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# Towards a path-transformative heuristic in inclusive innovation initiatives: an exploratory case in rural communities in Colombia

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## ABSTRACT

This study contributes to a better understanding of the transformative process towards inclusive innovation from the perspective of three literature branches, inclusive innovation, institutional entrepreneurship and path dependence. Based on these literature branches, we ensemble a heuristic to assess the role of Institutional Entrepreneurs in fostering Inclusive Innovation initiatives supported by National Entities in local communities. To assess the heuristic and answer the beforehand question, we used an exploratory case at the municipality of Cumbal, in Nariño (Colombia). Through secondary information analysis and preliminary fieldwork observations, we demonstrate usefulness of the heuristic to unfold the transformative process in local communities. Also, we identified Institutional Entrepreneurs as change agents.

## KEYWORDS

Inclusive innovation; Institutional Entrepreneurship; path dependence; path-transformative changes; Colombia; A Ciencia Cierta

## 1. Introduction

Emerging economies like Colombia have tried to improve their economic growth and development by implementing industrial policies and cash transfer programmes. However, these policies have shown poor performance; for instance, in the last 57 years, the level of productivity in Latin America and Sub-Sahara Africa has been negative on average (Cavallo and Powell 2018), and indexes of inequality remain high in those regions. Thus, despite the current policies, inequality remains a global concern (Papaioannou 2014).

A new set of strategies named 'Inclusive Innovation' is emerging as an alternative to foster development in marginalized settings. These strategies have two main characteristics. First, their purpose is to work directly with marginalized communities to meet their needs and concerns by using innovation (Harsh et al. 2017). Second, they try to empower these communities. Several authors consider essential this latter characteristic

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in processes of social development (Rennkamp 2011; Papaioannou 2014; Pansera and Owen 2018). These characteristics align 'Inclusive Innovation' under the framework of transformative changes. This framework is focussed on discussing questions about how to design and implement Science, Technology and Innovation (STI) to address social needs and environmental concerns (Chataway et al. 2017; Schot and Steinmueller 2018).

Different entities could foster these strategies (Chataway, Hanlin, and Kaplinsky 2014). Among those entities, the role of the State is crucial because attempts to meet social concerns do not always emerge spontaneously and demand policy guidelines (Rennkamp 2011). Thus, Inclusive Innovation requires an active State which promotes the creation of new paths (Martin and Sunley 2006; Dawley et al. 2015) in a sort of entrepreneurial State (Mazzucato 2013).

The role of actors is crucial to achieving the purposes intended by Inclusive Innovation strategies. For instance, Swaans et al. (2014) point out the relevance of innovation brokers to bring actors together in these strategies. However, the analysis of actors in transformative changes, such as those fostered by inclusive innovation, has not been studied enough. As De Haan & Rotmans have pointed out, actors in transformative changes are 'not explicitly represented and often poorly conceptualized' (2018, 276). These authors suggest new avenues to study transformative changes focused on the intentional actions that actors could perform to breaking path dependence and achieve institutional change.

A promising alternative to study the role of actors in inclusive innovation strategies is the institutional entrepreneurship approach. In this approach, the institutional entrepreneurs are agents of change who break the status quo and bring about new rules of the game (Pacheco et al. 2010). Institutional Entrepreneurs have the potential to contribute to meeting the needs and concerns of people who are living under marginal conditions using innovation directly. They could, therefore, bring a better understanding of transformative changes. Those actors have been studied in environments such as enterprises (Munir and Phillips 2005), processes of regional integration (Fligstein 1997) or health care systems (Battilana, Leca, and Boxenbaum 2009).

However, the analysis of actors and their roles in transformative changes, like inclusive innovation, has several gaps. First, it is not clear enough how inclusive innovation is fostering path-transformative development processes in marginalized communities. Second, limited knowledge is available about the way whereby Institutional Entrepreneurs open up path-transformative opportunities (Sotarauta and Pulkkinen 2011; Westley et al. 2011) for those who live under conditions of marginality. Also, little is known about Institutional Entrepreneurs' roles in emerging economies' territories (Battilana, Leca, and Boxenbaum 2009) or about their specific functions in conciliating interests between other actors. Finally, further research is necessary to understand how the State is supporting the coordination process between actors at the same level (local) and between levels (national-local). In this vein, this study strives to set down a starting point to fill the gaps beforementioned. To doing so, and as part of a broader research project, this study will ensemble a heuristic to discuss the following question. What is the role of the Institutional Entrepreneurs in fostering Inclusive Innovation initiatives supported by National Entities in local communities in Colombia? An exploratory case will be used to assess the usefulness of this heuristic and to answer this question.

This paper has five sections. The next section develops a heuristic based on the discussion of three literature branches, Inclusive Innovation, Institutional Entrepreneurship and Path-dependence. This heuristic will be a research strategy to answer the research question. Section three describes the data sources, and the approach followed to test the heuristic's analytical capability. The fourth section unfolds the heuristic based on the exploratory case. Finally, it presents some reflections from the exercise carried out.

## 2. Towards a heuristic to unfold a path-transformative process

In this section, we will ensemble our heuristic to answer the research question of this study. A heuristic is considered 'as an explorative research strategy combining a set of different perspectives' (Kuhlmann, Stegmaier, and Konrad 2019, 1093). This heuristic emerges from three literature branches, the notion of *inclusive innovation*, *institutional entrepreneurship* and *path-dependence* theory. The first branch is chosen regarding its potential to address social concerns that the innovation mainstream does not cope directly. The second looks for attending the lack of agency to explain transformative changes (Farla et al. 2012; De Haan and Rotmans 2018). Finally, path-dependence adds modularity to study phenomena throughout time.

