BENCHMARKING REPORT

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Medicine Estonia

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The ESCA benchmarking of Estonian clusters is a project of Enterprise Estonia funded by the European Union European Regional Development Fund

Imprint

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ESCA is the European Secretariat for Cluster Analysis. Based in Berlin and hosted by VDI/VDE Innovation + Technik GmbH, ESCA advises particular cluster managers and policy makers on cluster development while relying on an international network of specifically trained ESCA experts. ESCA experts have developed a methodology for cluster benchmarking that is acknowledged by both cluster managers and policy makers throughout Europe. Since 2008, more than 900 cluster management organisations have been benchmarked according to this methodology. Being additionally linked to and involved in the European Clusters Excellence Initiative (ECEI) from 2009 to 2012, ESCA experts contributed to the development of various tools that support cluster managers on their way to excellence.

For further information regarding the methodology and this benchmarking report, ESCA shall be contacted directly.

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The authors thank all colleagues at VDI/VDE-IT who have been involved in the design, implementation and documentation of the benchmarking exercise as well as the many benchmarking experts performing the benchmarking interviews all over Europe.

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1. Introduction

The methodology used for the benchmarking of cluster organisations was introduced by VDI/VDE Innovation + Technik GmbH (VDI/VDE-IT) in 2008 and since then it has been further developed in the context of several national and international projects:

- "Kompetenznetze Deutschland Initiative", supported by the German Federal Ministry of Economic Affairs and Energy (2007-2012)
- "European Cluster Excellence Initiative", co-financed by the European Commission, DG GROWTH (2009-2012)
- "Cluster Excellence in the Nordic Countries, Germany and Poland", supported by the Danish Agency for Science, Technology and Innovation and Ministry the German Federal Ministry of Economic Affairs and Energy (2010-2011)
- "go-cluster", supported by the German Federal Ministry of Economic Affairs and Energy (since 2012)

Since the end of 2011, VDI/VDE-IT has merged all its activities related to benchmarking, analysing and advising cluster organisations and cluster policy stakeholders under the brand "ESCA – European Secretariat for Cluster Analysis". Consequently, ESCA, with its internal experts and a broad international network of specifically trained experts throughout and even beyond Europe, provides cluster management organisations, policy makers and program agencies with cluster related analysis and advice as a one-stop shop.

By taking part in an ESCA benchmarking, the cluster organisation is awarded with the "Cluster Management Excellence Label BRONZE – Striving for Cluster Excellence". Further stages of cluster management excellence can be reached and are awarded with the "Cluster Management Excellence Label SILVER – Dedicated to Cluster Excellence" and the "Cluster Management Excellence Label GOLD - Proven for Cluster Excellence" (see Chapter 6.3).

The activities and labels of ESCA are well recognised by cluster organisations and cluster policy stakeholders worldwide. In many cluster support programmes, related activities for improving cluster management and aiming to be awarded with the respective label are implemented. The European Commission (DG GROWTH) acknowledges these approaches as well. An overview regarding the current stage of cluster organisations having participated in a benchmarking is presented in Table 1.

This report presents the results of the cluster benchmarking analysis of Medicine Estonia. It is based on an interview with Kersti Kraas which was conducted on May 30th, 2017 by Mateja Dermastia from Anteja ECG d.o.o.

The benchmarking was conducted in May/June 2017 as part of a project of Enterprise Estonia **"Benchmarking for clusters supported by Enterprise Estonia based on the European Secretariat for Cluster Analysis (ESCA) methodology"**. The project is funded by the European Union European Regional Development Fund.

The report presents the findings of this interview and gives the cluster organisation the opportunity to compare with a technological / industrial and an excellence portfolio consisting of 60 clusters selected within the ESCA reference portfolio. Furthermore, a comparison to all cluster organisations from Estonia is drawn. The report also provides general recommendations for the benchmarked cluster organisation on how to improve its performance.

In the context of the project of Enterprise Estonia, each benchmarking report is complemented with additional individual development suggestions as well as an indicative action plan

based on the benchmarking results in order to give further more individual assistance.

Collected data and this benchmarking report are treated with absolute confidentiality. It will only be made available to Enterprise Estonia and the interviewed cluster manager. Any other distribution by ESCA is not foreseen, unless the cluster organisation has agreed beforehand in written manner. The cluster management organisation has the right to publish the report or parts of it.

	Aviation and space	Biotechnology	Construction/building sector	Creative industries, media, design	Energy and environment	Food industry (non-biotech)	Health and medical science	Information and communication	Maritime technologies, water resources	Micro, nano and optical technologies	New Materials and chemistry	Production and engineering	Sports/Leisure/Tourism	Textile industries	Transportation and mobility	TOTAL
AUS	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
AUT	0	1	1	0	2	0	0	1	0	0	1	2	0	0	1	9
BEL	1	0	3	2	1	2	2	3	0	1	2	1	0	0	1	19
BGD	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	3
BGR	0	0	0	0	1	0	0	2	1	1	0	3	0	1	1	10
CAN	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
CHE	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	3
COL	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
CZE	0	0	2	0	3	0	1	3	0	1	1	5	1	1	1	19
DNK	2	1	3	11	13	5	8	5	4	0	2	7	2	0	3	66
ESP	4	5	5	9	12	14	5	12	6	1	3	12	5	5	11	109
EST	0	0	2	0	0	0	3	2	0	0	0	5	0	0	0	12
FIN	0	0	0	3	6	2	0	1	0	1	2	1	1	0	0	17
FRA	4	1	1	7	12	10	8	8	4	5	8	6	8	3	5	90
GBR	0	0	0	3	1	0	0	0	0	0	0	1	0	1	1	7
GER	7	12	4	10	22	7	13	18	1	23	11	22	2	2	17	171
GRC	1	0	0	1	0	0	1	0	0	1	0	1	0	0	0	5
HRV	0	0	0	1	0	3	0	2	0	0	0	8	1	0	1	16
HUN	0	2	2	0	6	1	1	7	0	0	0	5	1	0	1	26
IND	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
IRL	0	0	0	1	1	1	0	2	1	0	0	0	2	0	0	8
ISL	0	0	0	1	2	1	0	1	1	0	0	1	3	0	0	10
ITA	3	1	2	1	5	7	6	3	1	0	3	3	3	2	2	42
LBN	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
LTU	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
LVA	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	3
MAR	0	0	1	0	1	2	0	1	1	1	0	1	0	1	0	9
MEX	2	0	0	4	1	4	3	15	0	0	0	1	0	0	5	35
MLT	1	0	0	1	0	0	0	0	0	0	0	0	2	0	0	4
MNE	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
NLD	0	1	0	0	2	2	0	0	1	0	0	0	2	0	0	8
NOR	0	3	1	6	1	5	3	2	9	2	1	7	5	0	1	46
POL	2	3	5	5	7	2	5	8	0	1	2	5	1	1	2	49
PRT	1	0	2	1	2	4	1	2	1	0	0	3	1	1	1	20
ROU	0	2	2	1	3	4	5	8	0	2	0	8	5	3	3	46
RUS	2	0	0	0	1	0	1	0	0	1	0	2	0	0	0	7
SRB	0	1	0	0	1	0	0	2	0	0	0	2	0	0	0	6
SVK	0	0	0	0	1	0	0	4	0	0	1	3	4	0	1	14
SVN	0	1	0	0	1	0	0	1	0	0	1	3	0	0	1	8
SWE	0	2	0	1	1	2	1	5	1	1	2	2	0	1	0	19
TUN	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2
TUR	2	0	0	0	1	3	1	0	0	0	3	13	0	4	3	30
USA	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
TOTAL	32	36	37	70	114	83	70	120	32	43	43	136	49	29	64	958

Table 1: Number of clusters per country and specific technology area benchmarked by the European Secretariat for Cluster Analysis (ESCA) since October 2010

2. Cluster Excellence and the Cluster Management Benchmarking Approach

2.1 Cluster Excellence

For the purpose of this benchmarking activity, clusters are considered as networks of companies and research/education institutions (including universities, schools, private research and development organisations, etc.) that have a thematic focus, are regionally concentrated, institutionally organised and managed by a cluster manager or a cluster management team (the so-called cluster organisation). The cluster may also include other actors such as public agencies.

The cluster organisation is a management agency that coordinates the activities of the participants within the cluster. The cluster organisation is mandated by the cluster participants to represent the cluster, both internally and externally, and to develop and implement activities that support the development of the cluster and generate added value for each of the participants.

Many countries have developed cluster policies and programmes to enhance the impact of research and innovation. Clusters provide governments with a strategic opportunity to address social and economic challenges through business development and innovation support programmes. Cluster management excellence is considered as one of the most promising approaches to increase the contribution of clusters to sustainable economic development.

In this context, the European Commission and cluster policy makers in various countries encourage cluster organisations to take part in the ESCA benchmarking in order to promote cluster management excellence and mutual learning by comparing cluster organisations in Europe and even beyond. The benchmarking directly addresses managers and staff of the cluster organisations. Benefits for them are new insights and findings presented in this report, which can promote cluster management excellence and the quality of cluster services for participating enterprises and further stakeholders.

2.2 The Cluster Management Benchmarking Approach

Clusters are subject to permanent development. Therefore, cluster organisations require information on performance and competitiveness as an input for strategic decision making.

Benchmarking can support this process as it offers the opportunity for active learning through a comparison with other clusters. By relying on qualitative and quantitative indicators and by comparing cluster-specific results among peers (e. g. clusters from the same country and/or the same technology area / industrial sector), benchmarking can be used to document success and to identify opportunities for improvement. The findings are of interest to the cluster participants as well as to the cluster organisations.

The objective of the benchmarking exercise is not to rank or evaluate individual clusters but to provide cluster organisations with a better understanding of how to improve the quality and effectiveness of their work. Thus, in all cases the individual results should always be interpreted

individually, taking the specific environment, the strategic objectives, and other individual characteristics of the cluster and the cluster organisation into consideration.

In order to discuss the results of the benchmarking exercise and to improve the quality of the cluster management organisations work, ESCA collaborates with more than 130 benchmarking experts from more than 30 countries who are always be able to consult the cluster management organisations in the specific country. All benchmarking experts were specifically trained by senior experts from ESCA and have been working with clusters and cluster organisations for many years. A current list of benchmarking experts is provided on www.cluster-analysis.org/esca-experts.

2.2.1 Indicators for Cluster Management Benchmarking

The benchmarking is focussed on the cluster organisation that is responsible for managing the cluster and its activities, and – to a certain extent - on the community of the cluster actors. Economic or other effects of the cluster on entire industrial sectors or the development of regional strengths cannot be reliably measured through benchmarking and are therefore not part of this analysis. The dimensions and indicators of the cluster benchmarking, which are analysed for this report, are presented in Figure 1.

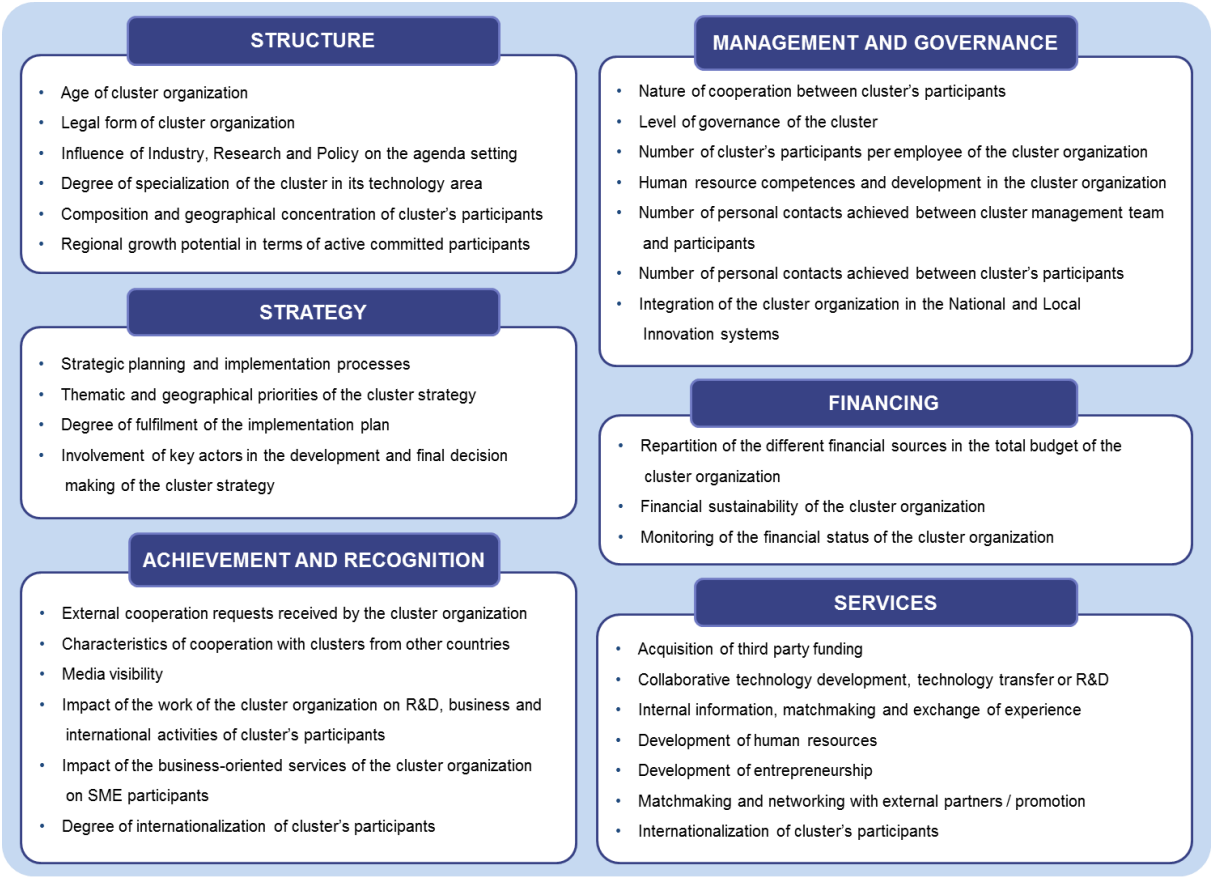


Figure 1: Dimensions and indicators used for Cluster Management Benchmarking

2.2.2 Comparative Portfolios

The comparative portfolios are permanently developing in time. After about two years, the ESCA benchmarking results are not considered as up-to-date anymore and are removed from the comparative portfolios. Therefore, the comparative portfolios used in this report result from data collected between June 2015 and today.

As the idea of benchmarking intends to compare with the "state of the art", only the cluster organisations reaching a minimum score of management excellence and mature cluster organisations are included within the **technological portfolio** (technology area). To do so, ESCA determines a composite "Excellence Score" for each cluster organisation. Chosen criteria of excellence according to the European Cluster Management Excellence Initiative (ECEI, see Chapter 1) as well as the spectrum and the intensity of the main services provided by the cluster organisation are used to determine this "Excellence Score". Very young cluster organisations having started their cluster activities less than around 2.5 years ago are not included in the technological portfolio since their characteristics differ from mature cluster organisations in many aspects.

On the contrary, the **national portfolio** includes all the interviewed cluster organisations within the country of origin, independent of their score of management excellence. In this case, it is interesting to compare with all clusters from the same country, in order to have a better overview over the own level of management excellence in the national, economic and political contexts.

The **excellence portfolio** uses the same "Excellence Score" as previously described. Only cluster organisations reaching a very high level of performance are included in the excellence portfolio.

These two or three distinct comparative portfolios are used in the benchmarking exercise:

- A national portfolio: the results of the interviewed cluster are compared with results from clusters of the same country. This is only possible if data of at least ten clusters from the country of origin of the interviewed cluster organisation is available (Table 2).
- A technological portfolio: the results of the interviewed cluster are compared with results from clusters that are active in the technology area selected by the cluster organisation (Table 3)[1].
- An excellence portfolio: the results of the interviewed cluster are compared with results from clusters of the excellence portfolio. This portfolio is technologically unspecified and gathers all the technology areas (Table 4).

[1] Cluster organisations which have classified themselves as being active in "Other technology area" were assigned to the best fitting technology area by ESCA during the data analysis.

	Aviation and space	Biotechnology	Construction/building sector	Creative industries, media, design	Energy and environment	Food industry (non-biotech)	Health and medical science	Information and communication	Maritime technologies, water resources	Micro, nano and optical technologies	New Materials and chemistry	Production and engineering	Sports/Leisure/Tourism	Textile industries	Transportation and mobility	TOTAL
AUS	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
AUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BEL	0	0	1	2	0	1	1	2	0	0	0	0	0	0	0	7
BGD	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	3
BGR	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	3
CAN	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
CHE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CZE	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
DNK	2	1	3	4	5	3	3	4	2	0	0	4	2	0	1	34
ESP	3	2	2	6	5	7	4	7	2	1	1	4	2	3	9	58
EST	0	0	2	0	0	0	3	2	0	0	0	5	0	0	0	12
FIN	0	0	0	2	3	0	0	0	0	0	0	1	0	0	0	6
FRA	1	0	0	0	1	0	3	3	1	0	1	1	1	0	2	14
GBR	0	0	0	1	1	0	0	0	0	0	0	1	0	1	1	5
GER	6	2	2	2	8	4	8	6	1	7	5	10	2	1	8	72
GRC	1	0	0	1	0	0	1	0	0	1	0	0	0	0	0	4
HRV	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	2
HUN	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
IND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IRL	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
ISL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ITA	1	0	0	0	0	0	1	1	1	0	1	0	1	1	0	7
LBN	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
LTU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LVA	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	3
MAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEX	2	0	0	3	1	4	2	6	0	0	0	1	0	0	4	23
MLT	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
MNE	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
NLD	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	4
NOR	0	2	1	3	0	3	1	0	1	0	0	4	1	0	0	16
POL	0	0	1	0	1	1	3	3	0	0	0	2	0	0	1	12
PRT	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	4
ROU	0	2	2	1	2	2	5	4	0	1	0	5	4	1	3	32
RUS	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	3
SRB	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
SVK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SVN	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
SWE	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2
TUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TUR	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	3
USA	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
TOTAL	18	11	14	28	33	29	37	45	9	11	9	45	13	10	31	343

Table 2: Number of clusters being used to compile the national portfolios (Oldest data from June 2015). Technological portfolio and country of origin of the interviewed cluster are highlighted.

	Aviation and space	Biotechnology	Construction/building sector	Creative industries, media, design	Energy and environment	Food industry (non-biotech)	Health and medical science	Information and communication	Maritime technologies, water resources	Micro, nano and optical technologies	New Materials and chemistry	Production and engineering	Sports/Leisure/Tourism	Textile industries	Transportation and mobility	TOTAL
AUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BEL	0	0	1	2	0	1	1	2	0	0	0	0	0	0	0	7
BGD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BGR	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	3
CAN	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
CHE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CZE	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
DNK	1	1	1	4	5	3	3	4	2	0	0	3	0	0	1	28
ESP	3	2	2	5	5	7	4	7	2	1	0	4	1	3	7	53
EST	0	0	2	0	0	0	3	2	0	0	0	5	0	0	0	12
FIN	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	3
FRA	1	0	0	0	1	0	3	3	1	0	1	1	1	0	2	14
GBR	0	0	0	1	1	0	0	0	0	0	0	1	0	1	0	4
GER	4	2	2	2	7	3	8	6	1	7	4	8	1	1	5	61
GRC	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	3
HRV	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
HUN	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
IND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IRL	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
ISL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ITA	1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	5
LBN	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
LTU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LVA	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	3
MAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEX	1	0	0	3	0	1	1	5	0	0	0	1	0	0	3	15
MLT	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
MNE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NLD	0	1	0	0	1	1	0	0	1	0	0	0	0	0	0	4
NOR	0	2	0	3	0	1	0	0	1	0	0	3	1	0	0	11
POL	0	0	1	0	0	1	3	3	0	0	0	2	0	0	1	11
PRT	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	4
ROU	0	1	0	1	1	0	3	4	0	0	0	5	0	0	2	17
RUS	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
SRB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SVK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SVN	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
SWE	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2
TUN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TUR	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
USA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	13	9	9	26	24	20	31	44	9	10	7	38	4	6	23	273

Table 3: Number of clusters being used to compile the technological portfolios (Oldest data from June 2015). Technological portfolio and country of origin of the interviewed cluster are highlighted.

	Aviation and space	Biotechnology	Construction/building sector	Creative industries, media, design	Energy and environment	Food industry (non-biotech)	Health and medical science	Information and communication	Maritime technologies, water resources	Micro, nano and optical technologies	New Materials and chemistry	Production and engineering	Sports/Leisure/Tourism	Textile industries	Transportation and mobility	TOTAL
TOTAL	3	1	1	4	7	6	6	6	3	2	4	5	2	1	9	60
PER CENT	17%	9%	7%	14%	21%	21%	16%	13%	33%	18%	44%	11%	15%	10%	29%	17%

Table 4: Number of clusters belonging to the excellence portfolio and repartition per specific technology area (Oldest data from June 2015). Technological portfolio of the interviewed cluster is highlighted.

2.2.3 Presentation of Benchmarking Results

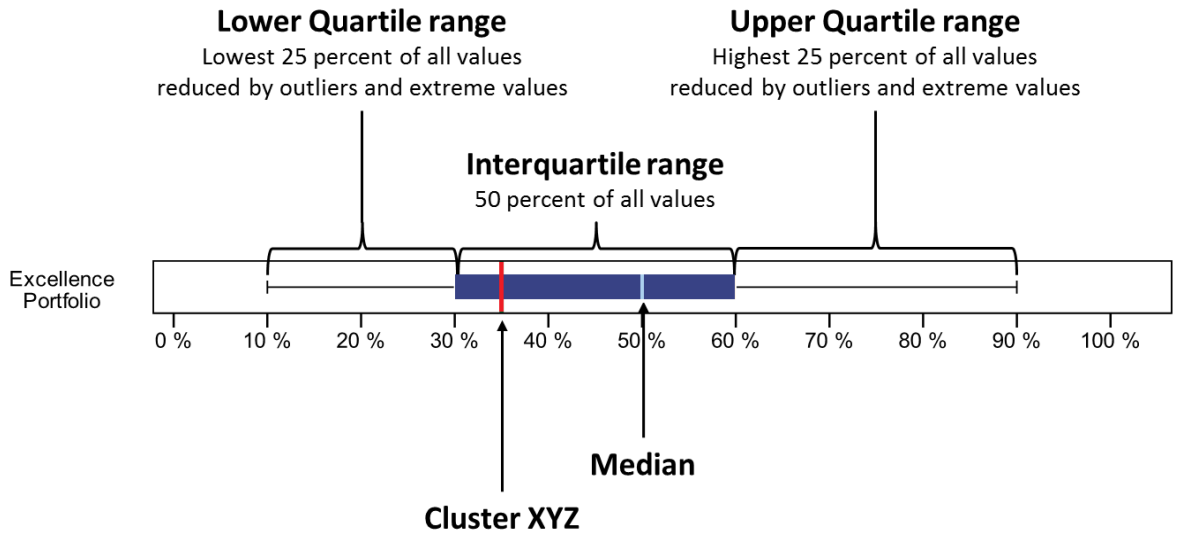
Boxplot

Boxplots display distributions of statistical data without making any assumptions about characteristics of this distribution. This means that the spacing between the different parts of the box helps to indicate the degree of spread and skewness in the data.

The box represents 50 % of the statistical population (the interquartile range), 25 % higher and 25 % lower than the median value, which is marked inside the box. The whiskers represent the lower quartile and the upper quartile of the data. For more homogeneity and representativeness of the results, only a reduced set is included in the lower and the higher quartile and not the full 25 % of the data. The ends of the whiskers are determined by the following model: the length of the whiskers is determined by the lowest and the highest value of the presented data AND shall not be larger than 1.5x the size of the interquartile range. This way, the whiskers include up to 25 % of the entire data, reduced by significant statistical outliers.

When applying the described methodology for drafting the box-plot chart, in general at least around 80-90 % of the cluster-related data can be considered to be inside the box or inside the range of the whiskers. Very special individual values are not considered.

