



# How Large European Companies can develop social business at the Base of the Economic Pyramid

Claudio Di Benedetto -- [claudio.dibenedetto@polimi.it](mailto:claudio.dibenedetto@polimi.it)

Irene Bengo – [irene.bengo@polimi.it](mailto:irene.bengo@polimi.it)

2017

- Research Context
- Problems and Objectives
- Methodology
  - Literature review
  - Data Collection
  - Data Elaboration
- Results
- Contributions
- Limitation and Further researches



## Focus on the Base of the Economic Pyramid (BOP):

➤ **Definition:** the **four billions people** living with an annual **income below \$3,260** in local purchasing power (London et al., 2011)

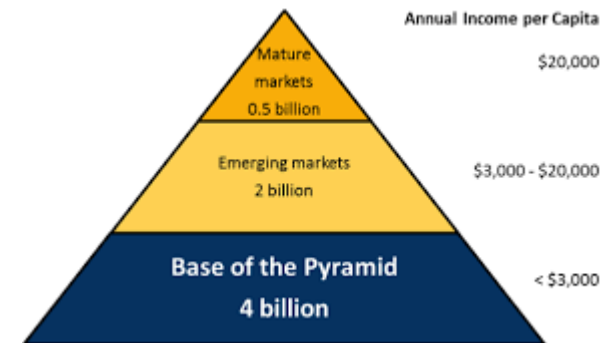
### Key Feature:

➤ **High Unmet Social Needs** defined as “the needs of the disadvantaged segments of population who do not benefit from the value created by the market”

➤ **Poverty Penalty**

➤ **High level of informal economy (70%)**

➤ **High income vulnerability**



Historically, the **socio-economic development** of those contexts has been left to **public and nonprofit organizations**



# Research Context Social Business (SB) - 2/3

## Large Companies at BOP

- **Crucial Role to Dev. BOP**
- **Scalable MKT based Solutions**



## BOP as an Opportunity

- **\$ 5 trillion Markets (PPP)**
- **Huge Latent Demand**



## Unique Challenge

- **Create Social Value**
- **Increase long term perspective of Growth and Profitability**



## Social Business an Appropriate Model

- **Satisfy Unmet Social Needs**
- **New form of value creation**

(Yunus 2010; Power and Wilson 2012; Seelos and Mair 2007)



## Definition of Social Business:

*“an advanced model of corporate social responsibility where large **companies start-up** or expand a **business venture** created to satisfy **unmet social needs**, through the development of “**socially innovative activities**”. With the aim of generate blended value, it operates with the financial discipline, efficiency and **tools of a private sector business**”*

(Alter 2007; Yunus 2010)

**Examples of Social Business:** *Grameen-Danone, Grameen Veolia Water, GDF in Togo, Ferrero Social Enterprise...*



## Problem:

Lack of studies on the **SB as an advanced form of CSR**, that prevents a comprehensive understanding of the phenomenon, in particular are not clear:

- The **Diffusion** of the Phenomenon
- The **role of companies in SB Development** and in particular the social business configurations or organizational forms they can develop

## Research Objectives:



- Analyze **the diffusion of the phenomenon**
- Define a new model to **Classify the SB configurations** they can develop

# Methodology

1. Objective 1 - Analyze **the diffusion of the phenomenon** to map the **state of the art of EU Large Companies** engaged in SB at BoP

**I. Data Collection:**

- a) Creation of a Data Base from the United Nation Global Compact
- b) Identification of EU Companies doing SB at BoP by Website Analysis

**II. Data Elaboration:** Descriptive Statistics

2. Objective 2 - Define a model to **Classify the SB configurations** they can develop

**I. Literature Review:** Identify the research framework to analyze **specific social business configurations**

**II. Data Collection:** about the social business configurations according to the Social Business Model Developed by Yunus (2010)

**III. Data Elaboration:**

- a) Data Coding
- b) Multiple Correspondence Analysis
- c) Cluster Analysis

# Methodology

1. Objective 1 - Analyze **the diffusion of the phenomenon** to map the **state of the art of EU Large Companies** engaged in SB at BoP

**I. Data Collection:**

- a) Creation of a Data Base from the United Nation Global Compact
- b) Identification of EU Companies doing SB at BoP by Website Analysis

**II. Data Elaboration:** Descriptive Statistics

2. Objective 2 - Define a model to **Classify the SB configurations** they can develop

**I. Literature Review:** Identify the research framework to analyze **specific social business configurations**

**II. Data Collection:** about the social business configurations according to the Social Business Model Developed by Yunus (2010)

**III. Data Elaboration:**

- a) Data Coding
- b) Multiple Correspondence Analysis
- c) Cluster Analysis

## UN Global Compact Database: 8.306 Companies

The **UN Global Compact** asks companies to embrace, support and enact, within their sphere of influence, a **set of core values** in the areas of:

- human rights
- labor standards
- the environment
- anti-corruption

The United Nations Global Compact presents a **unique strategic platform** for participants **to advance** their commitments to **sustainability and corporate citizenship**



# Obj.1 - Data Collection – Data Base Creation – 2/3

## Sample Selection

- Company have been selected by **32 European countries:**  
(Countries selected belong to **European Economic Area (28)** and **European Free Trade Area (4)**)
- Have been selected large companies with size > 250 employees



## Final Sample

- Total of **1745 Companies**
- Belonging to **30 countries**

Country	n° of companies “observations”
France	429
Spain	341
Germany	158
United Kingdom	99
Switzerland	56
Italy	51
Sweden	109
Denmark	121
Netherlands	58
Norway	54
Finland	39
Poland	32
Austria	28
Lithuania	17
Luxembourg	8
Liechtestein	3
Greece	28
Portugal	23
Belgium	21
Croatia	20
Bulgaria	12
Iceland	9
Romania	7
Ireland	5
Czech Republic	4
Hungary	4
Slovakia	3
Cyprus	3
Slovenia	2
Latvia	1
Estonia	0
Malta	0
Total	1745



# Obj.1 - Data Collection – Data Base Creation - 3/3

## Key Words to identify companies doing SB at BoP

11

### **Have been identified (as SB) initiatives that support or promote:**

- Social Enterprise and Social Entrepreneurship
- Creation or expansion of Local Cooperatives
- Women (or other disadvantage groups) Entrepreneurship
- Social Projects with long-term Economic Sustainability
- Social projects with Breakeven in the long term
- Social projects that do not provide a significant financial return in the short-term
- ....

