Description of Formalized Metrics of HEAL ME Architecture

Number	Dimension	Indicator	Metric	Description	Measure and Formula	Interpretation	Unit	Actor	Reference
Heterogeneity									
1	Social	Sustainability	Geografic arrangement	Number of countries that have partners in the community	X = N N = Number of countries where SECO Collaborators live	X > P P = Parameter The greater the number of countries, the better	Un - Unit	Project Manager	[Franco-Bedoya et al. 2014]
2	Technical	Sustainability	Semantic closeness	Value of the semantic proximity average of services in SECO	X = N N = Semantic proximity average	X > P P = Parameter The higher the value of average, the better	C - Value of the semantic proximity	Project Manager	[Franco-Bedoya et al. 2014]
3	Technical	Sustainability	Node types	Number of different types of nodes present in the peer-to-peer network	X = N N = Number of different types of nodes	X > P P = Parameter The greater the number of types, the better	Un - Unit	Network Manager	[Franco-Bedoya et al. 2014]
Regeneration Ability									
4	Social	Sustainability	Working Time Set	Joint effort time of communit members	$X = \Sigma^{1}_{N}T$ T = hours worked per day N = Number of days of joint effort	X > P P = Parameter The greater the number of hours, the better	H - Hours	Project Manager	[Franco-Bedoya et al. 2014]
5	Social	Sustainability	New Members	Number of new members added to communit	$X = \Sigma^{1}_{N}T$ T = Number of new members joined per day N = Number of days	X > P P = Parameter The greater the number of new members, the better	Un - Unit	Collaborator	[Franco-Bedoya et al. 2014]
Effort Balance									
6	Social	Sustainability	Number of Commits	Total number of commits made by developers	$X = (\Sigma^{1}_{N})\Sigma^{1}_{A}T$ T = Number of commits A = Number of developers N = Number of days	X > P P = Parameter High number of commits may indicate rework	Un - Unit	Project Manager	[Franco-Bedoya et al. 2014]
7	Social	Sustainability	Active Members	Number of communits with at least one active member	X = T T = Number of communities with active members	X > P P = Parameter The greater the number of communities, the better	Un - Unit	Project Manager	[Franco-Bedoya et al. 2014]
8	Social	Sustainability	Participativeness	Number of communits with active developers	X = T T = Number of communities with active developers	X > P P = Parameter The greater the number of communities, the better	Un - Unit	Project Manager	[Franco-Bedoya et al. 2014]

9	Social	Sustainability	Effort Total Set	Maximum amount of joint effort time of all community members	$X = \Sigma^{1}{}_{N}T$ T = Number of Hours worked per developer N = number of developers	X > P P = Parameter The higher the value of joint effort hours, the better	H - Hours	Project Manager	[Franco-Bedoya et al. 2014]
Expertise Balance									
10	Social	Sustainability	Participation in events	High number of participants in a community event	X = T T = Number of participants	X > P P = Parameter The greater the number of participants, the better	Un - Unit	Project Manager	[Franco-Bedoya et al. 2014]
Visibility									
11	Social	Sustainability	Tasks Divulgation	Number of disclosed task notices	X = T T = Number of task notices	X > P P = Parameter The higher the number of tasks, the better	Un - Unit	Project Manager	[Franco-Bedoya et al. 2014]
12	Technical	Sustainability	Downloads Made	Platform download number run by main site or alternative links	$X = \Sigma^{1}{}_{N}T$ T = Number of monthly downloads N = Number of months	X > P P = Parameter The higher the number of downloads, the greater visibility	Un - Unit	Communications Manager	[Franco-Bedoya et al. 2014]
13	Social	Sustainability	Number of Readers	Number of readers in the community	X = T T = Number of readers	X > P P = Parameter The higher the number of readers, the better	Un - Unit	Communications Manager	[Franco-Bedoya et al. 2014]
14	Social	Sustainability	Scientific publications	Number of scientific publications generated by the community	X = T T = Number of scientific publications	X > P P = Parameter The greater the number of scientific publications, the better	Un - Unit	Communications Manager	[Franco-Bedoya et al. 2014]
15	Social	Sustainability	Quotes on Social Media and Blogs	Number of community quotes on social media and blogs	X = T T = Total number of community citations	X > P P = Parameter The higher the number of citations, the better	Un - Unit	User	[Franco-Bedoya et al. 2014]
16	Social	Sustainability	Web page requests	Number of requests received on the home page	X = T T = Total number of requests received	X > P P = Parameter The higher the number of requisitions, the better	Un - Unit	Communications Manager	[Franco-Bedoya et al. 2014]

