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European Cohesion Policy performance and citizens' awareness: A holistic System Dynamics framework

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ABSTRACT:

As Cohesion Policy constitutes the major funding scheme of the European Union, not only does literature explore if the policy's performance is satisfactory but also investigates the extent to which the policy is effectively communicated to citizens. To integrate analysis of implementation and communication, we develop a novel qualitative framework that elicits a holistic analysis of the causal mechanisms behind: (i) the distribution of the Cohesion Policy funds, their management at a local managing authority level and the related impact on projects' quality, and (ii) the communication processes that underpin citizens' awareness about the Union's role in funded projects. The multilevel nature and the dynamic behaviour of the system, as well as its multiple feedback loops, render System Dynamics appropriate as an approach to model its complexity. The proposed framework aims at stimulating a focused discussion on Cohesion Policy by providing policy-making insights for designing efficient schemes to improve the actual and the perceived performances. Finally, it is anticipated to support research in the field from a new organisational perspective through considering the impact of local actors' structures, procedures and actions on Cohesion Policy outcomes.

KEYWORDS: European Cohesion Policy; funds' absorption; projects' quality; citizens' awareness; modelling framework; System Dynamics.

JEL CLASSIFICATION: C63; H72; H83; O52; P43; R58.

Desempeño de la Política Europea de Cohesión y concienciación de los ciudadanos: un marco holístico de Dinámica de Sistemas

RESUMEN:

Dado que la Política de Cohesión constituye el principal programa de financiación de la Unión Europea, la literatura no solo explora si el desempeño de la política es satisfactorio, sino que también investiga hasta qué punto la política se comunica de manera efectiva a los ciudadanos. Para integrar el análisis de implementación y comunicación, desarrollamos un marco cualitativo novedoso que genera un análisis holístico de los mecanismos causales basados en: (i) la distribución de los fondos de la Política de Cohesión, su gestión a nivel de la autoridad de gestión local y el impacto relacionado en los proyectos calidad y (ii) los procesos de comunicación que apoyan la concienciación de los ciudadanos sobre el papel de la Unión en los proyectos financiados. La naturaleza multi-nivel y el comportamiento dinámico del sistema, así como sus múltiples bucles de retroalimentación, hacen que la Dinámica de Sistemas sea un enfoque

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apropiado para modelar su complejidad. El marco propuesto tiene como objetivo estimular una discusión centrada en la Política de Cohesión, proporcionando ideas para la formulación de políticas que permitan diseñar esquemas eficientes para así mejorar los resultados reales y percibidos. Finalmente, se anticipa apoyar la investigación en el campo desde una nueva perspectiva organizacional a través de considerar el impacto de las estructuras, procedimientos y acciones de los actores locales en los resultados de la Política de Cohesión.

PALABRAS CLAVE: Política de Cohesión Europea; absorción de fondos; calidad de proyectos; concienciación ciudadana; marco de modelización; Dinámica de Sistemas.

CLASIFICACIÓN JEL: C63; H72; H83; O52; P43; R58.

1. INTRODUCTION

European Cohesion Policy (CP) aims at fostering a more sustainable territorial development in terms of economic growth and citizens' quality of life (Caldas et al., 2018). Following a partnership principle, its planning, decision-making, and implementation are performed by the European Union (EU) in close consultation with member states, subnational/local authorities and interest organization (Yesilkagit and Blom-Hansen, 2007), according to complex a multilevel governance scheme (Coppola et al., 2018).

As CP constitutes the main, and probably the largest, EU project funding scheme (Percoco et al., 2017), it is crucial to ensure that all CP funds are judiciously spent, by addressing institutional, governance and behavioural issues. Therefore, CP and related challenges have been broadly scrutinised; the scientific literature argues if and to what extent CP's performance (from funds' absorption to the broader concepts of efficiency and effectiveness) is satisfactory (McCann, 2015), given that its impact on regional development is far from uniform (Fratesi and Wishlade, 2017). For reducing the local heterogeneity of the policy's impacts, evidence suggests, important executive and distributional issues need to be overcome, which relate to the multilevel governance challenges (McCann, 2015). Indicatively, allocating additional funds to poorer regions might not lead to an improvement of their economic and social conditions, leading to a counterintuitive effect (Rodríguez-Pose and Garcilazo, 2015).

Recently, research on CP focused on how citizens perceive the efficiency and effectiveness of CP (Capello and Perucca, 2017). Notably, recent research efforts are exploring CP's potential to create satisfaction among citizens, which might eventually, in turn, play an important role in building a robust European identity (López-Bazo and Royela, 2017; Capello, 2018).

Although much research effort has been put in the CP field, to the best of our knowledge, there is an evident absence of a comprehensive framework for: (i) mapping all major variables that affect CP performance in terms of both funds' absorption and citizens' awareness about EU contribution on regional development, and (ii) combining the two subsystem structures (i.e. absorption and awareness) into a unique integrated one. This dearth of a holistic analysis is particularly worrying when considering that CP presents all the features of a complex system, the dynamics of which is often difficult to be understood and elicited (Moxnes, 2004; Moxnes and Jensen, 2009). In fact, complex systems are populated by information and material delays, feedbacks, non-linear relationships between variables, numerous actors with multiple objectives, diverse risks and significant uncertainty (Vennix, 1996; Sterman, 2000; Sterman, 2002). By failing to acknowledge this complexity, researchers and practitioners can be prone to misunderstandings, while policy-makers could opt for decisions that might face resistance or failure (Sterman, 2006).

To this end, this paper contributes towards the CP research by developing a modelling framework as a novel system 'map' that elicits that deep causal structure of: (i) the mechanisms through which the European CP funds are distributed and managed at a LMA level ('funds' absorption subsystem'), the (ii) the communication processes that underpin the building of citizens' awareness about the EU role in the projects implemented in the regions ('public awareness subsystem'), and (iii) the interconnection among them. Notably, the two subsystems are strongly interrelated, as the outputs of the one constitute the inputs

of the other and vice versa. More specifically, given that the variables of the one system affect the variables of the other through cause-effect links, the two systems reinforce each other based on the positive nature of the relationships. The importance of the interrelation between the two subsystems is even more evident considering that the amount of available funding, the number of refunded projects and their quality, as well as the LMA capacity, could affect the volume of information (and thus citizens' awareness), while the level of citizens' awareness could influence potential beneficiaries' consideration on EU funding opportunities (and thus funds' absorption) through the word of mouth.

The proposed framework constitutes a first-effort qualitative model for providing a conceptual representation of the entire system under study. This contribution is expected to be the first step in the direction of enhancing our understanding of CP systemic nature for providing a new tool for researchers, practitioners and policy-makers. To build this conceptual structure, we utilized the System Dynamics (SD) methodology (Forrester, 1961). The theory of system structure and behaviour that underpin SD, along with its focus on closed loops of cause and effect and on the distinction between levels and rates (Randers, 1980), is particularly appropriate to conceptualise the complex nature of the CP system which is characterised by multilevel governance (i.e. including the EU, the LMAs and the beneficiaries).

The proposed qualitative model provides a conceptual map to integrate different streams of research in the area of CP. This vast and diverse research territory combines studies developed in very different disciplinary contexts. The disciplinary richness of this field, however, may be at odds as policymakers' need an available inclusive map of key actors, scarce resources and interconnectedness of processes. The proposed model builds on the sparse and distributed mental models of researchers and policy-makers. Our aim is to deliver a conceptual tool that facilitates the dialogue between policy-makers and scientists, as well as among researchers from different disciplines. In addition, digging into the causal structure of CP, forced to clarify and articulate concepts previously let in their aggregate form. Indicatively, we develop a dualistic concept of project quality (absolute versus relative). Increasingly, projects quality is a concept that is powerfully permeating public debate (Cottone, 2018) in parallel with the absorption issue. However, practitioners and experts still have not provided a clear definition, thus project quality is a vague and undefined concept generating incommunicability and misunderstandings.

The remainder of the paper is structured as follows. In section 2, the SD methodological approach is presented as a solid background for our modelling approach. In section 3, we develop the holistic framework for modelling the CP's absorption and communication system. Finally, in section 4, major insights regarding the proposed model structure are discussed and recommendations for future research directions are provided.

2. METHODOLOGY

2.1. SYSTEM DYNAMICS APPROACH

To analyse the system under study, we employed the SD methodology. SD is a simulation-based method that provides meaningful insights for real-world problems exhibiting dynamic complexity. SD was originally introduced by Forrester (1961) as a modelling technique for assisting corporations in understanding the long-term impact of management policies. Since then, it has been extensively applied to several strategic and operational problems within the business sector (Mollona, 2017; Aivazidou et al., 2018a). Since its early beginning, SD has been further applied in social systems. For instance, Forrester (1969) utilised the SD approach to capture the life cycle dynamics of urban growth and decay, considering the city environment as a complex system that undergoes drastic changes over time.

Notably, the SD methodology moves off from the elicitation of a qualitative model. Based on this latter, a formal mathematical model can be developed to be simulated for exploring the consequences of modelled assumptions. Yet, the preliminary phase of qualitative modelling has, per se, a theoretical value since it crystallizes the knowledge and mental models extracted from fields' experts, both practitioners and

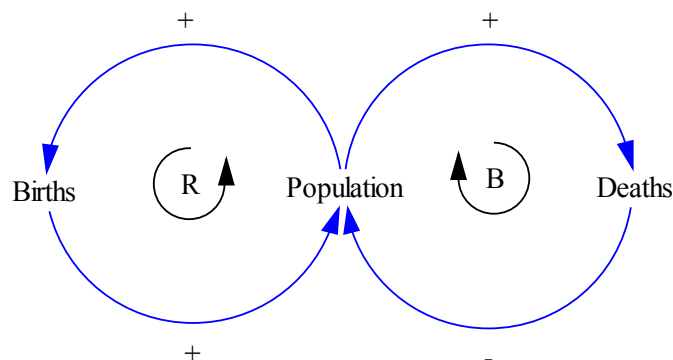
researchers. The mental models are defined as ‘networks of facts and concepts that mimic reality’, from which policy-makers ‘derive theory opinion of strategic issues, options, courses of action, and likely outcomes’ (Morecroft, 1994: 8). Notably, the quality of decisions and actions depends on the quality of mental models (Morecroft, 1994). Therefore, our aim is to integrate different available mental models and to return a richer an integrated portrait that foster informed dialogue and policy-making.

To this end, a major objective of this effort is to establish the use of the SD methodology for capturing the complex dynamics of socio-economic systems related to CP. In fact, although the European funding to the LMAs follows a linear pattern, the effects of the LMAs’ administrative capacity and the knowledge about the funds, as well as that of the projects’ application quality on the projects’ acceptance rate, generate non-linear interrelations within the system. Furthermore, taking into consideration the time-dependent behaviour of the funding flows, the complexity and the dynamics of the problem under study render SD the appropriate modelling method for the analysis.

The SD approach provides several additional benefits; firstly, it enables the conceptualising process to go beyond the state of the art, through proposing a holistic view of the CP system, unlike its partial view in existing research, which might miss interconnections between the variables (Meadows, 2009; Repenning, 2003). Moreover, it can overcome the traditional correlation studies, which offer static evidence for similar statistical behaviour between two variables, through providing a cause-effect mechanism that might explain this behaviour dynamically by offering operational thinking grounded in shared common reality (Olaya, 2012; Sedlacko et al., 2014). Finally, the development of a graphical map based on simple symbols and concepts as a solid boundary object¹ could facilitate and enhance comprehension and discussion in the field (Black, 2013).

In this paper, we present a qualitative model, namely the causal loop diagram (CLD) or system map. The CLD captures the conceptual structure of a system through representing its major cause-effect links, accumulations and feedback mechanisms. Arrows indicate causal links that connect a cause to its effect (Forrester, 1969). The causal impact of each relationship is presented with either a positive (both cause and effect increase or decrease) or a negative (when cause increases (decreases), effect decreases (increases)) polarity. A CLD further includes stock variables (symbolised by rectangles), which represent the state of a system in a given point in time and capture accumulation processes at work within the system, as well as flow variables (symbolised by valves) which are rates filling or emptying the stock variables (Sterman, 2000).