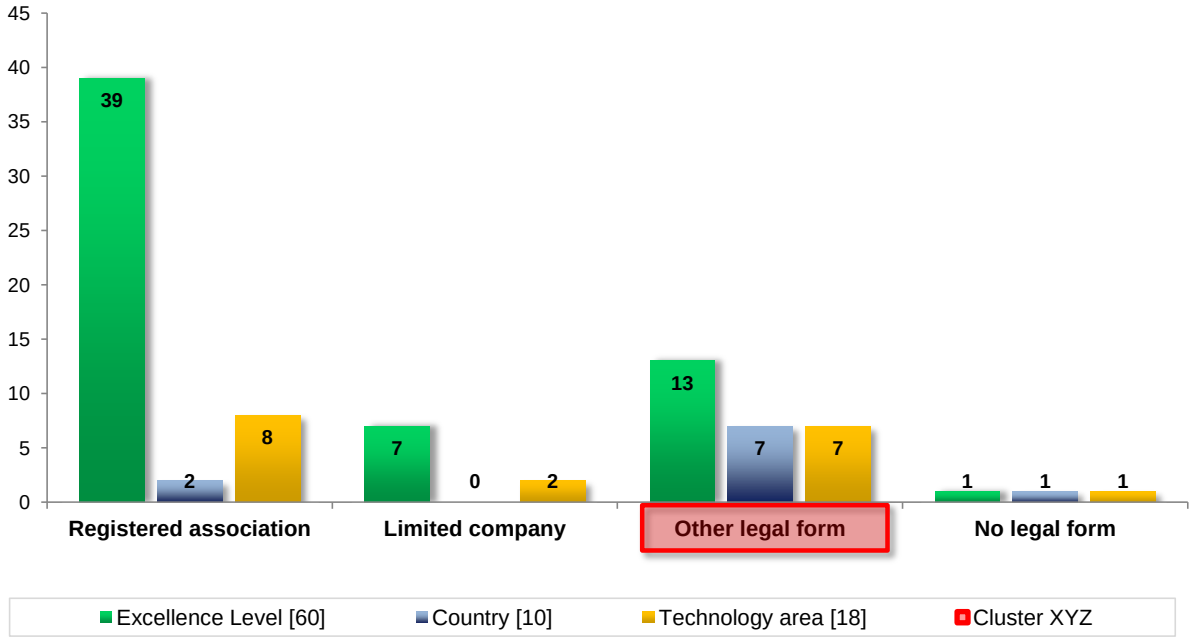
The red line represents the data of the individual benchmarked cluster. The figure does not feature a red line in case no data was assessed for the cluster.



Bar Chart

A bar graph is uses to show comparisons among categories.

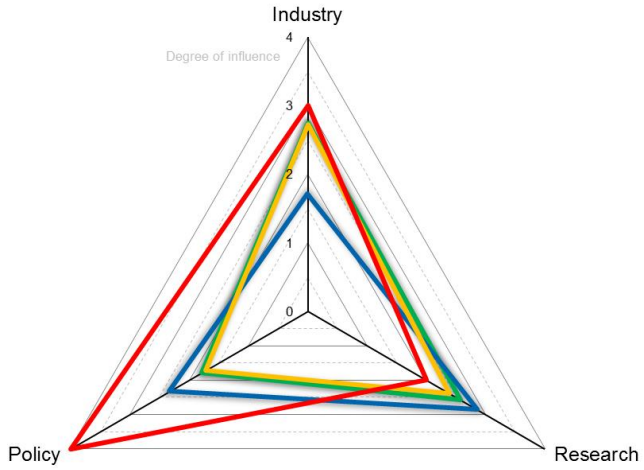
The answer of the benchmarked cluster is high-lighted by a red frame (Answer) in the horizontal axis. The figure does not feature a red frame if no data was assessed for the cluster. The results of the national portfolio (if existing) are indicated by a blue bar, the technical portfolio by a yellow bar and the excellence portfolio by a green bar.



Radar Chart

The radar chart is a graphical method of displaying multivariate data in the form of a two-dimensional chart of quantitative variables represented on axes starting from the same point.

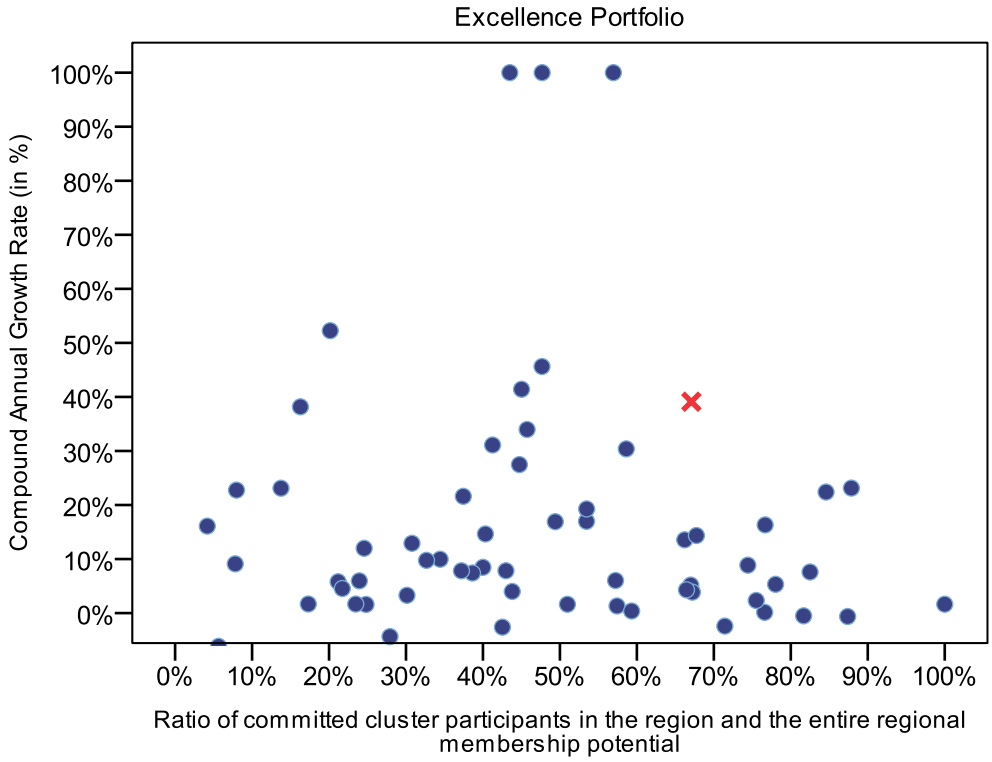
The data of the benchmarked cluster is indicated by a red line. The figure does not feature a red line if no data was assessed for the cluster. The results of the national portfolio (if existing) are indicated by a blue line, the technical portfolio by a yellow line and the excellence portfolio by a green line.



Scatter Plot

A scatter plot is a visual representation of bivariate data in a two dimensional coordinate system. The plotted points show the relationship between two variables and allow further statements about the correlation and estimated trend for the pair of values.

The position of the benchmarked cluster in the matrix is indicated by a red cross (x). In some cases, sufficient data could not be assessed during the interview. In these cases only the distribution of the comparative portfolios included in the data assessment is presented.



3. Benchmarking Results

3.1 Structure of the Cluster

3.1.1 Age of the Cluster Organisation

The maturity of a cluster organisation is often related to its age. As it takes time to successfully develop and implement activities for a cluster, it is supposed that a cluster organisation needs at least four years to yield satisfying results. The year in which the cluster management activities were initiated (not necessarily as a legally independent organisation) is positioned in the following graphs and compared to the different comparative portfolios. The age of the cluster as such may be older than the age of its management body.

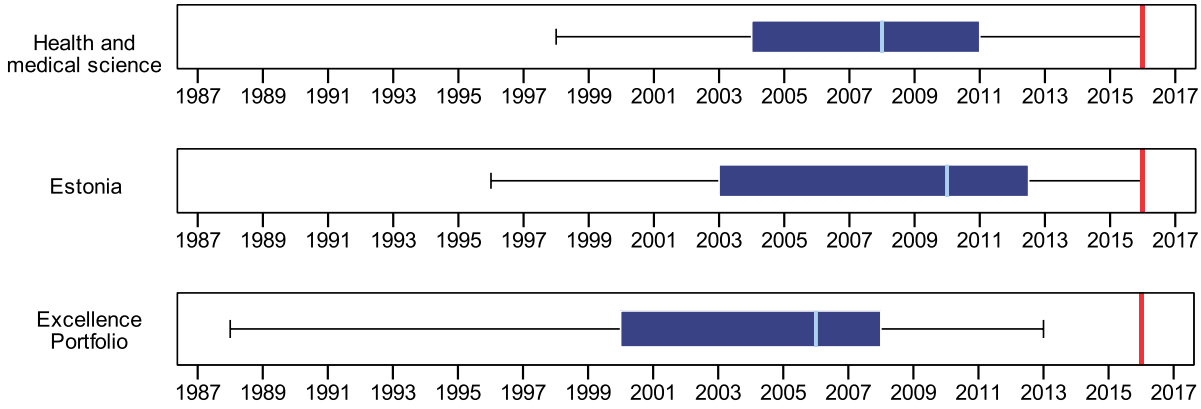


Figure 2: Year of establishment of cluster organisations

3.1.2 Legal Form of the Cluster Organisation

The main reasons for a cluster organisation to adopt a legal form are to reach:

- a higher commitment of its participants,
- shared risks,
- a higher exclusiveness of added value for the cluster participants
- easier access and/or eligibility to apply for public funds.

The most prevailing legal forms for cluster organisations are registered associations and limited liability companies.

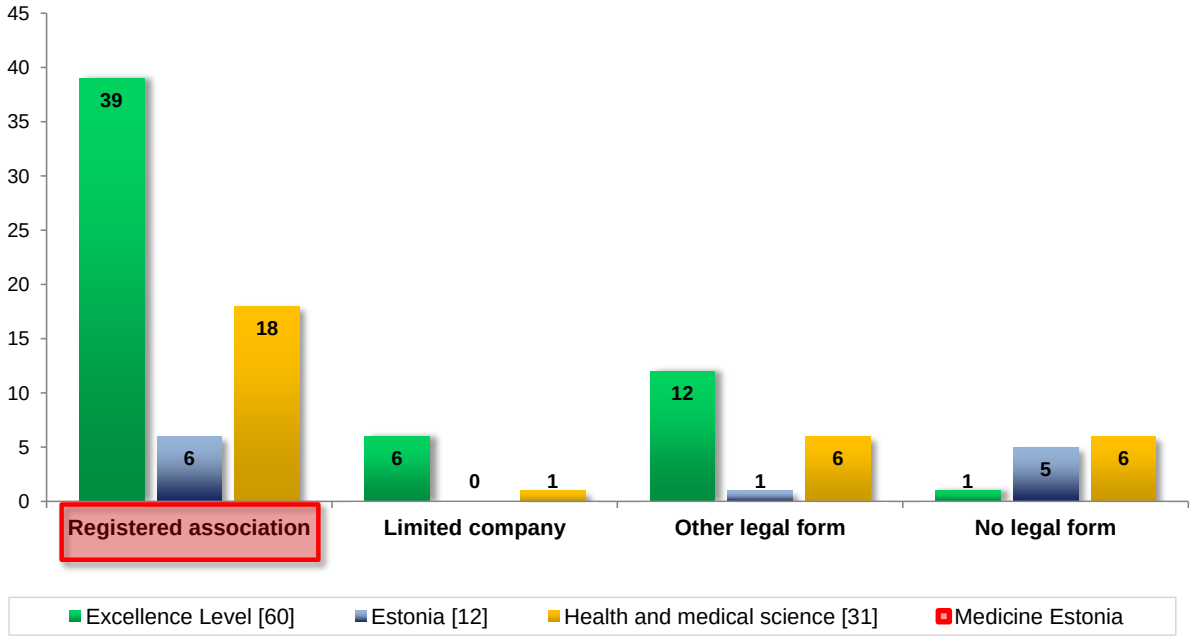


Figure 3: Legal form of cluster organisations within the comparative portfolios

3.1.3 Influence of Industry, Research and Policy on the Agenda Setting

In many cases, the cluster participants influence the agenda setting of the cluster as well as strategic priorities. The cluster manager was asked to indicate on a scale from 0 (no influence) to 4 (very strong influence) to which extent the cluster is driven by the industry, research and policy stakeholders for the agenda setting of the cluster.

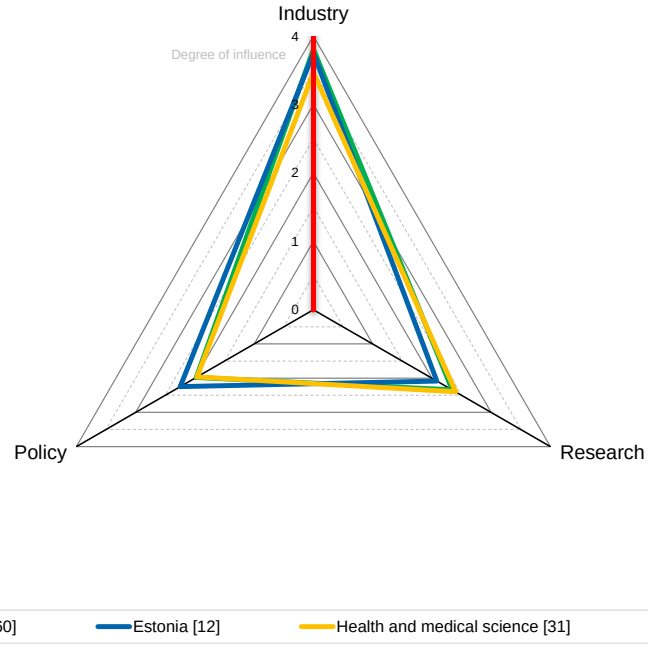


Figure 4: Influence of Industry, Research and Policy on the agenda setting of cluster organisations

3.1.4 Degree of Specialisation of the Cluster in its Technology Area

A cluster can be highly specialised in a specific industry field or can cover a broad range of different industries within the selected technology area. The degree of specialisation of the cluster within its selected specific technology area was assessed using a scale with a range:

- from (1) "The cluster is highly specialised in the selected specific industry field (technology area)";
- to (5) "The cluster covers a broad range of different industries within its selected technology area".

The following Bar Chart only presents the comparison of the assessed cluster to the peers from the same technology area.

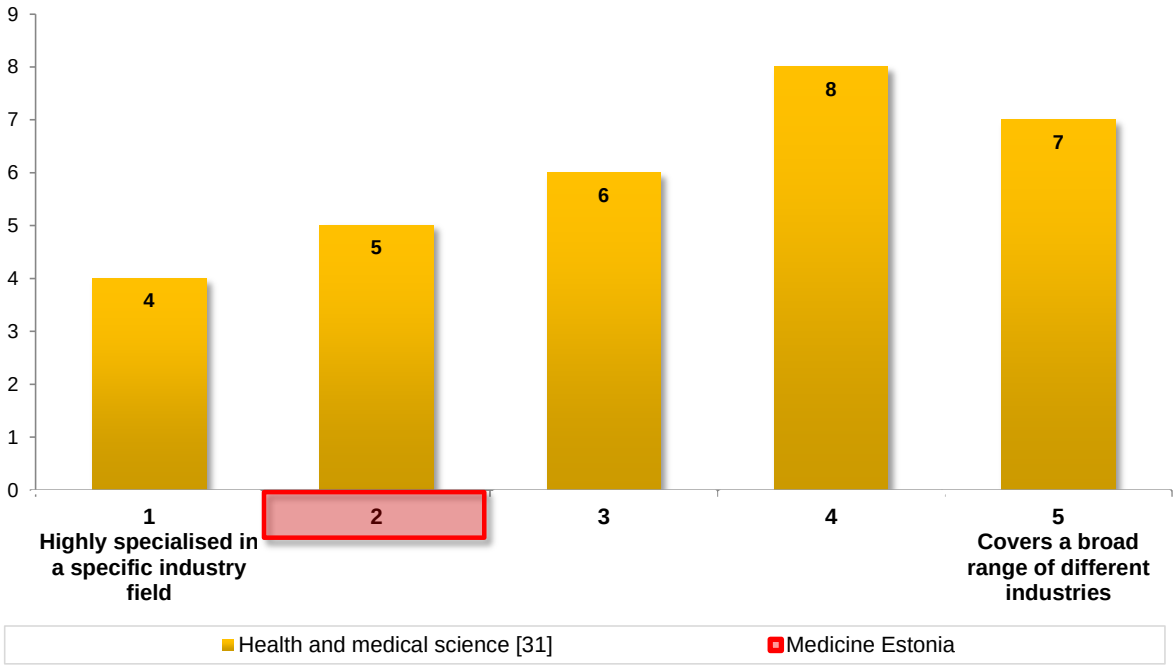


Figure 5: Degree of specialisation of clusters within the comparative portfolios

3.1.5 Composition of the Cluster Participants

The benchmark analysis mainly considers cluster participants in the sense of committed participants.

A cluster participant is committed if it actively contributes to the activities of the cluster, by e.g.

- paying membership fees or providing financial support for the cluster management on a regular basis (this may also include in-kind contributions or staff working time),
- signing of a declaration of accession (letter of intent, partnership agreement, or a similar form of written commitment) or
- regularly participating in cluster projects or working groups.

Commitment is not reflected by a registration for a newsletter or by a single participation in an event organised by the cluster organisation.

A non-committed cluster participant is a passive participant who shows interest in the cluster's activities going beyond the mere registration for a newsletter or similar (e.g. through [more or less] regular participation in events), but does not contribute actively to any of the cluster's

activities or does not provide any financial (or in-kind) support in any way.

The composition of the committed cluster participants is very important for successful work of and within a cluster. Bundling of different competences is one determinant for the facilitation of innovation and competitiveness of all cluster actors. If certain key actors and key competences are missing, this might have a negative impact on the innovation capability of the cluster.

The repartition of the committed participants is represented according to the following participants' categories:

- Figure 5: Total number of committed participants;
- Figure 6: Number of committed industrial participants;
- Figure 7: Number of committed SME[2] participants;
- Figure 8: Number of committed participants dedicated to R&D (universities[3] and R&D organisations);
- Figure 9: Number of committed participants dedicated to education and training (universities[3], schools and training providers);
- Figure 10: Number of committed participants that are governmental agencies.

[2] Based on the SME definition of the European Commission (Recommendation 2003/361/EC regarding the SME definition) a company is considered as SME if it has no more than 250 employees.

[3] Universities are counted twice, both in the category "R&D participants" and in the category "participants dedicated to education and training".

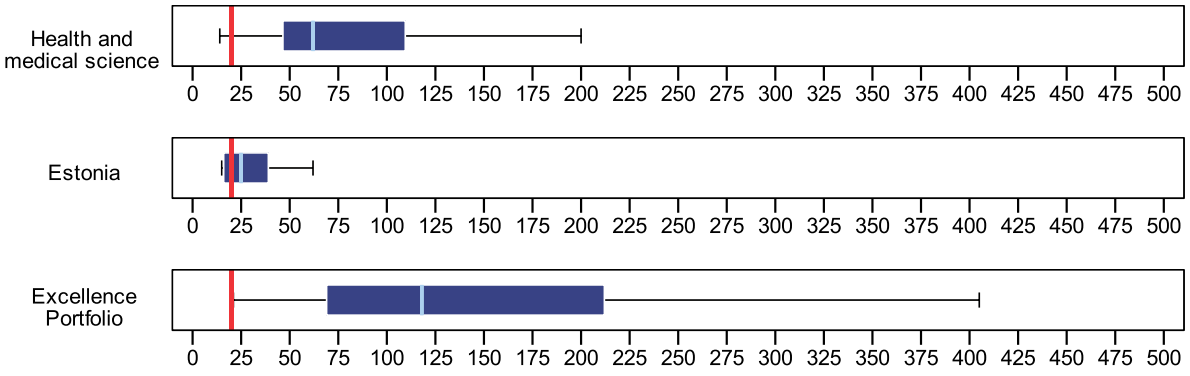


Figure 6: Total number of committed participants

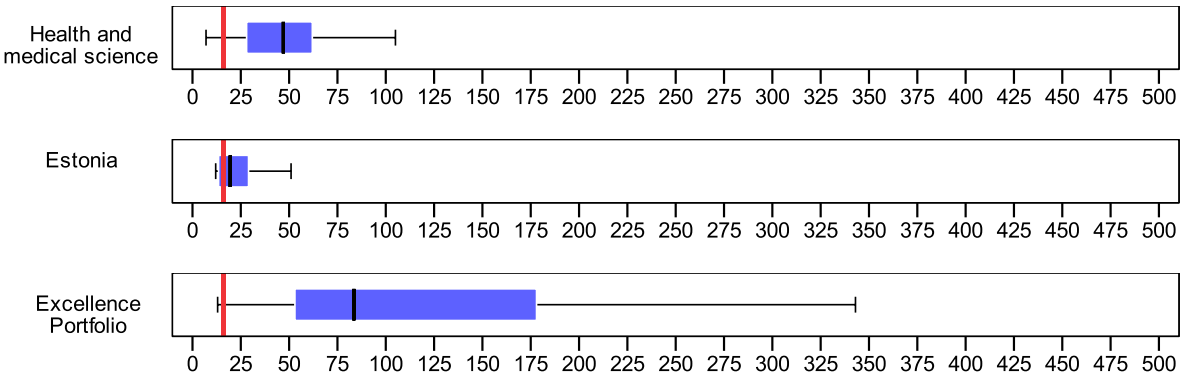


Figure 7: Number of committed industrial participants

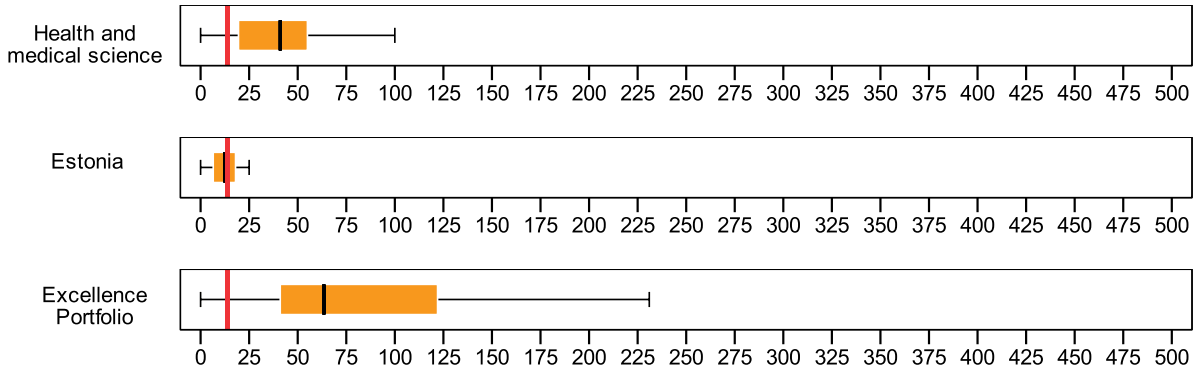


Figure 8: Number of committed SME participants

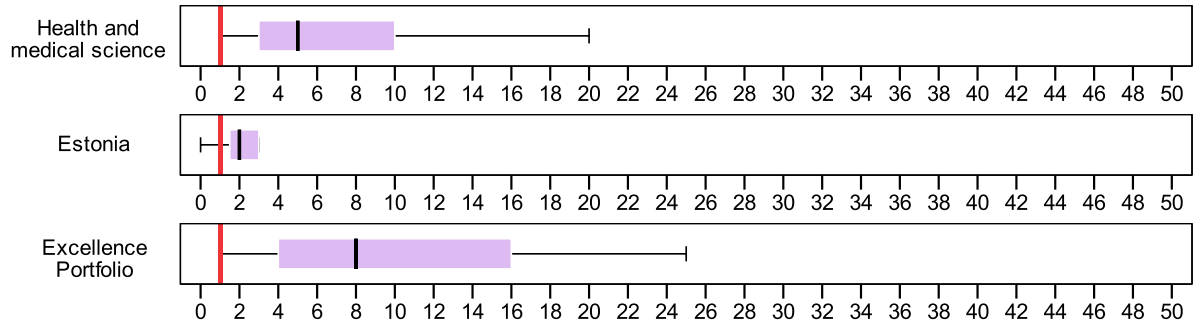


Figure 9 : Number of committed participants dedicated to R&D

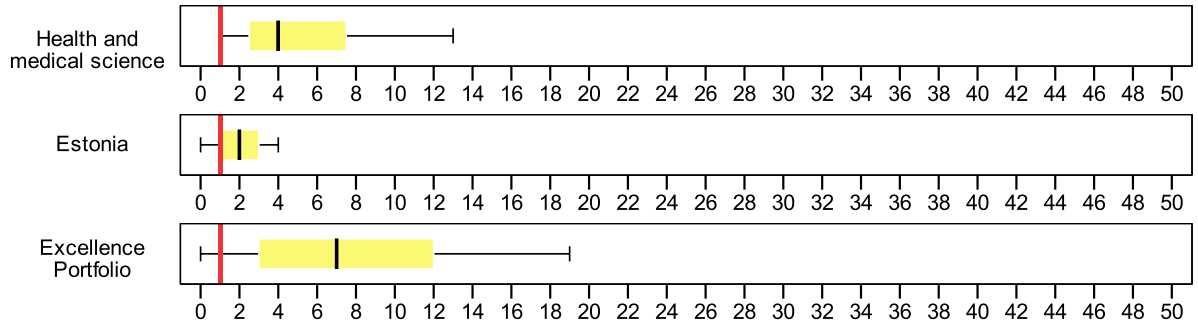


Figure 10: Number of committed participants dedicated to education or training

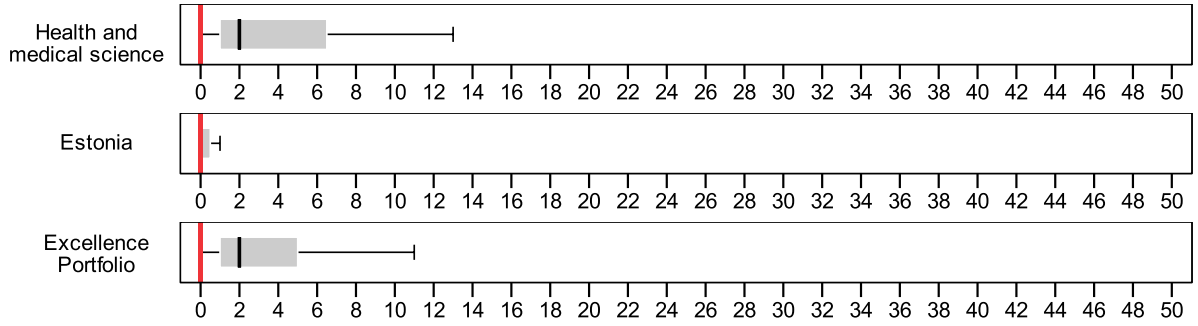


Figure 11: Number of committed participants that are governmental agencies

3.1.6 Geographical Concentration of the Cluster Participants

According to Michael E. Porter[4] "clusters are geographic concentrations of interconnected companies and institutions in a particular field". The issue of geographic concentration is considered here.