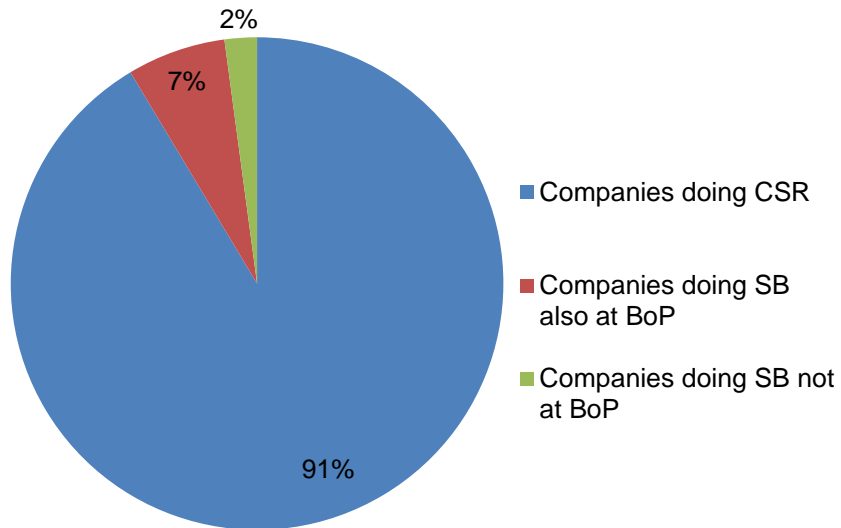
### **Have been selected initiatives that target BoP Population**

- Geographic target (DCs)
  - Marginalized People
  - People Excluded (access to Basic or financial services, ..)
  - Disadvantaged People
  - ...



# Obj.1 - Diffusion of the phenomenon 1/2 - Results

## Type of Social Activities

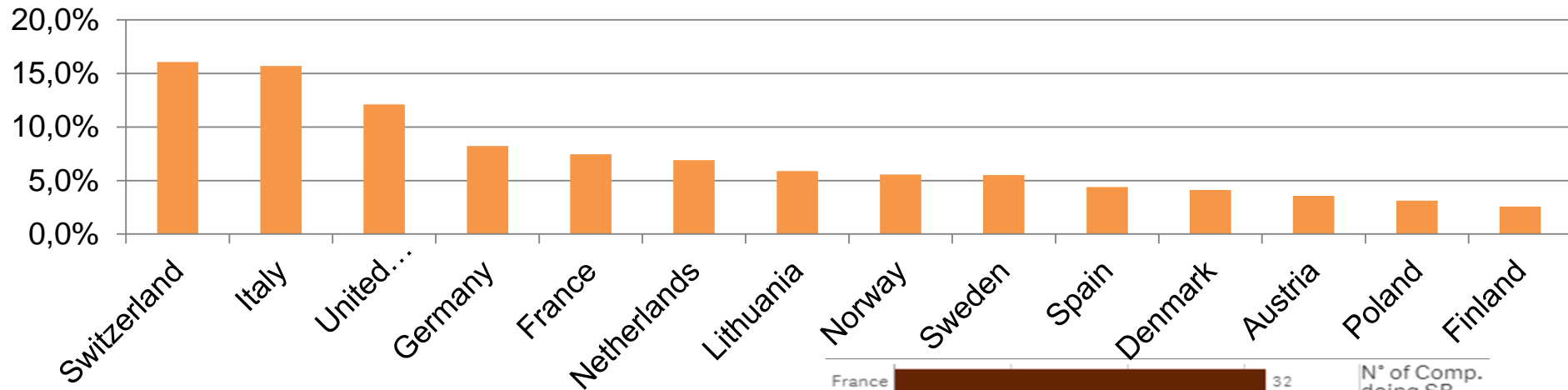


Country	n° of companies "observations"	Companies doing SB also at BoP	Companies doing SB not at BoP
France	429	32	12
Spain	341	14	6
Germany	158	13	3
United Kingdom	99	12	5
Switzerland	56	9	0
Italy	51	8	4
Sweden	109	6	3
Denmark	121	4	0
Netherlands	58	4	0
Norway	54	3	0
Finland	39	1	0
Poland	32	1	0
Austria	28	1	0
Lithuania	17	1	0
Luxembourg	8	1	0
Liechtenstein	3	1	0
Greece	28	0	0
Portugal	23	0	1
Belgium	21	0	2
Croatia	20	0	0
Bulgaria	12	0	0
Iceland	9	0	1
Romania	7	0	0
Ireland	5	0	0
Czech Republic	4	0	0
Hungary	4	0	0
Slovakia	3	0	0
Cyprus	3	0	0
Slovenia	2	0	0
Latvia	1	0	0
Estonia	0	0	0
Malta	0	0	0
Total	1745	111	37

- Company Size > 10.440 employees (Top 25%)
- Companies engaged in SB at BoP increases to 16% of the sample

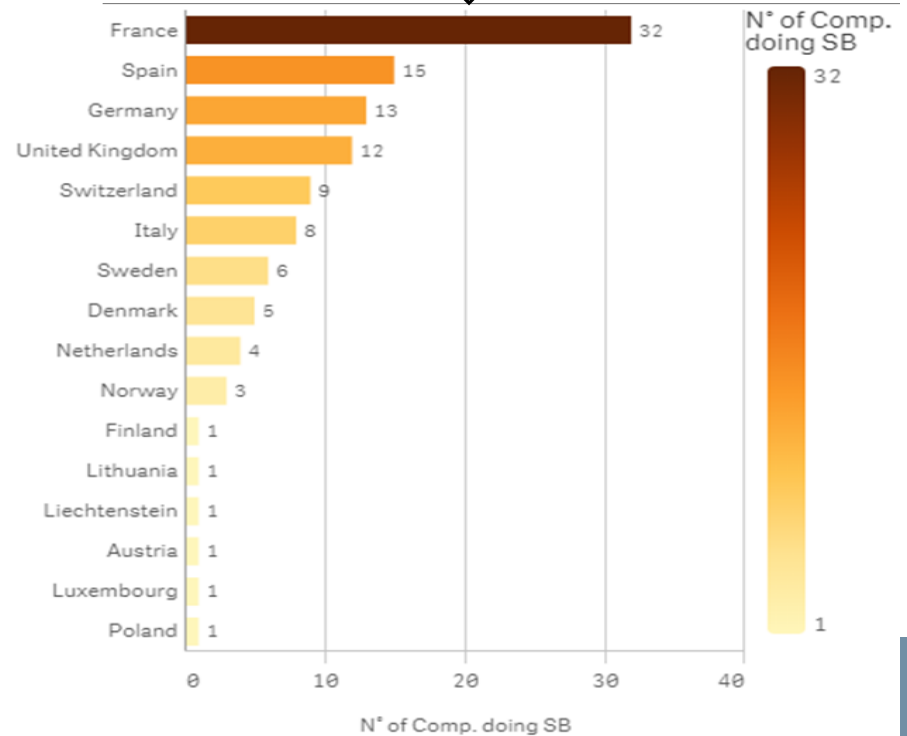


## N° of Companies doing SB at BoP / N° of companies member of the UNGC



**Total of 111 Companies**  
engaged in SB  
at BoP from **16 Countries**

**6,5 mln of Employees**



# Methodology

1. Objective 1 - Analyze **the diffusion of the phenomenon** to map the **state of the art of EU Large Companies** engaged in SB at BoP