Diversity									
16	Social	Diversity	Number of Developers	Total number of developers in the community	X = T T = Number of developers	X > P P = Parameter The greater the number of developers, the better	Un - Unit	Project Manager	[Dhungana et al. 2010]
18	Social	Diversity	Users Groups	Total number of users groups in the community	X = T T = Number of users groups	X > P P = Parameter The higher the number of groups, the better	Un - Unit	User	[Dhungana et al. 2010]
18	Technical	Diversity	Supported Programming Languages	Number of programming languages supported by platform	X = T T = Number of programming languages	X > P P = Parameter The greater the number of languages supported, the better	Un - Unit	Project Manager	[Dhungana et al. 2010]
20	Business	Diversity	Plan for Collapse	Existence of a plan against SECO collapse	X = T T = Existence of plane against collapse	X = Y | N Desirable to be positive	-	Project Manager	[Dhungana et al. 2010]
Productivity									
21	Social	Productivity	New Projects	Number of projects added	$X = \Sigma^{1}_{N}T$ T = Number of projects N = Number of months	X > P P = Parameter The greater the number of new projects, the better	Un - Unit	Project Manager	[Jansen 2014]
22	Social	Productivity	Community Events	Events in the community	$X = \Sigma^{1}_{N}T$ T = Number of Events N = Number months	X > P P = Parameter The greater the number of events, the better	Un - Unit	Project Manager	[Jansen 2014]
23	Technical	Productivity	Artifacts Added	Number of artifacts added in repository	$X = \Sigma^{1}_{N}T$ T = Number of artifacts N = Number of days	X > P P = Parameter The higher the number of artifacts added, the better	Un - Unit	Project Manager	[Jansen 2014]
24	Social	Productivity	Transmitted Messages	Number of messages transmitted by communication channels	$X = \Sigma^{1}_{N}T$ T = Number of messages N = Number of days	X > P P = Parameter High number of transmitted messages can indicate great interaction	Un - Unit	Collaborator	[Jansen 2014]
25	Technical	Productivity	Average of fix errors time	Average time needed to fix code errors	$X = (\Sigma^{1}_{N}T)/N$ T = Number of Error Correction Hours N = Number of days	X <= P P = Parameter The lower the average number of hours, the better	H - Hours	Project Manager	[Jansen 2014]

26	Social	Productivity	Partners added	Number of new partners added	$X = \Sigma^{1}_{N}T$ T = Number of partners N = Number of days	X > P P = Parameter The greater the number of partners, the better	Un - Unit	Project Manager	[Jansen 2014]
27	Social	Productivity	Number of Users	Number of Users	$X = \Sigma^{1}_{N}T$ T = Number of users N = Number of days	X > P P = Parameter The higher the number of users, the better	Un - Unit	User	[Jansen 2014]
28	Social	Productivity	Average Usage Time	Average usage time of the platforms by users	$X = (\Sigma^{1}_{N}T)/N$ T = Number of Hours of use N = Number of days	X > P P = Parameter The higher the average use, the better	H - Hours	User	[Jansen 2014]
Interrelatedness									
29	Technical	Robustness	Number of Connections	Highest number of connections on peer-to-peer network nodes	X = T T = Number of connections	X > P P = Parameter The higher the number of connections, the better	Un - Unit	Network Manager	[Franco-Bedoya et al. 2014]
30	Technical	Robustness	Connectivity Capacity	Maximum peer-to-peer network connection capacity	X = T T = Connection capacity	X > P P = Parameter The higher the capacity, the better	Un - Unit	Network Manager	[Franco-Bedoya et al. 2014]
31	Technical	Robustness	Ratio Between Number of Connections and Capacity	Ratio between maximum connection capacity and maximum number of peer-to-peer network connections	X = T/N T = Maximum number of connections N = Capacity of connection	X <= P P = Parameter The lower the number of ration, the better	Un - Unit	Network Manager	[Franco-Bedoya et al. 2014]
32	Technical	Robustness	Nodes Centrality	Maximum number of peer-to-peer network node connections with highest number of connections	X = T T = Number of connections	X > P P = Parameter The higher the capacity, the better	Un - Unit	Network Manager	[Franco-Bedoya et al. 2014]
33	Business	Robustness	External Partners	Number of external partners on the platform	X = T T = Number of partners	X > P P = Parameter The greater the number of partners, the better	Un - Unit	Financial Manager	[Franco-Bedoya et al. 2014]
Clustering									
34	Social	Robustness	Product Types	Number of product types on the platform	X = T T = Number of types	X > P P = Parameter The higher the number of types, the better	Un - Unit	Project Manager	[Franco-Bedoya et al. 2014]