FIGURE 1.
Examples of balancing and reinforcing loops



¹ ‘A boundary object is a representation, perhaps a diagram, sketch, sparse text, or prototype, that helps individuals collaborate effectively across some boundary, often a difference in knowledge, training, or objective’ (Black, 2013: 76).

In addition, a feedback is a sequence of causes and effects such as that a change in a given variable circulates through the loop and finally ends up further influencing the same variable (Georgiadis and Vlachos, 2004). These mechanisms are either balancing (negative) or reinforcing (positive) feedback loops (Forrester, 1969; Sterman, 2000). If an initial increase in a variable leads to an eventual decrease (or increase) in the same variable, then the feedback loop is considered as balancing (or reinforcing). Specifically, a balancing feedback loop demonstrates goal-seeking behaviour overtime; after an initial disturbance, the system seeks to return to an equilibrium situation. In a reinforcing feedback loop, an initial disturbance causes further change leading to exponential growth or decay, indicating the presence of an unstable equilibrium. Figure 1 represents two indicative examples of a balancing and a reinforcing loop using the case of population. An increase in population raises deaths, which in turn decrease the population (balancing loop), while a growth of population increases births, which in turn augment population (reinforcing loop).

2.2. MODELLING APPROACH AND SYSTEM BOUNDARIES

Due to the complexity of the system under study, we describe our model in two subsystems, namely: (i) the funds' absorption subsystem, and (ii) the public awareness subsystem. The funds' absorption subsystem focuses on the expenditure of EU structural funds in a LMA context, while the general public awareness subsystem concentrates on the number of citizens aware of the EU role in the CP within the LMA (Aivazidou et al., 2018b). Notably, the two subsystems are tightly interrelated given that the outputs of the one are inputs of the other and vice versa.

As typical in SD modelling (Vennix et al., 1994), we built upon multiple sources of information. To structure the CLD of the CP system, we used four sources: (i) EU, national and LMA official documents, (ii) and scientific literature, (iii) interviews with experts, and (iv) a workshop performed in the context of the PERCEIVE project (www.perceiveproject.eu). We employed official documents to accurately describing the main funding flow, while the heterogeneity of the rest of the inputs provided a broad set of information on the CP system. Specifically, given the rather qualitative nature of many variables within the system, scientific literature was utilised to support to the best possible extent the explanation of the connections among the variables. In case of an absence of related literature, especially in the communication part, empirical evidence was used to validate the reliability of the relationships; interviews with experts about EU funding were performed to find any missing factors or links in the causal loops. Finally, a workshop with different stakeholder validated the qualitative model. Table 1 provides detailed information about the interviews and the workshop.

Interviews and workshops with stakeholders and practitioners were particularly useful in the absence of relevant literature for qualitative variables to validate the causal relationships among variables. Participants' feedback was, in general, positive and they appeared active and interested when debating the model relations and implications. We structured the meetings following typical techniques of knowledge elicitation as described by Vennix et al. (1994; 1996). During the interviews, two or three researchers collected notes in parallel. The notes were then compared to obtain a consistent interpretation of elicited mental models. In the workshop, we adopted more structured knowledge elicitation techniques such as questionnaires, brainstorming, shared diagrams and maps to compile, individually or in a team, new structural insights. Overall, the presentation of different model versions and their discussion during interviews and workshops has acted as a continuous validation process of the conceptual structure of our work.

As regards the system boundaries, we adopted the perspective of a LMA to define the level of the analysis. Therefore, we only consider and describe in detail the aspects directly affecting, or affected by, the LMAs' performance, actions, scope and objectives. EU and nation-state actions are clearly important for LMA activities; however, we considered as inputs exogenous to the system and, thus, they are out of the scope of this analysis.

TABLE 1.
Interviews and workshop information

Type	Number of participants	Participants' job titles	Organisation type	Date and length
Interview	1	CEO	Private company (both beneficiary and intermediary company)	17 th April 2018 105 minutes
	2	Researchers	University	11 th June 2018 100 minutes
	1	Journalist	Newspaper	25 th June 2018 140 minutes
	1	Officer	LMA	10 th July 2018 150 minutes
	1	Employee	European Structural Fund (ESF) funded project participant	17 th September 2018 50 minutes
	1	Officer	Europe Direct	20 th September 2018 110 minutes
	1	Researcher	University	25 th September 2018 110 minutes
	1	Officer	LMA	25 th September 2018 80 minutes
	1	CEO	Private company delivering ESF funded courses	5 th October 2018 60 minutes
	2	Researchers	University	5 th October 2018 70 minutes
Workshop	approx. 20	LMA officers, EU officers, researchers		26 th October 2018 300 minutes

3. SYSTEM DYNAMICS FRAMEWORK

3.1. FUNDS' ABSORPTION SUBSYSTEM

The first subsystem under study is the main flow of CP funds from the EU through the LMAs to the beneficiaries, including all factors that affect these procedures. Notably, the analysis is multi-level, including three key players: the EU, the LMAs and the final beneficiaries (and only marginally the nation-state). In fact, the CLD illustrates how the initial EU funding is distributed dynamically, beginning from the allocation of the funds to the LMAs up until the final refund to the beneficiaries for the projects completed under the scheme. Furthermore, four major feedback loops exist in the system (Figure 2), namely: the “LMA learning” loop (in green), the “potential applications” loop (in purple), the “beneficiaries information enhancement” loop (in brown) and the “strategies to increase absorption rate” loop (in orange), all of which both affecting and get affected by the main funding flow. Remarkably, some of the loops are intertwined, further highlighting the complexity of the system. In addition, the light blue box indicates that the variable “Citizens aware of EU role in cohesion policy” acts as an input from the public awareness subsystem, while the light green boxes highlight the two types of projects' quality, absolute and relative, as defined by the authors in subsection 3.1.6.

FIGURE 2.
CLD of the funds' absorption subsystem

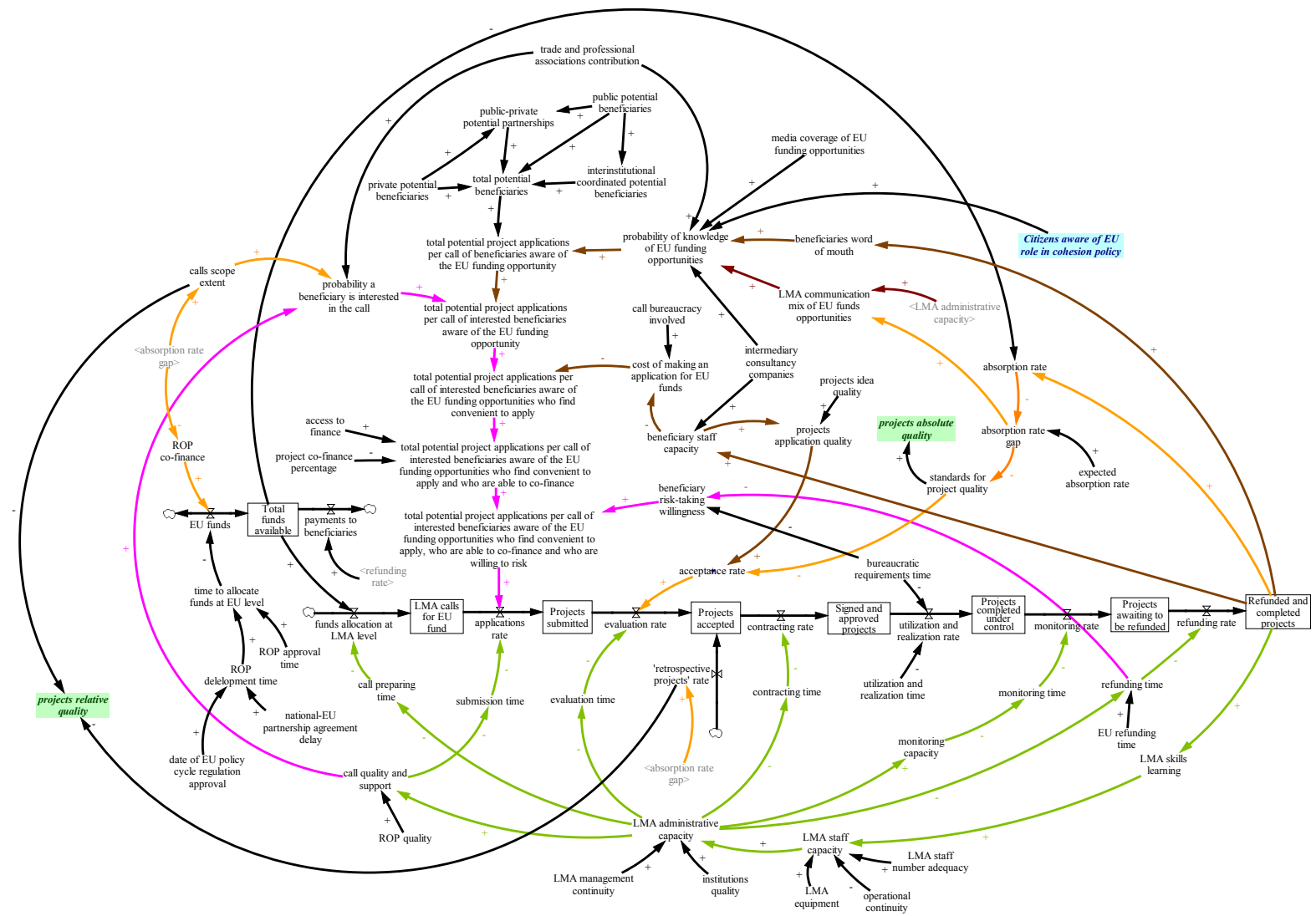
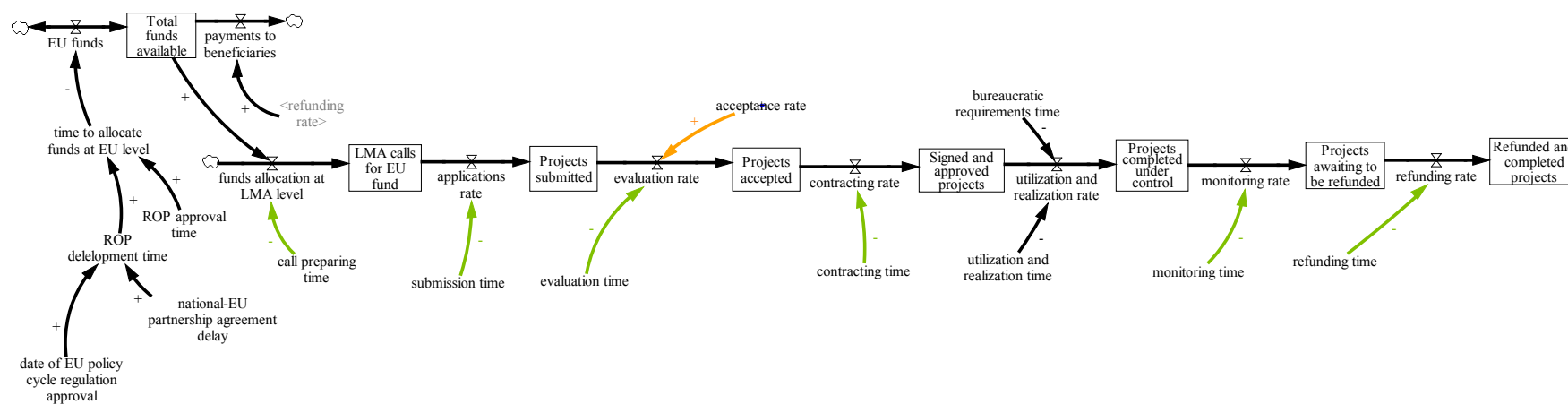