**I. Data Collection:**

- a) Creation of a Data Base from the United Nation Global Compact
- b) Identification of EU Companies doing SB at BoP by Website Analysis

**II. Data Elaboration:** Descriptive Statistics

2. **Objective 2** - Define a model to **Classify the SB configurations** they can develop

**I. Literature Review:** Identify the research framework to analyze **specific social business configurations**

**II. Data Collection:** about the social business configurations according to the Social Business Model Developed by Yunus (2010)

**III. Data Elaboration:**

- a) Data Coding
- b) Multiple Correspondence Analysis
- c) Cluster Analysis

## Obj. 3 – Identify and Classify the SB configurations – Literature Review

Stream of Literature	Reference
Traditional Literature on Business Models	(Boons & Lüdeke-Freund 2013; Casadesus-Masanell & Ricart, 2010; Teece, 2010; Chesbrough & Rosenbloom 2009; Johnson et al., 2008; Ostelwalder & Pigneur, 2010; Zott & Amit, 2010)
Literature on Business models related to social value creation	(Yunus et. al., 2010; Thompson & McMillan, 2010; Seelos & Mair, 2007, 2006; Dahan, et al., 2010)



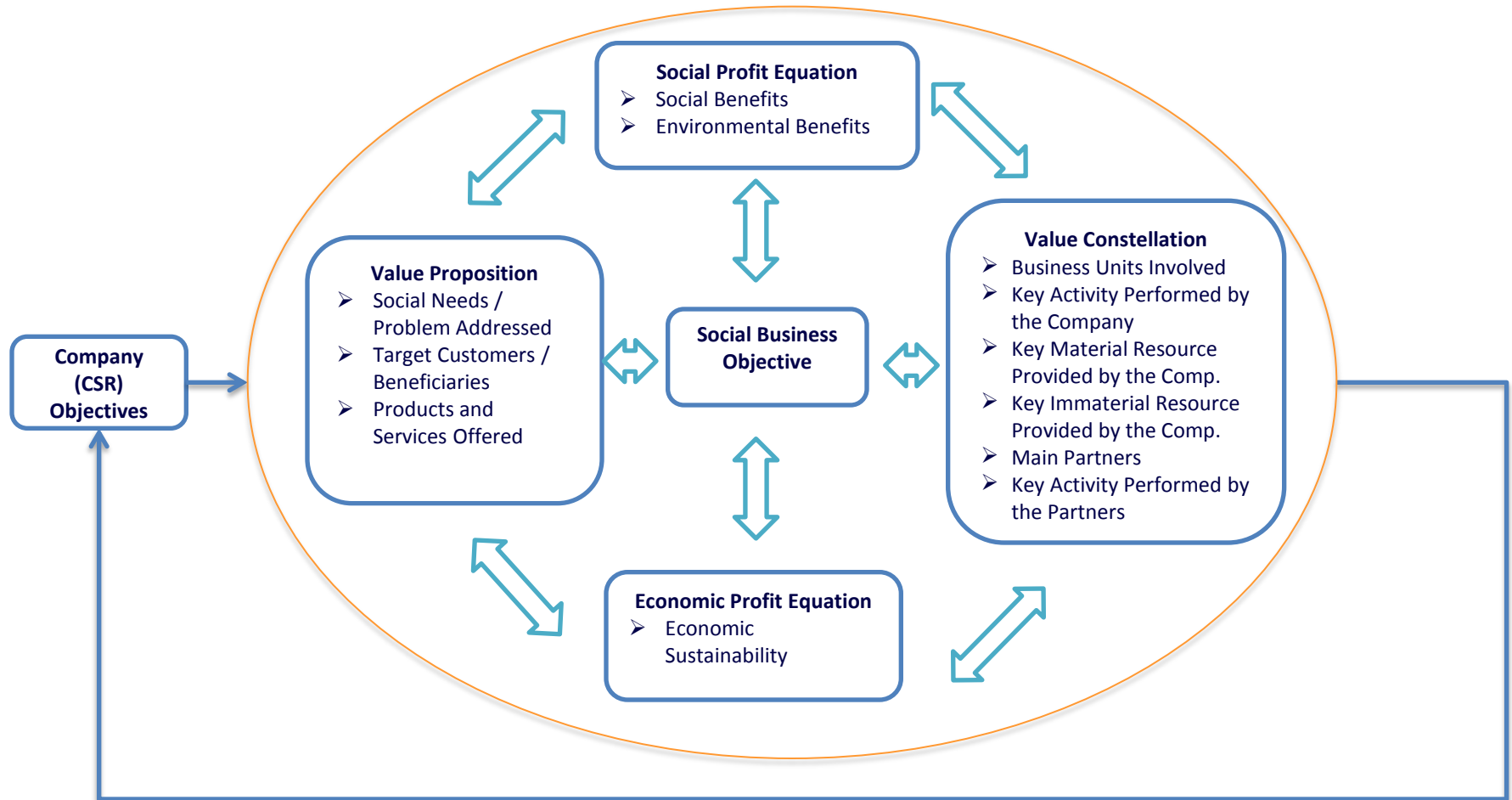
**Social Business Model - Yunus et. al., 2010**



# Obj. 3 – Identify and Classify the SB configurations 16

## Research Framework

The (four) components of social business configuration - Yunus et. al., 2010 - adapted



# Obj. 3 – Data Collection – Company’s Form

17

## Info Collected on Corporate Web-site / Company Report

Specific Social Business Configuration (SBM adapted from Yunus 2010)	
Company Objectives (if declared):	
Objectives of the social business:	
Social Problem / Need Addressed:	
Target Customers / Beneficiaries:	
Products and Services offered:	
Field of SB activities (Sector):	
Geographic Target:	
Description of resources provided and activities performed (Value Constellation):	
Business Units Involved:	
Key Activity Performed by the Comp.:	
Key Material Resource Provided:	
Key Immaterial Resource Provided:	
Main Partners:	
Key Activity Performed by the Partners:	
Other Notes (if relevant):	
Performances Achieved:	
Social / Environmental Benefits	
Economic Sustainability	

Due to Lack of Information



The resulting Sample is composed by **100 SB** initiatives developed by **97 Companies**



# Obj. 3 - Data Operationalization - The coding structure of SBM Variables 18

<b>Business Model Elements</b>	<b>Categorical Variables</b>			
<b>Direct Social Problem or Needs Addressed</b>	Lack of Financial Resources	Lack of financial Resources and/or Skills	Final Beneficiary Needs	
<b>Target Customer / Beneficiaries</b>	MdOs	SEs	Final Beneficiaries	
<b>Products and Services Offered</b>	Grant or In-kind Donation	Loan or Equity and strategic Support	Products, services, tech or specific expertise	
<b>Business Units Involved</b>	Corporate Foundation	CSR / Sustainability Unit	Dedicated Unit / Organization	
<b>Key Activity Performed by the Company</b>	Funding Activities	Funding Activities and Support activities	Involved in the development of the SB	
<b>Key Material Resource Provided</b>	Donations	Funds in form of investment	Funds and Company Products or Technology	
<b>Key Immaterial Resource Provided</b>	Competences and Skills	None		
<b>Main Partner</b>	MdOs	SEs	Multi-Stakeholders	None
<b>Key Activity Performed by the Partners:</b>	Management of the SB	Provide Funds and/or Support Services	Co-design and co-development of the SB	Not Relevant
<b>Economic Sustainability</b>	No (Company cover costs)	Partially (company cover part of the costs)	Yes (the program is sustainable)	



