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D7.2
Second year report on dissemination plan and activities

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2	INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	ICCS	Greece
3	PlayGen Ltd	PlayGen	United Kingdom
4	GCF - GLOBAL CLIMATE FORUM EV	GCF	Germany
5	Athens Technology Center S.A	ATC	Greece
6	UNIVERSITA POLITECNICA DELLE MARCHE	UNIVPM	Italy
7	INSTITUT JOZEF STEFAN	JSI	Slovenia
8	Germanwatch Nord-Sued-Initiative e.V.	GW	Germany
9	UNIVERSITAT JAUME I DE CASTELLON	UJI	Spain

Executive Summary

This deliverable summarizes the main activities of the dissemination activities carried out during the second year.

We briefly recall the main goals achieved during the first year of activity and then we explain the main tools that all partners have employed to disseminate the preliminary results of the project. Since the Symphony project provides (and combines) a heterogeneous set of tools - the ABM economic engine, Policy Oracle, the Symphony serious same, the data media mining tools, the environmental analysis - also the target audience is very heterogeneous - policymakers, citizens, academic researchers, industries and SMEs. Accordingly, we have employed different dissemination tools to promote the Symphony activities within the different communities.

We analyze the dissemination activity on our social media accounts -Facebook and Twitter. Through the use of their main statistics, we try to highlight the main strengths and weaknesses of each tools.

Then we focus on the dissemination activities performed by each partner through public events and conferences, and the dissemination activities targeted to involve the scientific community.

Finally, we provide an overview of the dissemination materials we have realized (posters, brochures, documents, templates).

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1. Introduction

The dissemination strategy has two main objectives: on the one hand, the promotion of the project to citizens, Academia and policy makers, and, on the other hand, the broadcast of final results.

The goal of promotion is to advertise the aim and the novelty of the project in order to increase the citizens awareness and to promote the participation in the serious game. We reach this goal by the end of the first year through the creation of: *i)* logo and template for presentation, *ii)* social media account (Facebook and Twitter), *iii)* the Symphony website, *iv)* focus groups.

As shown in Figure 1, the focus of the dissemination activities during the second and third year is the exploitation of the project results. The heterogeneity of the consortium partners give us very heterogeneous final "products" that should capture the interest of different audience.

The SYMPHONY project consortium has identified four specific groups of interest:

- Policy analyst and policy makers: the aim of SYMPHONY project is to offer a novel dashboard of services to policy makers in order to assist them in understanding and testing the impact of future policies.
- Citizens: the SYMPHONY project enables citizens to play an active role in complex policy decision making through the participation to serious game, Information Market and Social Media Mining.
- Academia and Researchers: the framework proposed by SYMPHONY aims at giving a more articulated and innovative response, based on the integration of an agent-based model with the nowadays available technology to gather citizens' expectations.
- Industries and SMEs: European companies and SMEs can find in SYMPHONY a good answer to concrete problems that limit their capacity to take advantage of novel approaches and technologies.

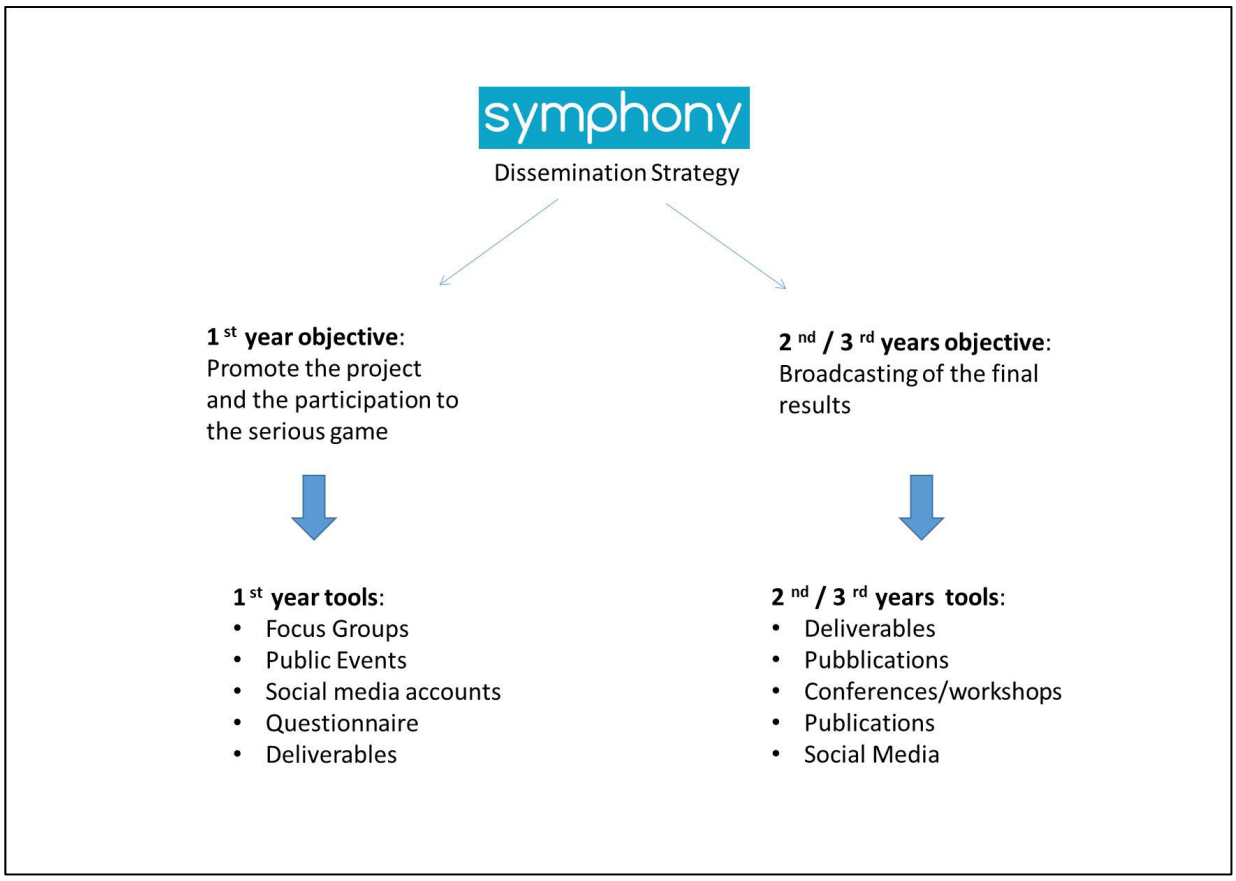

Figure 1: summary of the dissemination activities

The aim of the dissemination activities is to raise the awareness of the Symphony project and the main tools we offer to each of these groups. Since the target audience is very heterogeneous, we use different device to promote the Symphony activities. Indeed, according to the Symphony Document of Work, the suggested dissemination tools are: Deliverables, Publications, Conference and social media.

In this document we collect the dissemination activities performed by the Symphony consortium highlighting how the results have been spread out to different communities. This document has organized as follow:

- In Section 2 we resume the reached goal in the previous year
- In Section 3 we revise the dissemination activity through social media
- In Section 4 we summarize activities in conference and public events
- In Section 5 we focus the attention on the scientific works
- In Section 6 we show all the dissemination materials

2. Achievement of the first year

The Symphony project was born with the aim of revolutionizing the way that Policy Makers can assess the impact of their choices on the economy. By the end of the first years , the goal of the dissemination is to advertise the aim and the novelty of the projects . The main activities we performed during the first 12 months of the project are:

i. Creation of logo and template for presentation

Figure 2: Symphony logo

Figure 3: Symphony template

ii. Creation of social media accounts

We have opened public account of of Symphony in two of the major social Network: Facebook (https://www.facebook.com/symphonyproject) and Twitter (https://twitter.com/SymphonyEu).