### 2.1. Inclusive innovation as an Institutional Logic

The first component in our heuristic is the notion of Inclusive Innovation. We argue that this notion performs the role of an Institutional Logic (IL). To explain this argument, we will discuss first the concept of Inclusive Innovation. Afterwards, we will explain the link with IL.

#### 2.1.1. Approaches and definitions to understand inclusive innovation

Inclusive Innovation notion is not new. Some authors (Heeks et al. 2013; Smith, Fressoli, and Thomas 2014) consider the movement of appropriate technology in the 1970s its antecedent. However, the current attention on positive effects in the market by the innovation mainstream, disregarding social concerns and consequences (Rennkamp 2011), has increased the fears about possible social inequalities produced by such mainstream (Heeks, Foster, and Nugroho 2014; Harsh et al. 2017). Thus, this notion brings an alternative to reduce such inequalities (Chataway, Hanlin, and Kaplinsky 2014) through promoting participation in benefits of the development to who have been excluded (OECD 2017).

This notion is complex, without a neutral understanding (Pansera and Owen 2018), and sometimes considered as a buzzword (Fressoli et al. 2014; Pansera and Owen 2018). Papaioannou (2014) suggests two alternative approaches to understand Inclusive Innovation, the liberal and non-liberal politics approach. The liberal approach interprets Inclusive Innovation as the people's right to get into the market, both in processes (Swaans et al. 2014) and outcomes. Thus, Inclusive Innovation provides economic opportunities for marginalized people (George, McGahan, and Prabhu 2012).

A non-liberal approach stresses the substantial and equitable people participation in innovation, both in the process and outcomes, even if it is not market-oriented. In this approach, Inclusive Innovation is a process of active inclusion of marginalized

people into the development process (Foster and Heeks 2013; Cozzens and Sutz 2014). In short, Inclusive Innovation should make accessible to marginalized people the benefits of development (Harsh et al. 2017), not only regarding the economic arena.

### 2.1.2. Characteristics and an analytical explanation of Inclusive innovation

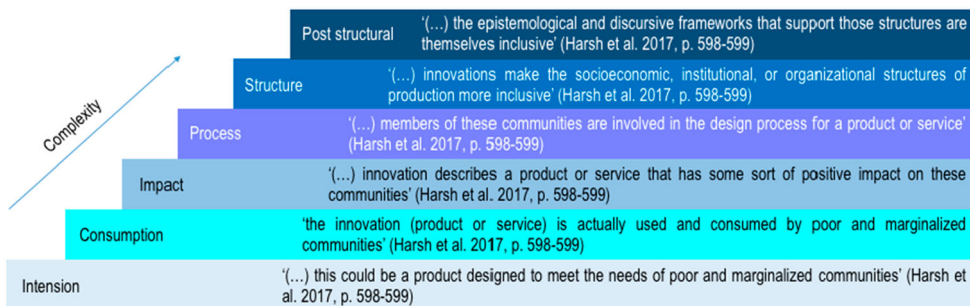
Pansera and Owen (2018) understand Inclusive Innovation as an umbrella term (Rip and Voß 2013). An initiative has to fulfil three characteristics to become part of this umbrella. First, it has to focus on the people (Harsh et al. 2017), meaning to embrace people concerns from a bottom-up approach (Papaioannou 2014). Second, it should consider people participation in processes, both setting the agenda, designing and implementing solutions (Swaans et al. 2014), and in all the stages to attend their concerns. Finally, equitable access to the solutions developed by people should be guaranteed. These characteristics highlight the relevance of people participation and the intention to reduce possible inequalities from the innovation mainstream.

Heeks, Foster, and Nugroho (2014) develop a logical explanation of inclusive innovation. Figure 1 depicts the description provided by them. Herein, the level of complexity increases from the bottom to the top. Thus, whereas the first rung represents the intention of being inclusive regarding the community needs, the last rung illustrates situations where ‘the epistemological and discursive frameworks that support those structures are themselves inclusive.’ (Harsh et al. 2017, 599). Here, we want to underline the multidimensionality and the different degrees that featured the notion of inclusion. Thus, instead of discussing who is included or not, it will be relevant to analyse the degrees of inclusion and the dimension where actors are included (Bijker 2012).

### 2.1.3. The link between inclusive innovation and the Institutional Logic

An Institutional Logic (IL) is a set of principles which guides the rules of the game (Leca and Naccache 2006). It refers to the conditions that allow or not practices (Alvial Palavicino 2016), or the ways to use specific incentives or disincentives to affect actors’ behaviours (Salerno 2007). We argue that Inclusive Innovation is an IL because it provides the principles to guide the practices that enable the development of initiatives to attend social concerns and reduce inequalities by using STI.

Two principles guide the practices and development of Inclusive Innovation initiatives, participation and equity (Papaioannou 2014). While the first one ensures the



**Figure 1.** The Inclusive Innovation Ladder. Source: Authors’ elaboration based on Heeks, Foster, and Nugroho (2014) and Harsh et al. (2017).

inclusion of people's concerns, their involvement in the processes to attend their interests and enjoy the results, the second looks for guarantying inclusion to all actors according to their needs.

Thus, instead of conceiving Inclusive Innovation as a model, it represents a set of principles to guide the reduction of the inequalities produced by the innovation mainstream. These principles give content to the three characteristics of an Inclusive Innovation initiative (section 2.1.b), and therefore, define the borders, conditions and alternatives for Institutional Entrepreneurs to climb through the six rungs in [Figure 1](#). In this way, these principles provide certainty about the justification of the rules to develop an initiative. This certainty is introduced by sharing the meaning of the objectives and the way to achieve them (Battilana, Leca, and Boxenbaum 2009, 69), and understanding and predicting actors' behaviours (Tracey, Philips, and Jarvis 2011; Alvial Palavicino 2016).