# Obj. 3 – Data Elaboration – Multiple Correspondence Analysis<sup>19</sup>

## Multiple Correspondence Analysis

- Reduce the number of variables (31 Dummy Variables)
- Find latent factors
- Transform binary variables into continuous ones
- Reduce variables multicollinearity
- N° of Factors based on Elbow Method



**Factor 1 – Level of Engagement (58%)**

**Factor 2 – Type of engagement (19,76%)**

**Factor 3 – Multi-stakeholder approach (6,60%)**

**Factor 4 – Absence of Partners (5.95%)**

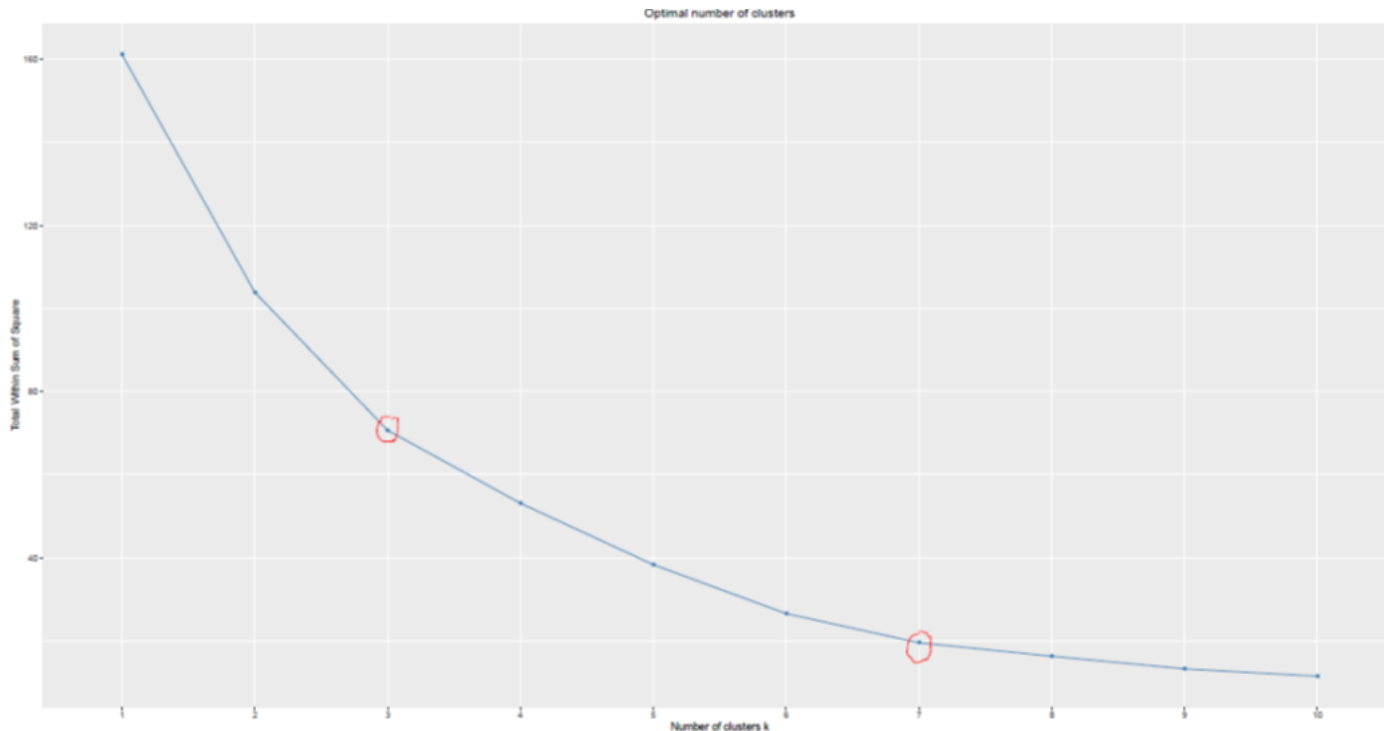
**Factor 5 - Unknown (4.54%)**



## Classification of SB Configurations

### Cluster Analysis:

- Hierarchical joining algorithms (Ward Linkage)
- N° of Cluster based on Elbow Method



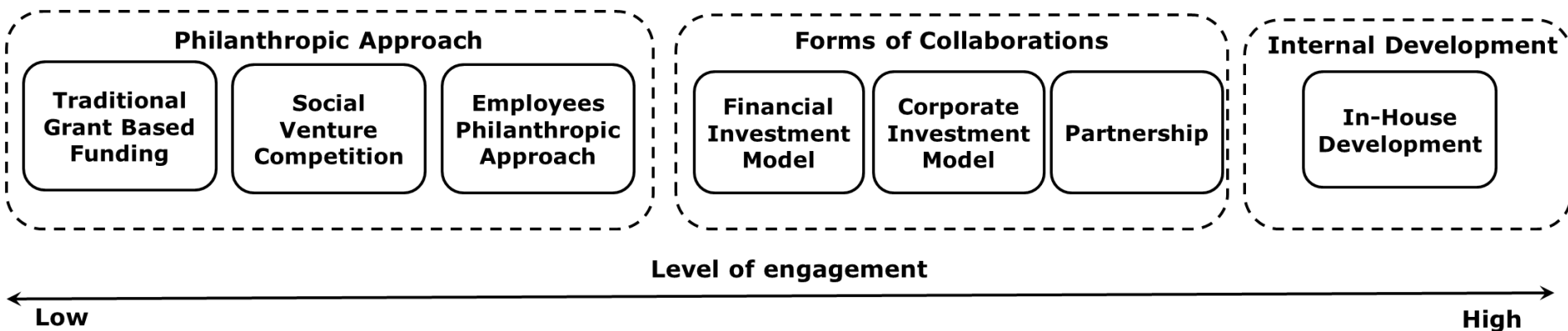
**Seven  
Clusters**

- Significance (Global MANOVA, Single ANOVA, Scheffè and Tuckey Test)



## Classification of SB Configurations

- **Seven** Social Business Configurations
- Classified according to the **Level of Engagement**
- Three Macro Configurations:
  - **Philanthropic Approach**
  - **Forms of Collaborations**
  - **Internal Development**



