive impact in sustainability and the results should be totally open since Natura was aiming to engage people on the initiative and the opportunities that it could bring in terms of projects, societal mobilization, new investments and businesses.

The Hackthon’s organization was only by Natura and the methodology used to implement this hackathon was very similar to the previous one since there were internal and external candidates that were carefully selected. There teams were formed to develop prototypes and arrange technical visits to the communities in Pará State (Amazon) where the raw materials were collected. There were 96 hours of prototyping, immersion at the Moju
Community, 32 participants in the groups, 16 consumers, 8 prototypes and concepts developed. As the engagement was one of the more important results, the impact of the Hackathon was also relevant in terms of people reached. There were 4,526,000 people reached by the social networks, 80,000 site accesses and 195 different institutions involved. After the Hackathon, the open innovation team promoted an event at headquarters of the company inviting important players into the ecosystem of innovation, entrepreneurship and sustainability to share the initiative and present its results. The objective of the event was to enlarge the impacts of the technologies developed and disseminate the way Natura is engaging people in innovation and sustainability.

To sum up, Figure 2 depicts the dimensions of an open innovation capability development for Natura. In this figure, it is portrayed how internal and external antecedents of open innovation, influence the creation and development of three micro-foundations for open innovation capability building. Finally, Natura’s open innovation capability resulted in different technology developments.

Figure 2. Open innovation capability development
5. Discussion

This paper has several implications for theory. First, goal formulation and strategic planning. Natura’s case suggests that involving external organizations in the formulation of innovation goals facilitates building an open innovation capability. In emerging markets, this is a cumulative and continuous process which evolves through three phases – formation, establishment, and consolidation – and open innovation capability building – intermediate-, advanced, and world leading- technology development. Our study emphasizes that innovation goal formulation and open innovation capability building are two processes which are interlinked and self-reinforcing. They can speed the catching up process to construct inimitable and complex technological skills and R&D processes for EMNEs. For example, this renewal helps in the acquisition of new technological competences to search for external solutions (Felin & Zenger, 2014). This is exemplified by senior management formulating innovation goals that do not only have an internal focus but, over time, have an external and blended focus. This occurs because national and international organizations have an important role in the incremental development of open innovation capability (Athreye et al., 2009).

While innovation goals are formulated by Natura’s R&D department, business units, and departmental directors, it is also important to acknowledge these are influenced by internal and external antecedents. At Natura, the internal innovation goals involved creating open innovation processes to initiate external collaborations, launching a research infrastructure to identify opportunities, and becoming a leader in areas connected to national strengths and competitive differentials. The execution of these innovation goals was achieved through the implementation of specific innovation plans that were coordinated by the innovation management unit. Moreover, the open innovation management unit was structured to help addressing external innovation goals i.e. manage partnerships with funding agencies and research institutions. Over time, this unit took on the responsibility for innovation processes, the institutional innovation strategy, open innovation projects, entrepreneurship activities, intellectual property management, and management of collaboration with external knowledge sources. The early decentralization of innovation activities to the open innovation unit allows EMNEs to connect to a wider variety of external resources. The decision to have internal and external innovation goals resulted in higher degrees of transparency and the opening up of Natura’s strategy goal formulation. External open innovation actors are important sources of new strategic notions. The initial
experiences result in an increasing strategic awareness which supports openness as an organizational practice (Hautz et al., 2017). Finally, inclusion of blended innovation goals was a strategic decision to build commitment from external knowledge sources.

Second, in emerging markets, open innovation starts through small innovation projects within R&D units that are attracted by the possibilities of acquiring external technological solutions and advancing their innovation capabilities. Over time, supported by external, internal or embedded strategic goals based on early results, open innovation units renew their open innovation capability to solve previously identified challenges faster and create new forms to deliver value for the company. For example, open innovation at Natura started as a tool to facilitate external collaborations which over time, became a strategic component to identify new innovation opportunities with customers and universities. In the last stage, Natura creates value for the National ecosystem where solutions are not created exclusively for Natura but for the emerging country. Consequently, understanding how emerging market companies build their open innovation capabilities requires awareness of the temporal aspect and the phases through which capability building occurs. It has been suggested that EMNEs build their technology capabilities incrementally and cumulatively by successively experimenting with accessing existing technologies, implementing incremental product improvements, replicating existing technologies, and developing new technologies (Kumaraswamy et al., 2012).