## ***2.2. Institutional Entrepreneurship: the first layer in our heuristic***

The purpose of this layer in the heuristic is twofold. First, it provides an agency source to operationalize inclusive innovation's principles. Second, it calls for attention about the challenges faced by 'Institutional Entrepreneurs' (IEs), and the strategies and skills required by them to change their reality, and bring about new transformative paths.

### ***2.2.1. Origins, definition and main features of IEs***

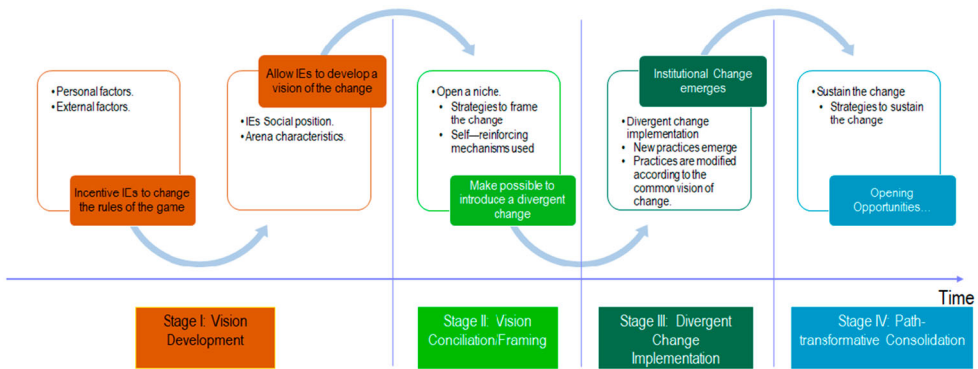
The concept of IEs was introduced by Eisenstadt (1980), and developed by DiMaggio in 1988 (Leca, Battilana, and Boxenbaum 2008; Pacheco et al. 2010). IEs are organized actors with enough resources to promote and achieve a desired social result (DiMaggio 1988). To achieve their goals, they break the status quo and prompt new game-rules (Pacheco et al. 2010), or institutions, which settle the constrains for the human interplays (North 1990). IEs are agents of change who could be represented by an individual or a collective actor (Sotarauta and Pulkkinen 2011; Weik 2011). These agents could appear in a distributive structure (Battilana, Leca, and Boxenbaum 2009; Kuhlmann and Rip 2018). It means that more than one IE could participate in a process of institutional change.

IEs have four characteristics. First, they show an intention to change the setting where they are (Sotarauta and Pulkkinen 2011). Second, IEs show the intention of change by introducing divergent changes (Battilana, Leca, and Boxenbaum 2009). Third, IEs try to promote the change or creation of a specific institutional setting (Leca and Naccache 2006, Weik 2011). Finally, IEs are involved actively in the process of change (Battilana, Leca, and Boxenbaum 2009). As a final remark, IEs' success in their change endeavours is not a requirement to be identified as IEs (Battilana, Leca, and Boxenbaum 2009).

### ***2.2.2. A model to unfold IEs' work***

These four IEs' characteristics are embedded in two models. These models explain the IEs process of institutional change. Battilana, Leca, and Boxenbaum (2009) suggested the first model, and Westley et al. (2011) the second. We mix the central elements of both models, considering their complementarity. [Figure 2](#) illustrates this merge by a four stages model.

The first stage is named '*Vision development*'. Herein, personal and external motivations lead IEs to develop a vision of an alternative institutional setting. The enabling



**Figure 2.** Four Stages in Institutional Entrepreneurs' work. Source: Authors' elaboration based on Battilana, Leca, and Boxenbaum (2009) and Westley et al. (2011).

conditions influence these motivations and signal the possible IEs' skills and strategies required to destabilize the current setting. Among different enabling conditions (Pacheco et al. 2010), Battilana, Leca, and Boxenbaum (2009) have highlighted two. First, the field's conditions, they depict three situations which facilitate the institutional entrepreneurship: i) shocks/crises; ii) severe problems arising; iii) organizational heterogeneity. Second, the actor position. This position defines the access level of IEs to resources (tangible or intangible) and their field perception (Leca, Battilana, and Boxenbaum 2008).

The '*Vision conciliation/framing*' is the second stage. Here, IEs seek to spread their vision of change between their community, stakeholders and actors who could help to support them. In this purpose, IEs use their skills and strategies to find resources, gain support, introduce a divergent change, and thus develop a niche. This niche embodies IEs' vision of the alternative institutional setting and put pressure on the current regime.

The third stage is named '*Divergent Change Implementation*'. In this stage, IEs are focused on two actions. First, they encourage new practices developing and foster the change of those misaligned with their vision of change. Second, IEs work on lower the threshold between the niche and the current regime. This activity will set the conditions to reallocate resources from the current regime to the emerging niche, and thus, increase its support.

Finally, the last stage is named '*Vision sustained*'. Here, IEs mobilize resources to sustain the divergent change introduced by their vision. The niche developed in the previous stages represents this divergent change. Thus, IEs will look to sustain the niche to support the process of eroding and replacing the current regime.

### 2.3. Path-dependence and path-creation: the second layer in our heuristic

This second layer provides the frame where IEs' implement their actions. We divide this frame into four phases following Sydow et al.'s model for facing a path dependency (2005). Each phase provides a boundary-setting linking the past and future of the process, and a fine-grain for understanding IEs' strategies, actors' interplays, surrounding conditions, external and internal factors.