Figure 4: Symphony's acoount in Facebook

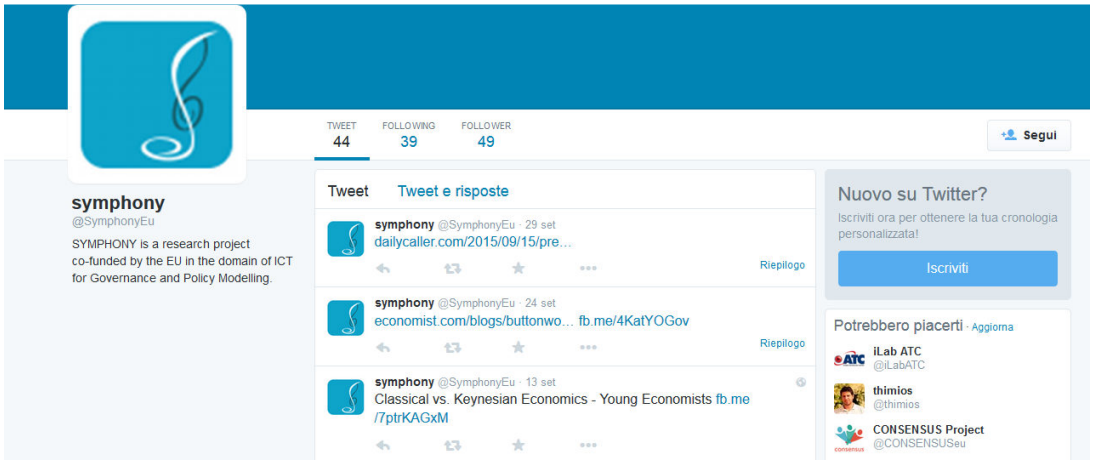

Figure 5: Symphony's account in Twitter

iii. Symphony website

We create the Symphony website that includes the aim of the project, the main objectives and the news about our activity (http://projectsymphony.eu/)

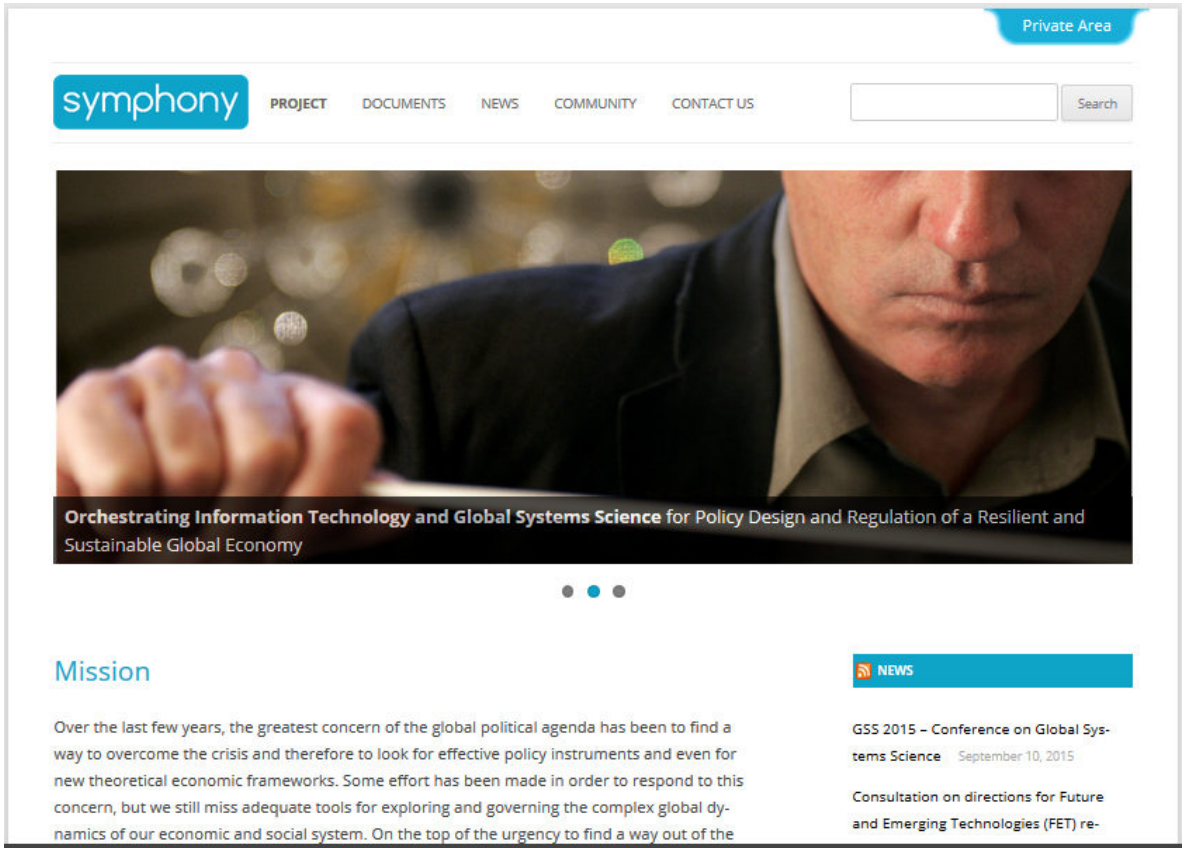

Figure 6: Symphony webpage

iv. Focus groups

During the initial phase of the project, most of the partner in the Consortium have organized a focus group to increase the visibility of the Symphony project and to collect feedbacks from the invited audience.

Figure 7: Focus groups

The use of these advertising channels increase the visibility of the project as a whole and, in particular, promote the innovative vision of Symphony to all the target groups.

3. Social Media dissemination activities

In the recent years, the best way to communicate or advertise activities is the use of Social Media. Indeed, using this tool is cheaper and allow us to reach a very wide audience. We choose two of the most used social media, i.e. Twitter and Facebook, to make known our project.

As we said, in the first year we open the social media accounts and during this second year we increase the popularity of the Symphony project using these accounts.

Regarding the Facebook page, the number of "Like" rises by 32% with respect to the previous year, i.e. the number of people that share our contents increases by 22. During the second year we share on the page posts regarding different topics. Indeed, we use this page not only to share the Consortium activities like the new questions updated in Policy Oracle, but we try to catch the attention of common citizens publishing journal articles which are related to our research. For example, we try to increase the knowledge of the different approach to investigate economic problems like behavioral economics or agent-based models.

The dissemination activities works well because, as shown in Figure 8, the number of people that observe our contents is, on average, very high and it reach a number of visualization close to 200.