# Obj. 3 – Qualitative Data Analysis

22

## Info Collected on Corporate Web-site / Company Report

Specific Social Business Configuration (SBM adapted from Yunus 2010)	
Company Objectives (if declared):	
Objectives of the social business:	
Social Problem / Need Addressed:	
Target Customers / Beneficiaries:	
Products and Services offered:	
Field of SB activities (Sector):	
Geographic Target:	
Description of resources provided and activities performed (Value Constellation):	
Business Units Involved:	
Key Activity Performed by the Comp.:	
Key Material Resource Provided:	
Key Immaterial Resource Provided:	
Main Partners:	
Key Activity Performed by the Partners:	
Other Notes (if relevant):	
Performances Achieved:	
Social / Environmental Benefits	
Economic Sustainability	

Qualitative Analysis



For each Social Business Configurations



# Obj. 3 - Results – Cluster Analysis

23

<b>Business Model Elements</b>	<b>Corporate Investment Model</b>
<b>Companies Objectives</b>	<b>1) Learning Investment - 2) Development of Innovations (products, services and Business Models)</b>
<b>Direct Social Problem or Needs Addressed</b>	<b>Lack of financial Resources and Skills</b>
<b>Target Customer / Beneficiaries</b>	<b>Social Enterprises and MFIs</b>
<b>Products and Services Offered</b>	<b>Tailored Financial Services - Loan or Equity - and strategic Support Services through dedicated Staff</b>
<b>Business Units Involved</b>	<b>Dedicated Units / Organization – Corporate Social Investment Funds</b>
<b>Key Activity Performed by the Company</b>	<b>Funding Activities (Screening, Selection, Disbursement, Monitoring and Repayment) and Strategic Support Services (Strategy, Marketing, Networking, Technical Expertise, Training)</b>
<b>Key Material Resource Provided</b>	<b>Funds in form of investment (Equity or Loans)</b>
<b>Key Immaterial Resource Provided</b>	<b>Organization Specific Resources - Competences and Skills</b>
<b>Main Partner</b>	<b>Social Enterprises and Microfinance Organizations</b>
<b>Key Activity Performed by the Partners:</b>	<b>Management of the SB</b>
<b>Social Benefits</b>	<b>Financial Inclusion and Access to basic services (food, energy, education)</b>
<b>Economic Sustainability</b>	<b>Yes (the program is sustainable)</b>

**(Pearson Plc., Danone, ENGIE, Schneider Electric SA, AXA, Deutsche Bank AG)**



# Contributions

**Academics:** the research contributes to **broaden the validity of existing CSR theory** to the context of social business and **adds new original findings** to the social business literature.

- New **attempt to quantitatively map the state of the art** of European companies doing SB at BOP
- The research **outlines the different roles that companies** (and partners) **can play** in the development of SB at BOP

## Practitioners:

- **Companies:** it can **support companies** in the development of SBs coherently with the implementation models currently adopted by frontrunner companies, in order to maximize value creation for the company and the society.
- **MdOs:** a **support tool to attract financial and non-financial resources** from private sectors to enhance economic and social sustainability of their development projects.

**Policy Makers:** an **useful tool** for policy-makers to **set regulations and incentives** in order to promote the diffusion of the social business to promote the sustainable development of developing countries.



# Limitations and Further Researches

## Limitations:

- Global Compact promote the engagement of companies member in issue-specific learning platforms and this, in principle, may result in a **higher propensity of companies member to implement advance CSR programs** such as social business
- Have been collected and use **information provided by companies** by Website and document analysis

## Further Researches:

- Replicate the study in **other geographic region** such as the USA
- Deepen the analysis of **companies' objectives**
- Analyze whether the Social Business Configurations Identified can be **valid to develop SB in other contexts** such as Developed Countries



**Thank you!**



# Social Business an Appropriate Model to engage the BoP

## BoP Characteristics

- High Unmet Social Needs
- Poverty Penalty
- Informal Economy
- Weak Legal System

## BOP as an Opportunity

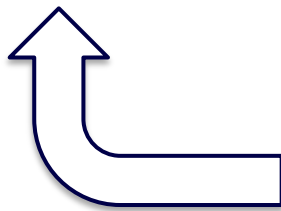
- \$ 5 trillion Markets (PPP)

Imply the adoption  
of Specific Business  
Principles



## BoP Principles

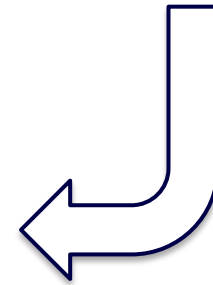
- Poverty Alleviation and Mutual Value creation
- Market Creation
- Innovation
- Co-creation and Stakeholder Participation
- Social Embeddedness



Potential to solve BoP  
Challenges

## Social Business Characteristics

- Multi-Objective Organization
- Inclusive Approach, Multi - Sector Nature, Empowerment
- Social Innovation
- Multi - Stakeholders Nature and Participatory Approaches



SB Embeds BoP  
Principles



## **1745 Companies' Websites Analyzed (UNGC Sample) - Information Collected**

- Name of the Company
- Country of origin
- Name of the Program Analyzed
- Brief Description of the SB activities or CSR Programs
- Source [links of the Website Visited]
- Date of Visit



## Obj. 2 Literature review – Identification of companies characteristics that influence the engagement in CSR

29

Variables	CSR Literature	References
<b>Size (n° of Employees)</b>	Positively associated to CSR participation due to higher visibility, greater resource-slack and more evolved managerial processes of larger firms	(Udayasankar, 2008; Aguinis & Glavas, 2012; Gallo & Christensen, 2011; Blomback and Wigren 2009)
<b>Ownerships Types</b>	Publicly traded firms are more likely to make efforts in dealing with social or environmental issues compared to privately held firms	(Dam & Scholtens, 2012; Reverte 2008, Gallo & Christensen, 2011)
<b>Sector</b>	The effect of the industry on the CSR level is documented, focusing on BOP some sectors are characterized by a huge latent demand	(Reverte, 2008; Melo & Garrido-Morgado, 2012; Cai et al., 2012; Banerjee et al., 2003)
<b>Country</b>	Cultural differences and national CSR policies can influence the level of CSR in a given context	(Knudsen, et al., 2015; Albareda, et al., 2007; Jamali & Mirshak 2007)
<b>Age of Membership to the GC</b>	a proxy of the company's experience in CSR	-
<b>GC Differentiation Level (Advanced)</b>	a proxy of the company's experience in advanced CSR practices	-



## Info Collected on the United Nation Global Compact Database

- Sector of provenance
- Country of origin
- Ownership Type
- Size
- Age of Membership
- GC Differentiation Level