### 2.3.1. Key elements in a path-transformative process

Path dependence is a crucial concept to understand the process of change (David 2007). This concept explains two situations (Henning, Stam, and Wenting 2013). First, it describes the direction followed in the process of change. Second, it explains how a series of decisions and their linked investments make progressively expensive and difficult to reverse or change the decision flow (Levi 1997).

A path-dependence process study considers four elements. The first element is the *critical juncture*. It is a period of significant change (Collier and Collier 2002), where among different alternatives, one is chosen to answer a concern (Salerno 2007). External events (Collier and Collier 2002) or endogenous actions led by agents could trigger a critical juncture.

The second element is the *self-reinforcing mechanisms*. They are a set of repetitive actions with positive feedback (Salerno 2007) that make them more appealing in their use (Sydow, Schreyögg, and Koch 2009). These mechanisms have been classified from different viewpoints, such as political science (Pierson 2000) and economics and institutional analysis (Schreyögg, Sydow, and Holtmann 2011).

The third element is the *lock-in*, shaped by two stages (Martin and Sunley 2006). The first stage embodies a situation where using self-reinforcing mechanisms produces a positive loop. This situation encourages their use, and, it increases the cost of changing the decision supported by them. This positive loop leads to the second stage. Here, the process reinforced by the mechanisms becomes rigid and inflexible, producing a sub-optimal outcome.

The fourth element is *path creation*. This element along with path dependence and path destruction resembles ‘an ongoing, never-ending interplay’ (Martin & Sunley, p. 408) which explains the process of change. Path creation depicts those stages where a lock-in situation is broken down, providing conditions for a new path’s emergence. Several authors have pointed out the relevance of the agency in the path creation process (Martin and Sunley 2006; Petrov 2008; Cooke 2012; Dawley 2013; Grillitsch and Sotarauta 2019). In path creation, agents perform two activities (Garud, Kumaraswamy, and Karnøe 2010), *path framing*<sup>1</sup> and *alternatives selection*<sup>2</sup>, which contribute to explain how they can promote changes in a current institution or create new ones (Sotarauta and Pulkkinen 2011). Thus, they are not doomed to lock-in, but they can build new paths.

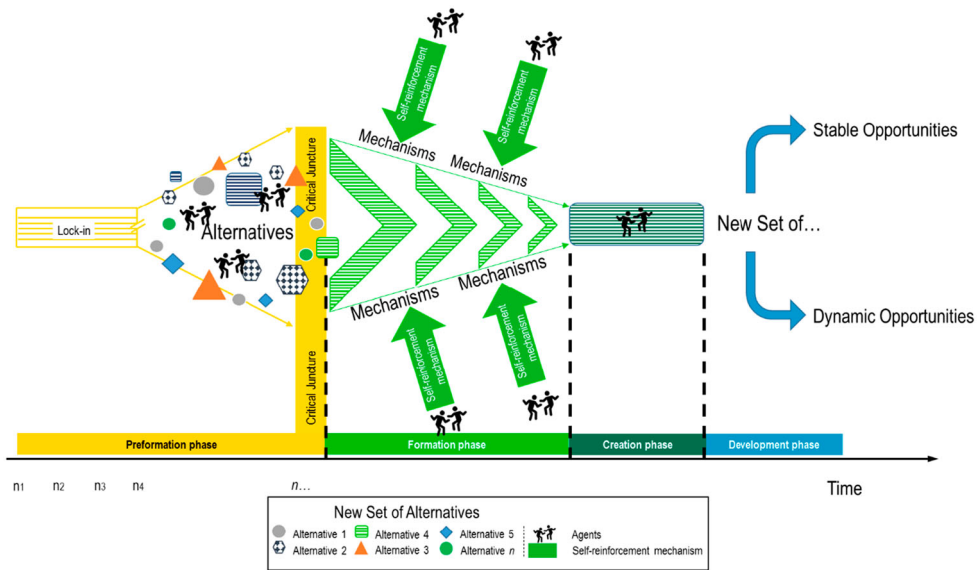
### 2.3.2. A path-transformative process

Based on the ideas by Sydow, Schreyögg, and Koch (2005), Martin (2010) and Westley et al. (2011), we suggest in Figure 3 a path-transformative process model.

The first phase is the *preformation phase*. It is ruled by a *lock-in* situation which could be broken by agents who are seeking to bring new alternatives to cope with such a situation. Here, the agents implement the ‘framing process’ to create enough momentum to boost the *critical juncture* and perform the ‘alternatives selection’ activity. Thus, they set their preferences for one alternative.

Once actors define their alternative, the *formation phase* will begin. In this phase, the agents perform two activities, according to Westley et al. (2011). First, they introduce a niche, and second, they make shallower the current regime. In these two activities, using self-reinforcing mechanisms is central for the agents’ goals.





**Figure 3.** Path Transformative process illustration. Source: Own elaboration based on Sydow, Schreyögg, and Koch (2005), Martin (2006) and Westley et al. (2011).

The third phase is the *creation phase*. In this stage, IEs implement self-reinforcing mechanisms to consolidate their vision of change. This consolidation is achieved by the introduction, creation and nurture of a new set of socio-economic practices, and therefore, changing the socio-political-economic structures (Martin and Sunley 2006).