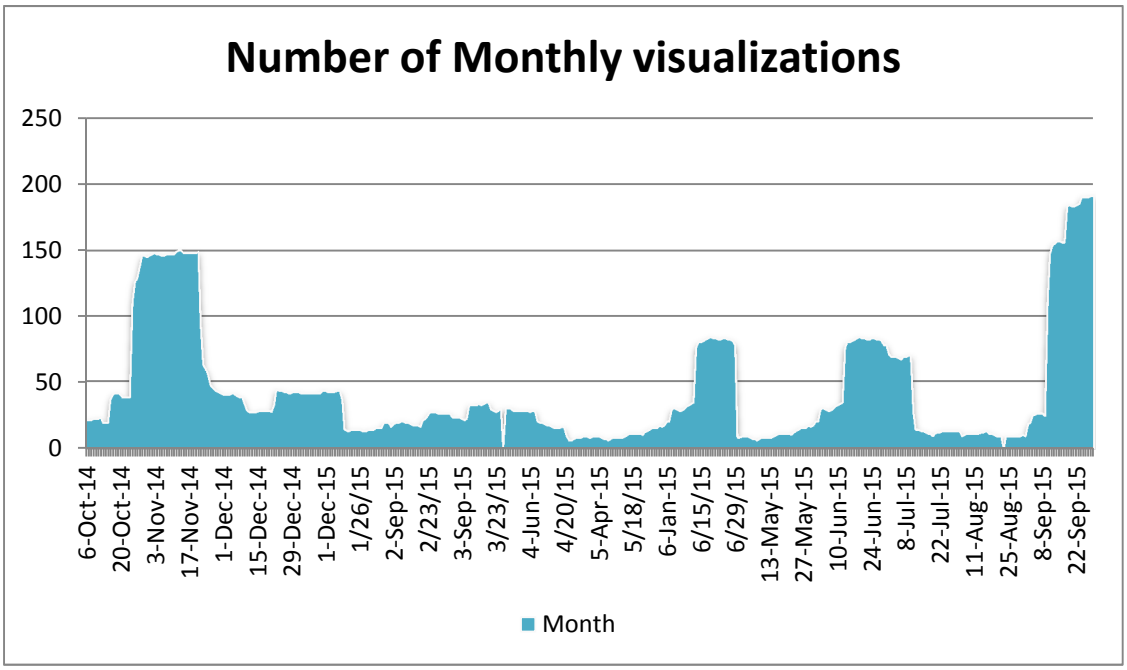

Figure 8: number of total visualization of the contents published in Facebook

Regarding the Twitter account, this was a weak point of our first year of dissemination. In the second year we increase the visibility of the Symphony project also in this Social Media. Indeed, we have registered an increase on the number of followers higher than 100%, which means that our community includes 33 people more.

Also in Twitter we share heterogeneous news covering the same topics of the Facebook page.

From the analysis of the main Twitter indicators during last year, we have found that Symphony's tweets cover an average audience of 210 users, in line with the Facebook visualizations.

The average number of new followers per month is 2, while the average number of users who have visited the Symphony Twitter profile is 28. Despite the fact that our Twitter activity has shown a positive trend in the last 3 months, there are still room for improving it, in particular, for what concerns the amount of tweets per month. As can be easily argue, all the statistics are linked to the number of tweets, as a proxy of the overall activity. With the ongoing of the project, there are room to improve: in particular, Twitter's activity should increase as soon as the new Symphony dashboard is ready to use (and to be advertised).

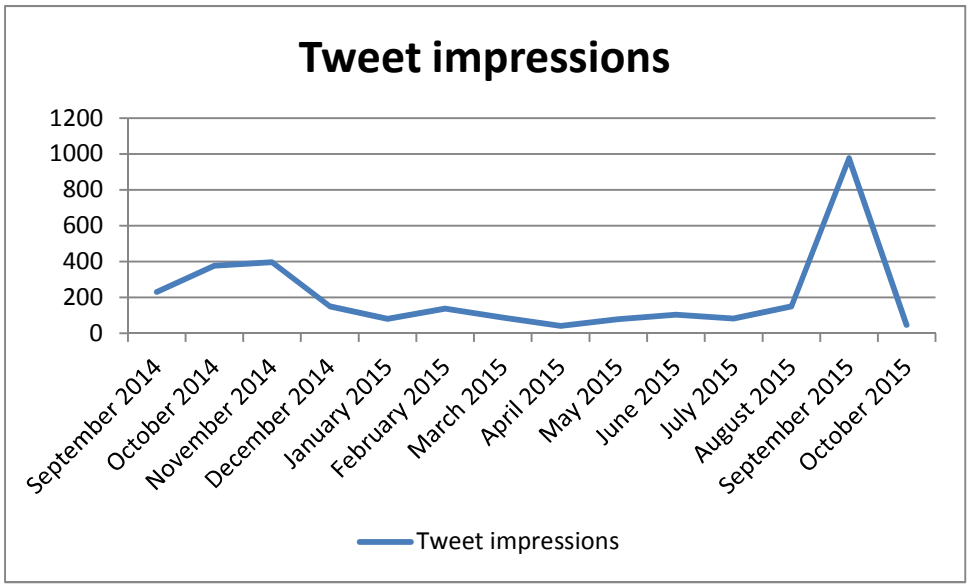

Figure 9: Number of users reached by Symphony's tweets

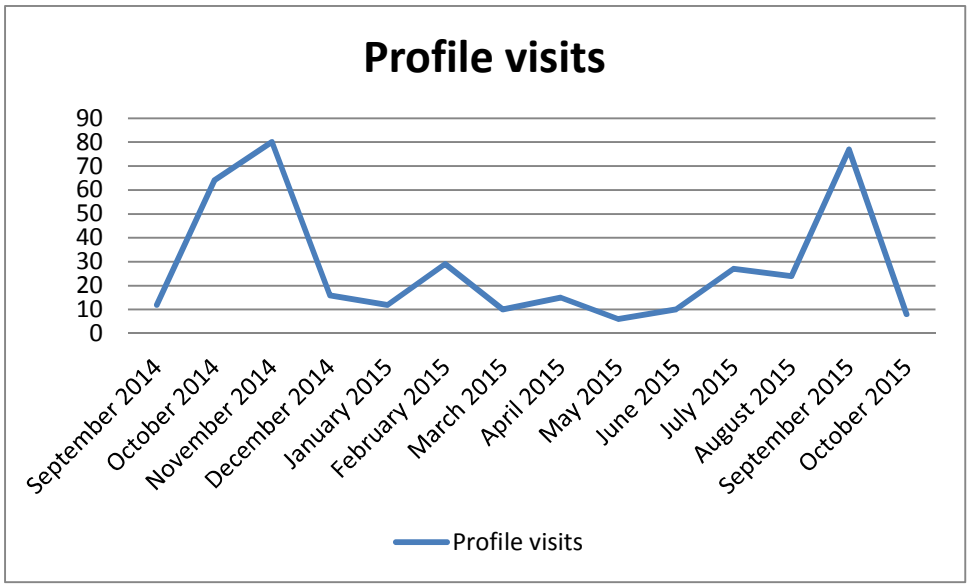

Figure 10: Number of Symphony's Twitter profile visits

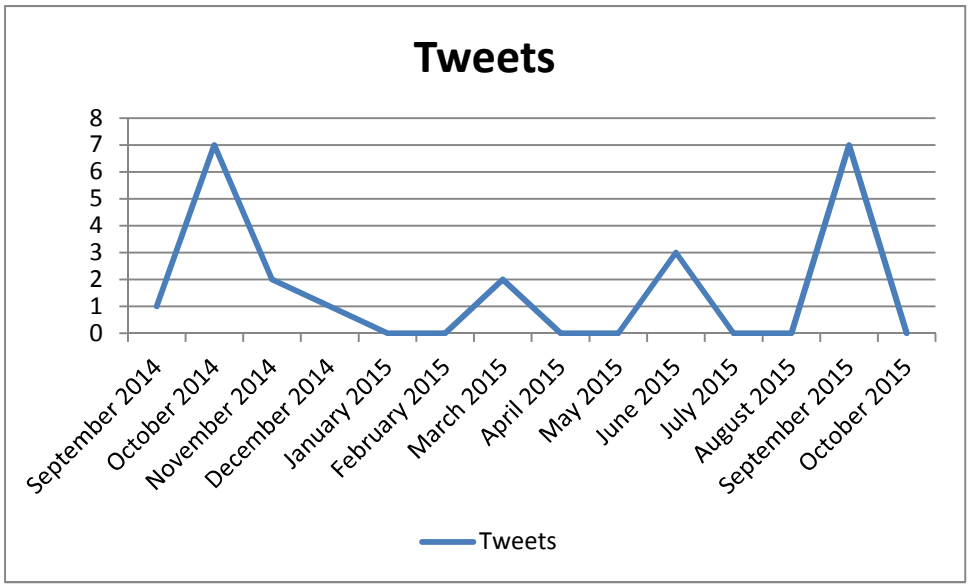

Figure 11:Number of Symphony's tweets per month

Finally, concerning the website, we continuously update all the relevant information and news in the home page and we update also the main scientific contributions of the partners in order to increase the interest of all the people that take a look to our site.