FIGURE 3.
Pipeline and resource stocks



3.1.1. PIPELINE AND RESOURCE STOCKS

Figure 3 depicts the diagram of the European funding flows through the LMAs to the beneficiaries. Initially, after all the necessary procedures for allocating funds are carried out (“time to allocate funds at EU level”), the “EU funds” flow in the “Total funds available” stock, which in turn can be reduced when EU pays its commitments (“payments to beneficiaries” valve is open). In addition, this stock is increased by the “ROP co-finance” which refers to the LMA’s economic contribution to the CP (ROP stands for Regional Operational Programme²). The amount of “Total funds available” directly affects LMA’s “funds allocation at LMA level” rate, which determines the amount of “LMA calls for EU funds”, after some time that is needed to prepare the call (“call preparing time”). The more funds are allocated, the more calls are prepared by the LMAs. Potential beneficiaries who apply to these calls are accounted in the “applications rate” mechanism: depending on the number of calls, potential beneficiaries submit their application, accumulating into the stock of “Projects submitted”. This process is not instantaneous, but it takes time to prepare and submit a project proposal (“submission time”), and the longer is this time, the lower will be the ‘applications rate’ flow. The submitted applications are evaluated (“evaluation rate”) at a speed depending on an “evaluation time” and at a successful degree depending on an ‘acceptance rate’, and all evaluated projects accumulate into the stock of “Projects accepted”. These projects are signed after a while (“contracting time”) and then “contracting rate” moves the projects approved to the “Signed and approved projects” stock. Subsequently, the projects are put into action (“utilization and realization time”) and after they are concluded, and the bureaucratic requirements performed (“bureaucratic requirements time”), through the “utilization and realization rate”, projects are completed and accumulates in “Projects completed under control”. In this stage, they are assessed for a period of time (“monitoring time”) and those passing the assessment process (“monitoring rate”) move to the state of “Projects awaiting to be refunded”. After technicalities are solved and processed (“refunding time” which is determined by both LMA and EU technical times), beneficiaries are finally refunded (“refunding rate”) and all projects accumulate in the “Refunded and completed projects” stock. Note that, “refunding rate”³, at the end of the pipeline, also determines directly the initial “payments to beneficiaries” outflow.

With respect to the “time to allocate funds at EU level” at the beginning of the stocks’ pipeline, it is comprised of two different components: “ROP approval time” and “ROP development time”. In fact, the EU proceeds to fund the LMA only if the ROP has been approved and, obviously, the ROP can be approved only if it has been developed. The higher these times are, the higher the “time to allocate funds at EU level” is (George, 2008; Milio, 2007) and this might result in delayed start of the LMA managing the CP funds. More specifically, the “ROP development time” is further influenced by the “date of EU policy cycle regulation approval” and the “national-EU partnership agreement delay” (George, 2008; Milio, 2007). In fact, when there is a delay in the date that the EU approves the related framework regulation or a delay between EU and the nation that receives the funding in signing the partnership agreement, the LMA cannot proceed to finalise the ROP.

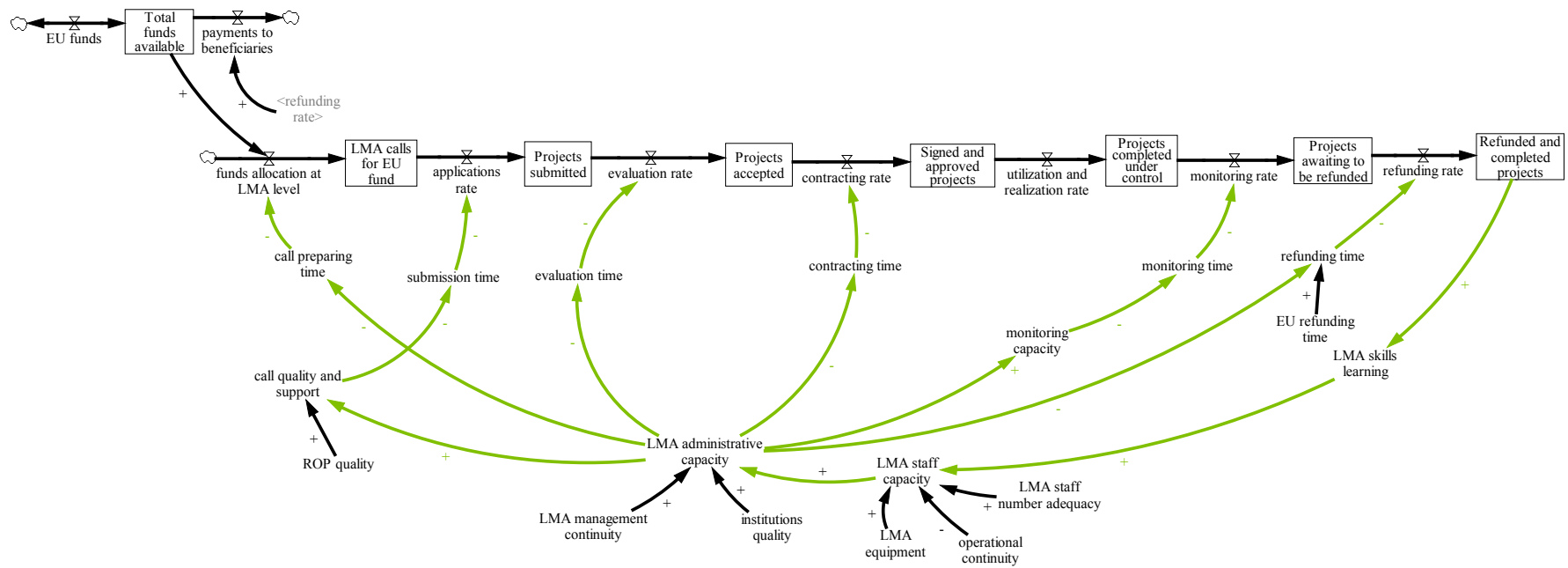
3.1.2. LMA LEARNING LOOPS

The LMA learning part is not a sole loop, but it constitutes a structure of five different feedbacks, given that the “LMA administrative capacity” affects most of the delays involved in the EU funding process (Figure 4). More specifically, an accumulation of successful “Refunded and completed projects” generates an enhancement in experience and ability in the organization and managing of the funds (“LMA skills learning”). This leads to an increase in the “LMA staff capacity” (Berică, 2010; Hapenciuc et al., 2013; Jaliu and Rădulescu, 2012; Lucian, 2014; Sumpíková et al., 2004; Tatar, 2010), which is further

² Each EU funded program under the CP scheme is also co-financed by the national and/or LMA (usually regional) governments. The co-finance relations regarding EU funds are expressed in the respective operational plans (OPs).

³ To limit overlapping arrows in both subsystems, the variables written in grey between brackets (<example>) are a copy of variables already present in the model.

FIGURE 4.
LMA learning loops



influenced by changes in the “LMA staff number adequacy”, the “LMA equipment” and its “operational continuity” (intended as the stability of local, national and European regulation of CP over time, because all the times regulations change the staff need to relearn how to operate). A rise in “LMA staff capacity” fosters the “LMA administrative capacity” (Berică, 2010; Hapenciuc et al., 2013; Jaliu and Rădulescu, 2012; Lucian, 2014; Sumpíková et al., 2004; Tatar, 2010), together with “institution quality”, understood as the quality of public institution governance (Charron et al., 2015), and “LMA management continuity” (meant as the overall political stability, continuity and correspondence with EU ideals). However, this latter can be seen as a qualitative broad concept comprising the political factors affecting CP such as: regional organisation, structure and size suitability to manage EU funds (Milio, 2007), the degree of regional autonomy in administering structural funds (George, 2008; Smętkowski et al., 2018; Tatar, 2010; Kyriacou and Roca-Sagalés, 2012), the number of departments involved in the process and the degree of cooperation among them (Milio, 2007; George, 2008; Lucian, 2014) and. Notably, an increase in the “LMA administrative capacity” reduces the time needed by LMA to process calls, applications and projects (i.e. “call preparing time”, “submission time” through increasing “call quality and support”, “evaluation time”, “contracting time”, “monitoring time” and “refunding time” which also depends on the “EU refunding time”), given its increasing effectiveness. Finally, a decrease of each different time increases the related rates, making the flow through the pipeline quicker, leading to more efficient processes and, subsequently, more projects completed, closing the loop from the same point from which started.

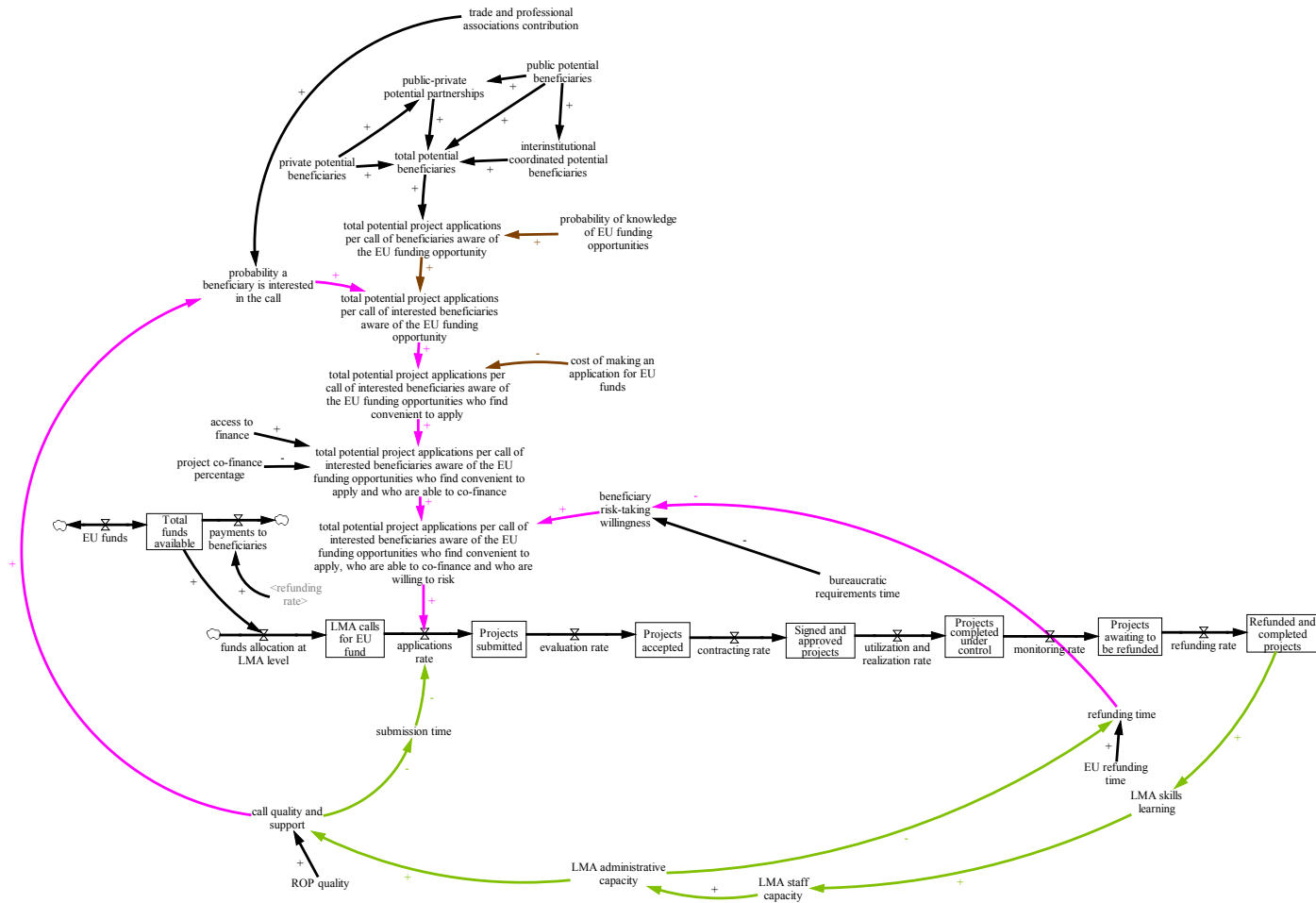
Indicatively, in the broader loop, a reduction in the “call preparing time” increases the “funds allocation at LMA level” rate, which in turn increases the “LMA calls for EU fund” stock. Then, a growth in this stock further increases the “application rate” (the more the calls are, the more project applications are submitted). The same positive effect is transmitted to the “Refunded and completed projects” stock. Finally, an augment in the aforementioned stock raises the knowledge of the local managing authorities and hence the “LMA skills learning” (Hapenciuc et al., 2013; Jaliu and Rădulescu, 2012; Lucian, 2014). Given that the loop has begun with an increase in the “LMA skills learning” and closed with an increase in the same variable, it can be considered as a reinforcing, or positive, loop. The rest four loops follow the same behaviour.