35	Social	Robustness	Greater Collaboration	Longer community contribution time to a project	X = T T = Contribution hours	X > P P = Parameter The higher the number of hours, the better	H - Hours	Project Manager	[Franco-Bedoya et al. 2014]
36	Social	Robustness	Active Projects	Number of active projects	X = T T = Number of projects	X > P P = Parameter The greater the number of projects, the better	Un - Unit	Project Manager	[Franco-Bedoya et al. 2014]
Financial Consistence									
37	Business	Robustness	Number of Partners	Total number of partners that the platform has	X = T T = Number of partners	X > P P = Parameter The greater the number of partners, the better	Un - Unit	Financial Manager	[Jansen 2014]
38	Business	Robustness	Commercial Sponsorship	Number of commercial sponsors that the platform has	X = T T = Number of sponsors	X > P P = Parameter The greater the number of sponsors, the better	Un - Unit	Financial Manager	[Jansen 2014]
39	Business	Robustness	Total Contribution Value	Total value of contributions received by the platform	X = T T = Value of contribution	X > P P = Parameter The higher the contribution value, the better	US$ - Dollar | R$ - Real	Financial Manager	[Jansen 2014]
40	Business	Robustness	Active Contributors	Number of active contributors on the platform	X = T T = Number of contributors	X > P P = Parameter The higher the number of contributors, the better	Un - Unit	Financial Manager	[Jansen 2014]
41	Social	Robustness	Frequently Users	Number of platform frequent users	X = T T = Number of Users	X > P P = Parameter The higher the number of users, the better	Un - Unit	User	[Jansen 2014]
Niche Creation									
42	Technical	Niche Creation	Documentation	Presence of documentation for platform	X = T T = Existence of documentation	X = Y | N Desirable to be positive	-	Project Manager	[Jansen 2014]
43	Business	Niche Creation	Types of Contributors	Number of contributors types in the community	X = T T = Number of contributors types	X > P P = Parameter The higher the number type of contributors, better	Un - Unit	Financial Manager	[Jansen 2014]

44	Technical	Niche Creation	Types of Application Projects	Number of types of application projects developed by the community	X = T T = Number of project types	X > P P = Parameter The higher the number of types, the better	Un - Unit	Project Manager	[Jansen 2014]
45	Technical	Niche Creation	Natural Language Support	Platform support for natural languages	X = T T = Support for natural languages	X = Y | N Desirable to be positive	-	Project Manager	[Jansen 2014]
46	Technical	Niche Creation	Supported Technologies	Number of types of technologies supported by SECO	X = T T = Number of technologies supported	X > P P = Parameter The greater the number of technologies supported, the better	Un - Unit	Project Manager	[Jansen 2014]
47	Technical	Niche Creation	Supported Development Technologies	Number of types of development technologies supported by the platform	X = T T = Number of development technologies supported	X > P P = Parameter The greater the number of supported development technologies, the better	Un - Unit	Project Manager	[Jansen 2014]

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