4. Dissemination through conferences and public events

Besides the dissemination through social media, another important channel we use is the participation in scientific conferences and public events. Also in this case we have the possibility to show our results and receive feedback from a wide and heterogeneous audience.

In this Section we list all the events that each of the partner joint, focus our attention on the events organized to promote the Symphony project. In Table 1 we summarize the events/conferences in which each partner take part.

Table 1: summary of the conference in which the Symphony project was presented

UNIGE	UNIVPM	ICCS	PLAYGEN	UJI	GW & GCF
Workshop on the Economic Science with Heterogeneous Interacting Agents	Workshop on the Economic Science with Heterogeneous Interacting Agents	COLLECTIVE INTELLIGENCE	Gaminomics	Workshop on the Economic Science with Heterogeneous Interacting Agents	Investment-oriented climate policy - workshop

Agent-Based Economic Modelling (Summer school)	10th International Conference on Signal-Image Technology and Internet-Based Systems	14th IFIP Electronic Government (EGOV) and 7th Electronic Participation (ePart)	Digital Shoreditch	EAEPE Conference 2015	Annual Conference Research for the Energy Transition
EAEPE Conference 2015	Agent-Based Economic Modelling (Summer school)	ACM womENcourage	Digital Economy Research Showcase		Stakeholder Conference "Dialogues between Science and Practice"
Debunking Austerity - Towards Alternative Economic Policy Scenarios	Conference on Experimental Finance				Expert discussion Energy Transition Fonds
5th edition of the International Workshop on Service Orientation in Holonic and Multi-Agent Manufacturing	EAEPE Conference 2015				Expert discussion on the European Energy Union
Global Cleaner Production & Sustainable Consumption Conference	Your Future Festival 2015				
Agent-based macroeconomics (Seminar)					
Agent-based macroeconomics (Seminar)					

The consortium as a whole takes parts at 17 conference in total. In each conference each partner presents the individual contribution to the Symphony project to different communities.

- Università degli Studi di Genova (UNIGE): people from this university present the main results of the Agent Based model to the "Workshop on the Economic Science with Heterogeneous Interacting Agents". Moreover, they take part to the "Agent-Based Economic Modelling" Summer school to explain, joint with UNIVPM, the Symphony main vision and the Agent Based model implemented in the project. They participate also in workshop in which the focus was the sustainability in order to present how the Agent Based Model take into account this aspect. Finally, they organize the "EAEPE Conference 2015" in Genoa in which the attention was focused on the impact of the Symphony project on the policy making activities. At the end of October they are organizing the "Festival della Scienza" event joint to the GSS Conference in which all the consortium will present the main results of the project. All of these conference involves only the scientific community.
- Università Politacnica delle Marche (UNIVPM): they organized the "Agent-Based Economic Modelling" Summer school in Ancona where PhD students learn how the Agent-Based works and take a look at the complex system at the base of the Symphony project. They presents the results

relating to the Agent-Based model and, in particular, on the role of expectations in this model in the following conferences: “10th International Conference on Signal-Image Technology and Internet-Based Systems”, “Workshop on the Economic Science with Heterogeneous Interacting Agents”, “Conference on Experimental Finance” and “EAEPE Conference 2015”. During the celebration of the event “Your Future Festival” in Ancona, they are able to present the Symphony project to students, scientific community and common citizens.

- Institute of Communication and Computer Systems (ICCS): they promotes the results from the Policy Oracle tool in the following events: “COLLECTIVE INTELLIGENCE”, “14th IFIP Electronic Government (EGOV) and 7th Electronic Participation (ePart)” and “ACM womENcourage”. They explain how this tool is implemented in the Symphony project and how it is possible to gather citizens’ expectation for initializing the parameters in the Agent-Based model. The audience of these conference is the scientific community.
- PLAYGEN has organized the event “Gaminomics” with the purpose to present the serious game implemented in Symphony. In this context, they explain the general purpose of the project and demonstrate the role of the serious game in the project. Representatives of Industries and R&D take part to this events. Moreover, they take part to the “Digital Shoreditch” and “Digital Economy Research Showcase” conferences.
- Universitat Jaume I (UJI): people from these university show the results from the Agent Based Engine in the “Workshop on the Economic Science with Heterogeneous Interacting Agents” and in the “EAEPE Conference 2015”. The focus of these talk are on one of the main novelty of the project, i.e. the multi-country analysis in the Agent-Based model.

- Germanwatch (GW) and Global Climate Forum (GCF): these institution work together in the sustainability transition use case. Indeed, they participate to the same events and promote the activities to integrate the environmental problem in the Symphony project. They participated to the following events: “Investment-oriented climate policy – workshop”, “Annual Conference Research for the Energy Transition”, “Stakeholder Conference "Dialogues between Science and Practice", “Expert discussion Energy Transition Fonds” and “Expert discussion on the European Energy Union”. The target groups of these events involved especially Policy Makers, Representatives of the European Union and Representatives of different Industries.

As we shown in this list, we are able to present the results from each component of the Symphony project as well as the vision of the project to an heterogeneous audience.

5. Dissemination for the scientific community

One of the most important target we want to reach is the scientific community. Symphony project propose a different and innovative approach to the policy making including innovative tools that should transform the policy makers' way of acting. For this purpose, it is important to spread out the significant results of the project using scientific journal.

Table 2: list of the scientific works

UNIGE	UNIVPM	ICCS	UJI	GCF	GW	IJS
"Fiscal consolidation and sovereign debt risk in balance-sheet recessions. An agent-based approach"	"Unbiased Adaptive Expectation Schemes "	"PolicyOracle: Nowcasting Expectations on Policy Indices."	"Fiscal consolidation and sovereign debt risk in balance-sheet recessions. An agent-based approach"	"Orchestrating Global Systems Science and Information Technologies for Policy Modelling: The SYMPHONY approach."	"Orchestrating Global Systems Science and Information Technologies for Policy Modelling: The SYMPHONY approach."	"Toward Social Media Mining: Twitter observatory"
"Orchestrating Global Systems Science and Information Technologies for Policy Modelling: The SYMPHONY approach."	"Adaptive expectations with correction bias: evidence from the Lab"	"Aggregating Expectations to Predict Policy Indices with Information Markets."	"Orchestrating Global Systems Science and Information Technologies for Policy Modelling: The SYMPHONY approach."	"Investment-oriented climate policy – an opportunity for Europe"		"Orchestrating Global Systems Science and Information Technologies for Policy Modelling: The SYMPHONY approach."
Budgetary rigour with stimulus in lean times: Policy advices from an agent-based model	"Network Approach for Detecting Macroeconomic Instability."	"Orchestrating Global Systems Science and Information Technologies for Policy Modelling: The SYMPHONY approach."		"The Possibility of Green Growth in Climate and Environmental Policy Analysis Models - a Survey"		"Event Detection in Social Media With an Event Database"
	"Stock Market Dynamics, Leveraged Network-Based Financial Accelerator and Monetary Policy."					

Table 2 shows the scientific contributions from each partner. The list of these publications are also available at the following link: http://projectsymphony.eu/category/publications/ .

As we explain for the conferences, each of these contributions cover a different topic. In particular, UNIGE, UNIVPM, UJI provide a scientific works about the ABM Engine. ICCS provides works about expectations using Policy Oracle tool. GCF investigate the impact of environmental policies on investments. Finally, many of the partners contributes to the drafting of the "consortium work", i.e. the working paper "Orchestrating Global Systems Science and Information Technologies for Policy Modelling: The SYMPHONY approach."

6. Overview of the dissemination materials

The dissemination materials consist in posters and brochures that we use to make the project easiest to understand. All of these material have been used to disseminate the Symphony activities during all the events we already mentioned. Moreover, many of the posters we present will be used during the GSS Conference which will take place at the end of October in Genoa.