Moreover, EMNEs go through three technology development phases focusing on intermediate technologies, advanced technologies, and world class technologies (Figueiredo, 2001). In each of these phases, EMNEs build three micro-foundations of open innovation (1) identify and formulate customer and technology needs, (2) search for external knowledge and (3) manage its integration. The first micro-foundation involves the creation of processes to identify technology and customer needs, and formulate a specific technological challenge (Von Hippel & Von Krogh, 2016). Here, open innovation managers design processes to analyze the information collected, and to break down the technological challenge into identified opportunities or technology needs. The second micro-foundation involves setting up mechanisms to search for external knowledge using crowdsourcing mechanisms such as co-creation, platforms, innovation intermediaries, technology scouts (Altman & Tushman, 2017; Lopez-Vega et al., 2016). These mechanisms need to be matched with specific innovation sources such as universities and
suppliers in order to identify solutions to a specific technological need. Finally, the third micro-foundation involves knowledge matching that aligns external and internal knowledge to facilitate the integration of external solutions (Lakemond, Bengtsson, Laursen, & Tell, 2016). In line with this, an EMNEs innovation capability evolves to help advance its technological frontier and develop new technologies.

Finally, a strong relationship with organizations, particularly those in the national environment, seems critical for EMNEs’ innovation capability building. This requires close and systemic interactions with and education of the local national ecosystem to initiate open innovation projects. In emerging markets, start-ups, medium sized companies, and supporting organizations such as science parks, incubators, and liaison offices are still relatively inexperienced in innovation collaborations. Our results highlight the importance of ecosystem mobilization through internal, external and blended strategic innovation goals. Natura started its open innovation capability by collaborating with public funding agencies. This capability evolved to develop structural initiatives i.e. its own innovation ecosystem while at the same time, influencing the whole Brazilian innovation ecosystem.

Organizational trust in emerging market is often low compared to emerged markets (Ovanessoff et al., 2015). This results in cumbersome collaborations and exchanges of results. By increasing transparency and inclusion with external actors (Hautz et al., 2017), through external and blended goals, Natura created organizational trust with research institutions and also with local and international technology partners, customers, and Amazonian communities. Increasing transparency and inclusion in the open strategy process facilitates dialogues and feedback from external organizations which in turn, boost innovation (Hautz et al., 2017). This requires a long-term and evolving strategic goals connected to the development of open innovation capabilities. Consequently, in emerging markets, the implementation of open innovation represents different challenges from those experienced by emerged market companies. Some of these are due to the maturity of the business environment, and are related to the local culture and practices in the knowledge production sector (Cuervo-Cazurra, 2012). Although this poses challenges for EMNEs compared to AMNEs, the former have an important advantage based on their knowledge of national and regional culture and practices.
6. Conclusions, limitations and further research

In conclusion, while numerous studies point to the challenges of open innovation, and stress different mechanisms needed to reach potential partners (Chesbrough & Brunswicker, 2014; Salter et al., 2014), these are implemented in emerged market countries. For example, numerous examples show the implementation, benefits of, and barriers to open innovation in emerged market multinationals such as Procter&Gamble, GE, Fiat, and Philips (Di Minin, Frattini, & Piccaluga, 2010; Huston & Sakkab, 2006). These studies of AMNEs highlight issues such as intellectual property ownership, creation of platforms to receive external solutions, changing organizational structures, and management of crowds. While these aspects are relevant for AMNEs, based on our results, this paper suggests that EMNEs initially evaluate country specific strategic resources to excel in innovation. For example, Wipro in India is a company that benefits from the large number of skilled IT people, and Cemex in Mexico can produce construction materials cheaply. Moreover, EMNEs intent on achieving a regional or global presence are required to acquire or develop R&D skills (Rui et al., 2016). However, the acquisition of R&D resources is attainable only for some EMNEs such as Geely which acquired Volvo, or Tata which acquired Jaguar. Most EMNEs have to rely on national and company specific R&D skills and processes to develop new technologies. In our study, we observed how a Brazilian EMNE initiated open innovation activities with national universities, business, technology centers, and public agencies. These activities allowed the firm to develop radical innovations responding to country specific resources and local needs. Companies that take a leading role in implementing open innovation tend to make important contributions that shape national and regional public policies and outcompete competitors.