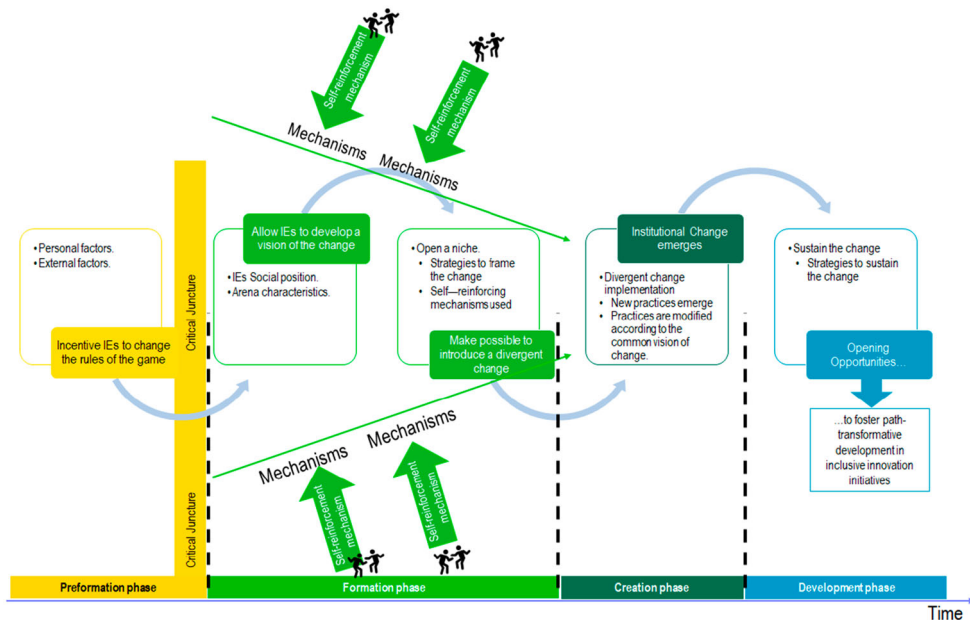
Finally, the *development phase* emerges. According to Martin (2010) this phase shows two possible outcomes. The first one is a new set of stable opportunities. In this case, the work lead by the agents could end in a path-dependent situation, featured by a low level of innovation if not any, and a lack of endogenous change. The other set is a dynamic stage, more prone to introduce endogenous change, evolution and innovation. We argue that the kind of outcome achieved in this last phase relies upon the practices and changes introduced by the actors in the previous stage. Thus, the introduction of a divergent change will produce a dynamic scene.

## 2.4. Assembling the heuristic

Based on the previous discussions, we suggest the following heuristic as an attempt to provide an explorative research strategy to answer the research question of this paper. In this heuristic, Institutional Entrepreneurship and Path-dependence work as layers to explain a path-transformative process based on the actions performed by IEs. Inclusive Innovation provides the IEs' directionality in the path-transformative process.

### 2.4.1. A path-transformative heuristic

Figure 4 shows the path-transformative heuristic. In the *preformation phase*, IEs begin their vision of change developing. The Institutional Logic guides this vision towards



**Figure 4.** A path-transformative heuristic. Source: Own elaboration.

using innovation to tackle poverty and inequality directly. Regarding this vision, IEs develop the *critical juncture* to support and spread their vision. In this phase, IEs build their vision of change and the critical juncture based on their motivations or harnessing windows of opportunity.

The second stage in our heuristic is the *formation phase*. In this stage, IEs continue building their vision by the process of conciliation. Here, their *social position* and the *field conditions* play an important role as enablers in their endeavour. Besides, IEs use *self-reinforcing mechanisms* to frame the advantages, convenience of their vision of change, and the drawbacks of the current alternatives. The use of these mechanisms, along with other *strategies*, contributes to the process of IEs' vision conciliation and mobilization with potential allies to support their vision and to *open a niche*.

IEs open a niche through the implementation of a divergent change. This process happens in the *path-creation phase*. In our heuristic, inclusive innovation as institutional logic brings the change's directionality to the divergent change. We claim inclusive innovation as a divergent change because it gives a role to innovation not aligned with the innovation mainstream, as was discussed in 2.1.

The last phase is the *development phase*. In our heuristic, we argue that the implementation of the *inclusive innovation's logic* produces a '*new set of dynamic opportunities*'. The consolidation of this new set of opportunities requires *IEs' strategies* to increase the number of actors who support the use of innovation as an alternative to attend directly social concerns. Thus, IEs will cement their vision and erode the 'old' regime, opening new opportunities for sustainable, social, and economic development.

### 2.4.2. Actors, transformations and assumptions in our heuristic

The path-transformative heuristic is focused mainly on the role of Institutional Entrepreneurs. However, we acknowledge the role that other actors, such as intermediaries (Kivimaa et al. 2019), frontrunners (Brown, Farrelly, and Loorbach 2013) among others, could play in such process (Fischer and Newig 2016). From the Institutional Entrepreneurship perspective, other actors play the role of allies, opponents or valuable assets that IEs could use to develop their strategies to foster the path-transformative process.

Here, the notion *transformative* accounts for the modification or emergence of a new set of practices to bring new futures to the organization where the IEs are embedded. These practices and futures should be oriented by the Institutional Logic provided by Inclusive Innovation, and diverge from the current institutional setting. Thus, a path-transformative process accounts for the process to develop a niche (Rotmans and Kemp 2001) from the perspective of IEs. In this frame, the scale of the analysis provided by the heuristic relies on the micro-level (Rotmans and Kemp 2001). Considering the MLP approach (Geels 2011), the micro-level has to be studied regarding its interplays with the regime and the landscape.