The following figure displays the percentage of the committed cluster participants located within a radius of 150 km from the premises of the cluster organisation and/or any regional offices (if existing).

The idea of geographical concentration is to encourage face-to-face meetings between the cluster management team and the committed participants, as well as between the cluster participants with limited effort of around two hours travel time (by car, train, etc.).

[4] Michael E. Porter, 1998: Clusters and the New Economics of Competition, in: Harvard Business Review, November 1998, p. 78

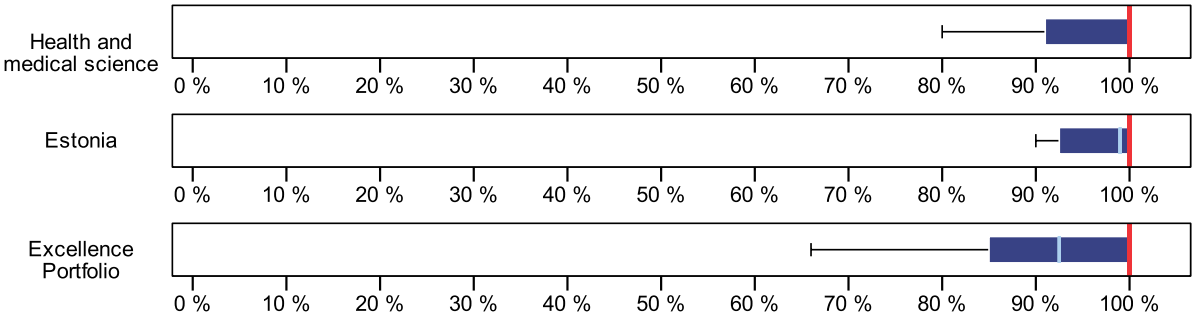


Figure 12: Percentage of committed cluster's participants that are located in a distance of < 150 km to the premises of cluster organisations and/or any regional offices

3.1.7 Regional Growth Potential of the Cluster

It is important that clusters achieve a critical mass with a high regional coverage in terms of committed membership. The focus on regional participants should yield benefits from regional proximity of appropriate partners.

Regional actors which could be targeted to become a committed participant and which would bring added value to the cluster when committing them as participants, as well as the committed and non-committed participants of the cluster, are all together defined as potential participants. The ratio of the number of committed cluster participants in the region (see chapter 3.1.6) and the number of potential participants in the region (%-value on the x-axis) is put in relation to the achieved annual growth of the regional membership of the cluster (growth in % on the y-axis).

Clusters that are located in **sector I** of the figure are characterised by a high potential for further growth with regard to the number of participants. For achieving a critical mass in the region - in terms of having a majority of potential cluster participants active within the cluster - further growth, with a higher rate than achieved in the past, is necessary. Reaching such a regional critical mass could be considered as a strategic task for the cluster management.

Clusters that are located in **sector II** of the figure are characterised by a reasonable regional coverage of their participants and/or by a signifi-

cant growth in the last 24 months. An increased growth of the committed cluster membership should not necessarily be considered as a strategic priority for the cluster management. For clusters that are younger than three years, this figure might not give a correct impression as the entire membership was built up recently with an extremely high growth rate, which of course cannot be expected to remain at the same level in the future.

Clusters that are located in **sector III** of the figure are characterised by a high regional coverage in terms of committed membership. Further growth in the region should not be considered as a strategic priority for the cluster management as “critical mass” has already been reached.

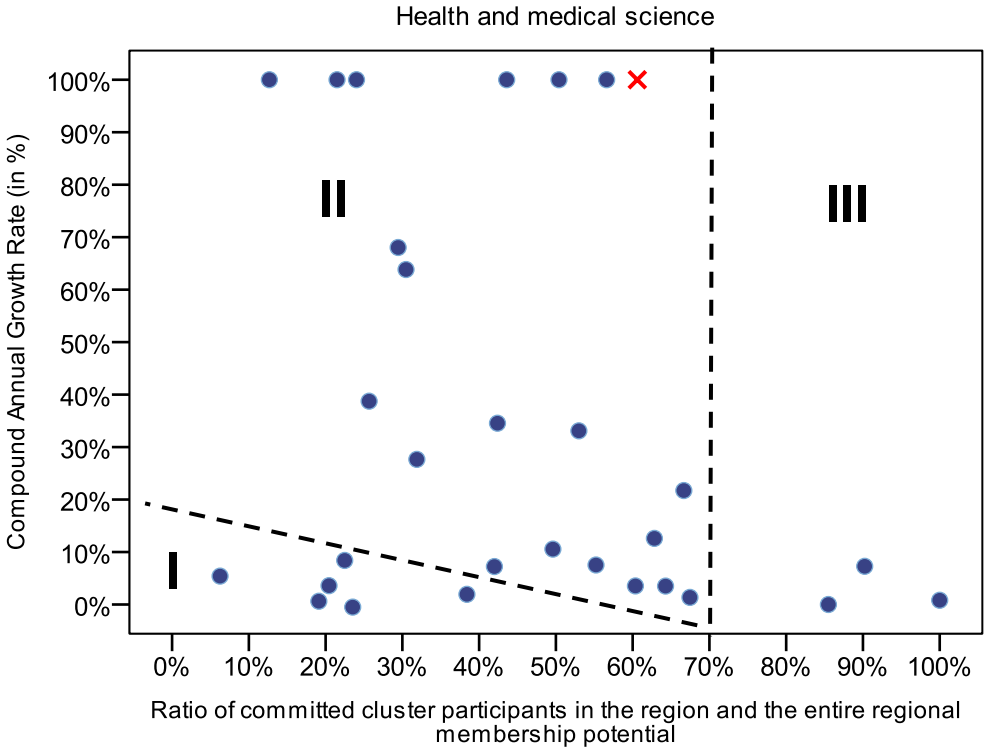


Figure 13: Regional growth potential of clusters within the technological portfolio

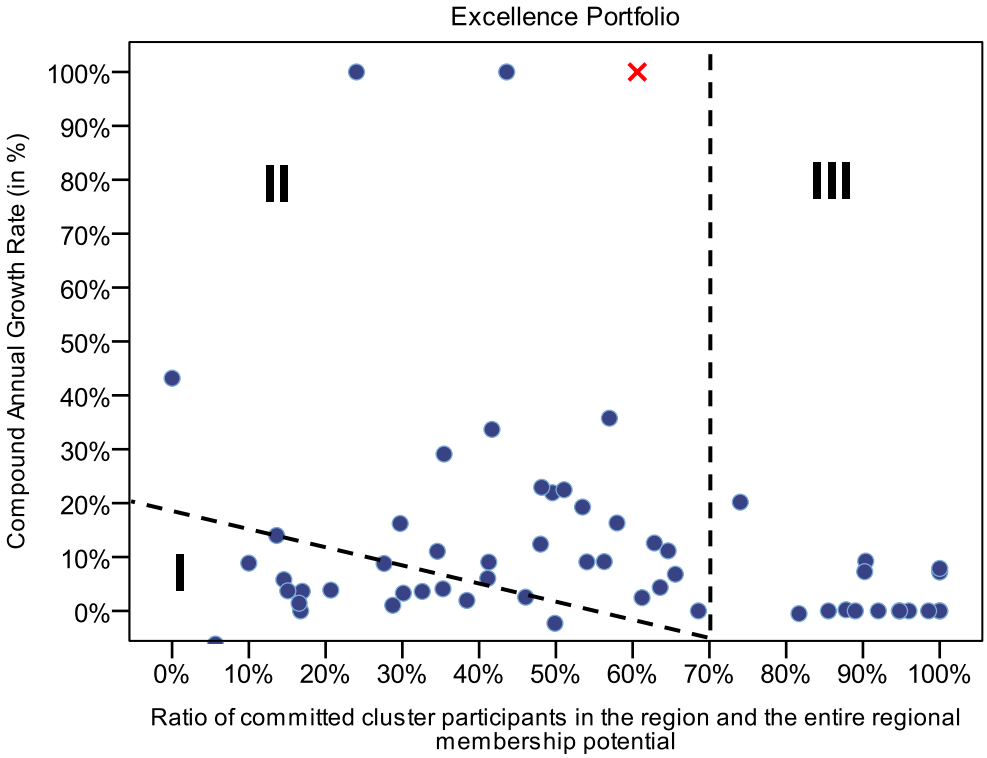


Figure 14: Regional growth potential of clusters within the excellence portfolio

3.2 Cluster Management and Governance

3.2.1 Nature of Cooperation between the Cluster Participants

The nature of cooperation between the committed cluster participants and the role of the cluster management can have different characteristics, which are described as follows:

- **Cluster management as external facilitator:** The cluster management acts rather as an external facilitator and is rather detached from networking activities between cluster participants. The core function of the cluster management within the network can be described as administration.
- **Decentralised cooperation:** Cooperation among the cluster participants can be characterised as decentralised. Cluster management has a significant influence, but it is not the main initiator of activities.
- **Centralised cooperation:** The cluster management is the hub of the cluster (considered as a star-shaped cooperative structure) and sets the agenda of the cluster activities. Cooperation between participants is primarily initiated by the cluster management.

The following figure indicates how the cluster managers understand their role.

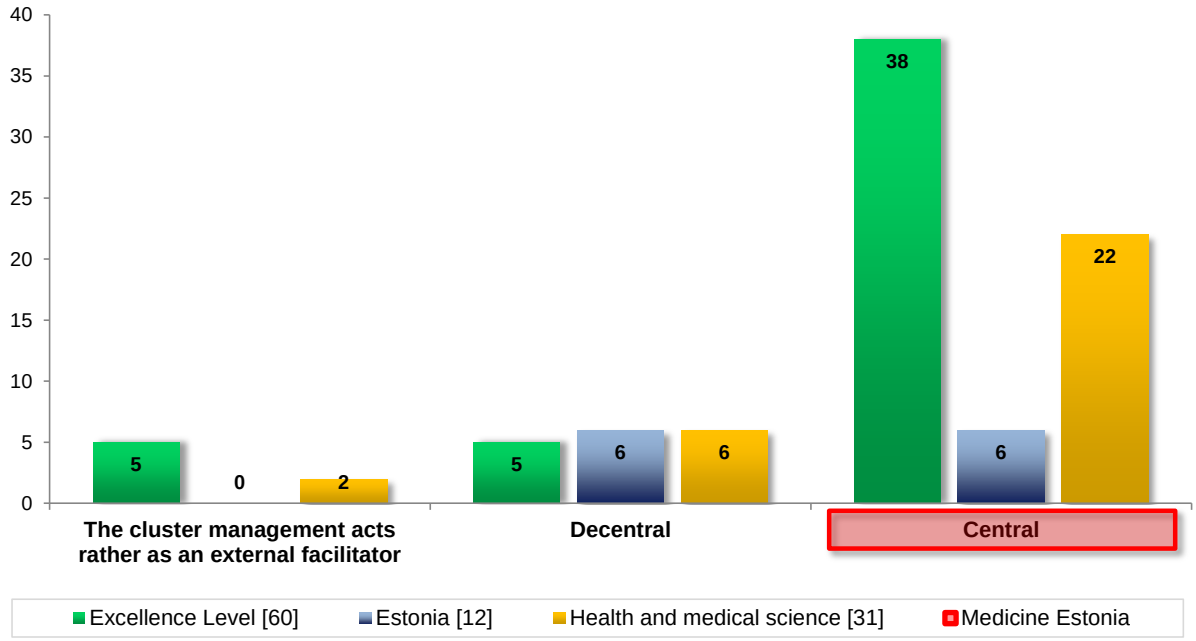


Figure 15: Nature of cooperation between cluster's participants within the comparative portfolios

3.2.2 Level of Governance of the Cluster

The existence of different stakeholders of cluster governance as well as their role in the decision making process for cluster strategy and cluster governance were assessed. In this respect, the three following elements of cluster governance were analysed:

- Clear definition of the tasks and responsibilities of the cluster manager, like team management, day-to-day business and strategic activities of the cluster, etc., are in place.
- A governing body such as a steering committee or advisory board exists and is responsible for making decisions and supporting the cluster management in implementing the action plan, survey and review of the progress of the cluster work as well as the work of the cluster management. Its responsibilities are understood by all participants and meetings take place on a regular basis.
- Participants of the cluster are involved in the decision making and strategic orientation of the cluster organisation, for example through general meetings or other forms of consultation.

For a successful networking all cluster actors have to understand and respect their tasks and responsibilities. In collaboration with relevant cluster participants, the cluster management must define dedicated governance structures and turn them into practice. The three elements described above were reflected in a composite indicator. Three levels were defined in order to identify whether there is a strong, moderate or weak system of cluster governance in place.

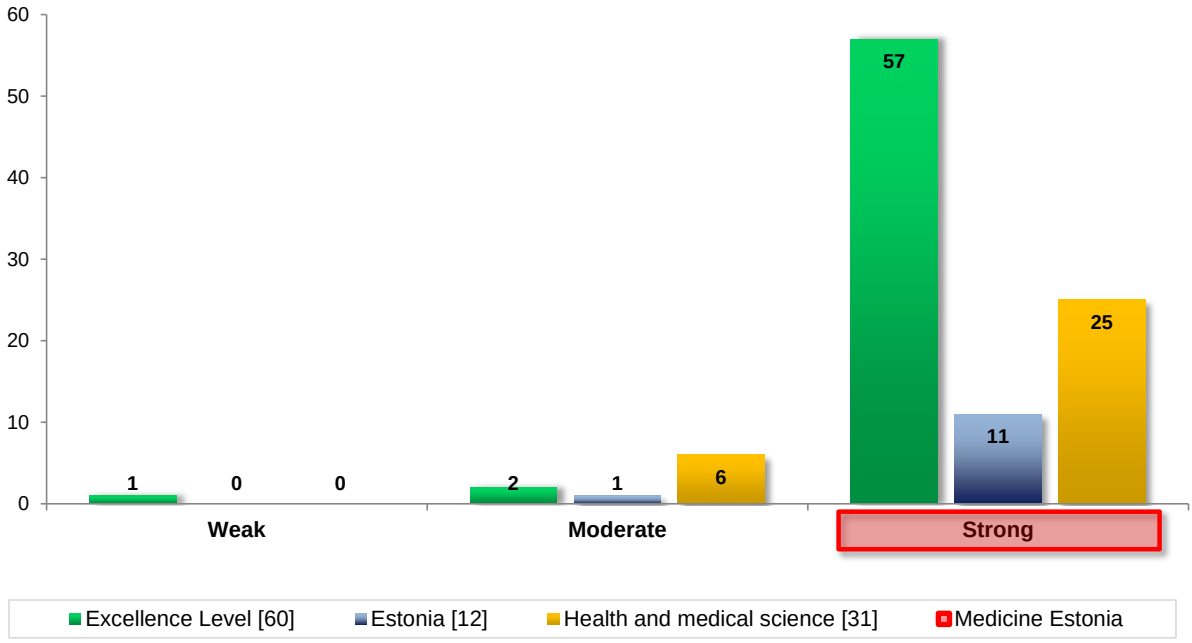


Figure 16: Level of governance of clusters within the comparative portfolios

3.2.3 Number of Employees in the Cluster Organisation (Full-time Equivalents)

The number of active employees in the cluster management team was expressed in full-time equivalents (FTE). The analysis of FTE provides a better understanding of the human resources that are effectively available for the cluster management in terms of working hours. Full-time equivalent employment (FTE) is the number of full-time equivalent jobs, defined as total hours worked divided by average annual hours worked in full-time jobs.

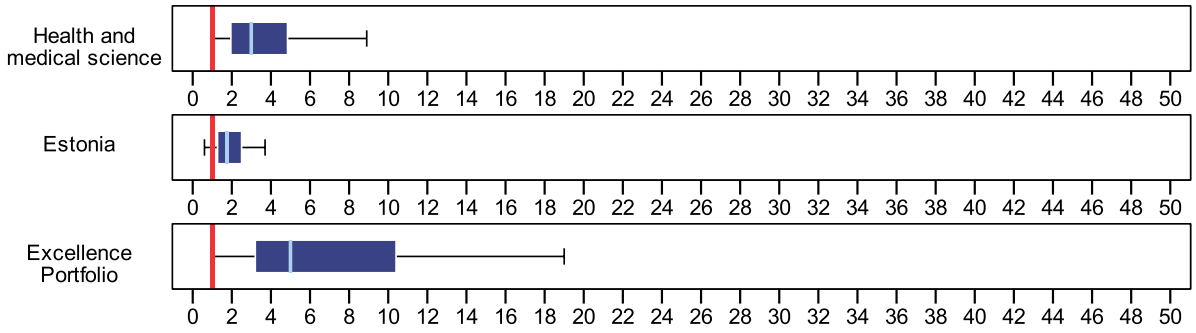


Figure 17: Number of employees (full-time equivalents) in the cluster management team

A more relevant factor for assessing whether the quantity of human resources of the cluster management is sufficient is the ratio of the number of cluster participants and the FTE in the cluster management staff. This indicator gives the numerical value of the number of cluster participants which one FTE of the cluster management has to serve. Higher capacities of the cluster organisation are expected to allow the development and provision of more tailor-made and demand-oriented services or a better direct support for the cluster participants.

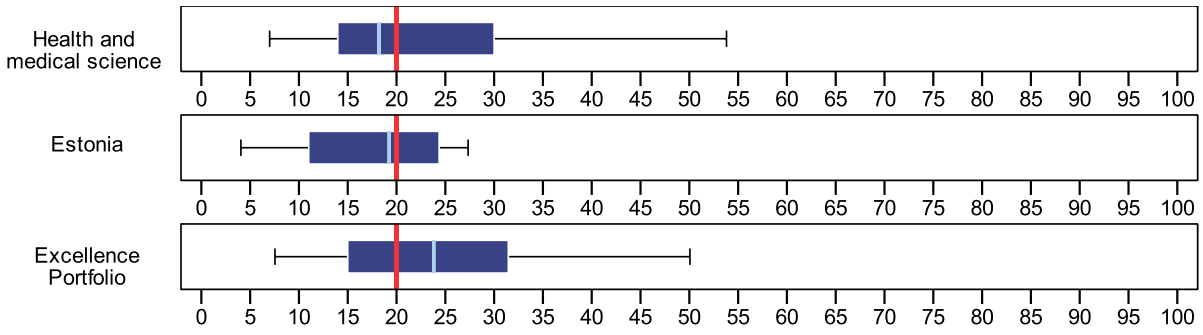


Figure 18: Number of cluster participants per employee (Full-time Equivalents) of the cluster management team

3.2.4 Human Resource Competences and Development

In order to assess the status of human resource development of the cluster organisation's staff, the benchmarking analysed the following topics:

- Lifelong training programmes and a sufficient budget for the human resource development of the cluster organisation staff are in place;
- Training measures for the cluster organisation staff are carried out on a regular basis;
- The cluster manager and/or the cluster organisation staff possess international work experience, foreign language skills and a professional international network;
- There is a continuity/fluctuation of the cluster manager and/or the cluster organisation staff.

The above described elements were reflected in a composite indicator. Three levels have been defined whether there is a high, moderate or low status of human resource development in place.

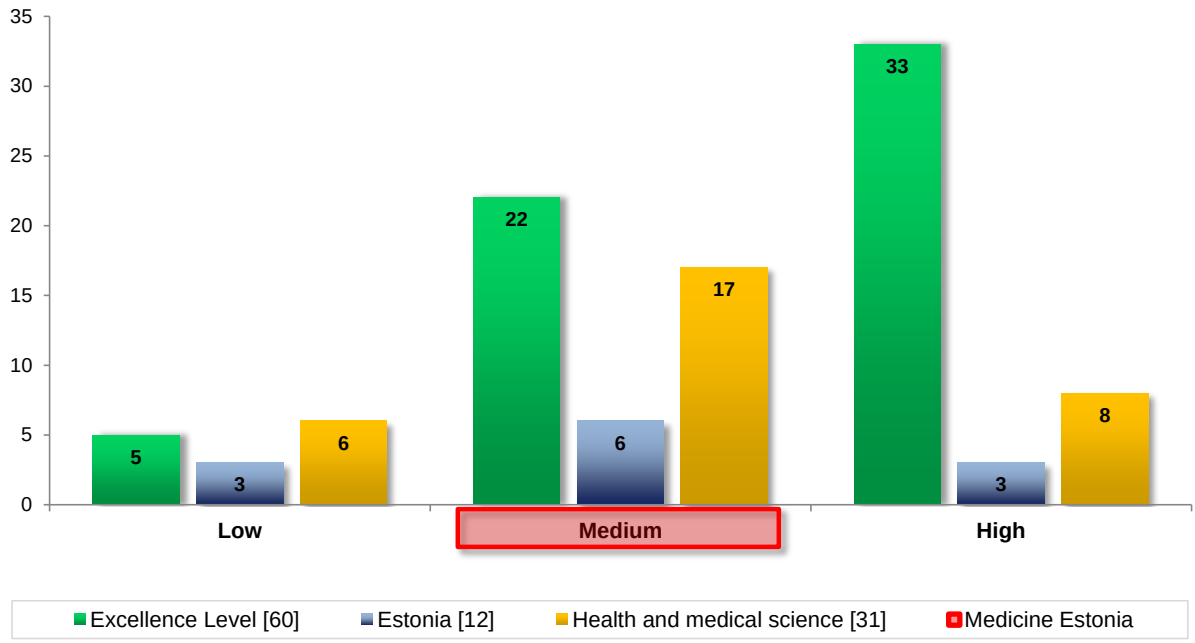


Figure 19: Status of human resource development of cluster organisations within the comparative portfolios

3.2.5 Number of Personal Contacts between the Cluster Management Team and the Cluster Participants

Regularly and well-maintained personal contacts between the cluster management team and the cluster participants are key elements for management excellence. It is a way for the cluster organisation to adapt its work better to the specific needs of its participants and offer tailor-made services. Eligible personal contacts are, for example,

- contacts during a visit at the cluster participant's premises or a visit of the participant at the cluster organisation's premises;
- an extensive bilateral exchange of information, for instance via telephone or mail;
- joint work of the cluster organisation management staff and the representatives of the cluster participants in specific projects, working groups, or other joint activities.