# Obj. 2 Preliminary Data Elaboration – Hp. Generation

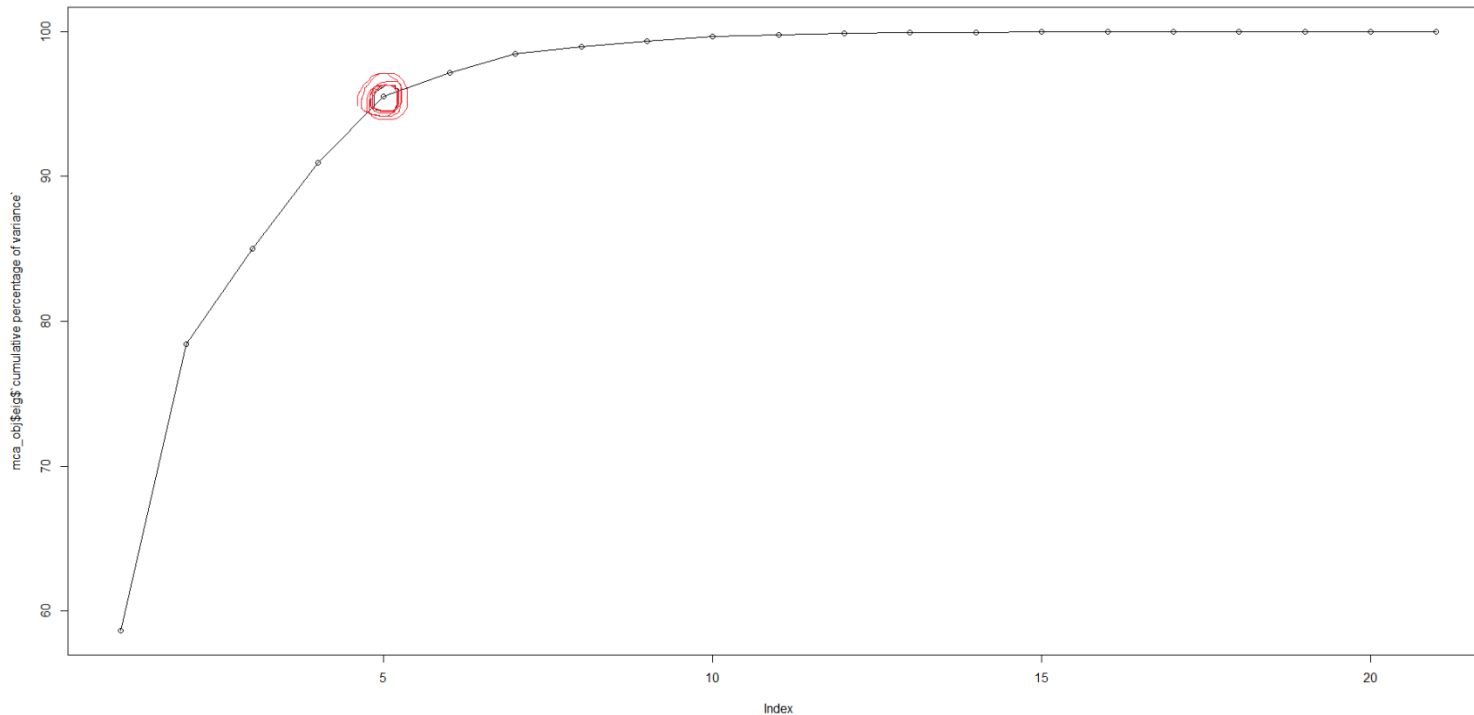
31

<b>Variables</b>	<b>Statistics UNGC Sample</b>	<b>Statistics SB Sample</b>	<b>Companies doing SB</b>
<b>Size (n° of Employees)</b>	17.890 Employees	59.900 Employees	Are more than three times Larger
<b>Ownerships Types</b>	23.4% publicly listed	45% publicly listed	Publicly Listed Companies are more active
<b>Sector</b>	26,7 % of UNGC sample	50,4% of the SB sample	Financial Sector, Energy and Wash, Food and Beverage and Healthcare and Pharmaceuticals
<b>Country</b>	45,4 % of UNGC sample	66,7% of the SB sample	France, Italy, Switzerland, Germany and UK
<b>Age of Membership to the GC</b>	6,65 years	9,92 years	More than three years older
<b>GC Differentiation Level</b>	10,9% classified as advanced	36% classified as advanced	proportion of companies classified as advanced increases by more than three times

# Obj. 3 – Data Elaboration – Multiple Correspondence<sup>32</sup> Analysis

## Multiple Correspondence Analysis

- Reduce the number of variables (31 Dummy Variables)
- Find latent factors
- Transform binary variables into continuous ones
- Reduce variables multicollinearity



**Five  
Latent  
Factors**



# Obj. 3 - Results - Multiple Correspondence Analysis 33

## Factor Interpretation

- **Factor 1 – Level of Engagement (58%):** the factor 1 clearly discriminates between approaches where companies are highly engaged in the SB at BOP (Integrated approach) and approaches where companies are poorly engaged and provide mainly funds (Philanthropic approach).
- **Factor 2 – Type of engagement (19,76%):** the factor 2 identify a type of engagement indeed, it discriminates between companies that adopt investment approaches and companies that adopt other approaches.
- **Factor 3 – Multi-stakeholder approach (6,60%):** the factor 3 indicates the presence of a multi-stakeholders partnership or not.
- **Factor 4 – Absence of Partners (5.95%):** the factor 4 indicates the absence of partners.
- **Factor 5 - Unknown (4.54%):** for factor 5 is difficult to provide meaningful interpretation due to the fact that variable's loads lead to results difficult to interpret.