6.1 Posters

The poster in Figure 9 shows the conceptual architecture of the Sympony project. It shows all the main components of the project, their functions and how they interact each other. On the right hand side there is a brief description of the graph.

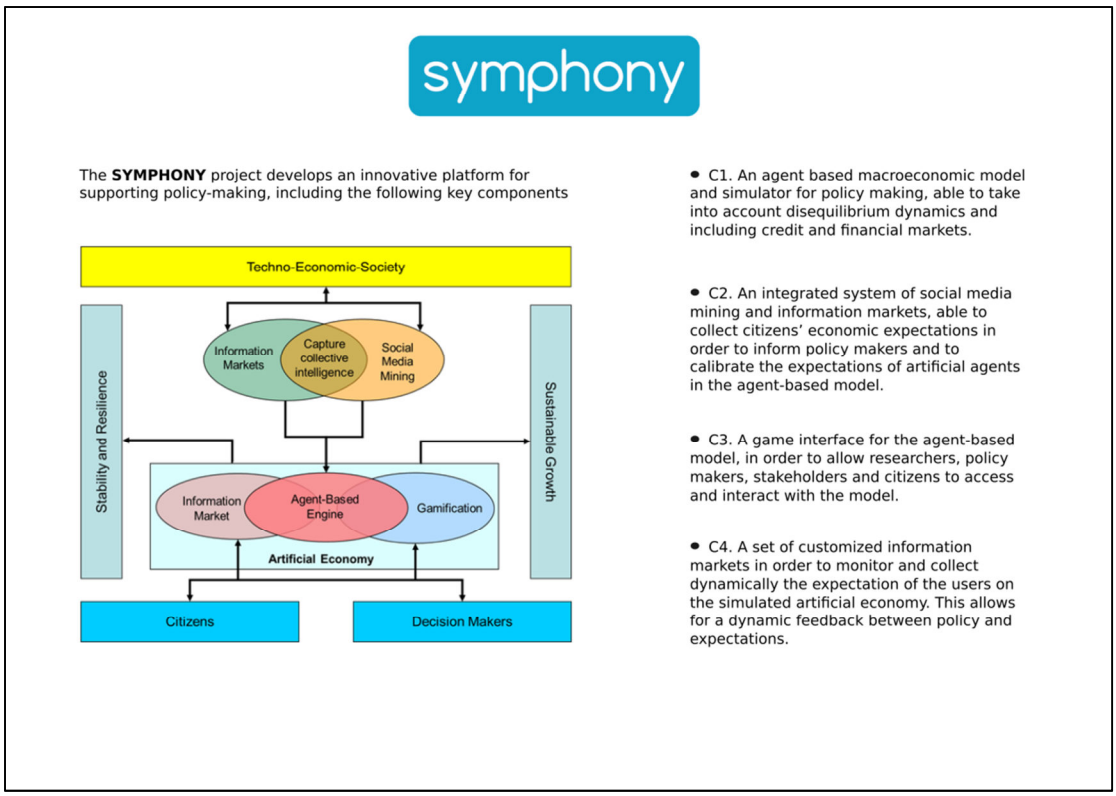

Figure 12: the Symphony architecture

Poster in Figure 10 shows the main tools used in the Symphony project. From the left side we have: the serious game, i.e. the interface that policy makers should be used to test their policy and to have a feedback by the Agent-Based model; the Policy Oracle platform that is used to gather expectations using information markets; Newsfeed which is one of the component of the Social Media Mining activities and it is useful to gather expectations from the social media.

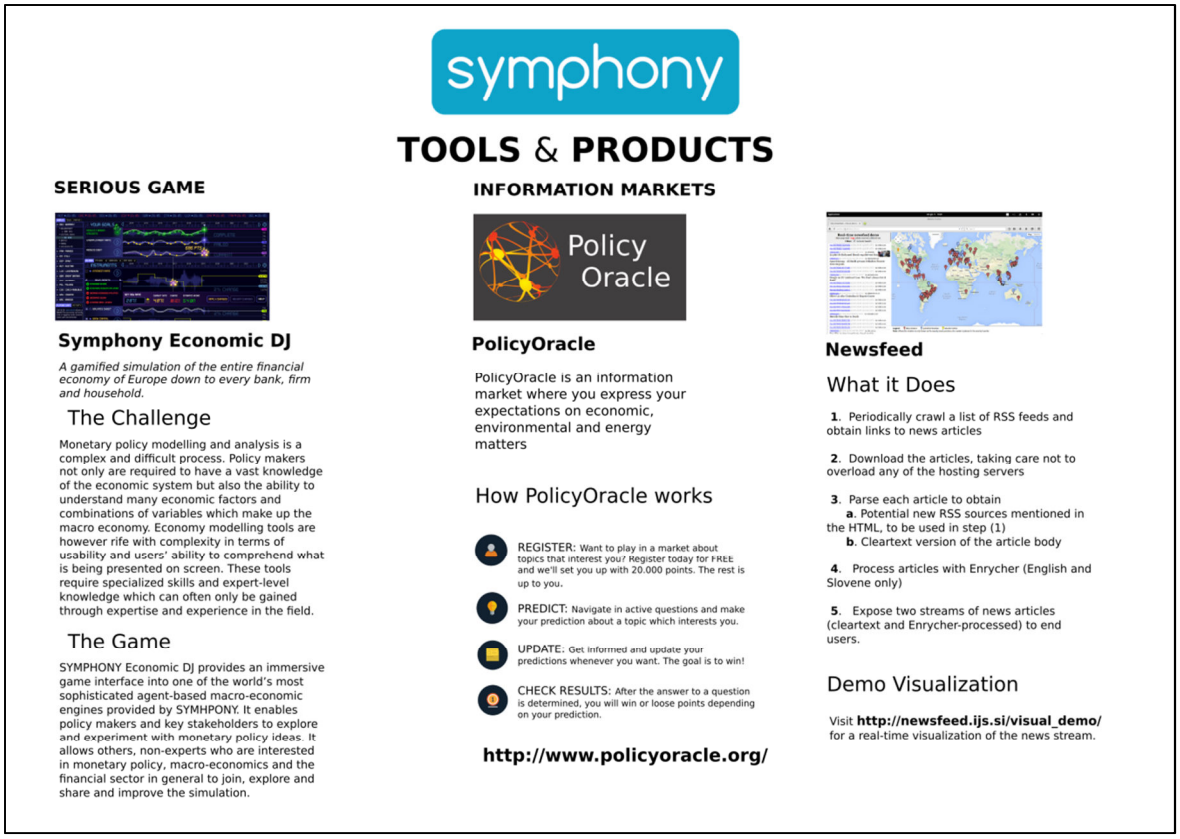

Figure 13: the main tools involved in the project

In Figure 11 we report all the goals of this project. We list the technological objectives, the Scientific objectives and the Societal objectives.