The share of committed cluster participants maintaining such contacts with the cluster organisation within the last twelve months is determined and compared in the following figure.

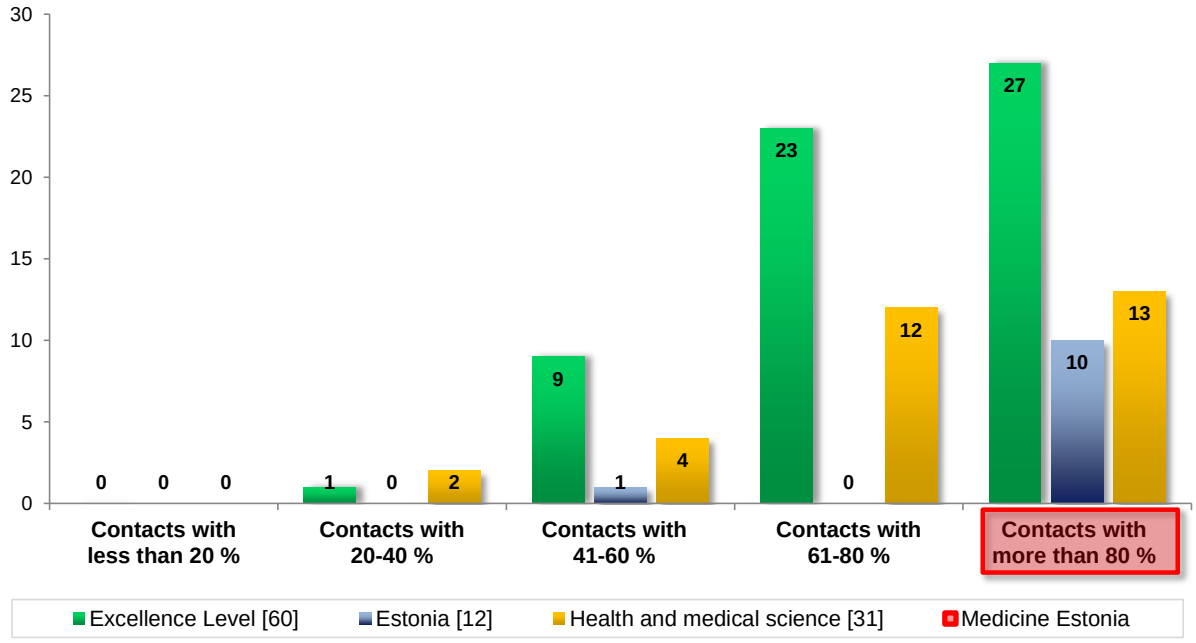


Figure 20: Number of personal contacts achieved between cluster management organisation and cluster participants within the comparative portfolios

3.2.6 Number of Personal Contacts between the Cluster Participants

The cluster structure and the various activities should enable and facilitate networking between the committed cluster participants. Cluster participants should be actively involved in collaborative multimember activities or collaborative projects in a significant manner. Participation in working groups, projects, delegation/trade visits, joint trade fair activities, active lecturing activities, etc. with a minimum involvement of two days per cluster participant are considered as eligible sufficient collaborative multimember activities. A simple passive attendance to one or even several events (seminar, workshop or get-together) is not considered as an involvement in a collaborative activity.

The share of committed cluster participants being involved in such collaborative activities within the last twelve months is determined and compared in the following figure.

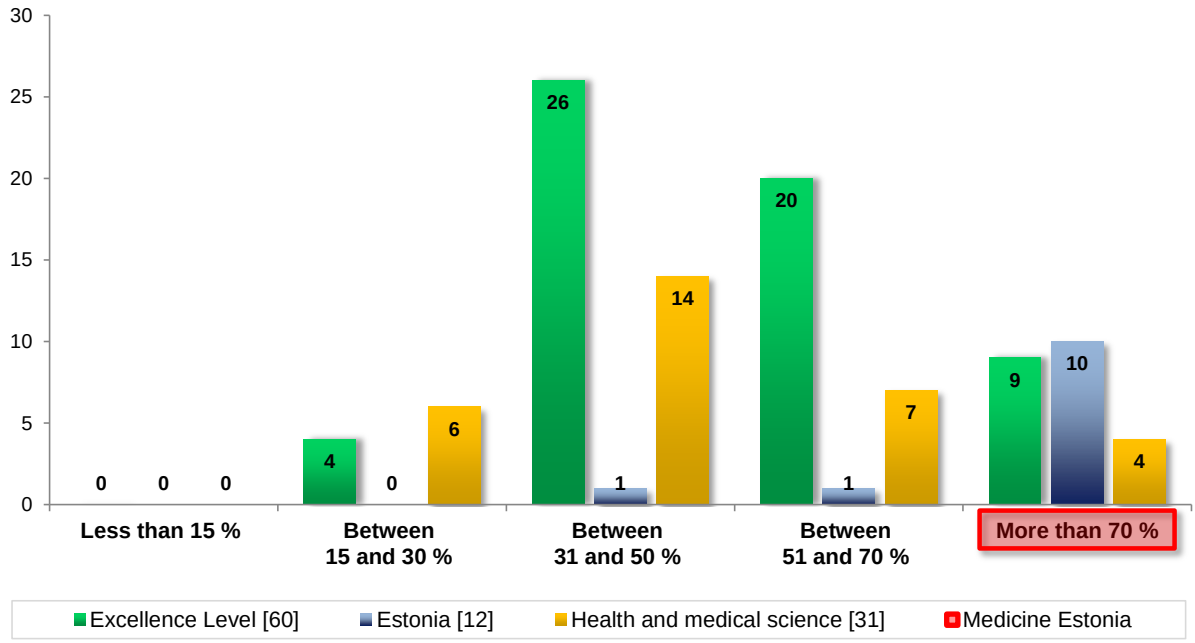


Figure 21: Number of personal contacts achieved between cluster participants within the comparative portfolios

3.3 Financing of the Cluster Organisation

The total budget of the cluster organisation includes the budget dedicated to management tasks or to activities performed by the cluster management organisation for cluster participants (staff and non-personnel expenses). It excludes the specific budget for R&D projects or any other projects conducted by the cluster participants alone, or conducted by the cluster organisation as a task not related to the actual cluster management.

The origin of the total budget of the cluster is split between the following categories: public funding, income generated from chargeable services, membership fees, as well as other private sources like private foundations or donations. In-kind contributions (non-cash contributions) are considered as private source income and are accordingly not represented in the following graphs.

Many cluster organisations were established with significant public support. As public support is mostly limited in time, it is crucial for a cluster management to tap other sources of financing. The substitution of public funding by private means over time can indicate good cluster management practises as products and services are sold to cluster participants or other parties.

In general, experience shows that a broad mix of various sources of income has proven to best for the sustainable existence and development of a cluster management organisation. Such a mix is the most resistant against failure of one of the financial sources.

3.3.1 Origins of Income of the Total Budget of the Cluster Organisation

The first figures below indicate the share of public funding of any type (including funding programmes, project funding limited in time, institutional funding and service contracts) in the total budget of the cluster management organisation related to the age of the cluster organisation and compared to the different comparative portfolios.

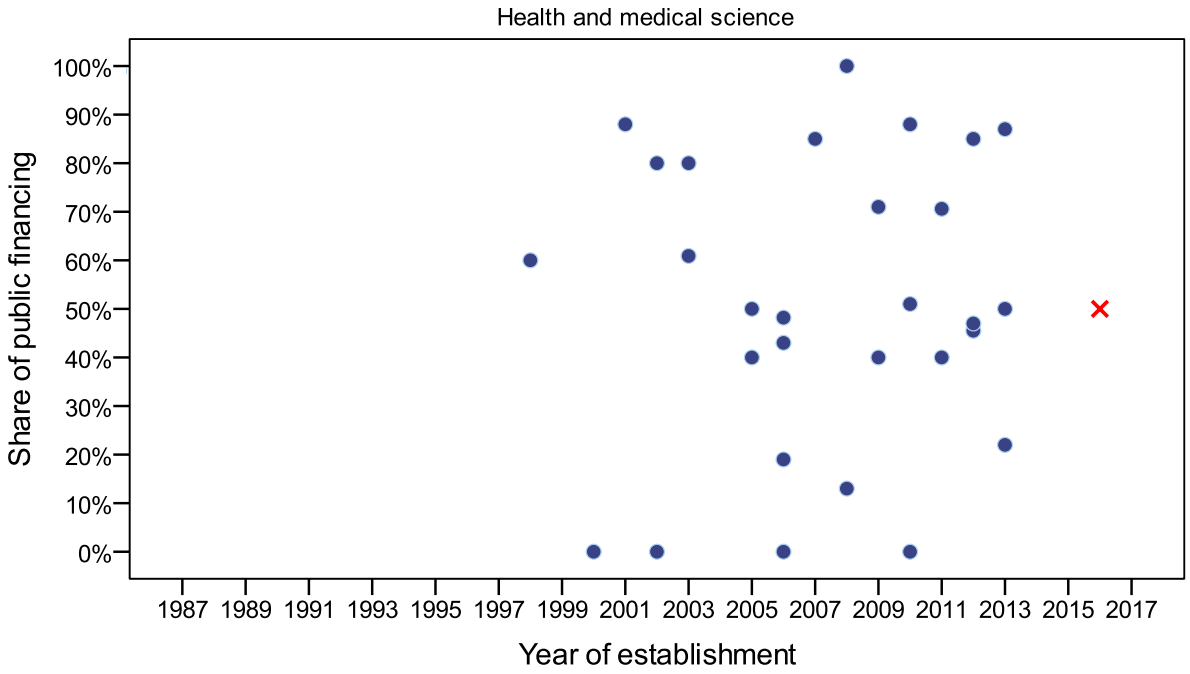


Figure 22a: Share of public funding in the total budget of cluster organisations in relation to the age of the cluster organisation within the technological portfolio

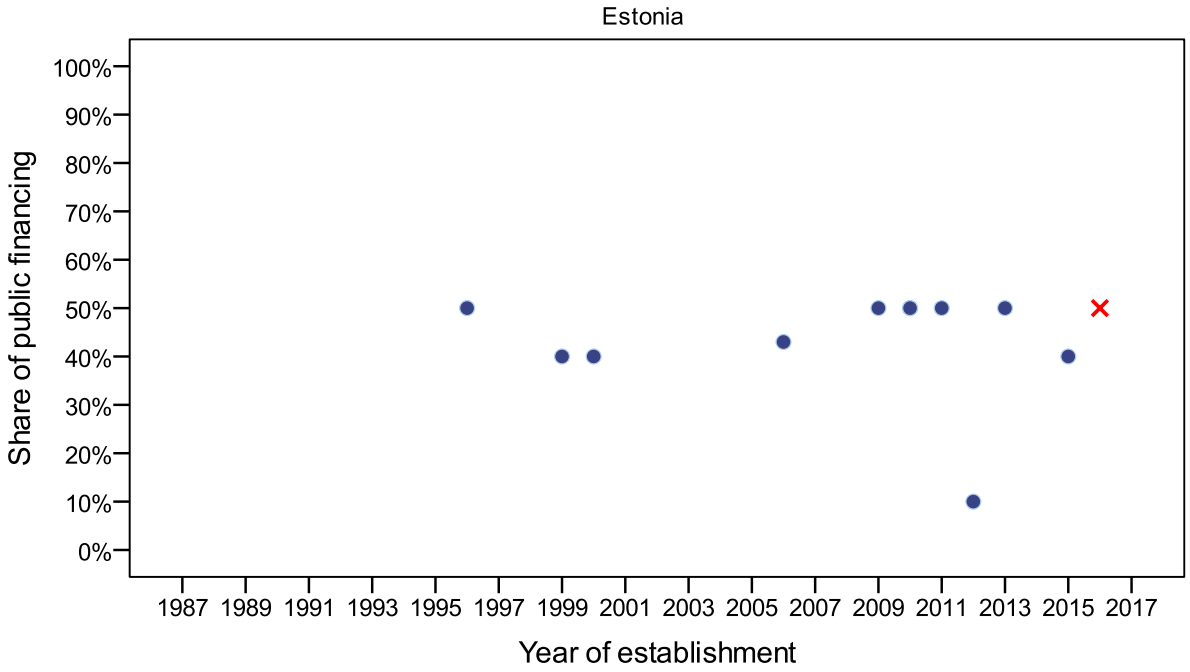


Figure 22b: Share of public funding in the total budget of the cluster organisation in relation to the age of the cluster organisation within the national portfolio

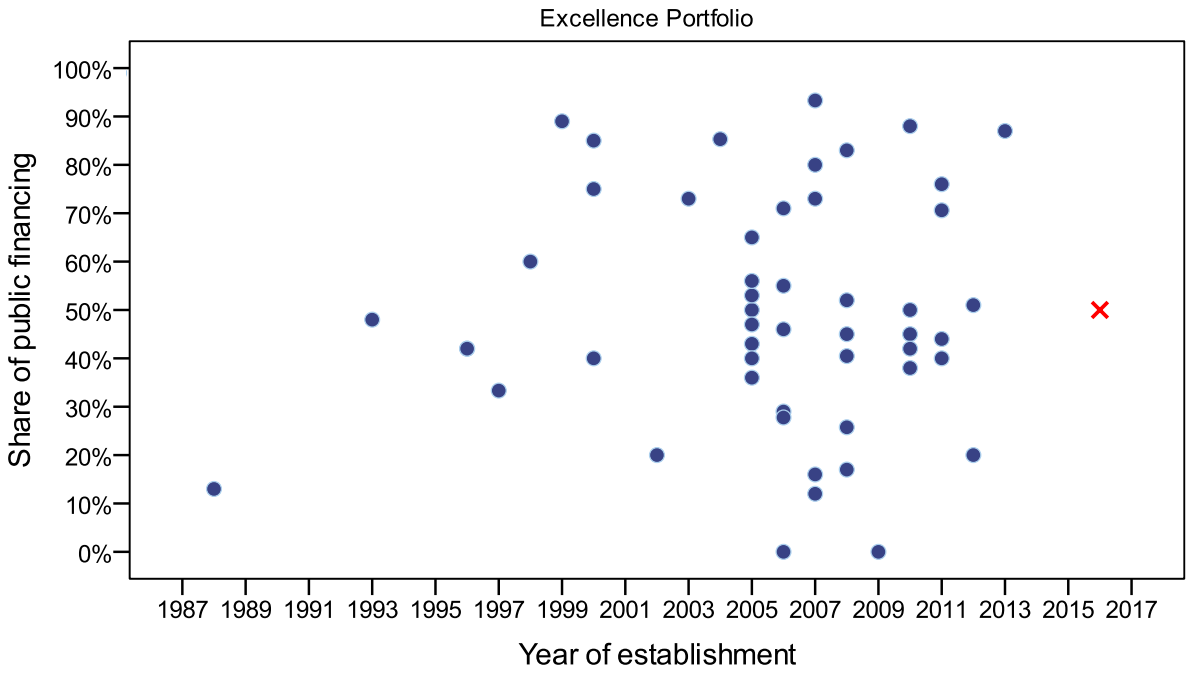


Figure 22c: Share of public funding in the total budget of the cluster organisation in relation to the age of the cluster organisation and compared to the excellence portfolio

The next figures below indicate the share of income generated from chargeable services (private and public contractors) in the total budget of the cluster management organisation related to the age of the cluster organisation and compared to the different comparative portfolios.

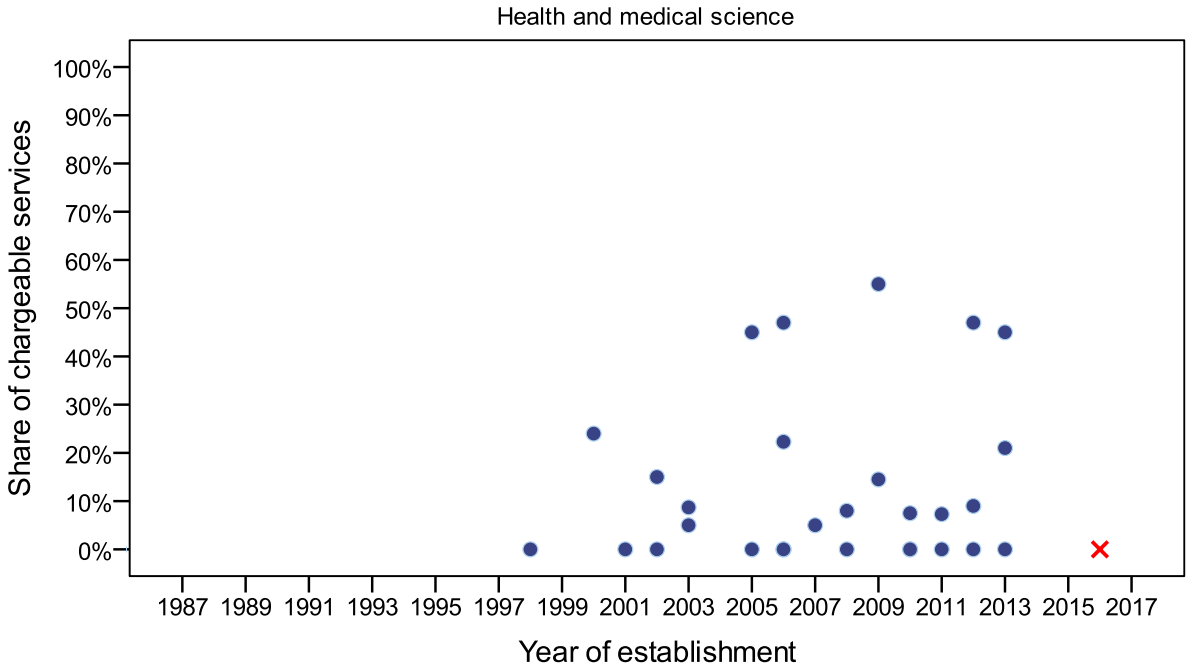


Figure 23a: Share of income generated from chargeable services in the total budget of cluster organisations in relation to the age of the cluster organisation within the technological portfolio

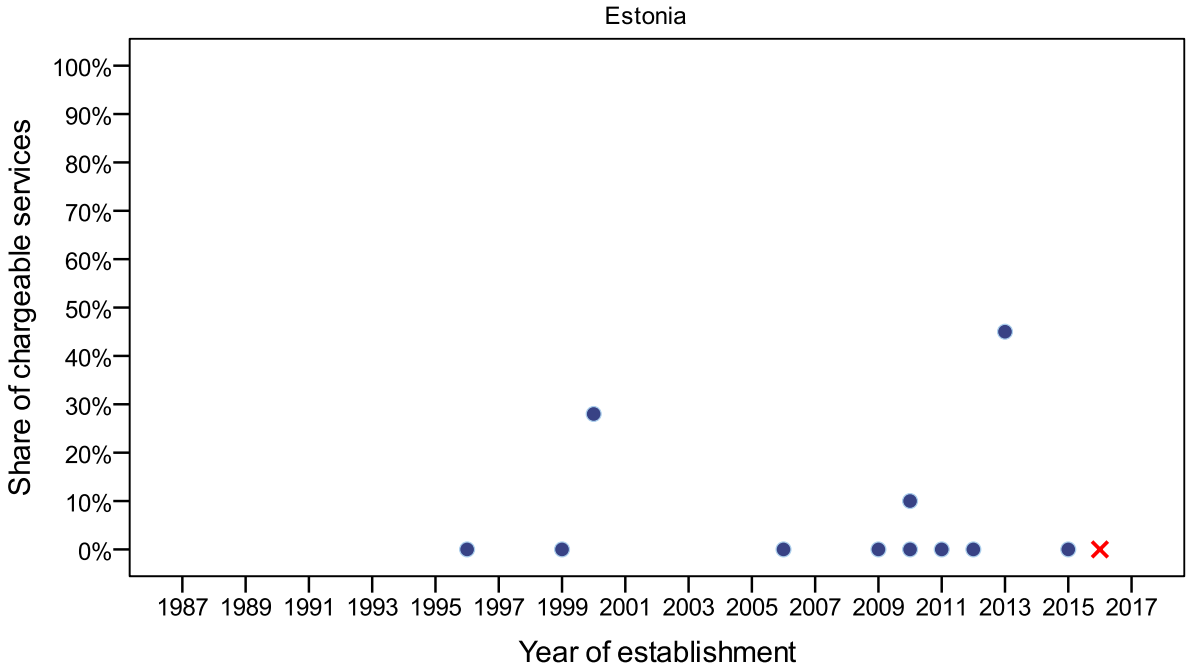


Figure 23b: Share of income generated from chargeable services in the total budget of the cluster organisation in relation to the age of the cluster organisation within the national portfolio

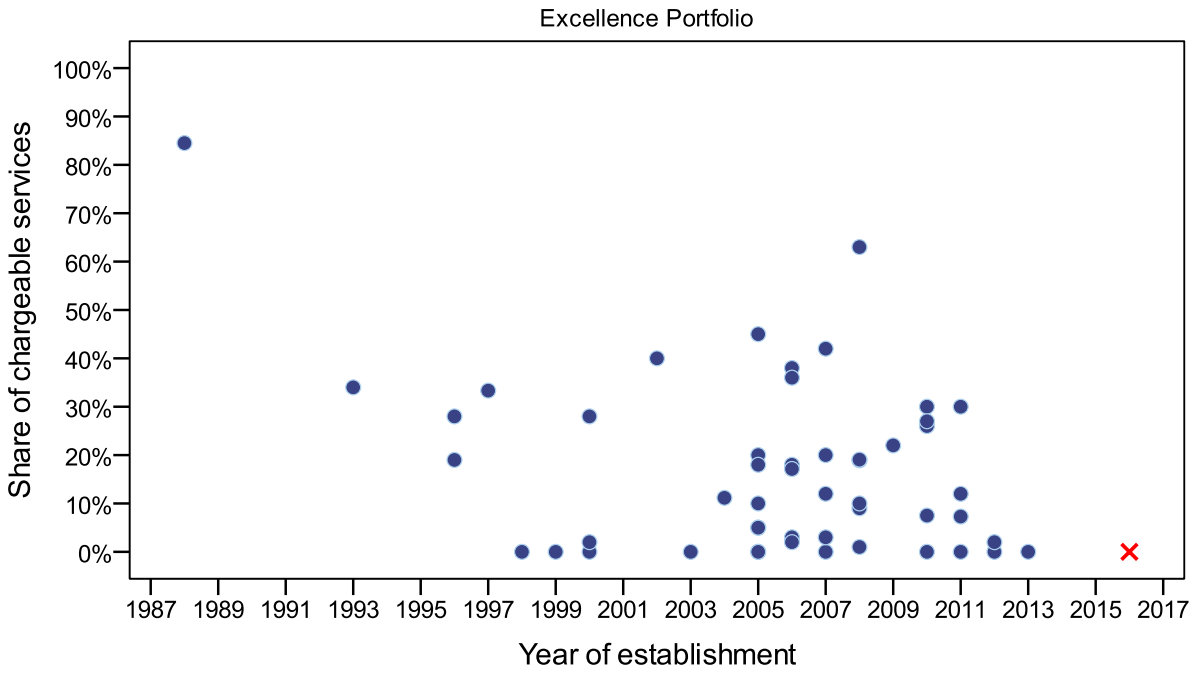


Figure 23c: Share of income generated from chargeable services in the total budget of the cluster organisation in relation to the age of the cluster organisation and compared to the excellence portfolio

Furthermore, the following figures below indicate the share of income generated from membership fees in the total budget of the cluster management organisation in relation to the age of the cluster organisation and compared to the different comparative portfolios.