3.1.3. PROJECT APPLICATIONS LOOPS

Figure 5 illustrates the closed system of the projects applications. Before describing the loops, it is noteworthy that the “total potential beneficiaries” number consists the sum of the “public potential beneficiaries”, the “interinstitutional coordinated potential beneficiaries”, the “private potential beneficiaries” and the “public-private potential beneficiaries”, providing the whole pool of beneficiaries who can apply for funds. An increase of each component increases the total sum (George, 2008; Squinzi, 2013; Jaliu and Rădulescu, 2012). From the initial “total potential beneficiaries” number, the system operates a series of ‘cuts’, which give a final number of potential beneficiaries that actually apply for a call.

Getting back to the structure, a rise in the “total potential beneficiaries” causes an augmentation in the “total potential project applications per call of beneficiaries aware of the EU funding opportunity” (T1) (Barberio et al., 2017). This variable takes into account the beneficiaries who are actually informed about the existence of a funding opportunity (“probability of knowledge of EU funding opportunities”). Then, if an increase in T1 occurs, the “total potential project applications per call of interested beneficiaries aware of the EU funding opportunities who find convenient to apply” (T2) grows (Zaman and Cristea, 2011). T1 hinges on the number of potential beneficiaries aware, as well as the “probability a beneficiary is interested in the call”, which in turn depends on “trade and professional associations contribution”, on “call quality and support” and on the “calls scope extent”. As for “trade and professional associations contribution”, different stakeholders such as industrial, commercial and public organizations can be involved to make a call more suitable for local needs and thus more desirable for potential beneficiaries. As for “call quality and support”, if a call is written in an easily accessible format, taking into account the necessities of the potential beneficiaries, while high-quality support is offered during the procedure, the

FIGURE 5.
Project applications loops



probability a beneficiary is interested rises. A change in T2 positively affects the “total potential project applications per call of interested beneficiaries aware of the EU funding opportunities who find convenient to apply” (T3) (Barberio et al., 2017). On the other hand, T3 is negatively influenced by an increase in the “cost of making an application for EU funds” that the beneficiaries should pay (Tatar, 2010), as it constitutes a discouraging factor further increased if “call bureaucracy involved” is high and ‘beneficiary staff skills’ low. Then, a growth in T3 raises the “total potential project applications per call of interested beneficiaries aware of the EU funding opportunities who find convenient to apply and who are able to co-finance” (T4), which is reduced by an increase “project co-finance percentage” asked to the beneficiaries (Berică, 2010; George, 2008; Jurevičienė and Pileckaitė, 2013; Zaman and Cristea, 2011; Sumpíková et al., 2004; Tatar, 2010) but counterbalanced if “access to finance” is relatively easy. Finally, an increase in T4 further increases the “total potential project applications per call of interested beneficiaries aware of the EU funding opportunities who find convenient to apply, who are able to co-finance and who are willing to risk” (T5) (Berică, 2010; George, 2008; Jurevičienė and Pileckaitė, 2013; Zaman and Cristea, 2011; Sumpíková et al., 2004; Tatar, 2010).

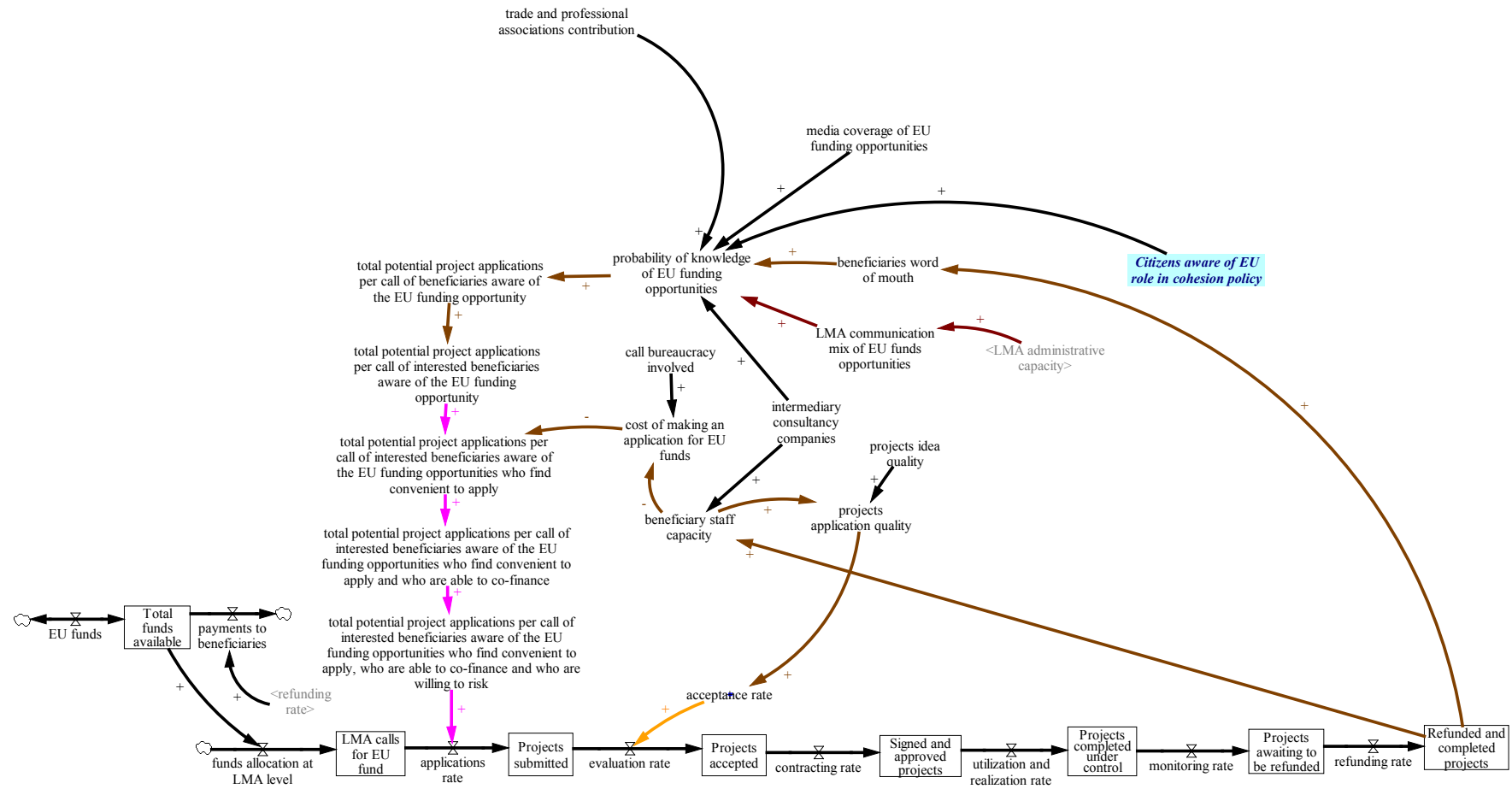
Following the loop's logic, an increase in T5, which reflects the final amount of the total potential applications that are going to be submitted, fosters the “applications rate”. Hereafter, the positive relationships (i.e. increasing effects) continue up to the “LMA administrative capacity” that has a positive effect on the “call quality and support” (Barberio et al., 2017). An increase in the “call quality and support” towards the potential beneficiaries that aim to submit an application leads to an increase in the “probability a beneficiary is interested in the call” (Barberio et al., 2017; Milio, 2007; Tatar, 2010). At the end of the loop, an increase in the probability further raises T1. Given that the loop has begun with an increase in the T1 and it ends with an increase in the same variable, it is a reinforcing loop that, if stimulated, is likely to produce a self-reinforcing behaviour. A second loop is identified; beginning from an increase in T5 and following the same pattern as the previous one, the “LMA administrative capacity” that has the effect of reducing the “refunding time”. A decrease in this last variable ends to make potential beneficiaries to perceive to be less risky to apply (increase in “beneficiary risk-taking willingness”) which in turn augments T5 (Jaliu and Rădulescu, 2012); the more beneficiaries have to wait to be refunded, the more they perceive the investment as risky and thus they are discouraged to apply. The latter loop has begun with an increase in the T5 and such an increase is transmitted through the loop to feedback into a further increase in T5, thus it can be considered as another reinforcing loop. Notably, a high “bureaucratic requirements time” could further decrease “beneficiary risk-taking willingness”.

3.1.4. BENEFICIARIES INFORMATION ENHANCEMENT LOOPS

The main loop underlying this concept expresses that the more EU funded projects are successfully completed, the more beneficiaries will talk about CP and inform other potential beneficiaries about this opportunity (Figure 6). Such mechanism is translated in the following way: a rise in the number of “Refunded and completed projects” pushes the “beneficiaries word of mouth”, which in turn fosters the “probability of knowledge of EU funding opportunities”. This probability is further positively affected by the number of “Citizens aware of EU role in cohesion policy”, which constitutes an input of the awareness subsystem. A growth in this probability affects T1 (Barberio et al., 2017) and, following the chain of variables, this is translated into an increase of applications and selected projects and thus into a rise in the “Refunded and completed projects” stock. This is a reinforcing loop since it started with an increase in the aforementioned stock and ended with an augmentation in the same stock.

A second loop starts again with an initial increase in “Refunded and completed projects”, which in turn raises the “beneficiary staff capacity” (which is also affected by the eventual assistance of “intermediary consultancy companies”) due to the staff's experience gained after the implementation of the projects. The latter variable could decrease the “cost of making an application for EU funds” because an experienced staff takes less time to prepare a project application. Then, following the projects applications loop, the series of causes and effects lead to a final increase of the “Refunded and completed projects”. Continuing

FIGURE 6.
Beneficiaries information enhancement loops



from the “beneficiary staff capacity”, a third loop is created; an increase in this variable enables the enhancement of the “projects application quality” due to the higher experience of the staff. Obviously, the application quality also strictly depends on the quality of the idea it describes (‘projects idea quality’). In turn, an increased applications’ quality could augment the “acceptance rate” of the project proposals and it could further promote the proposals’ “evaluation rate”, ending up in a higher number of “Refunded and completed projects”. Once again, as both loops have begun with an increase in the stock and closed with an increase in the same variable, they can be considered as a reinforcing, or positive, loops.