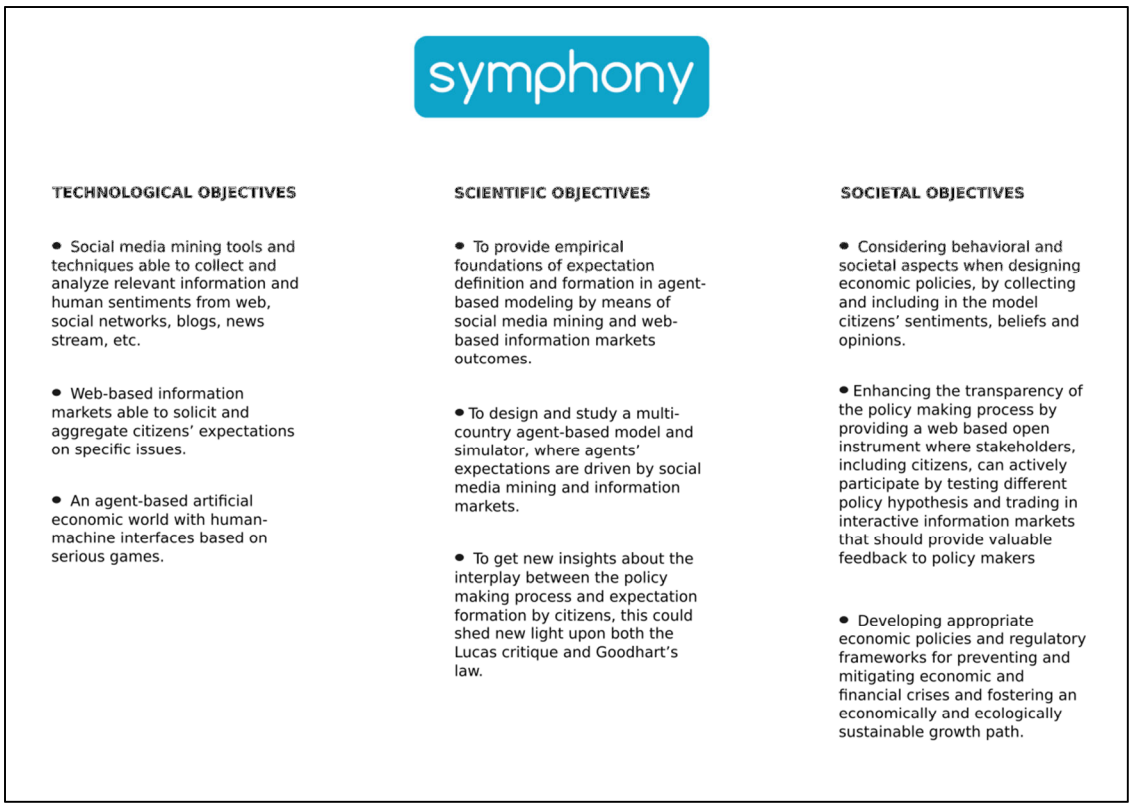

Figure 14: Symphony objectives

In the poster in Figure 12 we propose simplyfied version of the very complex Agent-Based Model at the basis of the Symphony project. In this poster we show only the main actors involved in the system (firms, households, banks…), their own actions (borrow loans, buy consumption goods,…) and the interactions among them.

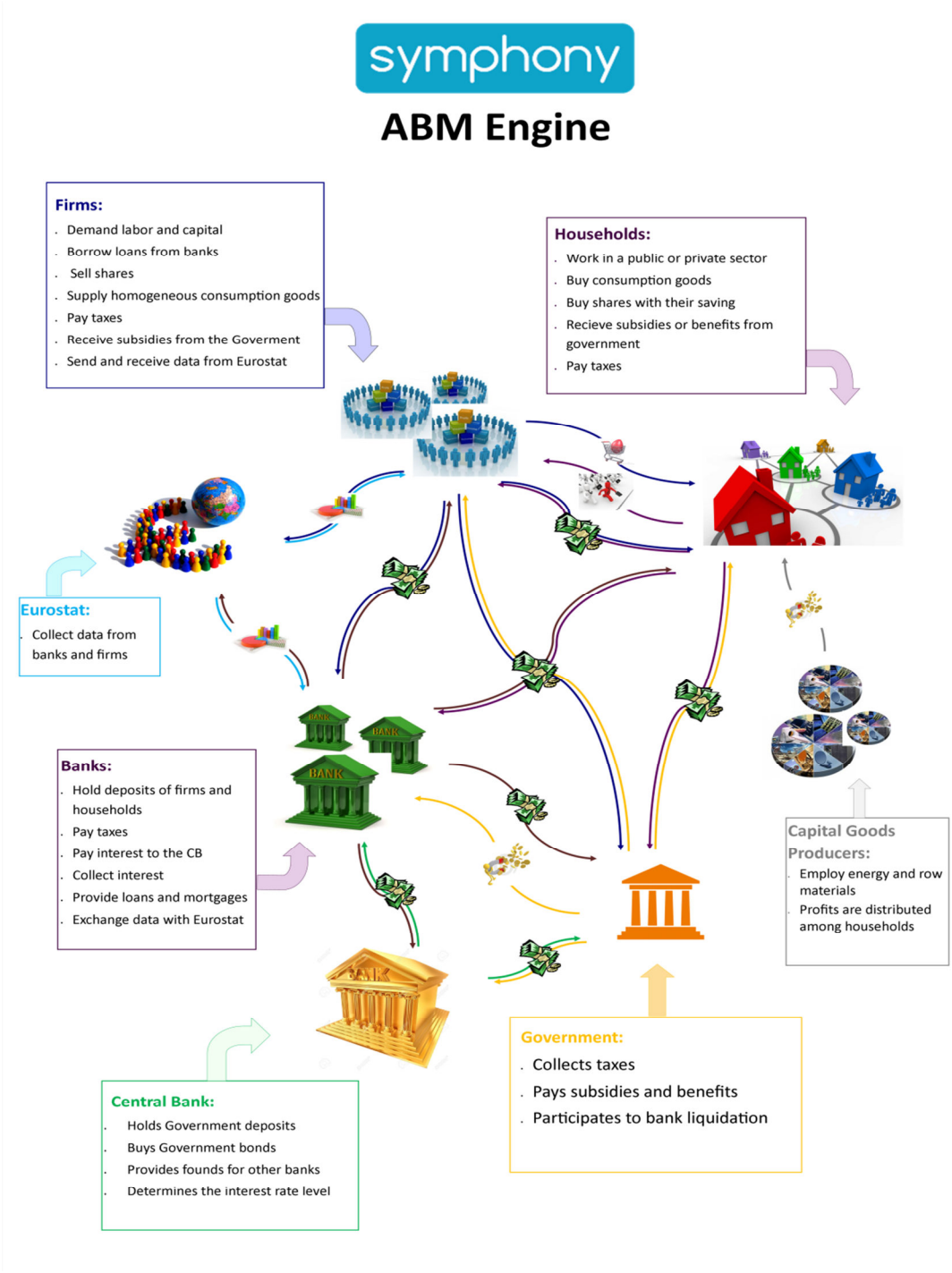

Figure 15: ABM Engine

In Figure 13 we report, in a very intuitive way, how the Policy Oracle tool works.