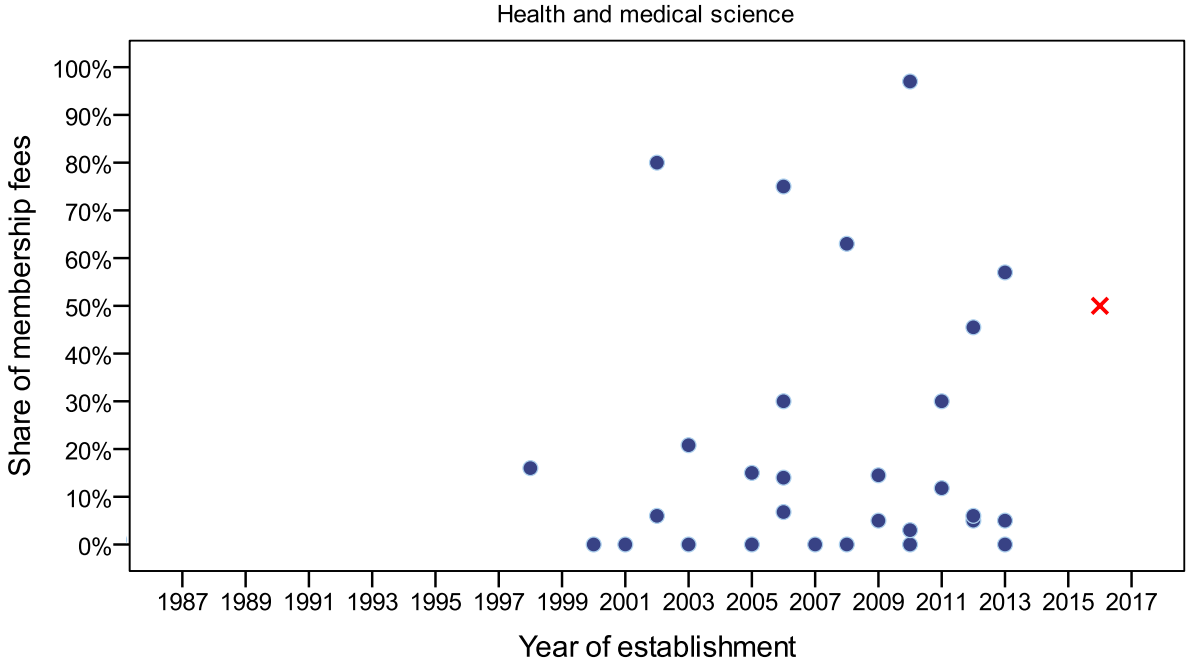


Figure 24a: Share of income generated from membership fees in the total budget of cluster organisations in relation to the age of the cluster organisation within the technological portfolio

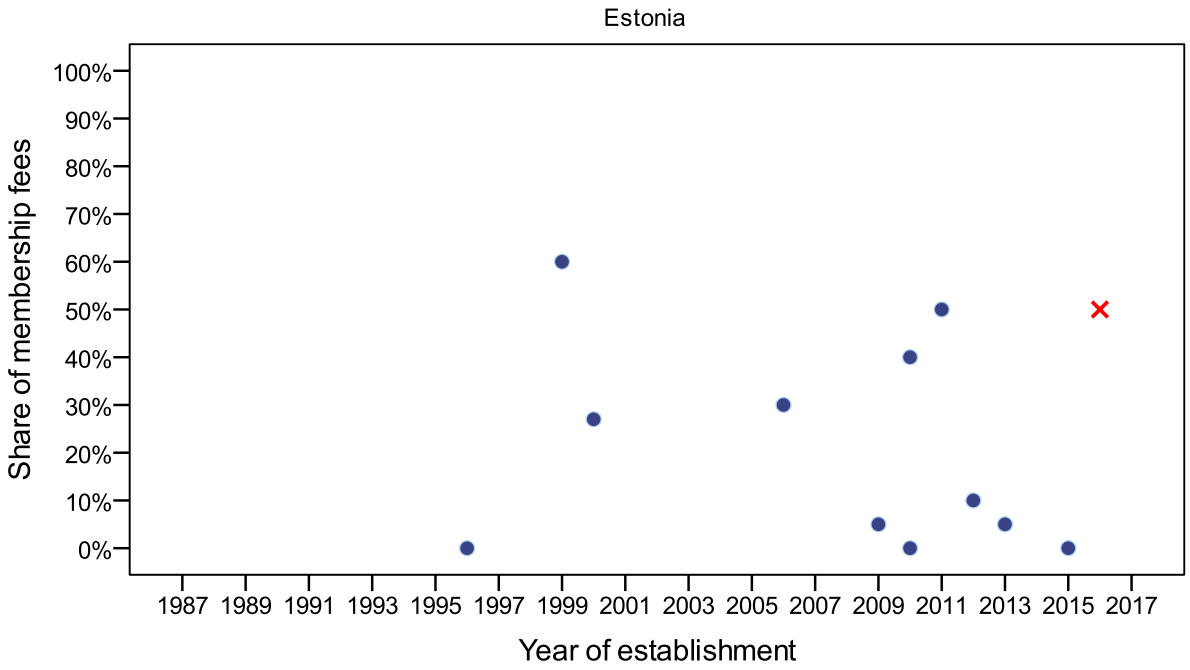


Figure24b: Share of income generated from membership fees in the total budget of the cluster organisation in relation to the age of the cluster organisation within the national portfolio

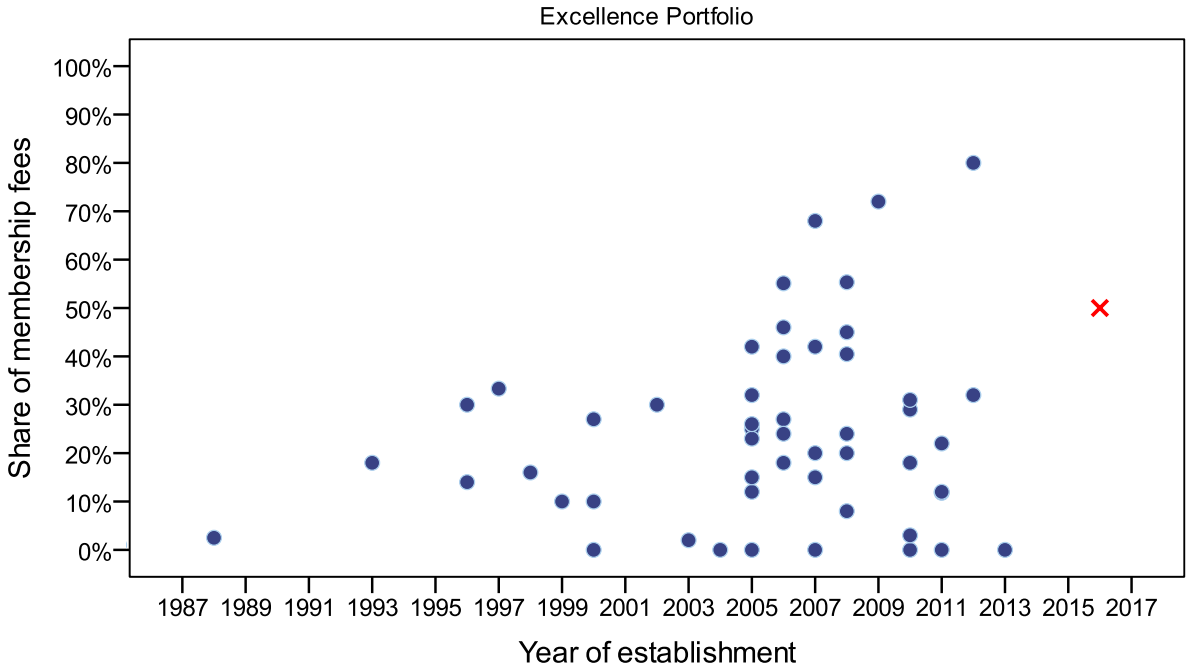


Figure24c: Share of income generated from membership fees in the total budget of the cluster organisation in relation to the age of the cluster organisation and compared to the excellence portfolio

Finally, the figures below indicate the share of private financing of any type (membership fees, chargeable services and other private funding sources like e.g. private foundations or donations, in-kind contributions) in the total budget of the cluster management organisation related to the age of the cluster organisation and compared to the different comparative portfolios.

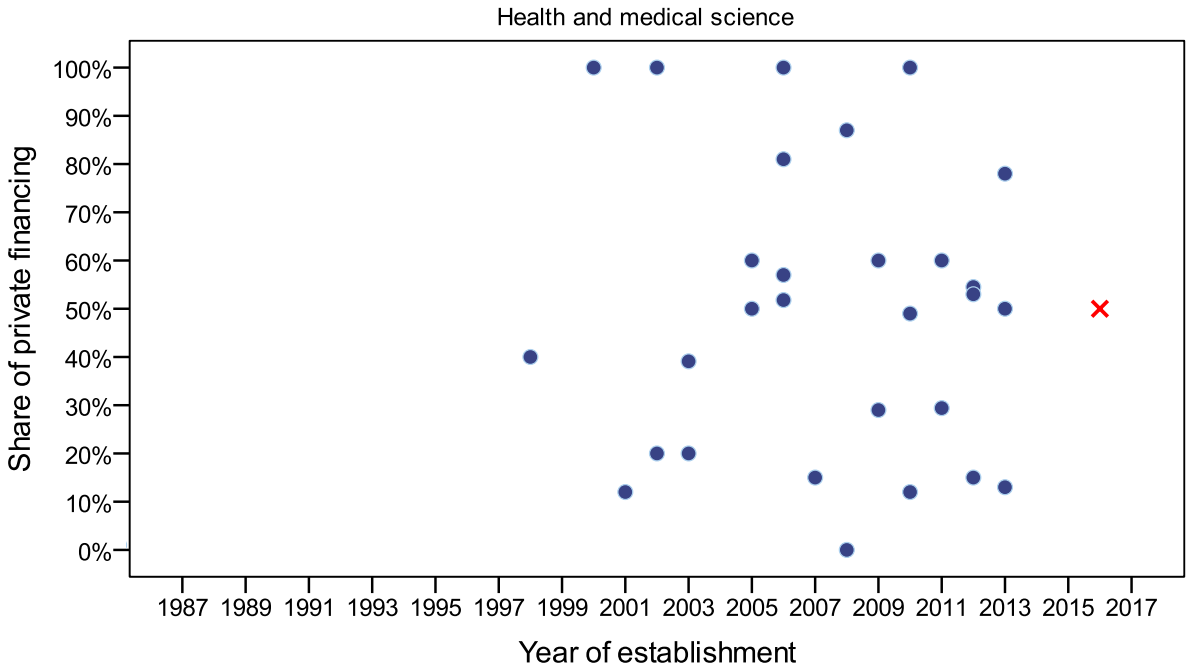


Figure 25a: Share of private financing in the total budget of cluster organisations in relation to the age of the cluster organisation within the technological portfolio

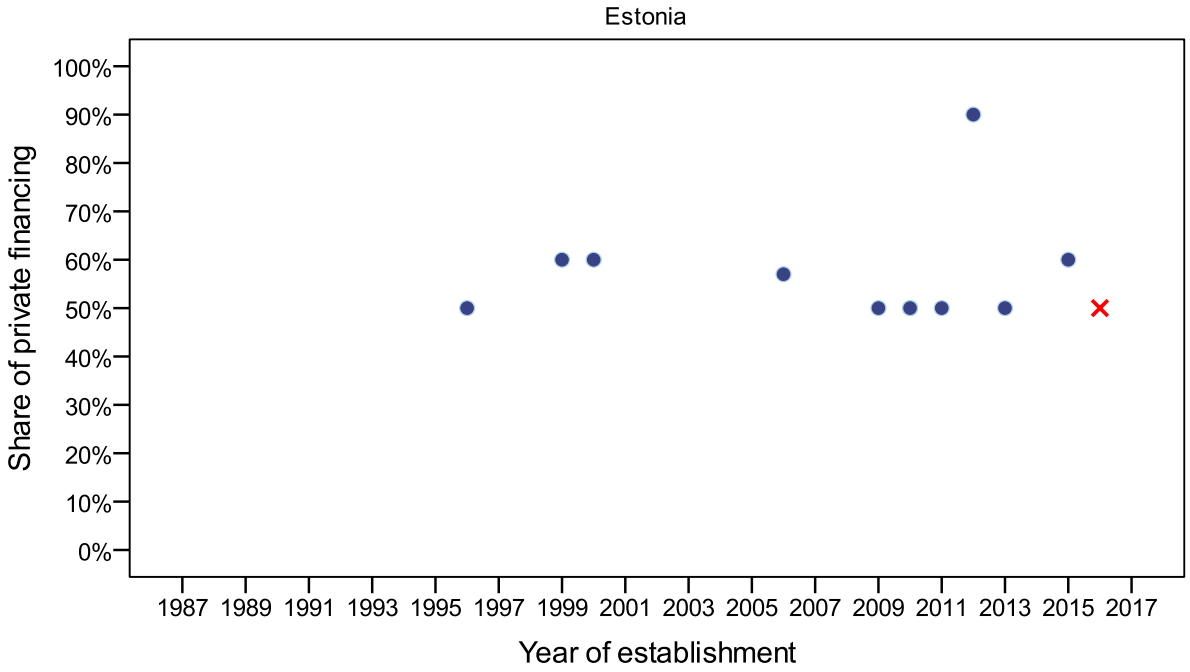


Figure25b: Share of private financing in the total budget of the cluster organisation in relation to the age of the cluster organisation within the national portfolio

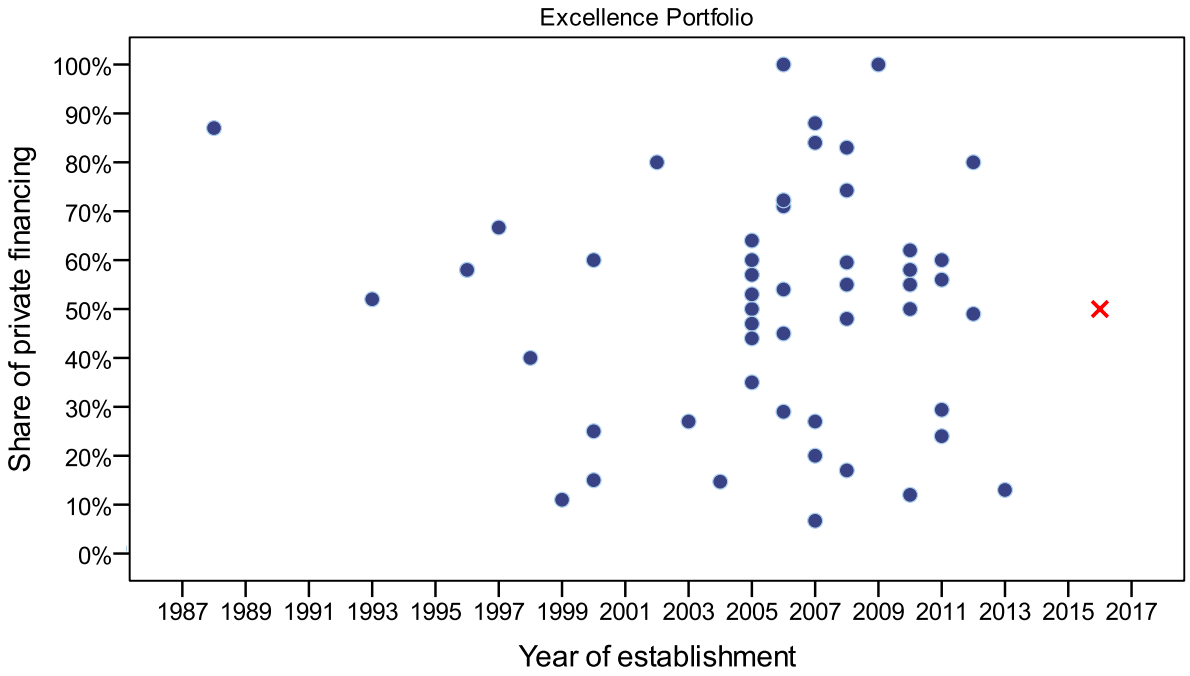


Figure25c: Share of private financing in the total budget of the cluster organisation in relation to the age of the cluster organisation and compared to the excellence portfolio

3.3.2 Financial Sustainability of the Cluster Organisation

The financial sustainability of the cluster organisation is an important aspect for the future perspectives and the existence of the cluster organisation. The cluster management needs to be based on a solid financial basis in order to concentrate on its mandate. Without a sustainable financial basis the cluster management has to spend significant resources on fundraising. Thus, these resources are not available for the development and provision of services for the cluster participants.

Cluster managers are asked to assess their financial situation according to the following categories:

- Secured in the long term (for more than 2 years);
- Secured in the short and medium term (for at least 1 year);
- Critical, but up to now no negative impacts on daily activities of cluster organisation;
- Very critical, with already negative impacts on daily activities of cluster organisation.

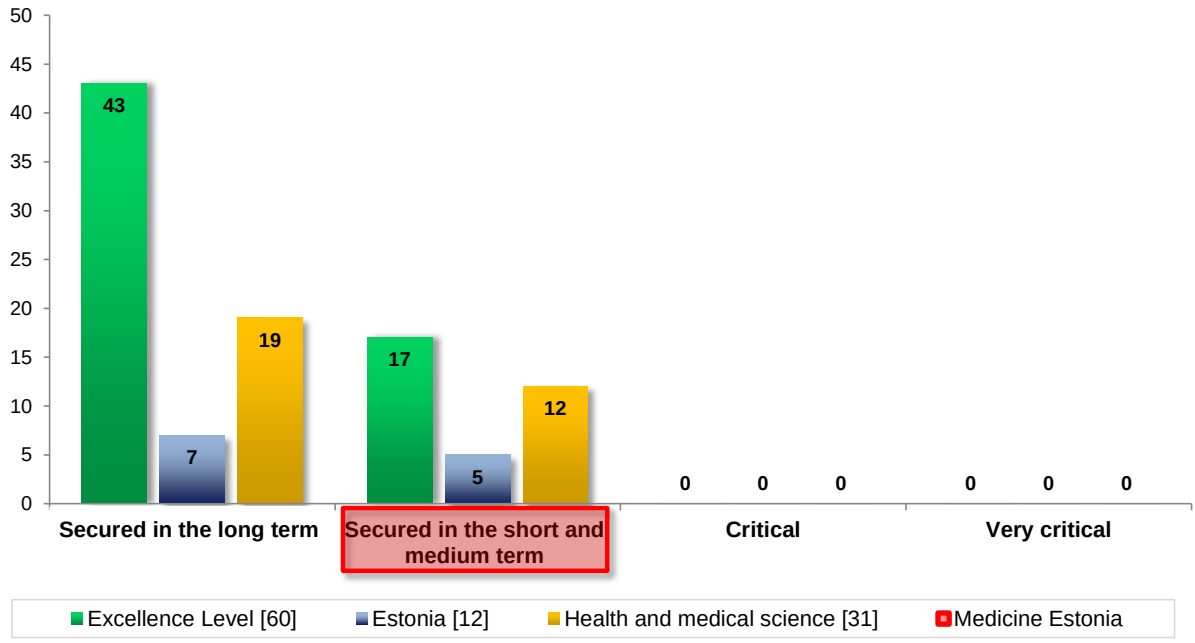


Figure 26: Financial sustainability of cluster organisations within the comparative portfolios

3.3.3 Monitoring of the Financial Status of the Cluster Organisation

A day-to-day controlling and financial reporting system which allows financial monitoring of the cluster activities at every time with little effort is the best way to be aware of the own resources and expenses. Doing so, it allows to react promptly to any demands of the cluster participants occurring in the daily activities without significant resources for internal administration.

"Day-to-day" in this context is not be understood that a monitoring is done daily, but more in the sense that the effect of any received income and expenses on the remaining budget is visible on short notice after these financial transactions have actually occurred and have been entered into such a system for financial monitoring. The maintenance of the monitoring system should thus be operated continuously, rather than only less often at specific dates and thus with significant delays.

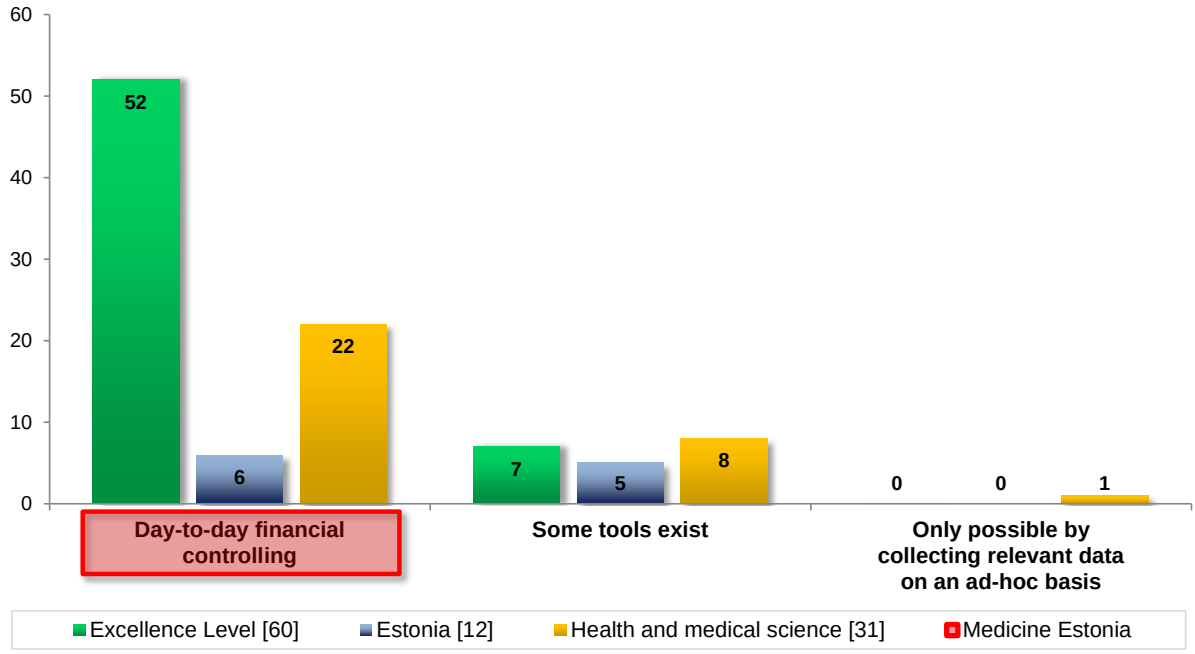


Figure 27: Monitoring of the financial status of cluster organisations within the comparative portfolios

3.4 Strategy of the Cluster Organisation

3.4.1 Strategic Planning and Implementation Plan

Strategic planning and the corresponding implementation plan are key preconditions of successful work. It is recommended to develop and implement a cluster strategy in order to operate in a sustainable and successful way. The strategy should be documented and cover all relevant strategic issues, topics, timeframes, etc., complemented by graphs and illustrations and describing the long, medium, and short term prospects. The strategy has to be an outcome of an internal process, in which the needs and expectations of the cluster stakeholders are discussed and translated into strategic measures. After implementing the main elements of the cluster's strategy, a continuous monitoring approach should document the progress and impact of the implementation. Review measures and corrective actions should be documented.

The following categories are defined:

- The cluster organisation states that they do not have a strategy (Left bars in the chart);
- A cluster strategy is available as a written document and includes an implementation plan with measurable milestones and budgets (Second bars from the left);
- A cluster strategy is available as a written document and includes an implementation plan with measurable milestones and budgets. A system to monitor the implementation plan of the strategy is in place (Third bars from the left);
- A cluster strategy is available as a written document and includes an implementation plan with measurable milestones and budgets. Strategy and implementation plan are reviewed on a regular basis (Fourth bars from the left in the chart);
- A cluster strategy is available as a written document and includes an implementation plan with measurable milestones and budgets. A system to monitor the implementation plan of the strategy is in place. Strategy and implementation plan are reviewed on a regular basis (Right hand bars in the chart).