This paper is not without limitations. The longitudinal perspective over a period of 15 years provided in-depth insights into the process of open innovation implementation at the largest cosmetic Brazilian MNE. Despite the unique setting of the firm and the study in an emerging market, some limitations of this paper include the generality of our findings because we conducted this research at one single firm. Also, the study was partially based on a retrospective perspective and it might be that we could not capture all the events and incidents during the initiation and implementation phases. Certainly, further research is needed to investigate open innovation in other firms from emerging markets. Currently, while the role of foreign subsidiaries in emerging markets as well as the research about innovation strategies of MNEs from emerging markets is capturing the attention of
innovation scholars, the field of open innovation has apparently ignored the implementation of open innovation in this geographical area.

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**Appendix 1: Natura’s closed innovation phase (2001 – 2005)**

In 2001, the development of the Ekos (a new product line based on products from the amazon) line showed the potential of partnering for external complementary competences to leverage innovation. However, as most R&D was internal, the dimension of monitoring and formulating technology and customer needs was inexistent. During 2002, Natura formalized its open innovation strategy joining public calls from the Brazilian Federal Government and through a joint-venture with a research company – Flora Medicinal aiming to accelerate the adoption of new competences and knowledge in specific technical areas.

In 2003, as the search for external solutions was new even for the Brazilian ecosystem, Natura created search tools to enlarge its collaborative R&D projects with different regions in Brazil. Initially, this occurred through the establishment of joint call-for projects with Brazilian R&D agencies that guided in the selection of scientific themes and their evaluation criteria. All these efforts generated a total of 15 research projects and 5 patents, collaborations with six Brazilian universities, and external funding from 3 public R&D funding authorities. Particularly, relevant was the development of natural extracts for a relevant brand, named Natura Chronos.

The dimension of managing integration required active engagement of internal researchers who ensured the planning, the alignment and the quality of projects. Every open innovation project had an internal and an external leader who managed the project internally, passing each project phase in the internal forums of the technology development process. Moreover, there were other activities that were developed internally, as the external partner would not have skills or infrastructure to perform these, like safety alternative tests and
animal testing. The new technologies resulting from open innovation would be delivered to enter the product development process just after all safety and efficacy tests were run internally or under Natura’s supervision at a specific and certified partner until a specification was approved by Natura’s ingredients committee. When the technology could be implemented in a new product, new tests had to be made to guarantee that the safety and efficacy of the product. For example, the sensorial requisites had not only to be fulfilled, but also surpassed. While these projects proved the benefits of external collaboration, Natura’s team continued to focus on the further implementation of open innovation and experienced challenges related to for instance NIH syndrome, IP protection, and internal boundary spanners.

**Appendix 2: Natura Cosmetics developing basic technologies in a closed innovation form**

Natura was relaunching its skincare main brand, Chronos, aiming to introduce anti-sign active from the biodiversity aligned to the strategy of the sustainable use of biodiversity introduced with the Ekos brand. At this time, just the first line was already launched, Chronos Spilol, which introduced the concept of the power of the actives originated from biodiversity obtained with high technology and in a sustainable way. Yet, there was the need to find a new active component to leverage this concept and keep the health of the brand, as competition was becoming more aggressive in this segment.

While projects from the first call-for-projects were achieving the expected deadlines and objectives, the ones focused in skincare were laying behind and results were not ready. Natura needed a new active component to launch a new product. At that moment, Natura and project partners initiated the search of an identified opportunity within existing projects. Following, a professor from the Federal University of Santa Catarina presented initial test of a medical plant that had the potential application in skincare technologies.

Specifically, the research aimed to study the anxiolytic (also antipanic or antianxiety) effect of passionflower (*passiflora*). After two years, the research outputs did not find any effect as an anxiolytic. Yet, researchers from Federal University of Santa Catarina and Natura found that the passionflower could have anti-inflammatory benefits, related to skin aging and may be used in line anti-signals. Following, between 2004 and 2007, the development, test and effectiveness measure of this new component was conducted which resulted in a positive outcome by the end of 2005. The result was a new product launch knows as the Chronos passiflora line. Internally, this project has been recognized as an exemplary project as it demonstrated the benefits of potential collaborations between Natura and local universities.