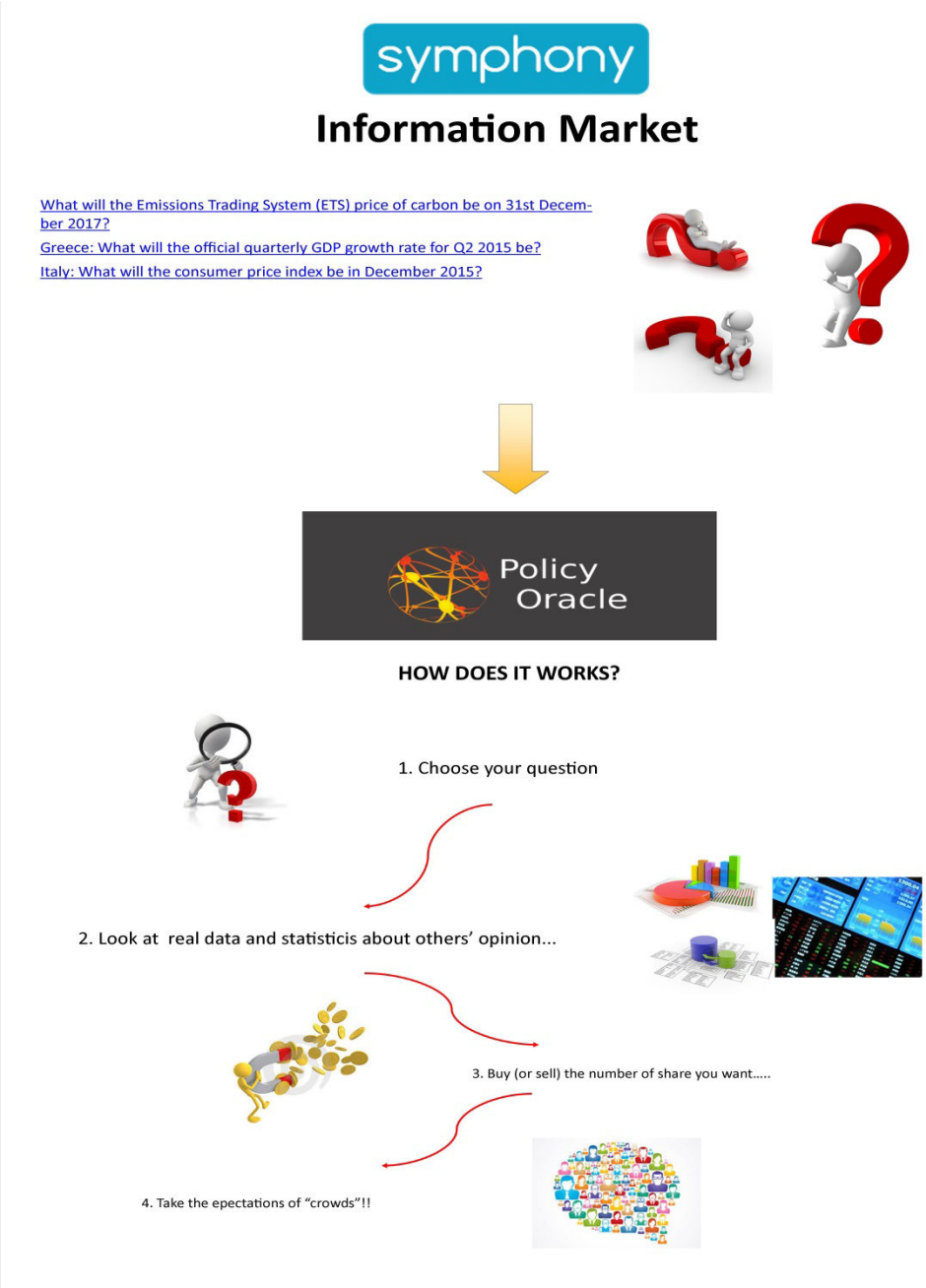

Figure 16: Policy Oracle tool

6.2 Brochures

In order to have a material that should be delivered to people who participate to public events, we prepare two kind of leaflets: the policy brief and a brochure.

The policy brief includes all the relevant information about the project. Indeed, after a brief description of Symphony vision and the innovative tools we use in this project, we focus on the key innovations of the project, i.e. the sustainability and the financial stability use cases. Finally, we write drown an overview of the expected results and we give summary information about the consortium. The snapshot of the policy

brief is shown in Figure 14, while the entire brief is available on the Symphony website and in the Appendix of this document.

Figure 17: Policy brief

Figure 15 and Figure 16 show the front and the back of the brochure. In the front we report the logo, the extending name of the project and we list all the partner involved in the Symphony project. On the back of the flyer we include the same information that are in the Policy brief, i.e. the main vision of the project, the innovative tools and the key innovations. Unlike the Policy brief, this kind of brochure is useful to disseminate information on the Symphony project in a simple and concisely way also to common citizens.

Figure 18: Front of the brochure

Figure 19: Back of the brochure

7. Conclusion

This report has presented the dissemination activities performed by the Symphony consortium, during the second year of the project.

Since Symphony provides a heterogeneous set of tools that cover different application fields - macroeconomic research, policy experiments, information markets, social data mining, sustainability analysis - also the target audience is composed by different communities.

Therefore, we have employed targeted dissemination tools for each group of interest. According to the results available, we have concentrated our attention to disseminate Symphony's work within the scientific community, through the dissemination of journal articles, conference papers and by organizing/participating to conferences and schools.

In order to reach a wider audience, the Symphony's partners have taken part in 17 public events, where each partner had the chance to present its individual contribution to the Symphony project to different communities.

Furthermore, all the tools that are going to compose the Symphony's dashboard - ABM engine, serious gaming, information markets, social data mining - are going to be disseminated through social network accounts - Facebook and Twitter - as soon as they will be ready.

Finally, we have listed all the advertising materials we have employed to disseminate the Symphony activities during this second year.

Appendix : Policy Brief

EUROPEAN
POLICYBRIEF

SYMPHONY PROJECT

Orchestrating Information Technologies and Global Systems Science for Policy Design and Regulation of a Resilient and Sustainable Global Economy

KEY INNOVATIONS

Economic models are usually unable to predict financial crises and generally inadequate to explain the instability of modern economic systems. We argue that this inadequacy depends on the reductionism of this kind of models, especially the representative and rational agent hypothesis, and on the general equilibrium approach.

The main objective of the SYMPHONY project is to empower economic decision makers with an innovative integrated platform for economic policy design and validation. The platform integrates key different and complementary components:

- an agent-based macroeconomic model and simulator able to overcome the strong limits of mainstream economic models. In particular, our innovative approach takes into account the interactions among heterogeneous economic agents;

- a social media mining tool and an information market tool able to gather European citizens' adaptive expectations on relevant economic variables;

- a serious game human machine interface which makes the use and the calibration of the agent based simulator accessible by policy makers, stakeholders and citizens.

The SYMPHONY project involves directly the main actors of the economic system such as citizens, stakeholders and policy makers.

POLICY USE CASES

In addition to the integration of different technical tools, the main innovation of the project refers to the development of two use cases. This novelty allows policy makers and researchers to validate and to use the main model results for further analysis. Moreover, the use cases improve the cooperation with selected stakeholders.

The use cases take into account two important issues: **financial stability** and the **transition to sustainable energy production**.

Financial stability plays a significant role in the financial system and in the economy as a whole. After the great financial crisis of 2007-09, the focus on systemic risk and the interconnectedness of financial institutions became a priority. The analysis of the Bank for International Settlements (see BIS, 2011) states that one of the main reasons why the economic crisis became so severe was that the banking sectors of many countries had built up excessive balance sheet leverage. The erosion of the level and quality of the capital base determined that the banking system was not able to absorb systemic trading and credit losses nor could it cope with the large off-balance sheet exposures. The crisis was further amplified by the pro-cyclical deleveraging process; the weaknesses in the banking sector were rapidly transmitted to the rest of the financial system and the real economy, resulting in a massive contraction of liquidity and credit availability.

Nowadays, one of the main objectives of central banks and policy makers is to promote and maintain monetary and financial stability as it contributes to a healthy economy and sustainable growth.

After the financial crisis, economists are trying to incorporate financial factors into standard macroeconomic models, in order to investigate the links between macroeconomics and finance, i.e. between business cycles and financial cycles. In

this respect, the focus of the financial stability use case in SYMPHONY involves macro-prudential, fiscal and monetary policies.

Banking regulation

After the crisis, prudential regulatory policies have been reconsidered as it has become clear that previous policies were too much focused on the risk of individual financial institutions and too little concerned about the risk of the system as a whole. Differently from micro-prudential regulation, focused only on the resilience of individual banks to exogenous risks, the reforms introduced in Basel III provide a macro-prudential approach to regulation and supervision that has a system-wide focus, with the goal to limit the risk of episodes of financial distress with serious consequences for the real economy (systemic risk). In this respect, an important Basel III provision is to reduce pro-cyclicality of micro-prudential banking regulation and promote countercyclical capital buffers for banks.