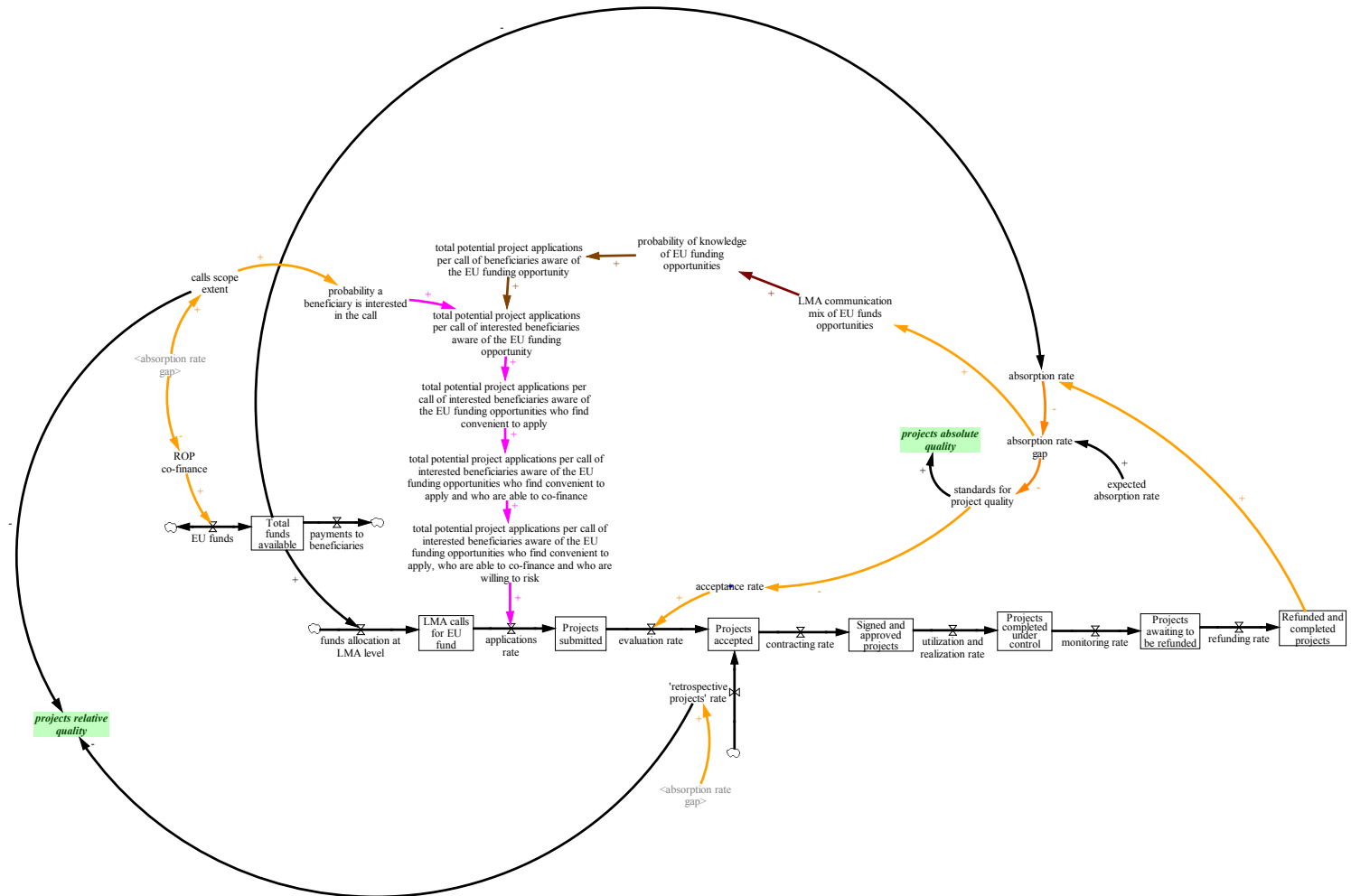
Lastly, a fourth loop always starting with an increase in the “Refunded and completed projects” state, leading to higher “LMA administrative capacity” (through increasing “LMA skills learning” and “LMA staff capacity” first). Such an increased capacity fosters the “LMA communication mix of EU funds opportunities” since the LMA becomes able to make better CP opportunities promoting, which in turn increases the “probability of knowledge of EU funding opportunities”. This probability can be also increased by increments in “media coverage of EU funding opportunities”, in “trade and professional associations contribution” and in “intermediary consultancy companies”. All these variables may improve the communication of the funding programmes to potential beneficiaries and inform them about the existence of EU financing calls and the feasibility of accessing to these funds (Barberio et al., 2017; Borz et al., 2018; Capello and Perucca, 2017; Jurevičienė and Pileckaitė, 2013). Continuing through the loop by following again the projects applications loop, the series of causes and effects raises the “Refunded and completed projects”. This is also a reinforcing loop.

3.1.5. SHORTCUT STRATEGIES TO INCREASE ABSORPTION LOOPS

If necessary, LMAs can adopt several strategies for increasing absorption rate (when it is delayed with respect to the desired rate). In fact, the absorption can be increased by: (i) decreasing the standards of the projects’ quality (the authority decreases its standards in order to accept more projects), (ii) by extending funding for existing projects (i.e. ‘retrospective projects’), (iii) by broadening the call’s scope (iv) by reducing the amount of LMA co-finance or (v) by fostering communication about CP opportunities (Figure 7). Thus, these alternative options are represented by four different loops, as described below.

The “Refunded and completed projects” divided by the “Total available funds” determine the “absorption rate” (Tatar, 2010; Zaman and Cristea, 2011). If the “absorption rate” is too low in comparison to the “expected absorption rate” an “absorption rate gap” follows, which is nothing more than the difference between the expected and desired rate and the actual. At this point, the four different loops, which correspond to the four LMA strategies to close the undesired absorption gap, separate. In the first loop, an increase in the “absorption rate gap” forces the LMAs to lower its “standards for project quality” to maximise the number of the projects accepted. Thus, a decrease in the “standards for project quality” increases the “acceptance rate” which in turn augments the “evaluation rate” (Burja and Jeler, 2018; Jurevičienė and Pileckaitė, 2013; Zaman and Cristea, 2011). As a result, an increase in this rate, following a series of positive causal links, finally leads to a higher “Refunded and completed projects” number. It must be specified that this strategy is very difficult to be put into action (LMA managers cannot easily decrease standards, they have to interface with control bodies) and therefore it is reported as a possible but unlikely solution (this ‘weakness’ is portrayed in the model by a dotted causal arrow connecting “absorption rate gap” and “standards for project quality”). In the second loop-strategy, a rise in the “absorption rate gap” increases the “retrospective projects’ rate”, which refers to the additional financing of projects already accepted and funded through an EU scheme (not necessarily CP) to facilitate the absorption of the EU funding (for example, see Corte dei Conti, 2017 for the Italian case). In fact, those projects already comply to EU regulations, their quality has been evaluated and accepted by a recognized body, while they are already in place, Thus, the LMA can easily identify them due to their high availability and rapidly insert them into the CP funding process. In the system map, such an increase rate leads to a greater “Projects accepted” number ending up raising the “Refunded and completed projects”. In the third loop, a higher “absorption rate gap” force LMAs to broaden their calls’ scope (“calls scope

FIGURE 7.
Shortcut strategies to increase absorption loops



extent”) to persuade more potential beneficiaries to submit a proposal. A growth in the latter variable augments the “probability a beneficiary is interested in the call” and thus, following the projects application loop, increases the “Refunded and completed projects”. The fourth strategy consists in a reduction of the additional co-finance provided by the LMA to the EU funds (lower “ROP co-finance”). Such decrease reduces the volume of the “Total funds available” and instantaneously increases the “absorption rate” being equal the number of projects completed, since now there are fewer funds to dispose of, and consequently the absorption gap diminishes. Finally, in the fifth loop, an increased “absorption rate gap” could push the LMAs’ to invest in communication strategies to inform potential beneficiaries (by raising the “LMA communication mix of EU funds opportunities”). A higher number of such strategies boosts the “probability of knowledge of EU funding opportunities” and consequently, following the word of mouth loop, leads to a higher “Refunded and completed projects number. In all the reported loops, an increase in the “absorption rate gap” produces a stimulus that is transmitted through the loop to lead to an increase in the “Refunded and completed projects” and a decrease in “absorption rate gap”. Therefore, these are balancing loops, or negative loops producing goal-seeking behaviour.

3.1.6. ABSOLUTE VERSUS RELATIVE PROJECTS’ QUALITY

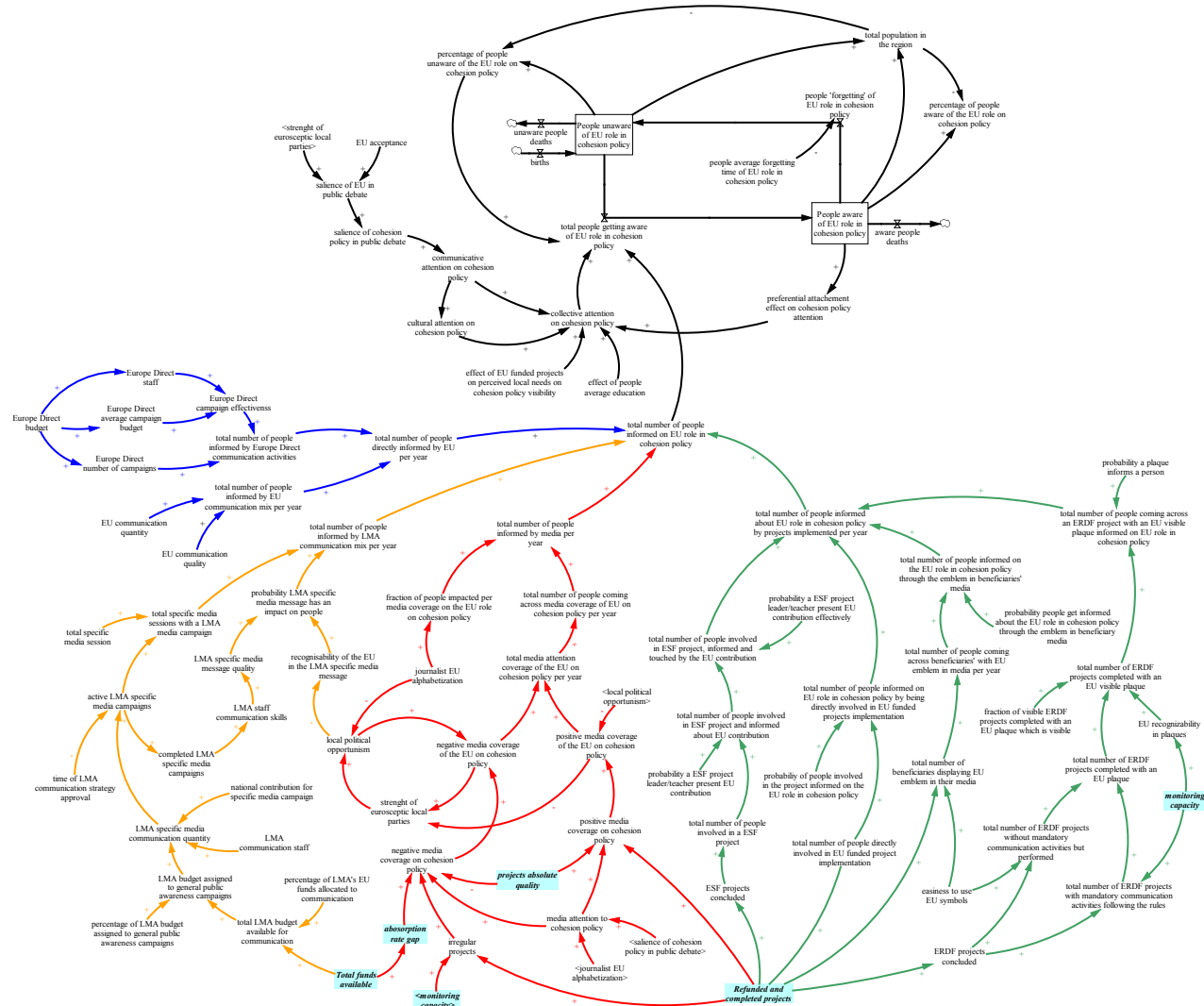
Except for the LMA strategies pointing at either increasing its communication or decreasing co-finance, the other three strategies end up to negatively affecting project quality. If LMA decreases its “standards for project quality”, it also reduces its “projects absolute quality”. According to a first-effort definition, “projects absolute quality” refers to the intrinsic quality of the projects, namely if they are properly performed (e.g. timely, high-quality work). On the contrary, if LMAs opt for the other two strategies to reduce absorption gap, extending the calls’ scope or relying on retrospective projects, it negatively affects the “projects relative quality”. The projects relative quality” is defined as the distance between the initial ROP objectives and the effective needs that a project fulfils. The greater this gap, the lower is the project relative quality.

To clarify this delicate difference, an indicative case follows; a LMA initial plan is to improve local business IT systems with new powerful computers but unfortunately the call it makes stays unfulfilled and so there is an absorption gap. Therefore, it decides to extend the calls’ scope to include the possibility for companies to buy phones, surveillance systems, air-conditioning systems, etc. In this case, the projects which go for the new call and get accepted can be expected to have a high absolute quality (if the LMA keeps high its standards) but low relative quality, since the new projects scope is far away from the initial LMA objective.