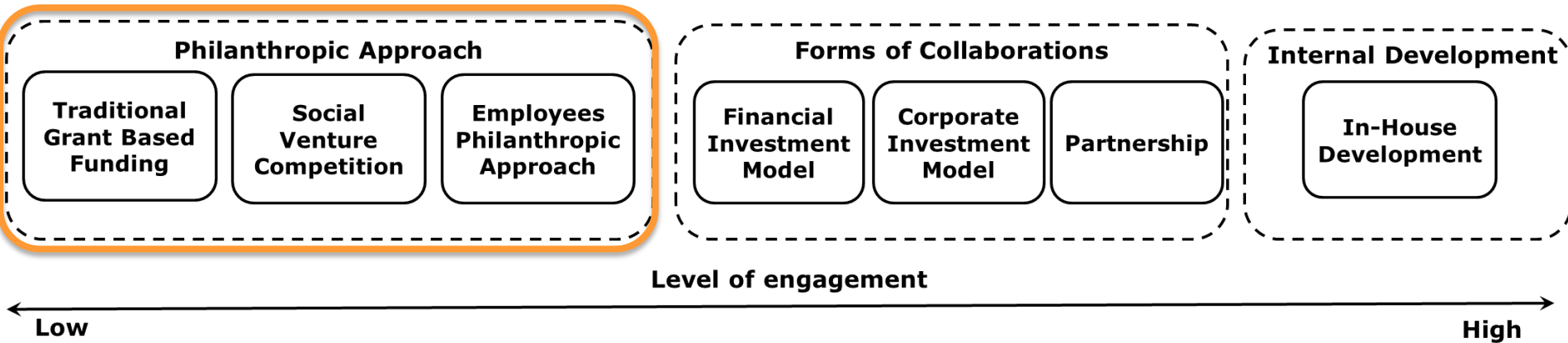


# Why Large European Companies engage in Social Business at BoP

Approach	Nature	Objectives	References
<b>Strategic perspective</b>	<b>Instrumental to economic value Creation</b>	<ul style="list-style-type: none"> <li>➤ Opportunity to enter in new markets</li> <li>➤ Opportunity for innovation (product, service, process, BM)</li> <li>➤ Learning investment</li> <li>➤ Strengthen Supply Chain</li> <li>➤ Better Access to information</li> <li>➤ Improve Image</li> <li>➤ Enhance Reputation</li> </ul>	Porter and Kramer 2002 , 2006; Carroll 2010; Shrader et. al., 2012; Hahn 2006; Davis 1973; Kolk et al 2006; Ven van de and Graafland 2006; Han and Scheermesser 2006; Matten 2006; London et. al., 2011
	<b>Institutional Pressure</b>	<ul style="list-style-type: none"> <li>➤ Enhance Stakeholder Relationship</li> <li>➤ Customer Demands (Loyalty)</li> <li>➤ Meet Shareholder Demands</li> <li>➤ Employees Motivation and Retention</li> <li>➤ Reaction to Competitor Behavior</li> </ul>	Ven van de and Graafland 2006; Han and Scheermesser 2006; Matten 2006; Tasavori 2013; Marano 2011; Nejati and Amran 2009; Brammer et. al., 2012; Campbell et. al., 2007; Dacin et. al., 2007
<b>Moral perspective</b>	<b>Moral Motives</b>	<ul style="list-style-type: none"> <li>➤ Concern for Society's Future</li> <li>➤ Share Resources with Society</li> <li>➤ Be Recognized for Moral Leadership</li> <li>➤ Personal Satisfaction</li> </ul>	Brammer et. al., 2012; Ven van de and Graafland 2006; Han and Scheermesser 2006; Matten 2006



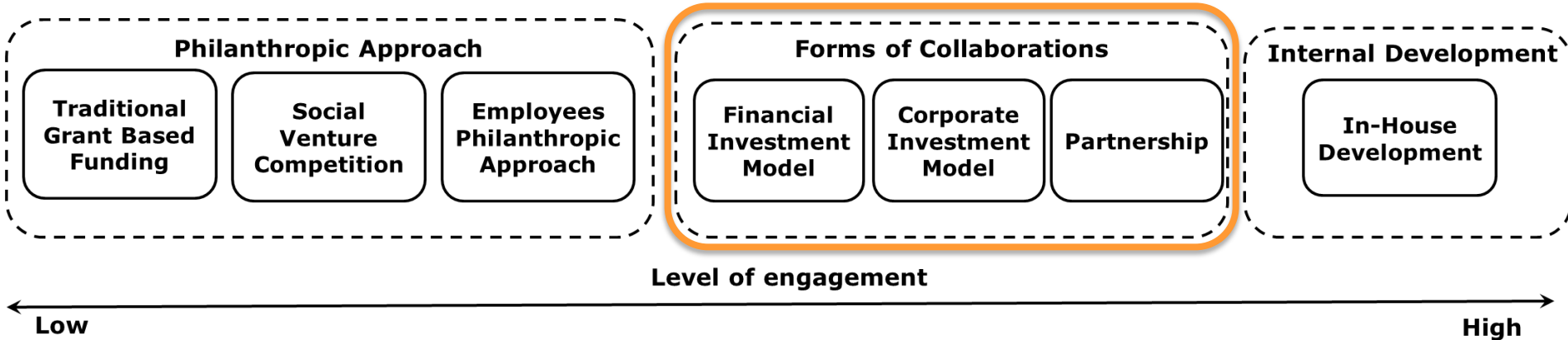
## Classification of SB Configurations



### Philanthropic Approach

- **Company Objectives:** Increase Reputation, Image, stakeholders relationships and Employees Motivation and Retention
- **Products and Services Offered:** Monetary or In-kind Donations in form of Grants and Pro-bono work
- **Target:** Mission Driven Organizations that run a SB at BOP
- **Key Activities:** Funding Activities and management of pro-bono work
- **Business Units:** Corporate Foundation
- **Sustainability:** Not economically Sustainable

## Classification of SB Configurations

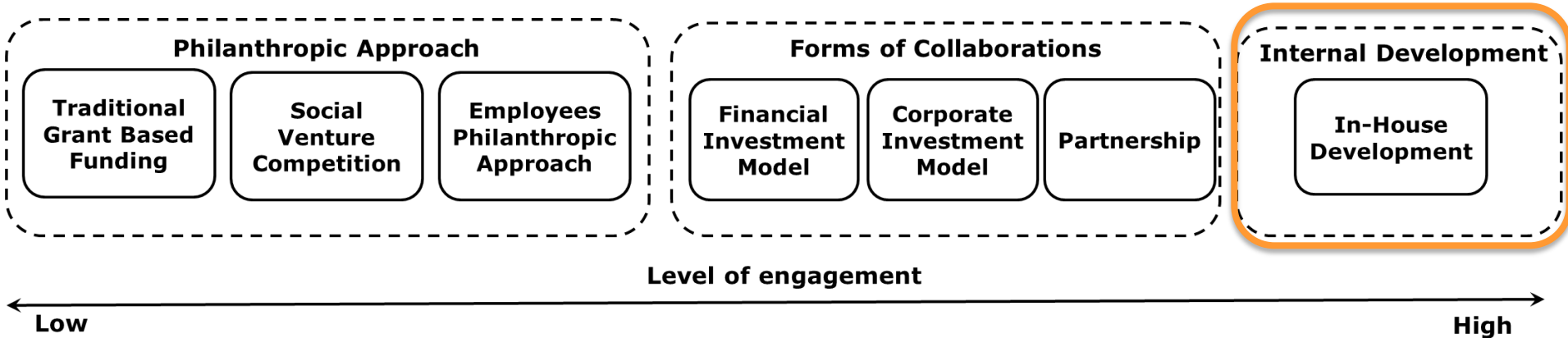


### Forms of Collaboration

- **Company Objectives:** Make Learning Investment, Develop innovations and Create New MKTs
- **Products and Services Offered:** tailored Financial Services and tailored Products, services or Technologies
- **Target:** Social Enterprise and Final Beneficiaries
- **Key Activities:** Funding activities and Strategic Support by employees or Co-development of the SB
- **Business Units:** Dedicated Unit / Organization
- **Sustainability:** Economically Sustainable



## Classification of SB Configurations



### Internal Development

- **Company Objectives:** Expand Existing MKTs or Create New Markets
- **Products and Services Offered:** tailored Products, Services or Technologies
- **Target:** Final Beneficiaries (BOP population)
- **Key Activities:** Development and management of the SB
- **Business Units:** Dedicated Units or organizations
- **Sustainability:** Economically Sustainable