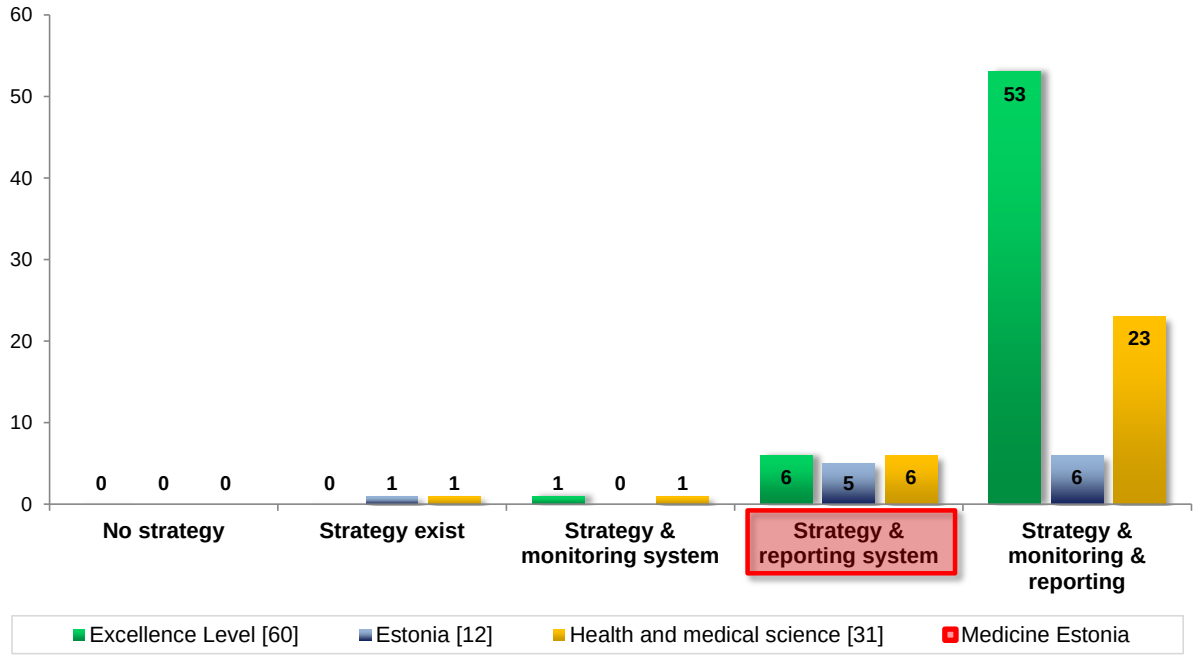


Figure 28: Strategic planning and implementation plan of clusters within the comparative portfolios

3.4.2 Thematic and Geographical Priorities of the Cluster's Strategy

The following two radar charts show the general priorities of the strategy of the cluster organisation. These priorities are considered to be the baseline of the cluster management's activities.

The first figure presents the thematic priorities of the cluster organisation. The second figure reflects the geographical scope of the cluster organisation and its activities (international, national, or local/regional).

The corresponding percentages indicate the relevance of different strategic priorities in the overall strategy (e. g. 40 % of activities are related to collaborative technology development, technology transfer or R&D) or the relevance of the geographic scope.

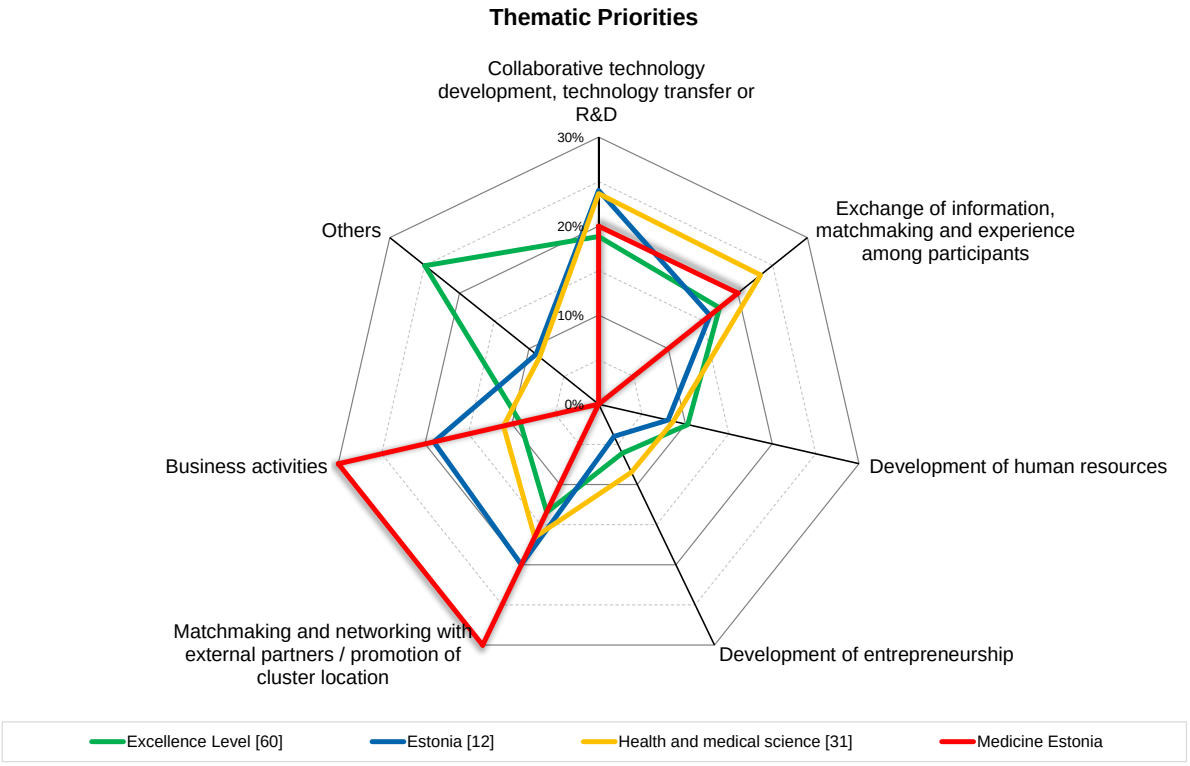


Figure 29: Thematic priorities of cluster's strategy within the comparative portfolios

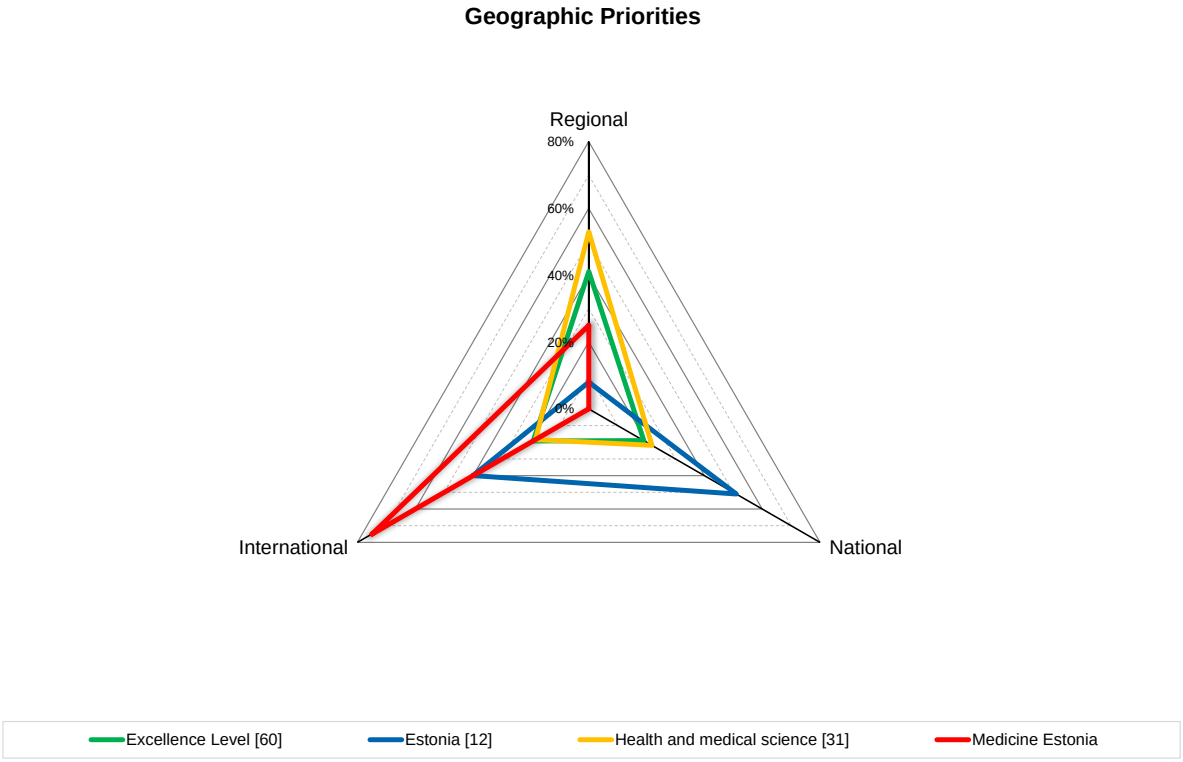


Figure 30: Geographical priorities of cluster's strategy within the comparative portfolios

3.4.3 Involvement of Key Actors in the Development and Final Decision Making of the Cluster's Strategy

The following two graphs demonstrate the involvement of the different types of actors in and of the stakeholders of the cluster within the process of elaborating and prioritising the general strategy of the cluster. The strategy should not be developed in a top-down process only, but should be elaborated under inclusion of the committed participants of the cluster, the industrial participants in particular. A balance of top-down and bottom-up approaches have proven their feasibility. However, when it comes to the final decision-making, very often the top-down is more prominent: Public authorities and funding sources/organisations play significant roles in this context.

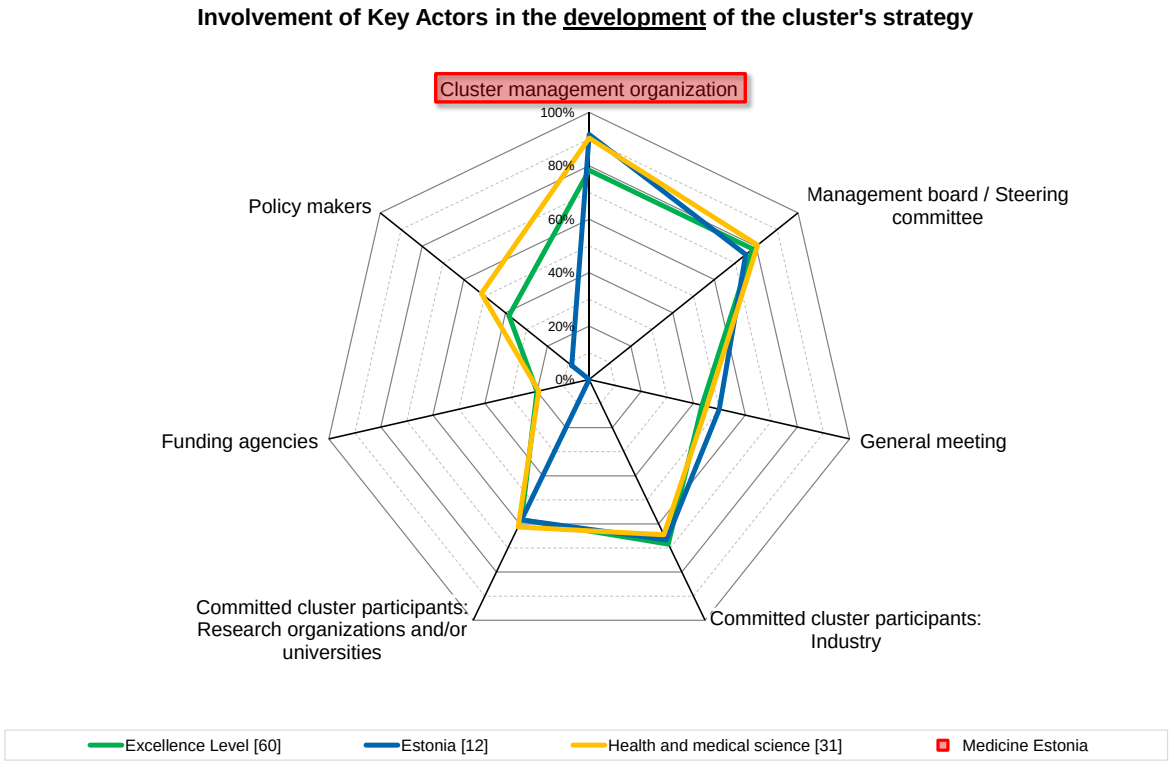


Figure 31: Involvement of key actors in the development of the cluster's strategy within the comparative portfolios

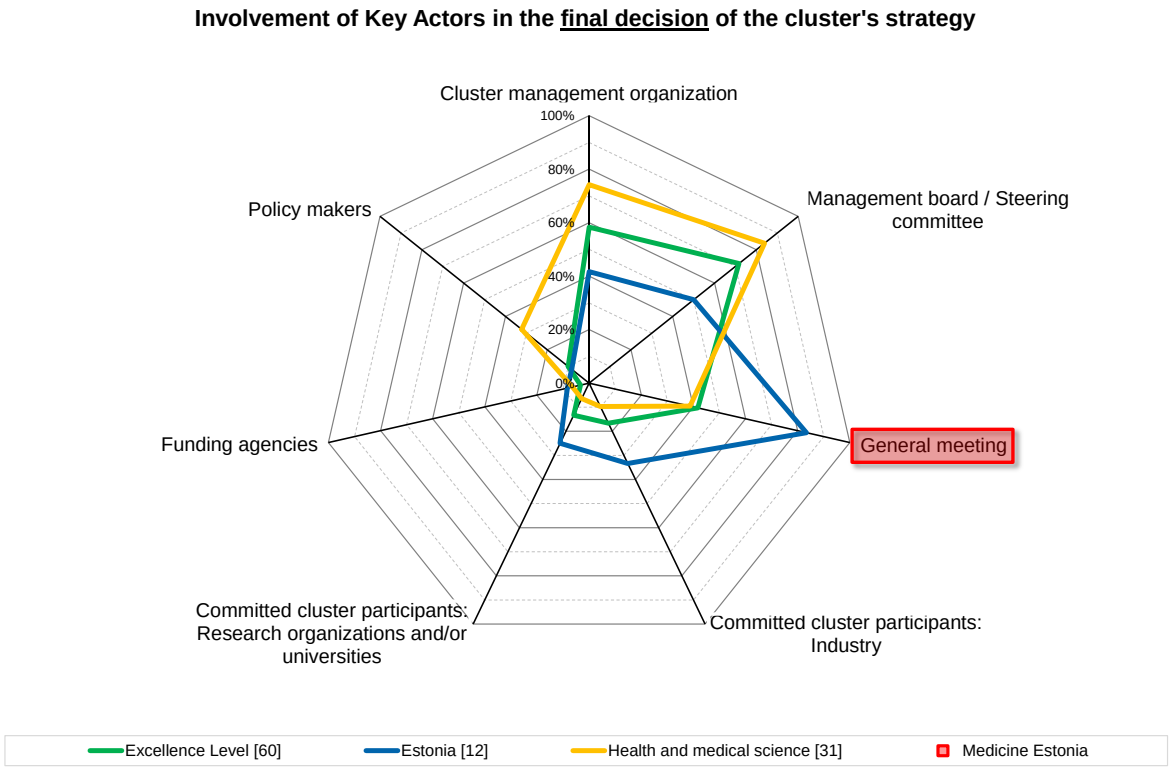


Figure 32: Involvement of key actors in the final decision making of the cluster's strategy within the comparative portfolios

3.4.4 Readiness for Internationalisation

With the indicator "Readiness for Internationalisation" the entire data of the cluster benchmarking exercise is used to determine a level of readiness of the cluster organisation and the cluster as such regarding the status and the degree of being prepared for successfully initiating and implementing internationalisation. Three areas are considered in this context and build the axes of a radar-chart, normalised on a scale from (0 = not prepared at all) to (4 = all prerequisites fulfilled and internationalisation as a pillar of cluster management is already successfully implemented):

- **Status of internationalisation of the cluster organisation and the various groups of cluster participants:** It is considered as very helpful, if at least major groups of the cluster participants are already acting in an international context and thus themselves have a clear view on their specific additional demands for activities within the cluster. The cluster organisation itself can benefit if experiences regarding internationalisation already exist and a certain status/brand of the cluster is visible on an international level.
- **Resources and competences of the cluster organisation:** Internationalisation requires longer-term significant efforts from the cluster management. Thus, financial resources should be sufficiently available to the cluster management on at least medium-term and personnel resources. Besides these quantitative aspects, skills and experiences regarding internationalisation, including language skills, are obviously required among the cluster management team in order to be well prepared for successfully acting in the international environment.
- **Strategy and already implemented services regarding internationalisation:** Depending on the different interests and experiences for the various cluster participants, the elaboration of a specific internationalisation strategy for the cluster is required which should not copy, but complement the individual internationalisation strategies of the cluster participants. The internationalisation strategy of the cluster should focus on aspects which cluster participants cannot address alone and where the cooperation within the cluster is a valuable asset (topics to be elaborated which generate added value to a group of cluster participants). As every strategy only can lead to effects when complemented with related activities and services, any existing experiences regarding international activities are valuable. As efforts for such activities normally are rather high, they should be carefully evaluated in order to learn from the experiences and to use the experiences to sharpen the focus of future internationalisation activities.

Building an average of the scores in all three axes leads to a total score regarding the readiness for internationalisation between (0) and (4). The average score is presented in the legend of the following graph in brackets.

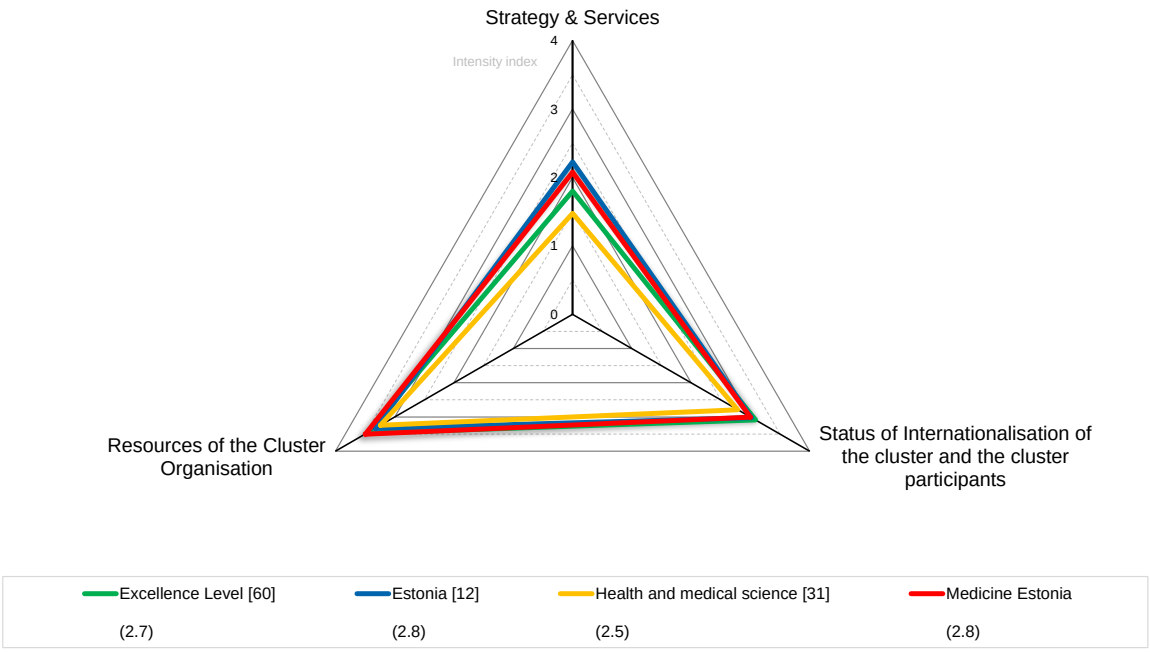


Figure 33: Readiness for Internationalisation of the cluster within the comparative portfolios

3.5 Services Provided by the Cluster Organisation

One of the main aims of cluster organisations is to provide need-oriented structures of cooperation and to make cooperation between members in the innovation business more efficient. The success of clusters therefore also depends on the extent to which the cluster management succeeds in supporting the cluster participants with need-oriented services. In doing this, it is crucial for cluster participants to be able to concentrate on their specific core competences and that the expenditure of time and financial resources by individual approaches is thus reduced. It is important that services are geared to needs in such a way that they generate high added value for participants. Hence, it is crucial to consider first of all the needs and requirements of the cluster participants and, in particular, the specific features of the cluster in the sense of an “optimal tailoring.”

In the follow-up, general service categories that could serve as a model for offers developing and implementing one’s own services are described:

- Acquisition of third party funding;
- Collaborative technology development, technology transfer, or R&D without third party funding;
- Information, matchmaking and exchange of experience among participants;
- Development of human resources;
- Development of entrepreneurship;
- Matchmaking and networking with external partners/promotion of cluster location;
- Internationalisation of cluster participants.

The diversity and the frequency of services provided by the cluster organisation are analysed. Based on this data, composite service indicators are calculated and grouped according to the following scale:

- (4) Very large spectrum of services and/or very high frequency of services;
- (3) Large spectrum of services and/or high frequency of services;
- (2) Average spectrum of services and/or medium frequency of services;
- (1) Limited spectrum of services and/or less sufficient frequency of services;
- (0) No services offered.

3.5.1 Acquisition of Third Party Funding

The acquisition of third party funding (from public sources), most of the time for R&D projects, is one field of cluster organisations' activities which serves the benefit of their participants. The acquisition of third party funding in the area of education and training or regional development is common as well. Cluster managements should have an overview over funding opportunities and should spread this knowledge amongst their cluster participants.

Medicine Estonia has no activity in this service category. The results of the comparative portfolios are represented in the graph.

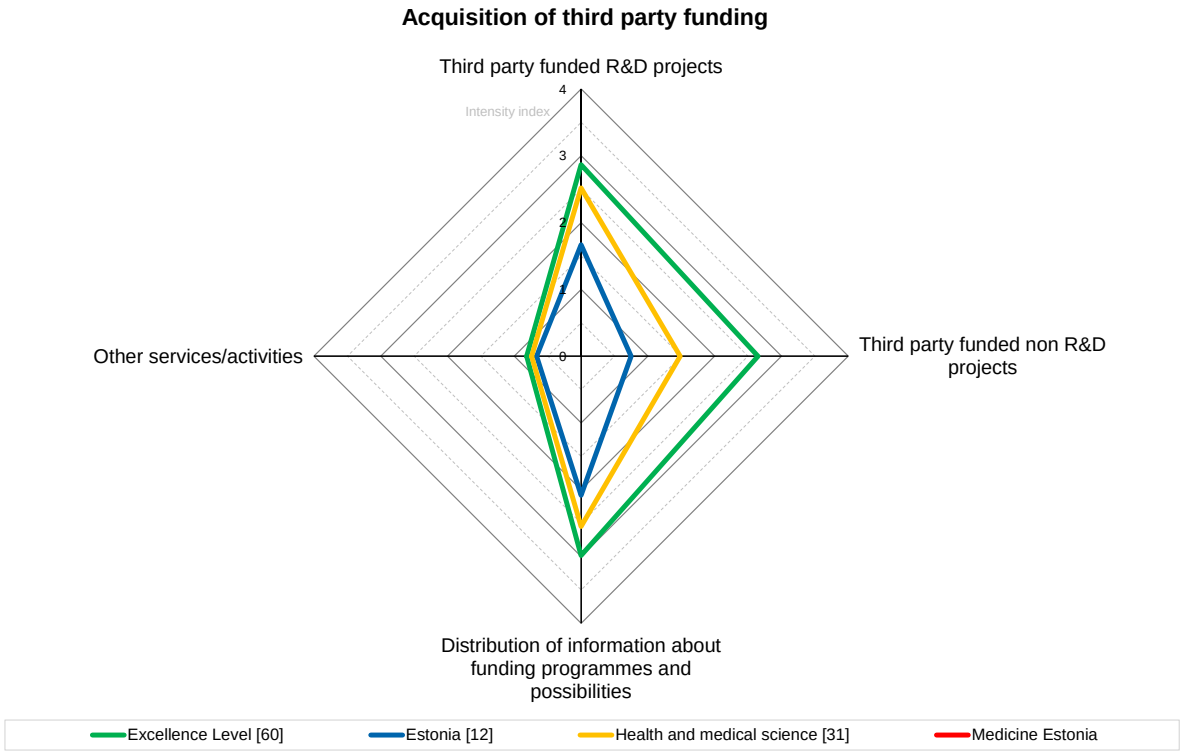


Figure 34: Services provided by cluster organisations in the service category „Acquisition of third party funding" within the comparative portfolios

3.5.2 Collaborative Technology Development, Technology Transfer, or R&D

The stimulation and facilitation of collaborative technology development and innovation-related cooperation among the participants of a cluster is another key area for activities of the cluster management. Facilitating both specific interest groups, as well as initiating joint R&D activities among the participants and activities relating to joint products, services, and IP-rights are further typical activity areas. Any projects being (co-)funded from public sources are not considered here, but in the previous chapter 3.5.1. Furthermore, rather singular or isolated occasions for exchange of experience etc., are not considered here either, but are covered in the activities described in the following chapter 3.5.3.