3.2. PUBLIC AWARENESS SUBSYSTEM

The following subsystem reflects the main streams of information that affect the citizens’ awareness about CP funds. To provide a definition of awareness, a person is considered as aware if they have heard about any EU co-financed project that improves the area where they live. To the best of our knowledge, this is a first research effort for mapping all major factors that potentially influence these streams of information. In fact, we found four main streams (Figure 8), namely: (i) the “EU direct” stream (highlighted in blue), (ii) the “local managing authority” stream (highlighted in orange), (iii) the “media” stream (highlighted in red), and (iv) the “funded projects implemented stream” (highlighted in green). The system further includes a “closed pipeline” mechanism that balances the trade-off between citizens’ awareness and forgetfulness about EU funded projects on their region. In addition, the light blue boxes indicate that the respective variables act as inputs from the funds’ absorption subsystem. In other words, the absorption subsystem influences the awareness subsystem through these channels.

FIGURE 8.
CLD of the public awareness subsystem



3.2.1. CLOSED PIPELINE

Figure 9 depicts the system's closed pipeline of the main flow of citizens that get either aware or forget about the European Cohesion Policy. The people of a community ("total population in the region") can be unaware ("People unaware of EU role in cohesion policy") or conscious ("People aware of EU role in cohesion policy") of the EU contribution to their region through the CP. The ratio of aware population to the "total population in the region" estimates the "percentage of people aware of the EU role on cohesion policy", which constitutes the major outcome of the public awareness subsystem.

Two types of dynamics regulate the aware and unaware population: (i) the demographic changes, and (ii) an aware-forgetting closed mechanism. The demographic changes alter the population composition; "unaware people deaths" and "aware people deaths" negatively affect the unaware and aware populations, respectively. Notably, all new-borns ("births" flow) end up in the unaware population, as, obviously, they do not know about the CP existence. The closed mechanism illustrates the cycle between people informed and aware about EU role in CP ("total people getting aware of EU role in cohesion policy") and people forgetting it ("people 'forgetting' of EU role in cohesion policy"). The later flow transfers people from the aware population to the unaware one, expressing the idea that after a certain average time ("people average forgetting time of EU role in cohesion policy") citizens tend to forget.

On the other hand, the awareness mechanism of the EU role in CP is affected by 3 factors. The first factor refers to the "percentage of people unaware of the EU role on cohesion policy", which constitutes the ratio of unaware population to the "total population in the region". This fraction represents the susceptible citizens who can potentially move from unaware about the EU role on CP to aware (Bass, 1969). In fact, if there is a considerable pool of unaware citizens, it is potentially possible to inform more people. In contrast, when unaware people are few, the transfer rate to aware population is more challenging due to the high number of people already informed.

The "collective attention on cohesion policy" constitutes the second factor influencing the awareness flow. This variable refers to the attention a population reserves to a topic which is high when the topic emerges, while it starts to decrease inexorably when this attention reached its peak (Candia et al., 2019). In this vein, the "collective attention on cohesion policy" could consist: (i) the "communicative attention on cohesion policy", and (ii) the "cultural attention on cohesion policy". According to Candia et al. (2019), communicative attention refers to the most liable attention that a community gives to a subject, namely the initial one in which discussion on the topic is increased. Instead, cultural attention is the most solid one; it reflects the idea that cultural object sediments stay in mind for longer even if they have disappeared from the communicative attention. Notably, those two constituents are strictly dependent; the quantity of communicative attention gained by a topic defines also the quantity of the cultural one. The "communicative attention on cohesion policy" is increased when "salience of cohesion policy in public debate" is high. In fact, when the EU role becomes the centre of public debate, people, in general, pay more attention to CP. In turn, the "salience of EU in public debate" is positively influenced by the "strength of eurosceptic local parties" and the general acknowledgement of EU politics importance in daily life ("EU acceptance"), since both factors tend to mention EU in their public discourses even for opposing reasons. The "collective attention on cohesion policy" can be further affected positively by the citizens perception of the EU funded projects completed as important ("effect of EU funded projects on perceived local needs on cohesion policy visibility"), as well as by the average education of the population ("effect of people average education"). In addition, collective attention is also influenced by the so-called "preferential attachment effect on cohesion policy attention", which *refers to a process in which attention begets attention* (Candia et al., 2019: 82), creating a reinforcing loop that fosters the initial attention. Finally, to activate the awareness flow ("total people getting aware of EU role in cohesion policy"), citizens should be informed about EU role in CP ("total number of people informed on EU role in cohesion policy").

FIGURE 9.
Closed pipeline

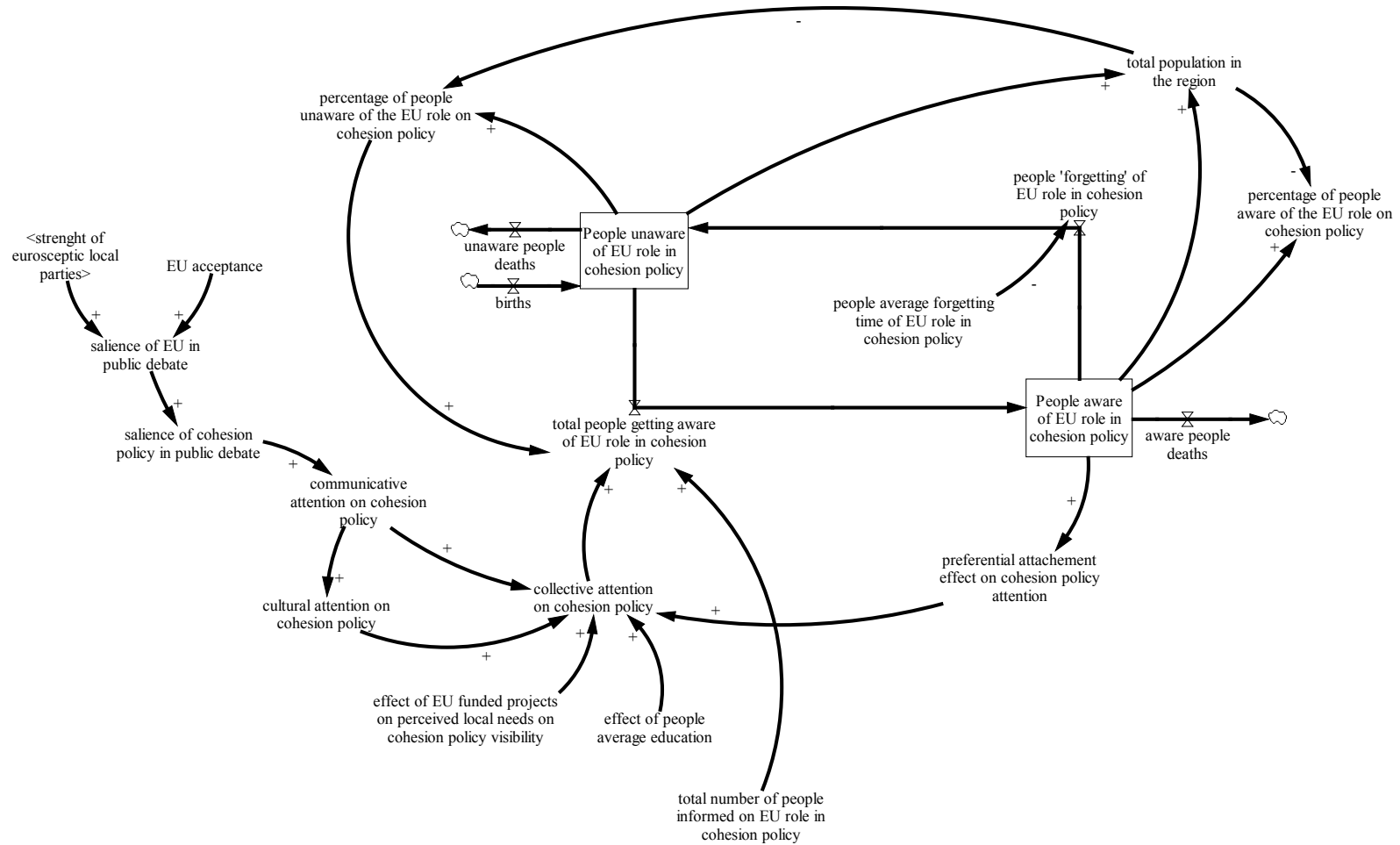
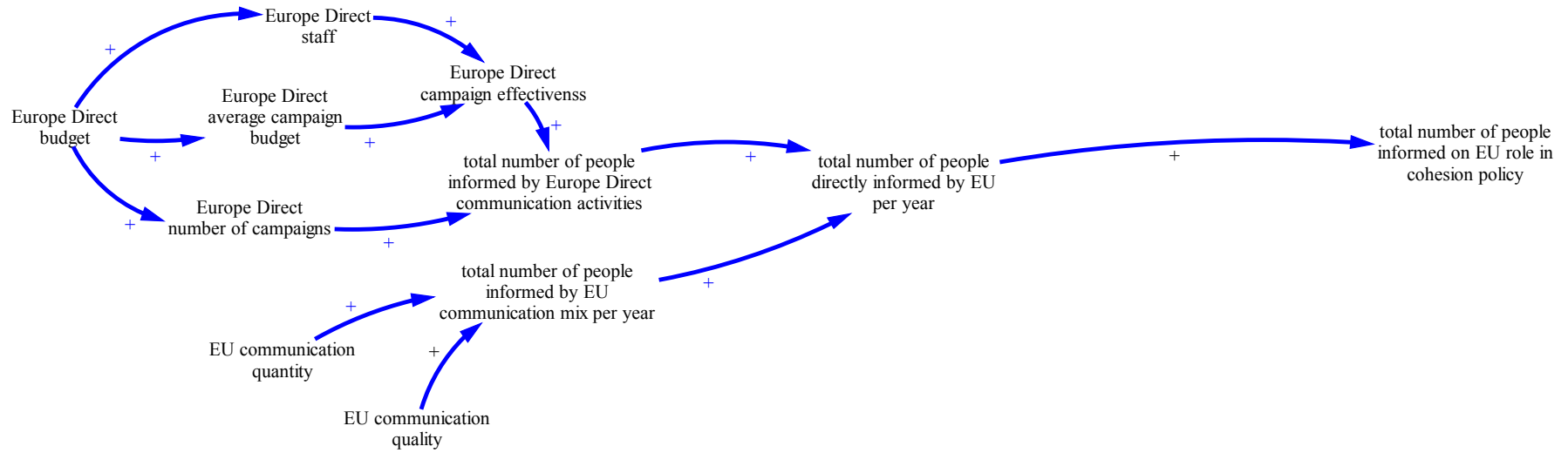


FIGURE 10.
EU direct stream of information



3.2.2. EU DIRECT STREAM OF INFORMATION

This stream is composed of two sources: (i) the Europe Direct agencies' collaboration with locals through a network of information centres, documentation centres and speakers in every EU region, and (ii) the communication directly put in place by European institutions through media campaigns (Figure 10).

With respect to the first substream, the total budget that EU provides to the Europe Direct agency ("Europe Direct budget") can have a positive influence on: (i) the budget of the information campaigns ("Europe Direct average campaign budget"); (ii) the number of personnel that is engaged with such campaigns ("Europe Direct staff"); as well as (iii) the number of the related campaigns ("Europe Direct number of campaigns"). An increase in the first two quantities affects the ("Europe Direct campaign effectiveness"), which combined with "Europe Direct number of campaigns" in place, can lead to a rise of the "total number of people informed by Europe Direct communication activities" as the better and the more the campaigns are, the more citizens will get aware about the cohesion policy.

At the same time, both the "EU communication quantity" and the "EU communication quality" positively influence the "total number of people informed by EU communication mix per year". The total number of citizens who are informed by both the Europe Direct agency and the EU in general equals to the "total number of people directly informed by EU per year" that, in turn, increases the overall "total citizens getting aware of EU role in cohesion policy" flow.