The path-transformative heuristic has three assumptions. *First*, Inclusive Innovation represents a set of principles in a direct approach to development (Arocena and Sutz 2017) which require an agent to their implementation. *Second*, Inclusive Innovation's principles seek to break the innovation mainstream's path-dependence. Hence, an agent like the Institutional Entrepreneur is required to break the path-dependence and create a path-transformative future. *Third*, the innovation mainstream seeks to increase industrial productivity and competitiveness to produce economic growth (Pinzón-Camargo & Ordóñez-Matamoros 2018). It is an indirect approach to development (Arocena and Sutz 2017) where the role assigned to innovation could produce and increase social inequalities. To some extent, the State should correct them (Bortagaray and Ordóñez-Matamoros 2012).

## 3. The approach followed and data sources

To assess the analytical capability of the path-transformative heuristic, we developed an exploratory case (Yin, 2018) from the Colombian Ministry of Science, Technology and Innovation-(MSTI) programme 'A Ciencia Cierta' (ACC). We are not looking for extrapolating claims from the case analysis but discuss the heuristic strengths and drawbacks as a starting point to unfold path-transformative phenomena. Therefore, more than present empirical results of a fieldwork analysis, we want to assess to which extent our heuristic helps to explain interplays, processes and strategies led by IEs in an Inclusive Innovation case. The exploratory case was chosen randomly from a set of six cases selected from a PhD research project. In that PhD project, three cases belong to ACC and the other three to the programme 'Ideas para el Cambio'. They were chosen following the Case Study Research method (Yin, 2018) to study Institutional Entrepreneurs role in different institutional and organizational settings and inclusive innovation programmes in Colombia.

We consulted information from public archives, videos and secondary material prepared under the MSTI's supervision. We had the support of this entity to access some of this information. We made a full reading of all the material and using Atlas.ti the

content was classified according to the categories defined in the Path-transformative heuristic described in Figure 4. In this way, it was possible to identify actors, actions, events and process occurred in the framework of the initiative. Each heuristic's phase was studied alone and regarding its contribution to the path-transformative process.

#### 4. The heuristic in use: an exploratory case in a rural community in Cumbal (Nariño, Colombia)

The exploratory case is an indigenous agrotourism organization called La Kumba. It is run by 13 families in the municipality of Cumbal located in Nariño, Colombia. This municipality is near the border between Ecuador and Colombia. It is 3,050 m.a.s.l on average, has an extension of 1,265 Km<sup>2</sup>, and is surrounded by a volcanic system. Its population is 32,672 inhabitants, most of them (87.83%) are indigenous (DNP n.d.). Cumbal has suffered the risks produced by its volcanic system (El Tiempo 2014). It has also faced the internal conflict of Colombia and its economy relies mainly on cattle, dairy, and agricultural activities (Alcaldía Municipal de Cumbal-Nariño, S.F.; Alcaldía Municipal de Cumbal-Nariño 2017). Regarding inequality and poverty, Cumbal belongs to a department with adverse conditions of inequality and poverty. Nariño has a Gini Index circa 0.51, and about 41.4% of their population is living in poverty (DANE 2019).

Figure 5 describes according to our heuristic, the Path-transformative process followed by this organization. Each phase in this process is explained below.

##### 4.1. Preformation phase

A leader from the 13 indigenous families who run La Kumba played the Institutional Entrepreneur's role (IE). In this phase, two factors fostered his vision development. First, external factors such as the lack of economic alternatives, low profits produced

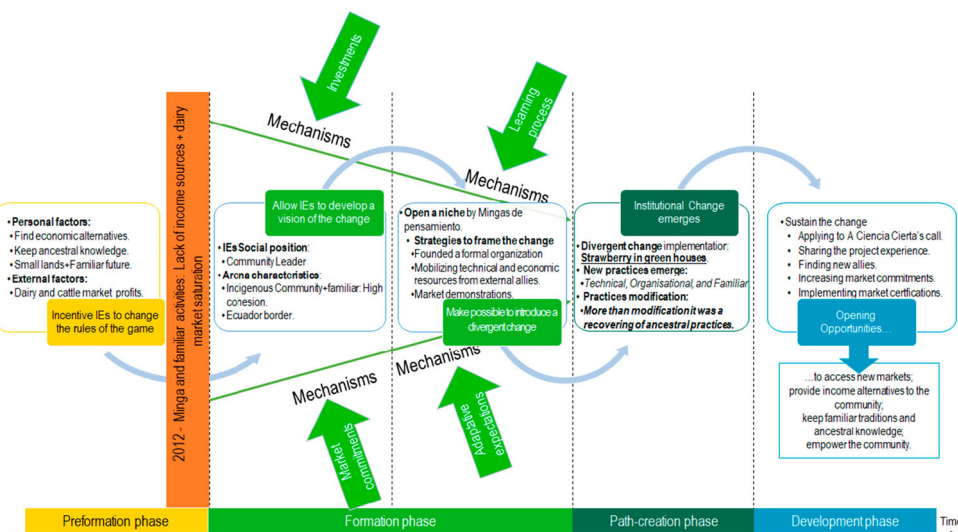


Figure 5. La Kumba's Path-transformative process. Source: Own elaboration.

by the dairy market, and the lack of extensive lands to increase their cattle production. Second, internal motivations like keeping the community's traditional knowledge, bring a better future to their families and provide economic opportunities to their community (COLCIENCIAS 2016; COLCIENCIAS 2018a).

These motivations fostered IE to frame a critical juncture in 2012 to find alternatives for the associates. In this purpose, IEs used a traditional indigenous collective activity named *Minga*<sup>3</sup> (Consortio dit, 2017). *Mingas of work* and *thought* were developed (COLCIENCIAS 2015a). The first ones allowed collective building of greenhouses; the second ones worked as governance spaces for associates, to plan and decide La Kumba's future through consensual processes.