In line with the recommendations of the Basel committee, the SYMPHONY agent-based macroeconomic model implements a mechanism that allows banks to build up and release capital buffers according to the overall conditions of the economy, generally identified as the expansion and contraction of the economic cycle. In order to assess expansions and contractions over the business cycle, either the unemployment rate or the aggregate credit supply are considered as a measure of economic activity (see e.g. Cincotti et al. 2012).

Securitization and its effect on aggregate economic activity is a second important banking regulation issue to be addressed within SYMPHONY. A recent study (Bertay et al. 2015) finds that that securitization of household loans is negatively associated with economic activity, whereas business securitization exhibits a weak positive association with it. Furthermore, securitization of real estate loans is considered to have played a crucial role in the US housing bubble, whose bursts triggered the US financial crisis, and then in transmitting the crisis worldwide through the securitized loans sold to European financial institutions.

Fiscal and Monetary Policies

Financial and monetary stability should be one of the main goal of fiscal and monetary policies. In this respect, SYMPHONY aims to test most relevant fiscal and monetary policies in the financial stability use case.

In the aftermath of the global financial crisis, most European governments have adopted austerity measures in order to address the problem of public debt increase due to the crisis. This choice has been based on the idea that fiscal consolidation has expansionary effects in the long run. However, countries that adopted the most severe austerity policies are still in recession or in a stagnant growth situation.

On the other hand, recent studies (see e.g. DeLong et al., 2012; Koo, 2015) have provided convincing theoretical and empirical evidence about the efficacy of temporary expansionary fiscal policy in severely depressed economies. In a balance-sheet recession as well as in a severe depression scenario, like the one faced by most Western economies after the credit-fuelled asset bubble burst, fiscal stimulus could actually turn out to be expansionary and self-financing while fiscal austerity may turn out to be depressive and self-defeating.

Furthermore, the crisis made evident the inadequacy of conventional monetary policy based on the Taylor rule and its transmission mechanism. Indeed, present economic stagnation and the liquidity trap emphasize the necessity of unconventional monetary policy as at the zero lower bound, conventional rule-based monetary policy, e.g. Taylor rule, is useless. Quantitative easing, which has been recently proposed and adopted by most important central banks, can be considered an unconventional policy consisting in the purchase of longer-term government bonds by the central bank in order to decrease long-term interest rates, stimulate investments and hence aggregate demand, then avoiding the deflation risk.

The financial stability use case analyses the effect of different fiscal policies along with a quantitative easing program. In particular, SYMPHONY provides a set of tools that is able to replicate and analyze a mix of several fiscal and monetary policies. More specifically, fiscal policy tools include three main fiscal rules[1]:

- Stability and Growth Pact, which requires the government to implement a fiscal policy aiming to stay within the limit of deficit to GDP ratio lower than 3%.
- Fiscal Compact, which beside the deficit to GDP limit of 3%, makes binding the requirement for debt to GDP ratio to be below 60%. In particular, when debt to GDP is greater than 60%, the aim of fiscal policy is to reduce it by 1/20th per year on average until the target is met.
- Fiscal accommodation, that reduce tax rates during crisis.

Monetary policy tools include:

- Taylor rule, used to set the central bank policy rate based on the inflation rate and the output gap.
- Quantitative easing, i.e. the purchase of government bonds in the secondary market by central banks.

[1] The first two fiscal policy recall important treaties adopted at European level to coordinate fiscal policy.

Fiscal and monetary policies can change during the business cycles and react to endogenous crisis, thus showing their impact during the downfalls, recessions and recovery periods. In Teglio et. al 2015, it is shown that fiscal accommodation and quantitative easing during crisis help the financial system and the economy. On the contrary, fiscal consolidation increases the number and the duration of crises.

Transition to sustainable energy production

Another policy objective in many countries worldwide is the transformation of the economy into a low-carbon and sustainable economy, aligning economic, environmental and social interests. The SYMPHONY project considers this challenge in the sustainability transition use cases by testing the economic effects of specific climate policies. The main policy question to be analysed is if and under which conditions climate policy can have positive economic effects, thus challenging the current framing of climate policy as an economic cost.

First, the sustainability transition use case focuses on introducing three main elements into the ABM: GHG emissions (including a price on carbon), renewable energy and energy efficiency investments. Second, it will evaluate the economic effects of different climate policies. One level of policies are the targets set at EU level under the "2030 climate and energy framework"[2] (GHG, Renewable Energy, Energy Efficiency target). Another level concerns the more specific national regulations, such as the introduction of a feed-in-tariff for renewable energy and other possible subsidies for clean tech innovations.

Additionally, what is particularly interesting to analyse within the SYMPHONY project, is the combination of climate and economic policies, such as a "green" fiscal stimulus program and a "green" quantitative easing program. Especially the latter cannot be analysed with the current climate economic models so far.

Finally, SYMPHONY also addresses the interplay between financial stability and the sustainability transition in the energy sector. In this respect, we want to test appropriate economic and financial policies with the purposes to foster a sustainability transition. Joseph Stiglitz (2013) highlights that to current economic crises "there is an alternative: invest in our future, in ways that help us to address simultaneously the problems of global warming, global inequality and poverty, and the necessity of structural change." This opens up the possibility of climate policy being beneficial also for an economy.

[2] European Council Conclusions (23/24 October 2014)
http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf

Key elements to consider when it comes to the economic effects of climate policies are the re-coordination of investors' expectations, industrial investment cycles, financial investment patterns, and the economics of both finite and renewable resources. Links between technological innovations, expectation dynamics and investment patterns need to be emphasized. This is a particular strength of SYMPHONY.

In addition, a green fiscal stimulus, easements of capital requirements for green investments and green quantitative easing can be modelled by introducing another type of bond - green bonds – which are used to finance investments into low-carbon technologies. For example, the governor of the Bank of England has recently spoken in favour of green quantitative easing[3].

Furthermore, a carbon price will be introduced in the agent-based model. To reach its 2030 carbon reduction targets the EU-ETS has become the most important instrument of EU climate policy. Even China has recently announced to introduce a nation-wide ETS from 2017 on. This shows that introducing a price on carbon emissions is a question that is relevant at international level and is an important element to be introduced into the agent-based model.

CONCLUSIONS

The recent financial and economic crisis has shown the fallacy of the mainstream approach both in predicting and solving the recession. This inadequacy depends on the reductive approach based on a representative agent and on the assumption that agents have rational expectations. It has been shown that the interaction of agents leads to different aggregate results with respect to the mainstream approach. Furthermore, agents usually form their expectations not in a rational way but using adaptive rules. This means that policy makers underestimate or overestimate the impact of their choices.

SYMPHONY project provides an innovative integrated platform based, on the one hand, on an agent based model which takes into account the heterogeneity and the interaction of economic agents, and, on the other hand, on innovative tools to gather information and expectations from common citizens. This integrated platform is very useful to policy makers to make unbiased predictions.

The financial stability use case is essential to test the impact of monetary and fiscal policies in a more realistic model and analyse the reaction of the economy so to provide a good suggestions for implementing the best policies. Moreover, the sustainability use cases allows us to understand the economic effects of climate

[3] "Breaking the tragedy of the horizon - climate change and financial stability" - speech given by Mark Carney at Lloyd's of London http://www.bankofengland.co.uk/publications/Pages/speeches/2015/844.aspx

policies and therefore to better understand the mechanism of a transition to a sustainable economy.

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PROJECT NAME

Symphony - Orchestration Information Technologies and Global Systems Science for Policy Design and Regulation of a Resilient and Sustainable Global Economy

COORDINATOR

Università degli Studi di Genova

CONSORTIUM

Università degli Studi di Genova (Italy), Institute of Communication and Computer Systems (Greece), PLAYGEN (UK), ATC – Athens Technology Center SA (Greece), Global Climate Forum (Germany), Università Politecnica delle Marche (Italy), Jožef Stefan Institute (Slovenia), Germanwatch (Germany), Universitat Jaume I (Spain).

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