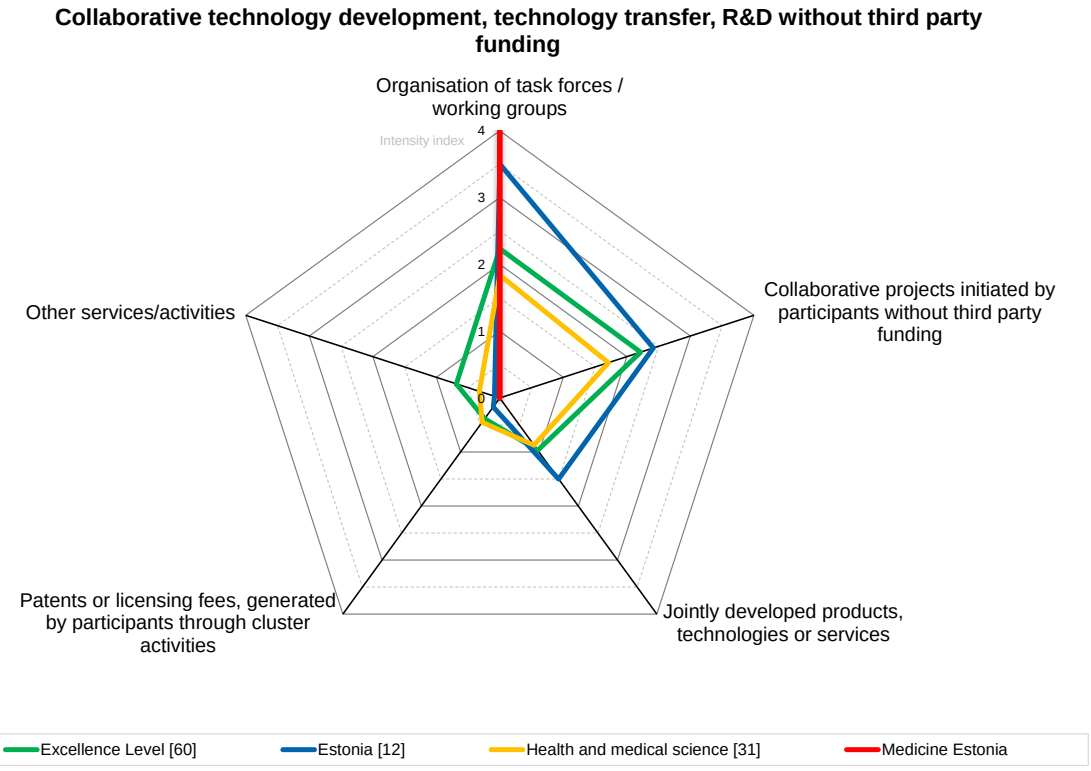


Figure 35: Services provided by cluster organisations in the service category "Collaborative technology development, technology transfer or R&D" within the comparative portfolios

3.5.3 Information, Matchmaking and Exchange of Experience among the Cluster Participants

The process of innovation in clusters is largely determined by communicative processes, i.e. by the way the players involved communicate with each other and pursue common aims. Situations in which communication and experience are exchanged contribute to value creation and are, as a result, a crucial economic factor. Nevertheless, cluster communication exceeds the general exchange of information about specific projects. Communication is designed to enable the players involved to build up long-term relations (of cooperation), to exchange experience and to learn from each other. In this regard, participants and, above all, cluster management organisation are called upon to make use of their personal, methodological and social competences of communication and to develop a common communication platform.

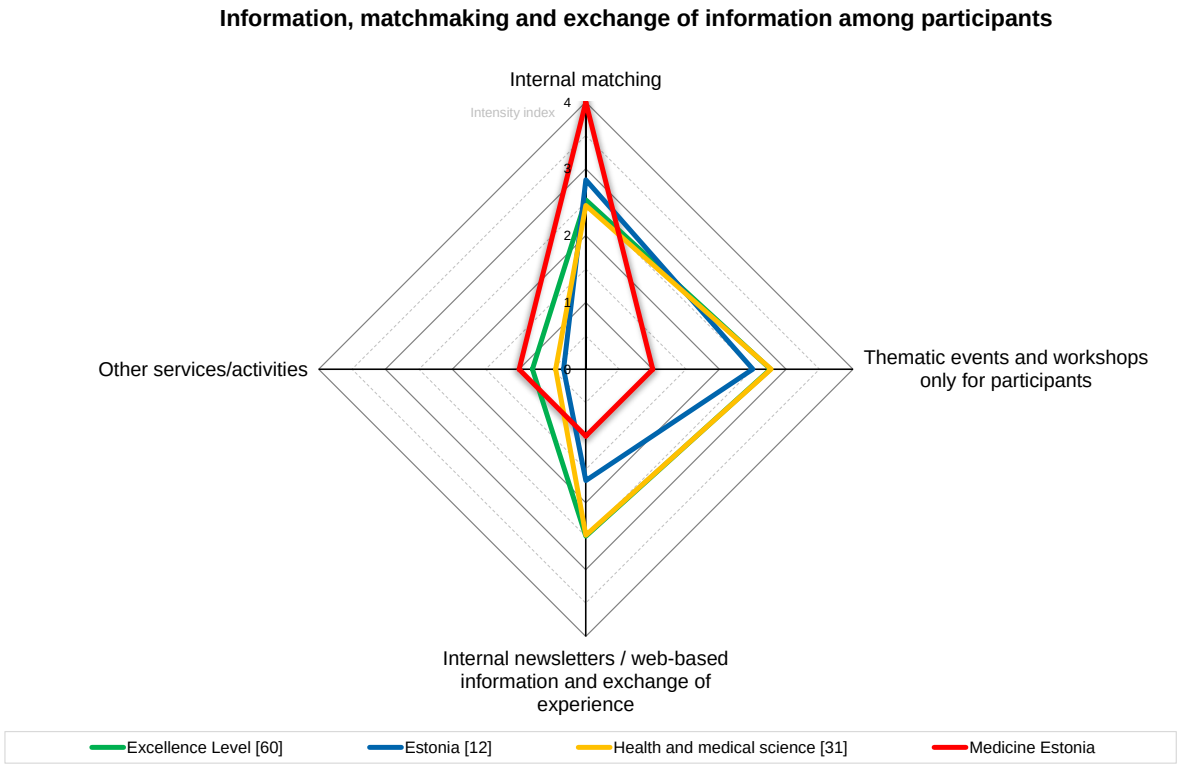


Figure 36: Services provided by cluster organisations in the service category "Information, matchmaking and exchange of experience among participants" within the comparative portfolios

3.5.4 Development of Human Resources

The development of human resources by the cluster participants is particularly relevant for the success of innovation processes. Adequately and, most of all, well-trained skilled personnel should be available on all levels of the value creation chain. Despite these factors, it is all the more important to find suitable personnel to meet significant needs. Many instruments of personnel recruitment can be used to reach this goal.

Medicine Estonia has no activity in this service category. The results of the comparative portfolios are represented in the graph.

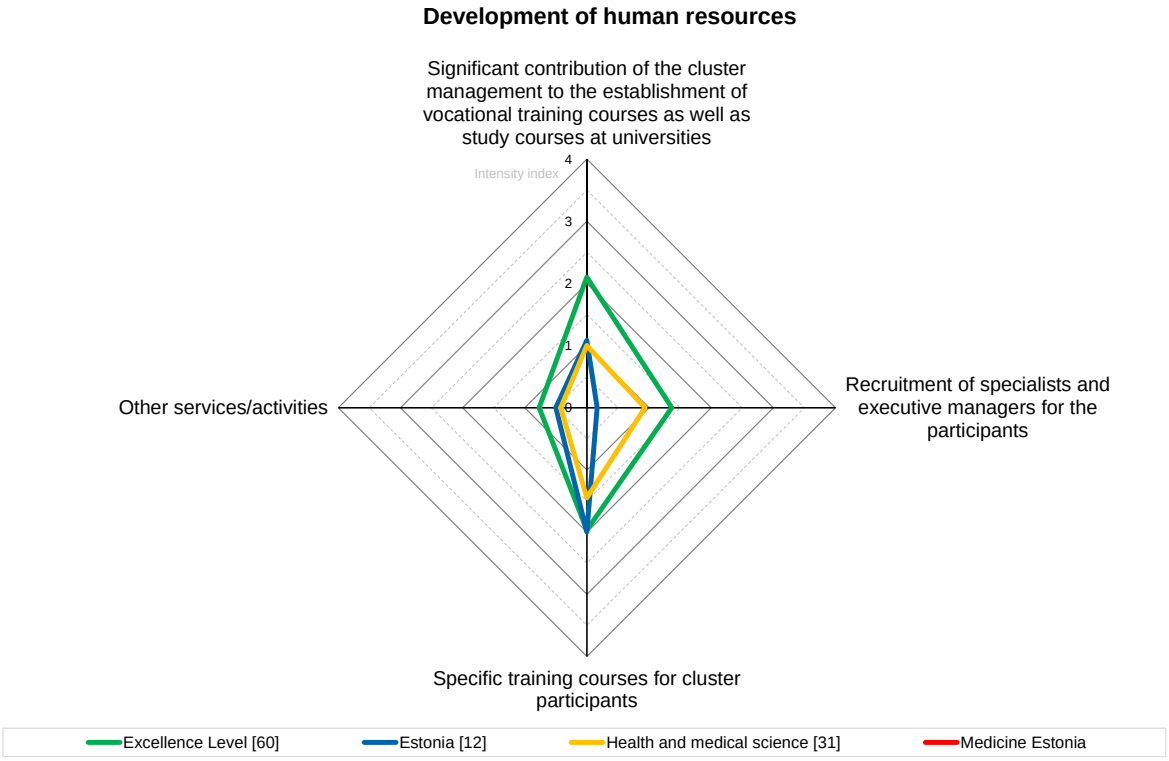


Figure 37: Services provided by cluster organisations in the service category "Development of human resources" within the comparative portfolios

3.5.5 Development of Entrepreneurship

As a rule, young business starters in the phase of setting up and establishing business need to be supported by competent and experienced experts. During this phase, the focus must be put on the development and implementation of innovative ideas in the first place and on a good business plan. Business starters should receive the right advice in order to deal with the following questions:

- "What is the process of starting business like?",
- "How can a business plan be developed?",
- "Where can I obtain the necessary capital?",
- "Are there alternative financing options?",
- "What is the right legal form?", or
- "How can a sales network be built up?", etc.

It is the role of the cluster management to provide some support or to organise a process to gain such support based on knowledge within the entire partnership in the cluster. Of course, this can be done as well by involving external expertise.

Medicine Estonia has no activity in this service category. The results of the comparative portfolios are represented in the graph.

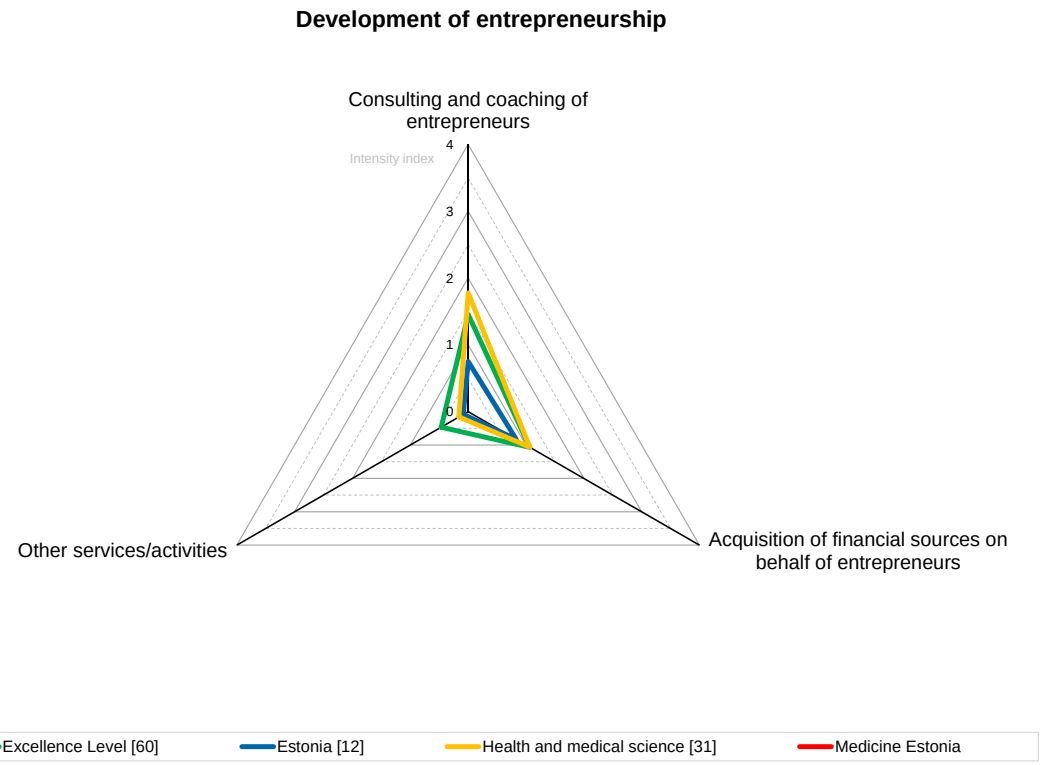


Figure 38: Services provided by cluster organisations in the service category "Development of entrepreneurship" within the comparative portfolios

3.5.6 Matchmaking and Networking with External Partners and Promotion of the Cluster

With regard to clusters, public relations can be defined as the concise, externally oriented presentation of the cluster with its visions, goals, structures, profiles of participants, innovation products, services and other specific cluster features in order to achieve an increased visibility. It is the aim of the externally oriented communication to build up a reputation for the cluster and thus attract further participants. For external players, meaningful public relations must make clear rapidly and precisely what is specific and unique about the cluster concerned. This means that the clearer the message of the network is, the more effective its (national and international) positioning is.

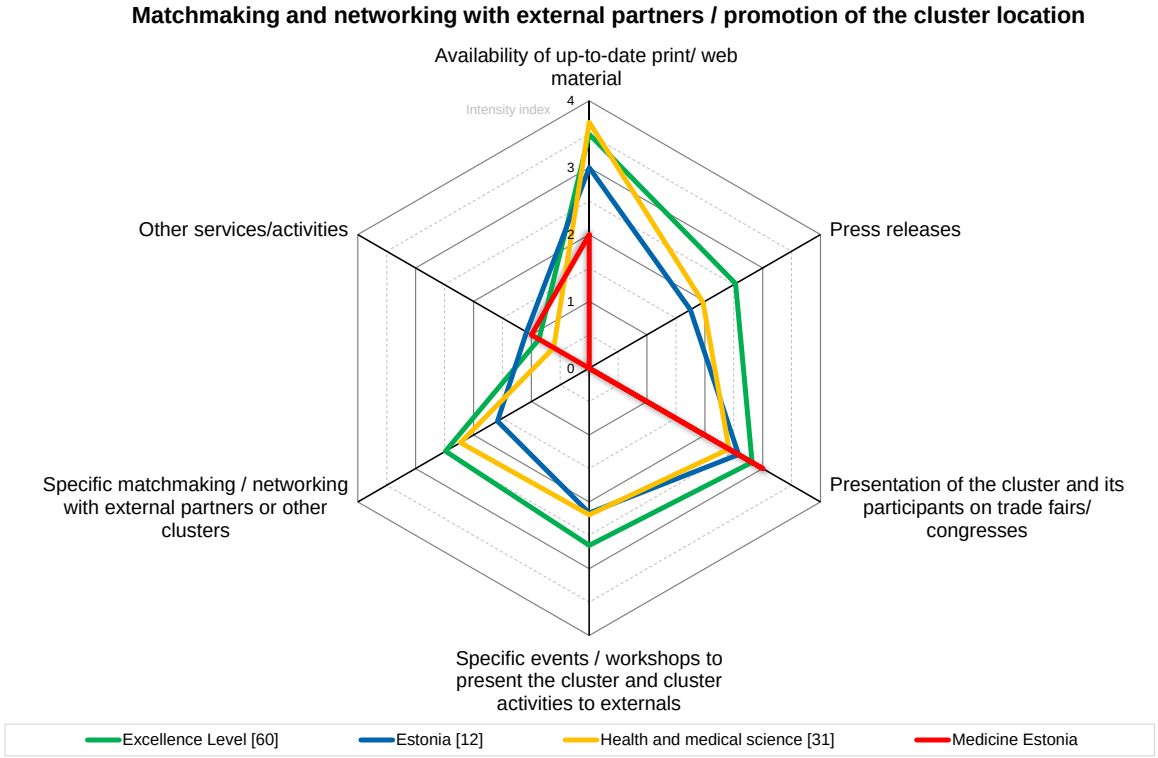


Figure 39: Services provided by cluster organisations in the service category "Matchmaking and networking with external partners/promotion of cluster location" within the comparative portfolios

3.5.7 Internationalisation of the Cluster Participants

For many cluster participants the main reason for going international is to keep their lead in technological development and to strengthen their own position on markets worldwide. Furthermore, the expectation of improving the access to identified target markets in order to take advantage of the cooperation more easily and efficiently is a common motive. In case a cluster internally lacks some important competences, the primary objective of taking part in international cooperation is to obtain missing know-how on usability or technology. This becomes especially important if clusters are active in areas with broad technological character.

The cluster participants, mainly small entities, often lack time, resources or budgets to successfully realise internationalisation processes. This is the rationale for cluster organisations to provide customised supporting measures and tools to the cluster participants on their paths to internationalisation, as they usually have more resources at their disposal and are more experienced in internationalisation matters.

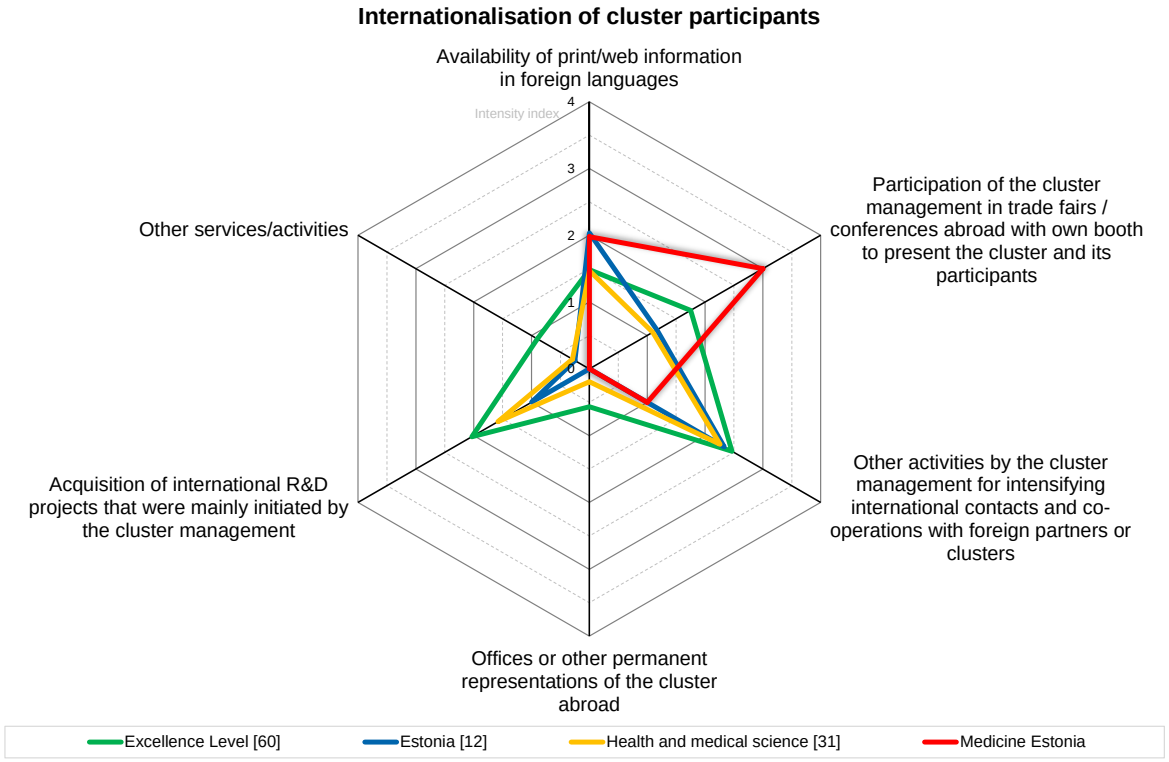


Figure 40: Services provided by cluster organisations in the service category "Internationalisation of cluster's participants" within the comparative portfolios

3.6 Achievements and Recognition of the Cluster Organisation

3.6.1 Degree of Fulfilment of the Implementation Plan

The implementation plan of the cluster's strategic planning should exist in a written form. It should contain measurable targets and dedicated budgets and suit the strategic challenges. The degree of fulfilment of the implementation plan during the previous year of activity enables the self-assessment of the cluster organisation's labour efficiency and of the strategic challenges' objectivity.

The monitoring of the degree of fulfilment of the implementation plan's specific items could also be used as an input for strategy reviews or discussions with various stakeholders of the cluster (including funding organisations). Learning effects should allow for more realistic planning in the future with necessary efforts to achieve certain effects being planned more precisely.

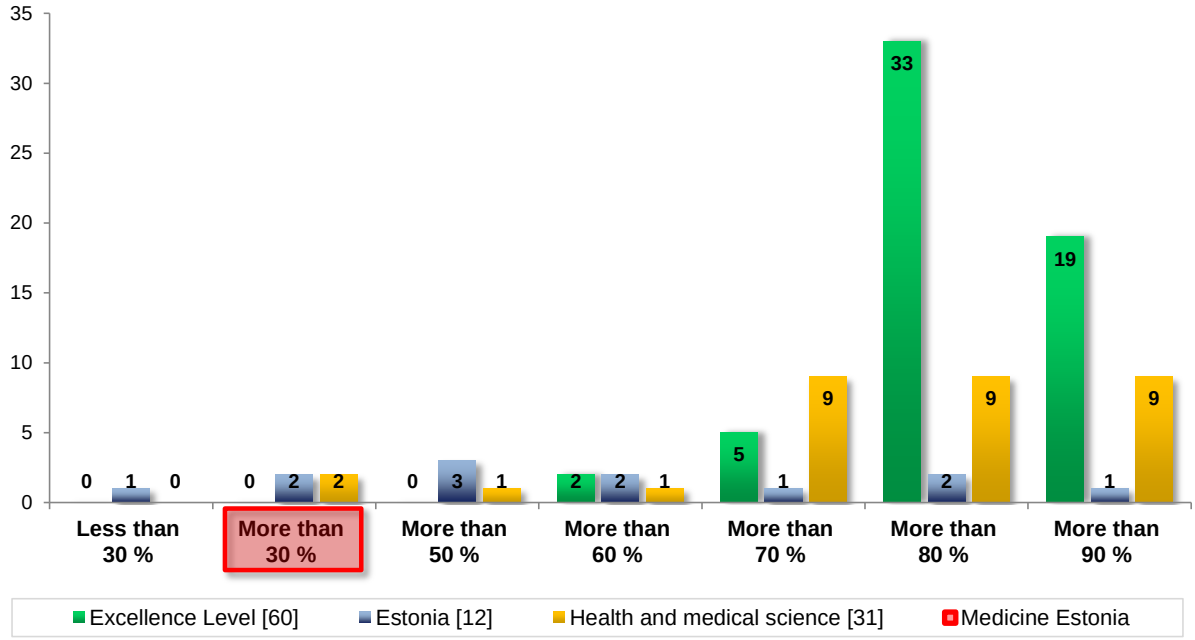


Figure 41: Degree of fulfilment of the implementation plan in the previous year of activity within the comparative portfolios

3.6.2 External Cooperation Requests Received by the Cluster

The recognition and visibility of a cluster is often reflected in a high number of external cooperation requests coming from relevant actors and received by the cluster organisation.

The amount of external cooperation requests within the last 2 years is represented on a scale ranging

- from (0) no cooperation requests;
- to (4) large number of cooperation requests.

This scale is relative and cannot be quantified, as a definite number of external cooperation requests can be considered as low for some clusters and as large for others. This consideration is highly influenced for example by the cluster's age, maturity and size.