#### 4.2. Formation phase

The IE's vision was to recover their agricultural traditions and find economic alternatives to his community. Regarding the social position and the field conditions, at least three factors contributed to spreading the IE's vision. The first one was IE's position as leader of 13 families. The second factor was the lack of opportunities from the cattle and dairy market, and finally, the high level of cohesion that indigenous communities have in rural regions.

IE implemented different strategies and self-reinforcing mechanisms to get support for his vision. The first strategy was discursive. The IE framed a discourse showing the disadvantages of the current local regime and the advantages of his vision of change (see Table 1). This discourse was spread through *Mingas of thought* and social activities (COLCIENCIAS 2016).

The second strategy was to involve the associates in his vision. Thus, for instance, IE did a co-creative (Balanzó, Nupia, and Centeno 2020) experiment with the associates to find out the best product to sow in 2013. Strawberries showed the best results among other crops tested by the associates (COLCIENCIAS 2018b). IE used these results to frame the strawberries crops as a promissory alternative for the organization and to give directionality to his strategies.

Third, IE got and mobilized allies (Battilana, Leca, and Boxenbaum 2009) and resources to support her vision. Some of those allies were the Indigenous Reservation and national entities like the National Training Service (SENA) (COLCIENCIAS 2015a). The first ally brought financial resources to the association, which also meant tacit political support regarding its role as the indigenous authority. The second one

**Table 1.** Current local regime disadvantages and Vision of change' advantages.

Disadvantages	Advantages
The cattle and dairy production is featured by low profits; they have high fixed costs and big spaces which are not available for all the community.	Strawberry and dairy production have the same production costs, but the first one uses less space and provides more profits.
The cattle market has been damaged by Free Trade Agreements signed by Colombia.	It could be an economic activity according to their traditional knowledge.
300 m <sup>2</sup> working with cows produce COP 27,200 every two months.	300 m <sup>2</sup> working with strawberries produce COP 200,000 in five weeks.

Source: Own elaboration based on MSTI's archives (2016).

brought technical and reputational support but also kept informed the association about funding opportunities.

Fourth, IE used self-reinforcing mechanisms to strength and implement his vision. Thus, in 2014, La Kumba became formally in an agrotourism organization (Cámara de Comercio de Ipiales 2020), which increased the organization's institutional density (Pierson 2000). This formalization enabled La Kumba to apply for public funds which also worked as self-reinforcing mechanisms. Thus, IE got funding in 2014 from the Ministry of Agriculture-(MinAgriculture) for training and developing facilities like greenhouses. In this case, the relationship between MinAgriculture and La Kumba kept top-down. Thus, MinAgriculture provided financial and technical resources according to its policy guide lines (MinAgricultura, s.f.). Finally, making market commitments, attending to market and trade fairs reinforced the promissory futures from strawberries crops.

### 4.3. Creation phase

In this phase, the work between IE and his community triggered four types of new practices and modified those linked with the agricultural processes. The first set of new practices were *technical*. La Kumba was the first to grow strawberries in the region and to use greenhouses. Also, they used technological artefacts, such as hydrometers and dripping systems to take care of their strawberry crops. The second set of practices were *organizational*. In this case, they learnt to apply for and operate local and national entities resources, and to manage a productive organization. In third place, they developed *market practices*. For instance, they got involved in fairs and business rounds, learnt to find new consumers, deal with them, and promote their product. Finally, they introduced a new product in their daily diet as a *family practice*.

Regarding the *practices modified*, La Kumba outpaces conventional agricultural processes. They recovered their ancestral knowledge in complement to scientific knowledge to protect and nurture strawberries crops. Thus, they made bio-preparations instead of pesticides and used the moon phases to take care of the crops.

To sum up, these set of practices, both the new and modified, suggest a divergent change in La Kumba regarding mainly agricultural practices and dairy activities in the region which base on the green revolution and do not consider the ancestral knowledge importance.

### 4.4. Development Phase

IE and the community continued implementing strategies to sustain/cementing this dynamic stage. They mobilized new allies spreading and sharing their experience within Cumbal's community and with other organizations, and looking for new costumers to increase strawberries' demand. They also continued applying for public funding. They got a crucial ally in 2015, thanks to information given by SENA. This new ally was the MSTI through the programme 'A Ciencia Cierta' (ACC). It is a programme which looks for strengthening and sharing experiences where STI has been used by the communities to solve a specific problem (MinCiencias 2020).



IE, with the SENA support, applied to a public call from ACC, and in a national contest, La Kumba's project was selected in 2016. However, the funding assignation required a bargaining process between IE and MSTI visions in an activity called *local encounter*. ACC designed this activity with two purposes. First, to increase and strengthen the organization allies network. Second, to develop a governance space where the organization, MSTI, researchers from local universities, private or public entities under the figure of 'godparents', and an enabler organization hired by MSTI, deliberated about the STI improvements required (COLCIENCIAS 2015b) to strengthen La Kumba's project. Tensions between IE and MSTI visions emerged in this encounter, the godparents mediated between the two parties using their scientific knowledge and technical experience, enablers worked as process intermediaries (Kivimaa et al., 2019). The interplays between these actors made it possible to co-create and co-design (Balanzó, Nupia, and Centeno 2020) a joint project based on mutual agreements. In this process, the municipality authorities were invited, but they did not attend either brought support or oppose the project, which showed a lack of interest from them.