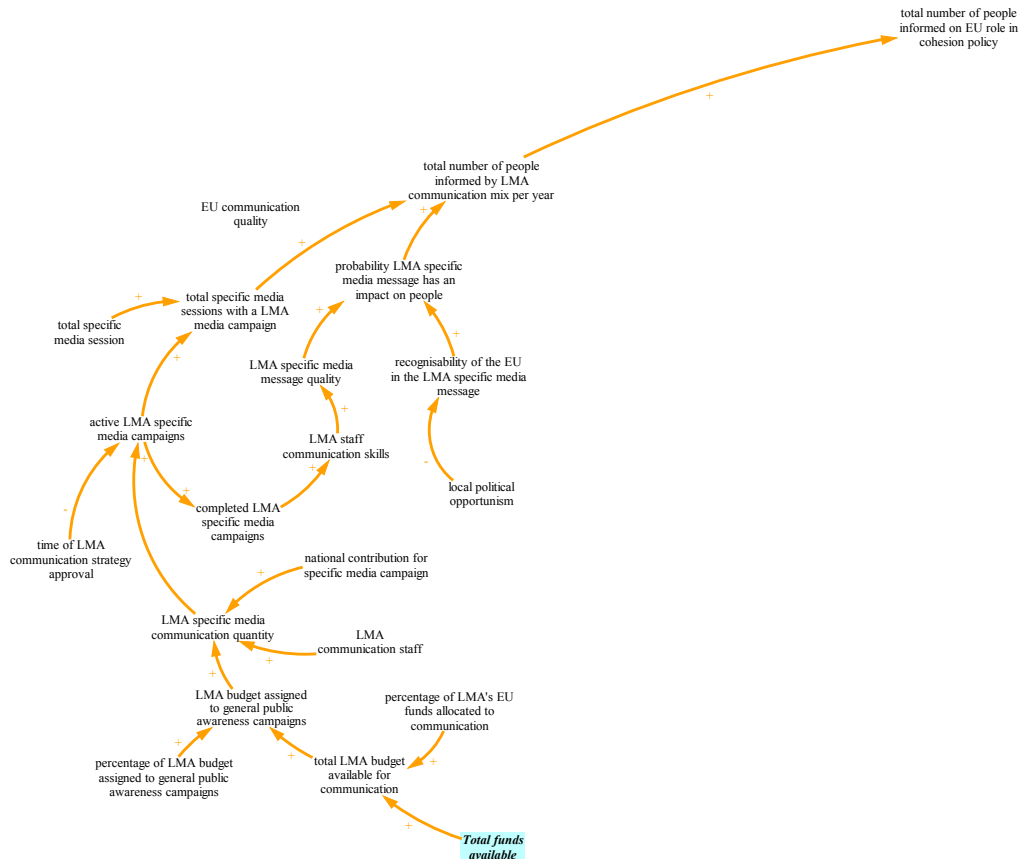
3.2.3. LMA STREAM OF INFORMATION

Figure 11 depicts the stream of information as provided by the LMAs. To start with, a part of the EU's "Total funds available" (as an input of the absorption system), which is calculated based on the "percentage of LMA's EU funds allocated to communication", covers the "total LMA budget available for communication" about the CP. Then, part of it (defined by "percentage of LMA budget assigned to general public awareness campaigns") is allocated to the LMA for launching campaigns to raise the general public's awareness ("LMA budget assigned to general public awareness campaigns"). An increased budget for campaigns and a high number of LMAs' personnel engaged in communication activities ("LMA communication staff"), eventually along with "national contribution for specific media campaign", foster the number of campaigns the LMA can launch ("LMA specific media communication quantity"). Then, once the communication campaign quantity is decided, the campaigns can start ("active LMA specific media campaigns"); a high quantity of approved campaigns increases the number of active ones. However, the rate of active campaigns slows down in case the "time of LMA communication strategy approval" is high, since this delay can relent the process starting. Finally, an increased total number of launched campaigns can potentially raise the "total specific media session with a LMA media campaign", that is the session of a specific media that people are involved in and in which a LMA campaign exists. Of course, since not all the media have the same usage rate, we adjust this effect by considering a "total specific media session".

However, a successful campaign needs to be impactful as well ("probability LMA specific media message has an impact on people"). A low "local political opportunism" can lead to an increased "recognisability of the EU in the LMA specific media message" by the people that in turn boosts the likelihood of a positive effect of the LMA's media campaigns on citizens ("probability LMA specific media message has an impact on people"). In addition, a high "LMA specific media message quality", which is positively affected by the "LMA staff communication skills", can further augment this probability. Notably, these skills could be further promoted by the active campaigns that are completed ("completed LMA specific media campaigns"), since a high number of campaigns performed can foster the experience is gained by the LMA staff. An increased "probability LMA specific media message has an impact on people", along with a large number of "total specific media session with a LMA media campaign", can raise the "total number of people informed by LMA communication mix per year", as the more the effective LMAs' campaigns exist, the more people get informed. Finally, the total number of people

informed by the local managing authorities further adds on the “total citizens getting aware of EU role in cohesion policy” rate.

FIGURE 11.
LMA stream of information



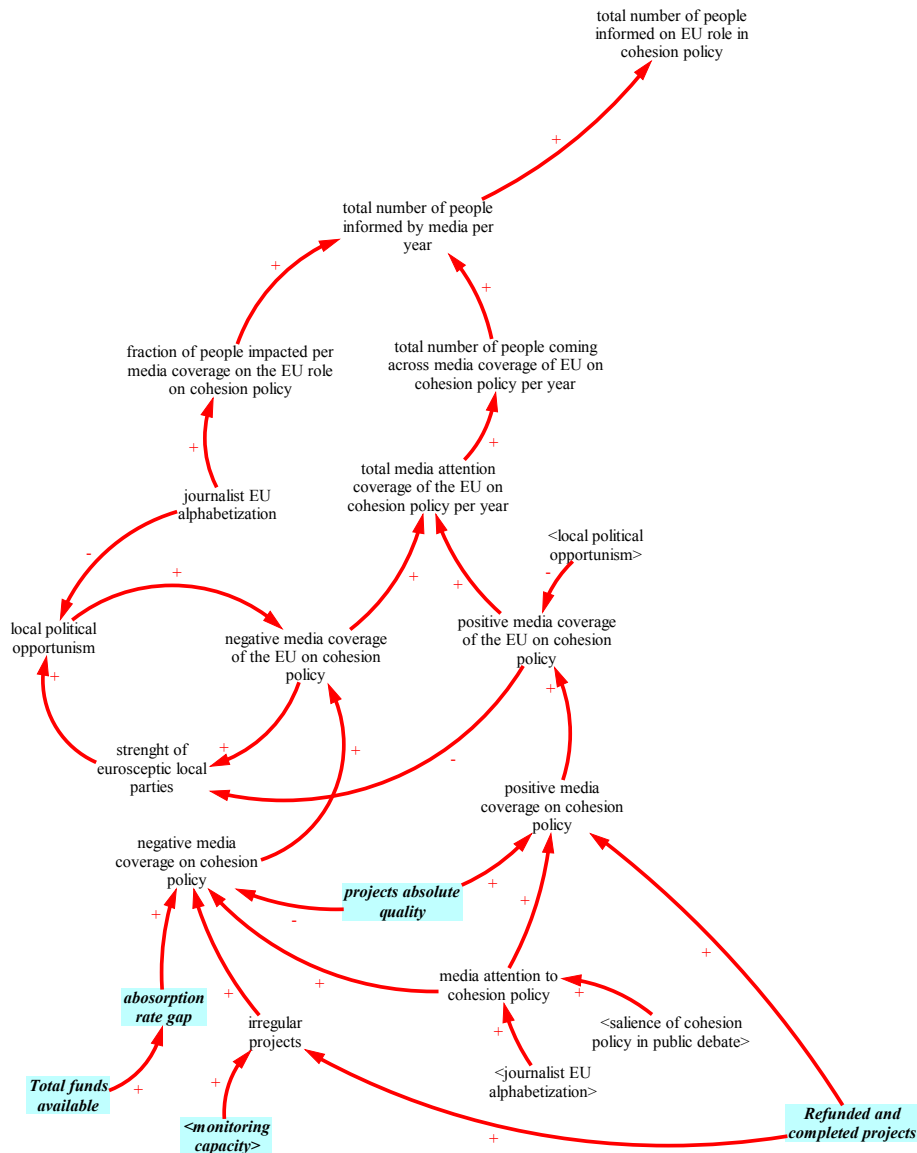
3.2.4. MEDIA STREAM OF INFORMATION

The media affects the citizens' awareness through two different streams: (i) the positive news stream, and (ii) the negative news stream (Figure 12). Although the two streams cause contradictory types of awareness, this part of the model focuses only on the fact that citizens get informed about cohesion policy and structural funds, no matter the nature of the news.

Specifically, the “positive media coverage on cohesion policy” is directly influenced by the total number of “Refunded and completed projects”, their “projects absolute quality” (both of which are inputs of the absorption subsystem) and the “media attention to cohesion policy”. In fact, the more the projects completed are and the better quality they have, the more positive attention the media is likely to assign to CP. At the same time, if there is high media attention to CP related issues (fostered by augmentation in “journalist EU alphabetization” and “salience of cohesion in public debate”), the positive coverage is further increased. However, CP communication via media is not enough to inform citizens about the EU contribution to that. It is necessary that the news reports explicitly the EU role in contributing to the project under implementation or completed. In this respect, local politics might try to take full credit for

a well-done project under the CP scheme, without mentioning other actors' contributions. Therefore, from the total mass of positive news about CP ("positive media coverage on cohesion policy"), it is necessary to consider only those that mention EU role ("positive media coverage of the EU on cohesion"). Positive coverage, however, can be negatively affected by the strength of the "local political opportunism", which may conceal the role of EU in funding specific appreciated local policies.

FIGURE 12.
Media stream of information



In contrast, the "negative media coverage on cohesion policy" is affected by the EU funds' "absorption rate gap" (absorption system's input), the number of "irregular projects", as well as the "project average quality" (absorption system's input) and the "media attention to cohesion policy" (as in the case of the positive media coverage). Regarding projects' quality, when it is low, the negative news on CP is increased. In addition, any irregularities on the projects completed (a high number of "Refunded and completed projects" raises the possibility of the existence of "irregular projects"), which are discovered

easier when the LMA “monitoring capacity” (absorption system’s input) is high, augments the negative media coverage. Finally, an increased absorption gap, which gets higher when the volume of “Total funds available” (absorption system’s input) is high, can further have a negative effect on cohesion policy’s media coverage. Contrary to what happens in the positive stream, if negative press attention occurs regarding CP funded projects, “local political opportunism” may try to cover own inefficiencies in EU fund management by blaming the EU instead. This shifting the burden to the EU may increase the probability of “negative media coverage of the EU cohesion policy”. However, opportunism may be balanced by journalists’ ability to recognize actual contributors to a CP funded project (“journalists EU alphabetization”). At this point, a vicious cycle of negative political news arises: a high “negative media coverage of the EU on cohesion policy” increases the “strength of eurosceptic local parties” in Europe, which in turn raises again the “local political opportunism”, creating a self-sustained cyclical effect in which all factors continuously incite each other. Hopefully, the “strength of eurosceptic local parties” could be reduced in case significant “positive media coverage of the EU on cohesion policy” takes place. In this respect, the local parties’ level of analysis was adopted since their crucial role in CP implementation and European integration relation is evident (Gross and Debus, 2018).

Negative and positive media coverage per year adds on the “total media attention coverage of the EU on cohesion policy per year”, which in turn positively affects the “total number of people coming across media coverage of EU on cohesion policy per year”. However, when citizens come across a media coverage on cohesion policy, they are not necessarily informed. In fact, the “fraction of people impacted per media coverage on the EU role on cohesion policy” positively affects the “total number of people informed by media per year”. This means that only if there is a significant impact of the news on the citizens (which is high when the “journalist EU alphabetization” is high too), citizens actually get aware of the media message. Finally, the total number of citizens who are informed on cohesion policy by the media further add on to the final “total citizens getting aware of EU role in cohesion policy” rate.