# Data Elaboration - Cluster Analysis (7 clusters)

## 3. MANOVA

- Test significance of clusters compared to the 5 Factors

### Global MANOVA

	Df	Pillai approx	F num	Df den	Df	Pr(>F)
as.factor(cut.7w)	6	4.1998	81.355	30	465	< 2.2e-16 ***
Residuals					93	



# Cluster Analysis (7 clusters)

## ➤ Single ANOVAs

### Response Dim.1 :

	Df	Sum Sq	Mean Sq	F value
Pr(>F)				
as.factor(cut.7w)	6	61.717	10.2862	398.2 < 2.2e-16 ***
Residuals	93	2.402	0.0258	

--- Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

### Response Dim.2 :

	Df	Sum Sq	Mean Sq	F value
Pr(>F)				
as.factor(cut.7w)	6	33.747	5.6244	150.38 < 2.2e-16 ***
Residuals	93	3.478	0.0374	

### Response Dim.3 :

	Df	Sum Sq	Mean Sq	F value
Pr(>F)				
as.factor(cut.7w)	6	13.7778	2.29630	27.596 < 2.2e-16 ***
Residuals	93	7.7388	0.08321	

### Response Dim.4 :

	Df	Sum Sq	Mean Sq	F value
Pr(>F)				
as.factor(cut.7w)	6	17.3990	2.89983	88.884 < 2.2e-16 ***
Residuals	93	3.0341	0.03262	

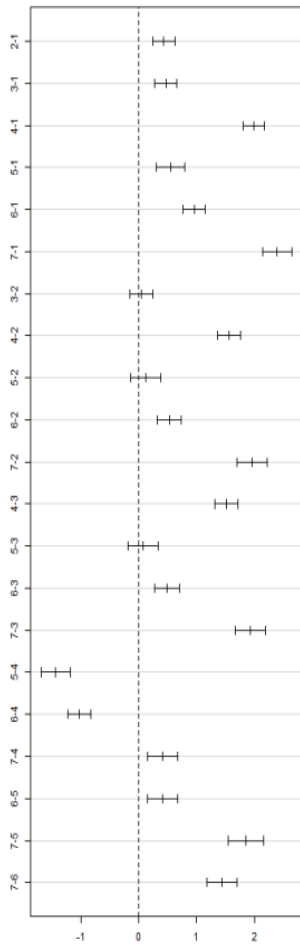
### Response Dim.5 :

	Df	Sum Sq	Mean Sq	F value
Pr(>F)				
as.factor(cut.7w)	6	14.9592	2.49321	80.713 < 2.2e-16 ***
Residuals	93	2.8728	0.03089	

# Cluster Analysis (7 clusters)

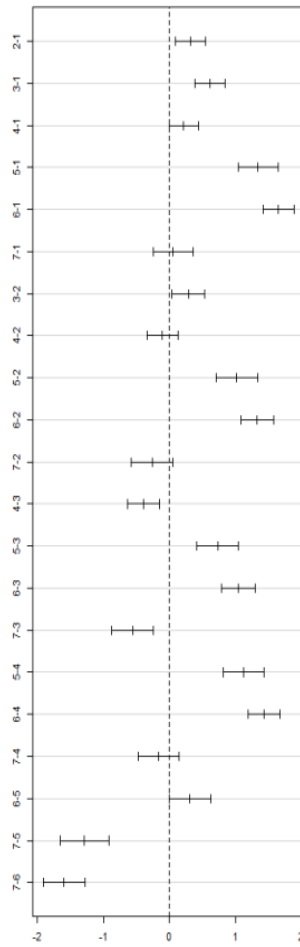
## ➤ Tuckey Test

99% family-wise confidence level



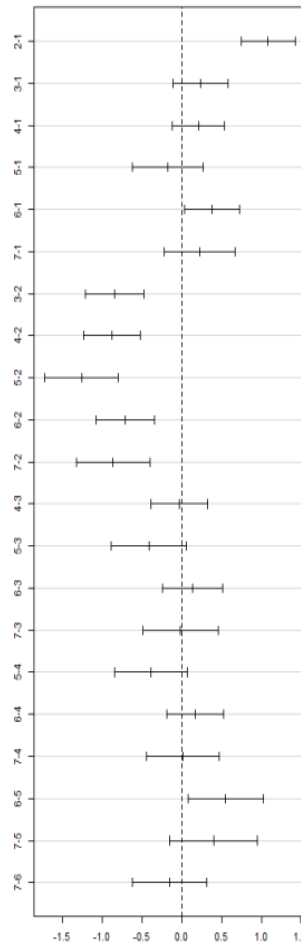
Differences in mean levels of as.factor(cut.7w)

99% family-wise confidence level



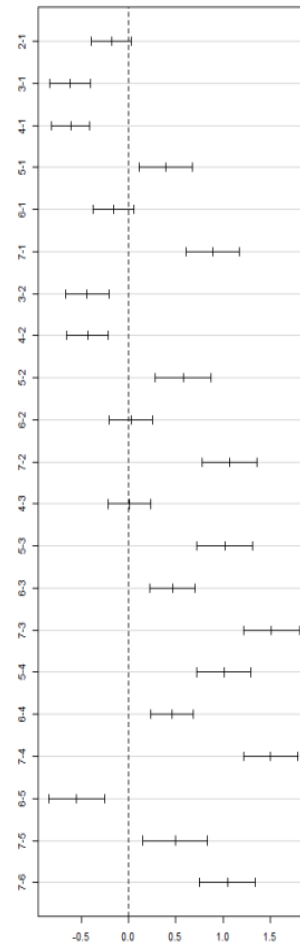
Differences in mean levels of as.factor(cut.7w)

99% family-wise confidence level



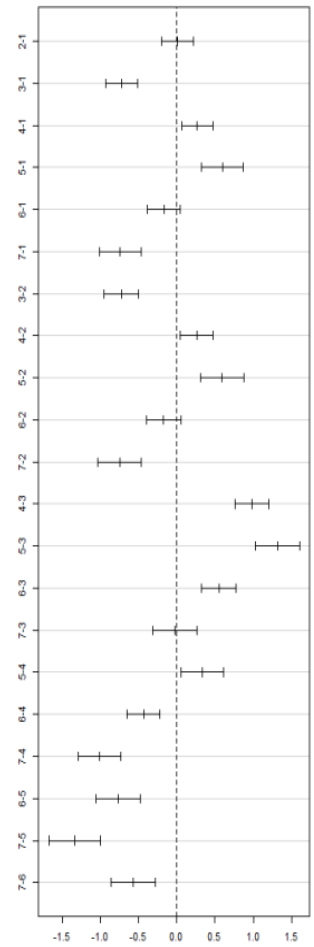
Differences in mean levels of as.factor(cut.7w)

99% family-wise confidence level



Differences in mean levels of as.factor(cut.7w)

99% family-wise confidence level



Differences in mean levels of as.factor(cut.7w)



# Cluster Analysis (7 clusters)

## ➤ Scheffè Test