MSTI became an ally for La Kumba increasing its reputation at the local and national level, broadening its allies network, and challenging the IE's vision of change. Throughout the project implementation, the godparents worked together with La Kumba sharing indigenous knowledge and scientific knowledge to improve the crops and the organization, and MSTI boosted the role of STI in the project through the process intermediaries, always in a horizontal relationship.

This project finished in 2017 and worked as a self-reinforcing mechanism to sustain/cementing La Kumba vision. According to fieldwork observations in 2019, it contributed to four aspects. First, it strengthened the self-confidence of IE and La Kumba's associates in the vision of change and encouraged them to apply for new funding opportunities and share their experience with other communities and national actors (RTVC 2016). Second, the crops' productivity increased (350Kg/week in 2016 to 1ton/week in 2019), and they accessed to 20 new markets. Third, it incentivised changes in associates dietary habits. Finally, the alliance between MSTI and La Kumba is still working. Thus, La Kumba uses the ACC project to increase its reputation and find new allies, and the MSTI uses the project results to increase ACC credibility.

## 5. Reflections on using the heuristic

We suggested an explorative research strategy to account for transformative processes based on divergent changes introduced by IEs and supported in practices creation or modification. Figure 4 shows the use of the strategy to explain from the micro-level the phases and actions performed by IEs in a niche developing characterized by the use of STI to attend social concerns directly.

We did not try to explain a transition process (Geels 2011) using our heuristic. Instead of that, we were attempting to disentangle from the IEs perspective, the processes that happen between the development phase and take-off phases explained by Rotmans and Kemp (2001). Thus, we are providing insights about the IEs' role in processes of institutional change (Brinkerhoff 2015) and how they open up transformative processes (Sotarauta and Pulkkinen 2011; Weik 2011; De Haan and Rotmans 2018).



The two layers and the Institutional Logic (IL) used in our heuristic showed advantages but also rooms for improving in future research. Path-dependence theory brought useful concepts to describe a trajectory shift process and introduced a modularity approach to unpack a complex phenomenon diving it in phases. However, we should be aware of the following aspects. First, these phases could produce an attraction towards a linearity understanding of the phenomena. Second, although the theory suggests four phases, boundaries are not black and white but in grey-scale. Finally, path-transformative processes could have back and forth situations that our exploratory case did not allow to test.

The Institutional Entrepreneurship layer was crucial to reflect on the role of actors in path-transformative processes. IE's strategies, interplays with allies, the introduction a divergent change based on practices provided an agency perspective to explain the shift between the development phase to the take-off phase (Rotmans and Kemp 2001). In this purpose, the combination with path-dependence phases provided a systematic approach to study the case. There is room for improvement regarding a possible oversimplification of other actors role under the figure of allies. Different exercises have explored the actors' diversity (Fischer and Newig 2016) and could enrich the IEs' role and their interplays with other actors.

Inclusive Innovation as an IL contributed to describe IEs in addressing social concerns by using STI directly, and how IEs produced different levels of inclusion in each phase and all the process. However, the ladder approach by Heeks, Foster, and Nugroho (2014) showed two limitations. First, it is biased to market-oriented initiatives. Thus, motivations, like keeping traditional knowledge alive or dietary practices in La Kumba's case, could be dismissed. Second, it understands inclusion as a linear process. In the exploratory case, the process inclusion emerged in the co-creative experiment with the associates. But the consumption and impact happened afterwards, which contradicts, for example, the ladder approach.

Although the case in our paper was exploratory and used to test our heuristic, it deserves some reflections that are not looking for extrapolation. From the Institutional Entrepreneurship viewpoint, we tracked an *IE*, and his strategies to frame the discourse, to involve the associates, to find allies and to use self-reinforcement mechanisms to support his vision of change. Thus, IE's strategies were crucial to introduce a divergent change by making new practices (technical, organisational, market and familiar) and modifying others (agricultural). These elements depict a path-transformative process of the 13 families associated in La Kumba, who left the cattle and dairy activities as income sources and recovered their ancestral agricultural knowledge implementing practices and technologies different than those used in the green revolution.

The path-dependence layer contributed to study the IE's in each of the heuristic's phases, but also to realize how the inclusive innovation level was increasing between phases. Thus, while in the pre-formation phase, the intension level emerged in IE's vision, the formation phase showed the associates' involvement in the process to define the best crop option. After this decision, the consumption and impact levels emerged. Finally, the widening of La Kumba's allies networks because of ACC in the development phase suggests a gradual structural inclusion emergence at the local level in the middle term.

Finally, an exciting contrast was identified between the policies role of MinAgriculture and MSTI as self-reinforcing mechanisms to strengthen the path-transformative process triggered by IE. Thus, while in the formation phase, MinAgriculture fostered a programme under a top-down approach, in the development phase, the MSTI through ACC propitiated a horizontal arena using the figure of local encounter. The IL deepened this encounter by making salient the relevance of indigenous and scientific knowledge, bringing more actors/allies, allowing co-creating and co-designing futures and achieving to agreements to support the path-transformative process. These characteristics show ACC as an inclusive innovation initiative regarding the elements discussed in section 2.1.b.

## Notes

1. Agents use elements from the past to set the conditions for a new path, and they define the boundaries between what is exogenous and endogenous in the path creation process. In this activity, they have to create enough economic and political momentum, and directionality to support their endeavour (Dawley et al. 2015).
2. Agents select suitable options according to their intentions. They create and use self-reinforcing mechanisms to achieve these options and to increase the cost of other options for the path creation process.
3. The notion of Minga involves traditional spaces of solidarity work, social movement, and political action (López Córtes 2018).

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