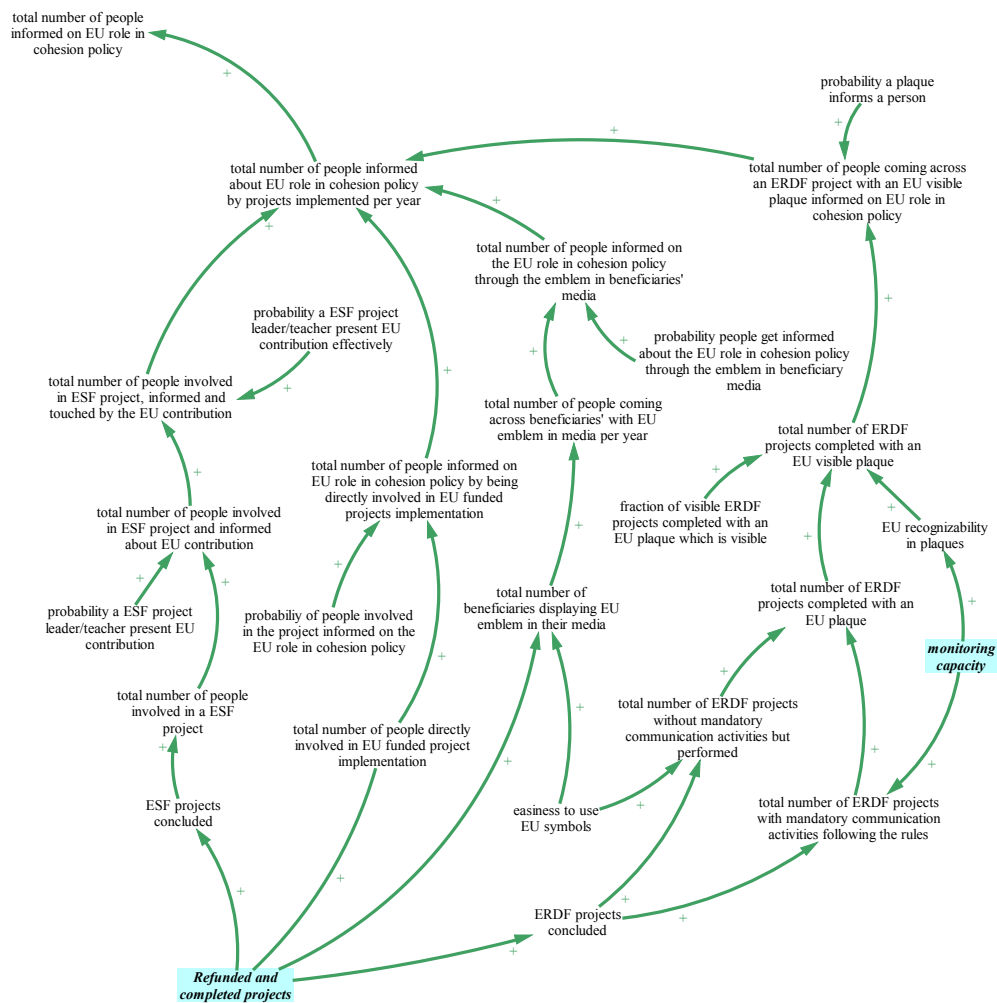
3.2.5. FUNDED PROJECTS IMPLEMENTED STREAM OF INFORMATION

This stream is divided into four substreams concerning the citizens’ awareness that imply: (i) participation in an ESF project, (ii) direct involvement in a European Cohesion Policy project implementation, (iii) participation in the project beneficiaries’ media networks, and (iv) coming across the related label of the European Regional Development Fund (ERDF) programme on a project plaque (Figure 13).

Beginning from the first substream, an increased number of “Refunded and completed projects”, as an input of the absorption system, (that also imply a growth of “ESF projects concluded”) raises the “total number of people involved in an ESF project”. A high number of people participating at an ESF project, along with a considerable “probability an ESF project leader/teacher present EU contribution”, can lead to an increased “total number of people involved in ESF project and informed about EU contribution”. However, apart from conveying the EU contribution message to the participants, project leaders/teachers should further make it in an effective way. Such a high probability (“probability an ESF project leader/teacher present EU contribution and that is effective”), along with the number of participants informed about ESF programme, can lead to a growth in the “total number of people involved in ESF project, informed and touched by the EU contribution”.

With respect of the people having direct involvement in a regional EU funded project implementation, a high number of “Refunded and completed projects” increases the “total number of people directly involved in EU funded project implementation”. However, not all people involved in the projects are really informed about the role and the goals of the EU in the cohesion policy. Therefore, except for the number of people involved in the projects, a high “probability of people involved in the project informed on the EU role in cohesion policy” is further required for obtaining a growth of the “total number of people informed on EU role in cohesion policy by being directly involved in EU funded projects implementation”.

FIGURE 13.
Funded projects implemented stream of information



Concerning the citizens that get informed through the beneficiaries' media networks, a high number of "Refunded and completed projects" may increase the "total number of beneficiaries displaying EU emblem in their media" (that depends on the "easiness to use EU symbols"). A significant number of beneficiaries displaying EU emblem further raises the "total number of people coming across beneficiaries' with EU emblem in media per year". However, not necessarily all the people that have seen the emblem translate the symbol in awareness concerning the role of the EU in CP. Thus, apart from an increased number of people that have observed the EU emblem, an increased "probability people get informed about the EU role in cohesion policy through the emblem in beneficiary media" is further required to augment "total number of people informed on the EU role in cohesion policy through the emblem in beneficiaries' media".

Finally, going through the substream of people that recognise the label of EU funding on an ERDF project's sign, an increased number of "Refunded and completed projects" implies an augment of "ERDF projects concluded". ERDF projects are divided into: (i) the projects that have optional communication activities ("total number of ERDF project without mandatory communication activities but performed"), and (ii) the ones that have mandatory ("total number of ERDF projects with mandatory communication

activities following the rules”). Therefore, an increase of the total ERDF projects leads to a growth of both categories. It should be also mentioned that the number of optional activities may be enhanced by a higher “easiness to use EU symbols” (if it’s complicated to use the EU symbols, beneficiaries might be discouraged to use them), while the mandatory ones could be fostered by a higher level “monitoring capacity” of LMA (absorption system’s input) to control beneficiaries add in their site a plaque. The number of projects that actually fulfil optional and mandatory communication requirements sum to the “total number of ERDF projects completed with an EU plaque” for communicating the EU funding contribution. However, only if the plaques are visible (“fraction of visible ERDF projects completed with a visible plaque”, namely the projects’ information need to be in visible locations and with a visible plaque) the “total number of ERDF projects completed with an EU visible plaque” increases. In addition, since EU flag and symbols have to be understandable, “EU recognizability in plaques”, which in turn is affected positively by the “monitoring capacity”, plays a role in increasing visibility of projects’ information. Thereafter, if many projects have a visible EU plaque, the “total number of people coming across an ERDF project with an EU visible plaque informed on EU role in cohesion policy” raises constrained by the probability that the plaque provides a meaningful and impactful information about EU funding (“probability a plaque informs a person”). Finally, all citizens of the four different substreams add to the “total number of people informed on EU role in cohesion policy”.

4. DISCUSSION AND CONCLUSIONS

4.1. MODELLING INSIGHTS

The described conceptual SD model crystallizes the expertise of the academic society, policy-makers and related stakeholders, as collected through literature review, interviews, official documents, focus groups and workshops. While scattered literature is available on the organisational perspective of CP, our modelling framework fills this gap as a first attempt to develop a comprehensive view on the system through identifying various factors that affect the CP absorption and communication, as well as to provide an integration of the absorption and awareness subsystems that are considered as interrelated reinforcing each other.

Our novel SD model contributes towards providing a solid basis for: (i) an in-depth analysis of relevant actors and variables that affect the behaviour of the system, and (ii) a rigorous development of hypotheses concerning major “cause-effect” relationships in both subsystems of the structural funds’ absorption and the citizens’ awareness about the EU role in the local socio-economic development. In practice, this model constitutes a tool for exploring: (i) the dynamics between CP regional demand (e.g. beneficiaries’ applications) and supply (e.g. LMAs’ calls) over time, and (ii) the manner in which the equilibrium between them affects the absorption system. In addition, the proposed model could be used to analyse the interconnections among the funds’ expenditure, the volume of information about CP results in the local communities and the actual level of citizens’ awareness.

More specifically, our work aims at encouraging researchers and policy-makers to embrace a systemic approach to the study of CP. Besides the complexity of each subsystem (“absorption” and “awareness”), our model suggests that an appropriate perspective considers the quandaries that ensue from the interaction of the two subsystems; they are interweaved by a number of processes so that, in the long-term, the evolution of CP can be fully investigated only by looking at the nature of the feedback between the two subsystems. For example, the absorption dynamics depend on the number of potential beneficiaries and on their awareness about the existence and mainly the functioning of CP. Yet, the awareness dynamics depend on the communication policy, which includes the word of mouth that occurs when projects are funded and beneficiaries share their experiences. In this light, in the long term, the more effective the processes of funds allocation and absorption is, the easier the communication of potential benefits and opportunities about CP will be. From this perspective, the dynamics of fund allocation, we strongly advice,

cannot be considered disconnected from the communication of the policy. On this ground, we suggest that the communication of Cohesion Policy is an integral element of the policy itself.

Thus, the proposed interpretative framework could support: (i) European policy-makers in understanding the system's complexity and, subsequently, designing more efficient funding schemes and policy interventions, (ii) LMAs in managing efficiently the funds and increasing the quantity and quality of the projects implemented, (iii) all actors involved in the funding procedure in improving the approach with which they communicate the projects' outcomes to the citizens for increasing awareness. In addition, we anticipate that this model could enable the scientific community to foster and deepen the research in the CP field. Specifically, by providing a boundary object, our qualitative model stimulates a better and more focused discussion on the CP system, from theoretical contexts (i.e. orienting practitioners and researchers in positioning their thinking within the CP system) to more practical (i.e. improved and facilitated communication). In line with this, we envisage that the proposed dual definition of project quality could assist in creating a common background on this "missing" concept.

4.2. RESEARCH DIRECTIONS

After the conceptual mapping of the system, the next phase of the usual SD modelling approach is the quantification, which entails the conversion of the CLD into a dynamic simulation model (Sterman, 2000) followed by a rigorous and tested validation procedure aiming at assessing its reliability (Forrester and Senge, 1980; Barlas, 1989). This process is useful for estimating the strengths of the different mechanisms in the structure and can translate the proposed qualitative framework into a computer-simulation model for providing policy-makers and stakeholders with meaningful sensitivity and scenario analysis.

Acknowledging the outcomes of this study, future efforts on CP should direct towards broadening the research scope to improve CP comprehension and provide new perspectives for more specific studies. Therefore, apart from SD, the innovative use of methodologies suited to the analysis of complex systems, such as soft system methodologies (Al-Harrasi, 2017) or agent-based modelling (Bao and Fritchman, 2018), is suggested. In addition, due to the multitude of actors involved in the system, the development of models through participatory approaches could be meaningful (Vennix, 1996); this process could improve outputs quality and create diffused commitment towards shared policy interventions.

Except for the methodological issues, emphasis should be placed on the research concerning the projects' quality. Although a first attempt to provide a definition of the dual nature of this concept is made, future research should focus on the development of empirical research to provide potential evidence on its existence. In a different direction, research in the field of CP should be expanded towards investigating the cause-effect relationships between citizens' awareness about funds' absorption and European identity. In this perspective, awareness about the positive impact of CP on local needs could be conceptualized as a precondition for building a stronger EU identity. Given that awareness is a more neutral term including citizens that may have either a negative or a positive perception about EU, a differentiation between these two types of perception could provide meaningful insights about the factors that influence the European integration.

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