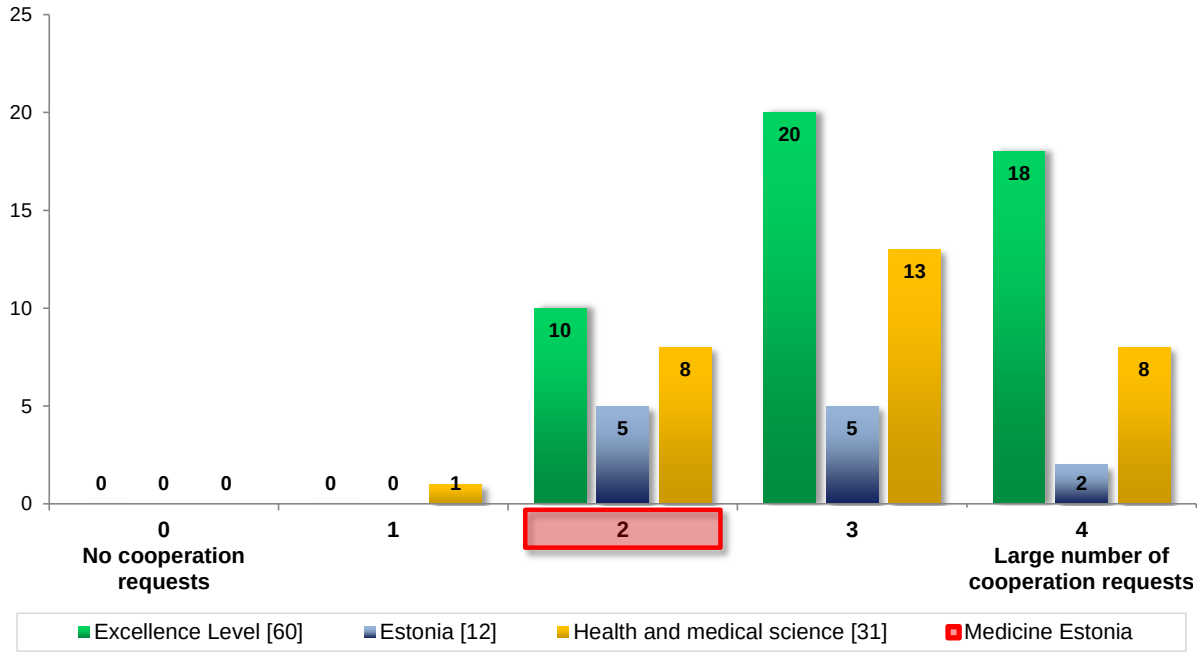


Figure 42: Number of external cooperation requests received by cluster organisations within the comparative portfolios

The institutional origin of external cooperation requests gives an idea of the categories of actors that are attracted by projects and activities of the cluster. The cluster manager was asked to estimate to which extent its cluster is asked for cooperation by the categories of industry, research or policy stakeholders. The following scale was used with a range:

- from (0) “No request”;
- to (4) “Large number of cooperation requests”.

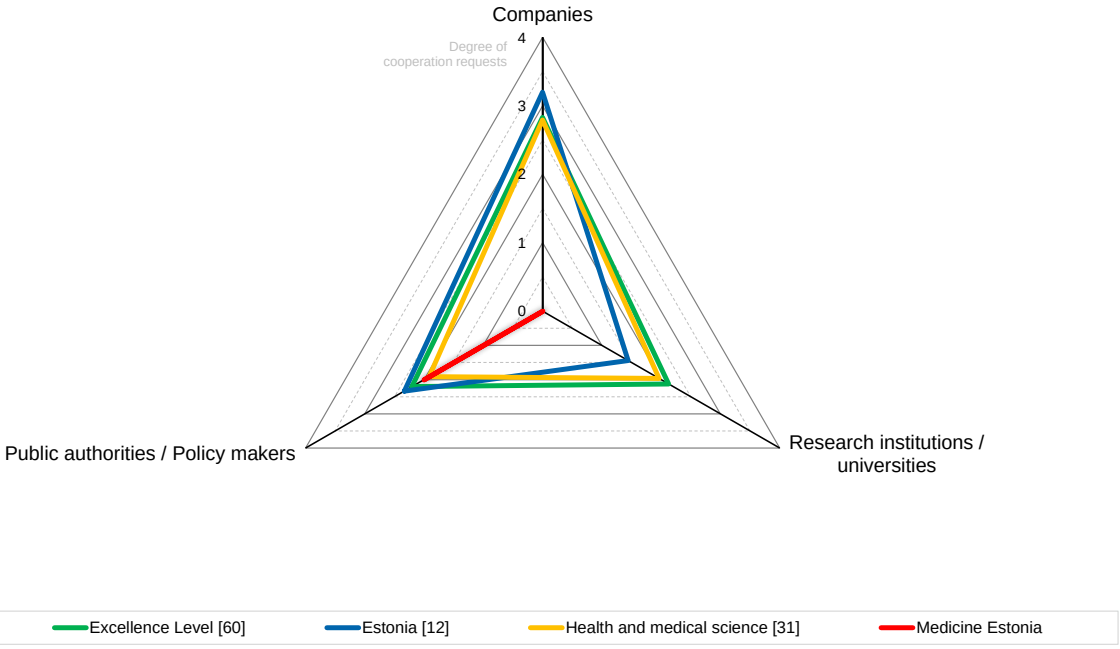


Figure 43: Institutional origin of external cooperation requests received by cluster organisations within the comparative portfolios

The geographical origin of external cooperation requests illustrates how well known the cluster and its projects and activities are among local/regional, national and international actors.

The percentage per geographical origin reflects the share of cooperation requests among the total number of external cooperation requests.

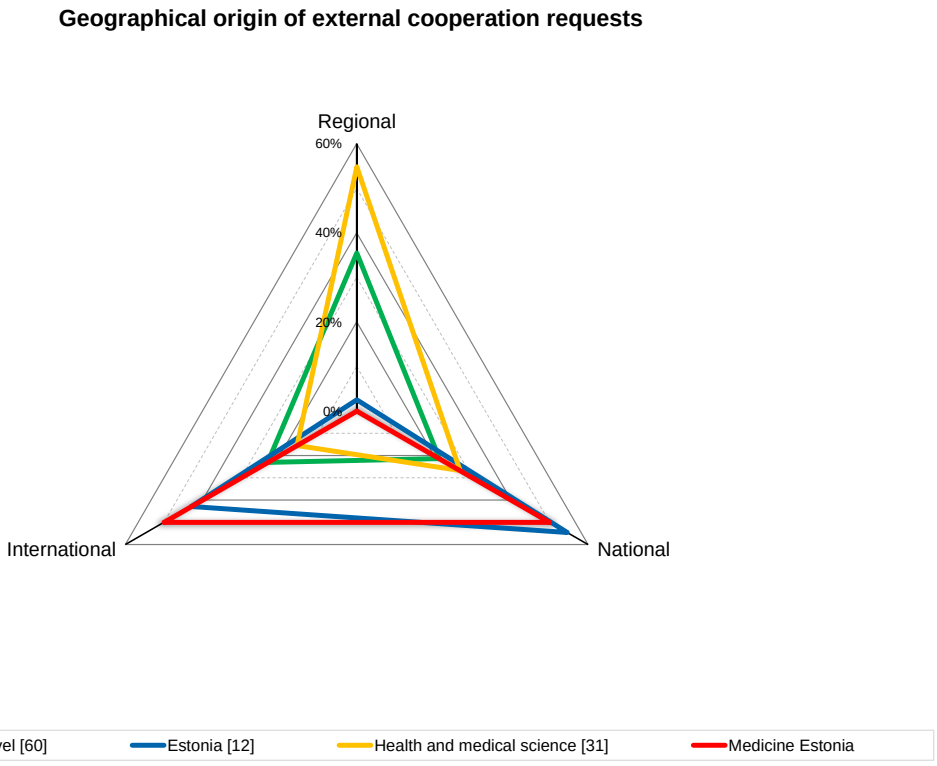


Figure 44: Geographical origin of external cooperation requests received by cluster organisations

3.6.3 Characteristics of Cooperation with Clusters from other Countries

The characteristics of a cooperation with clusters from other countries are analysed. This particularly has to be seen in relation to the geographic priorities of the cluster strategy. If internationalisation has a certain share, then it should be assumed that cooperation with clusters (cluster organisations as well as actors from the clusters) has reached a certain level already, meaning that collaborative projects or joint actions are already ongoing. The lower the international priority within the strategy is judged, the less probable it is that any type of international cooperation will be implemented or prepared.

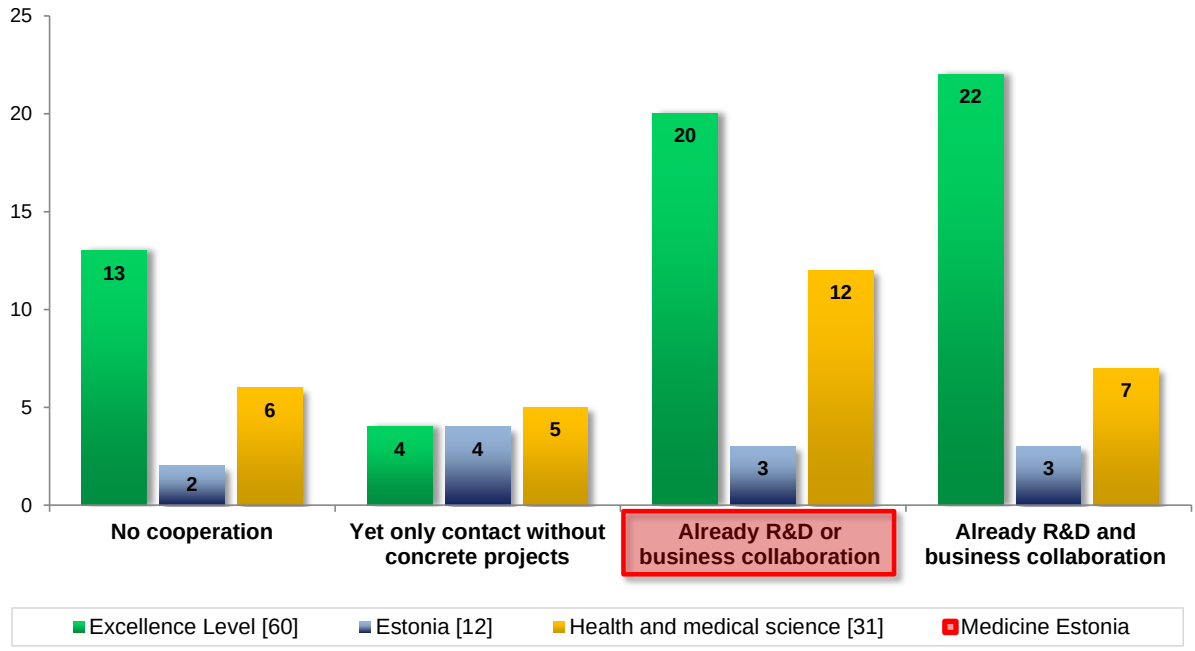


Figure 45: Characteristics of cooperation with clusters from other countries within the comparative portfolios

3.6.4 Media Visibility

Media visibility on regional, national and international level is important for clusters to attract partners, clients etc. Thus, the visibility of the cluster is assessed in terms of the frequency of media appearances. The visibility of the cluster was analysed on a scale ranging

- from (None);
- to (High), which is more than 48 media appearances in the past twelve months (equals four media appearances per month).

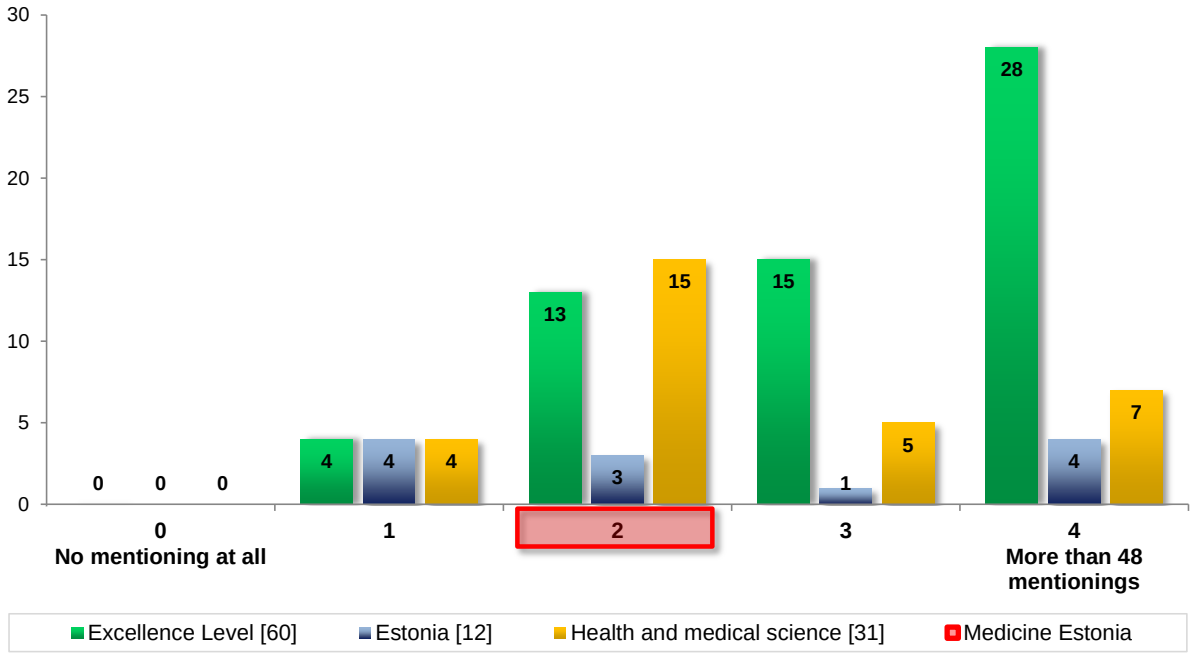


Figure 46: Media appearance of clusters within the comparative portfolios

3.6.5 Impact of the Work of the Cluster Organisation on R&D Activities of the Cluster Participants

The impact of the cluster organisation's work on the cluster participants' R&D activities is indicated by the following figure. The spectrum and frequency of services provided by the cluster management with respect to R&D is expected to have an impact on the R&D activities of the cluster's participants. The cluster managers self-assessed the impact of their work according to the following scale:

- (4) Significant and sustainable effects on a significant number of the cluster's participants in the field of R&D;
- (3) Significant and sustainable effects on a reasonable number of the cluster's participants in the field of R&D;
- (2) Measurable effects on a certain number of the cluster's participants in the field of R&D, but not yet really significant and/or sustainable;
- (1) Limited effects on a small number of the cluster's participants in the field of R&D;
- (0) No effect yet.

The self-assessment covers different categories of the cluster's participants (SME, Non-SME, universities, R&D organisations, and training and education providers).

The work of **Medicine Estonia** has no impact yet on the R&D activities of its participants. The results of the comparative portfolios are represented in the graph.

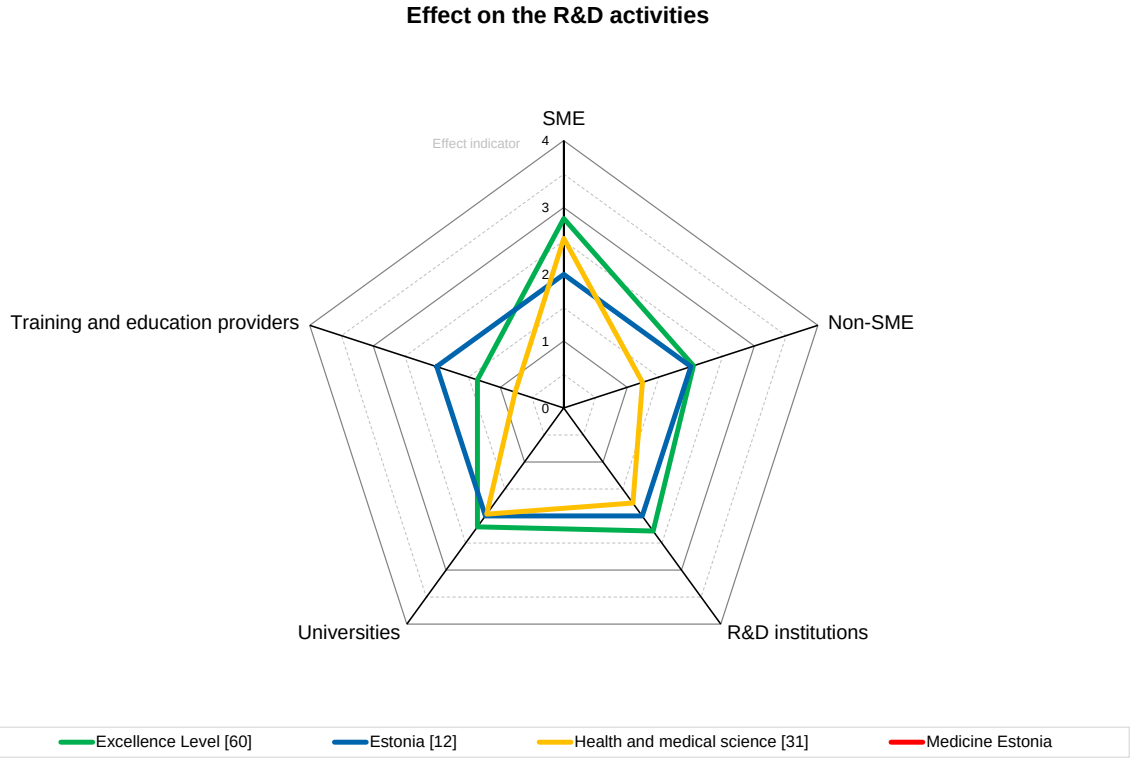


Figure 47: Impact of the work of cluster organisations on R&D activities of the cluster's participants

3.6.6 Impact of the Cluster Organisation's Work on the Cluster Participants' Business Activities

The impact of the cluster organisation's work on the cluster participants' business activities is indicated by the following figure. The spectrum and the frequency of services provided by the cluster management team, with respect to business development, are expected to influence the business activities of the cluster's participants. The cluster managers self-assessed the effect of their work according to the following scale:

- (4) Significant and sustainable effects on a significant number of the cluster's participants in the field of business development;
- (3) Significant and sustainable effects on a reasonable number of the cluster's participants in the field of business development;
- (2) Measurable effects on a certain number of the cluster's participants in the field of business development, but not yet really significant and/or sustainable;
- (1) Limited effects on a small number of the cluster's participants in the field of business development;
- (0) No effect yet.

The self-assessment covers different categories of the cluster's participants (SME, Non-SME, universities, R&D organisations, and training and education providers).

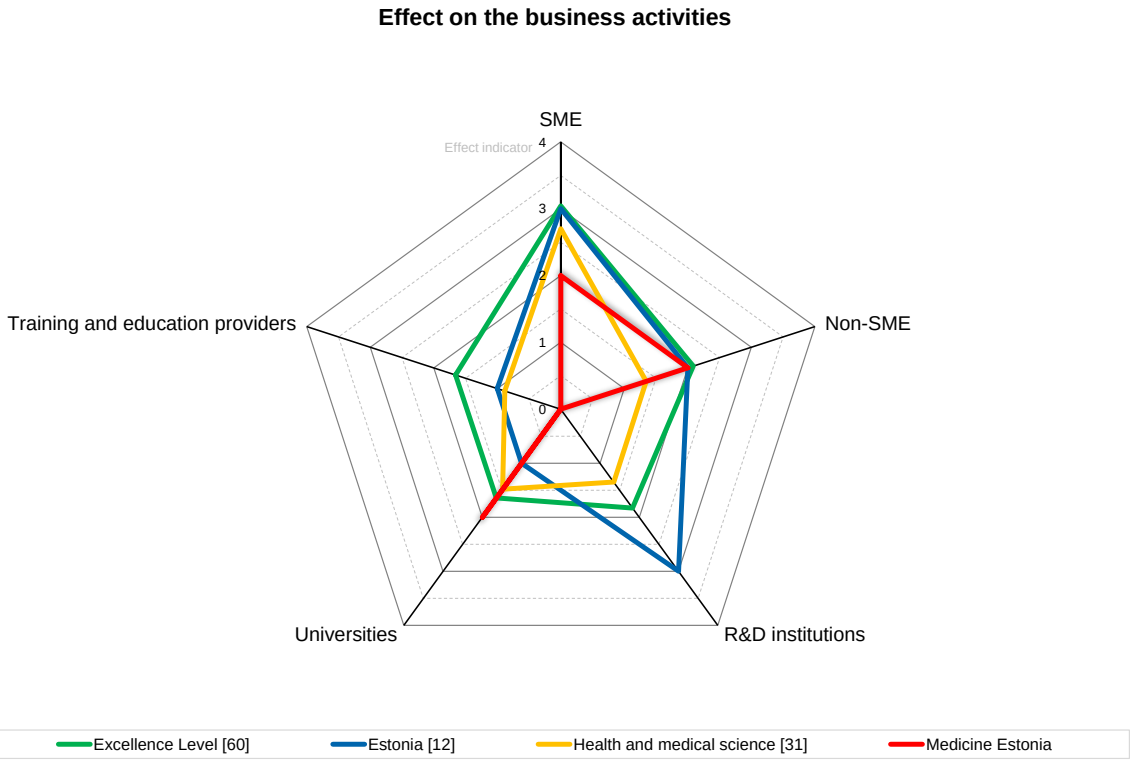


Figure 48: Impact of the work of cluster organisations on business activities of cluster participants

3.6.7 Impact of the Cluster Organisation's Specific Business-oriented Services on SME Participants

The following figure displays a correlation between the spectrum and intensity (in terms of frequency) of specific business-oriented services and the impact of the cluster management organisation's work on SME business activities. The more services are provided (see e.g. the median value), the higher the impact on SME business activities is expected.

The spectrum and intensity of the business-oriented services are summarised in a composite indicator. The indicator is determined by incorporating all services analysed in chapter 3.5 which have direct influence on business activities rather than R&D activities. Every single service furthermore is weighted specifically within the composite indicator.

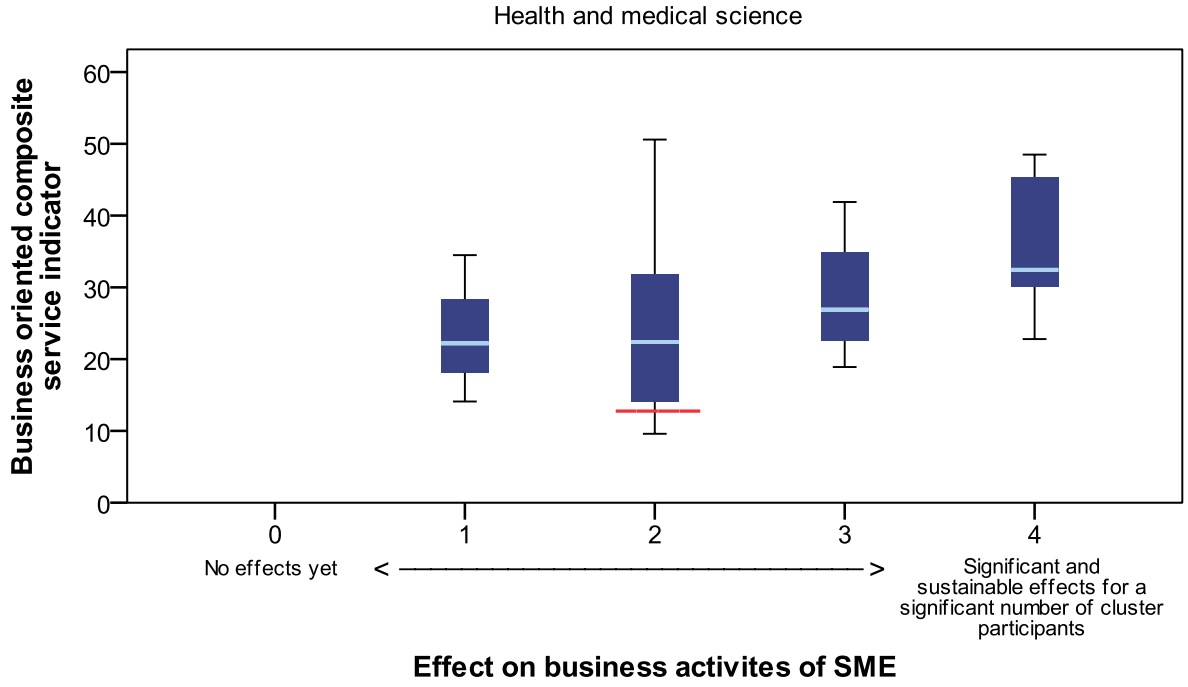


Figure 49: Impact of service spectrum and intensity on SME business activities within the technological portfolio

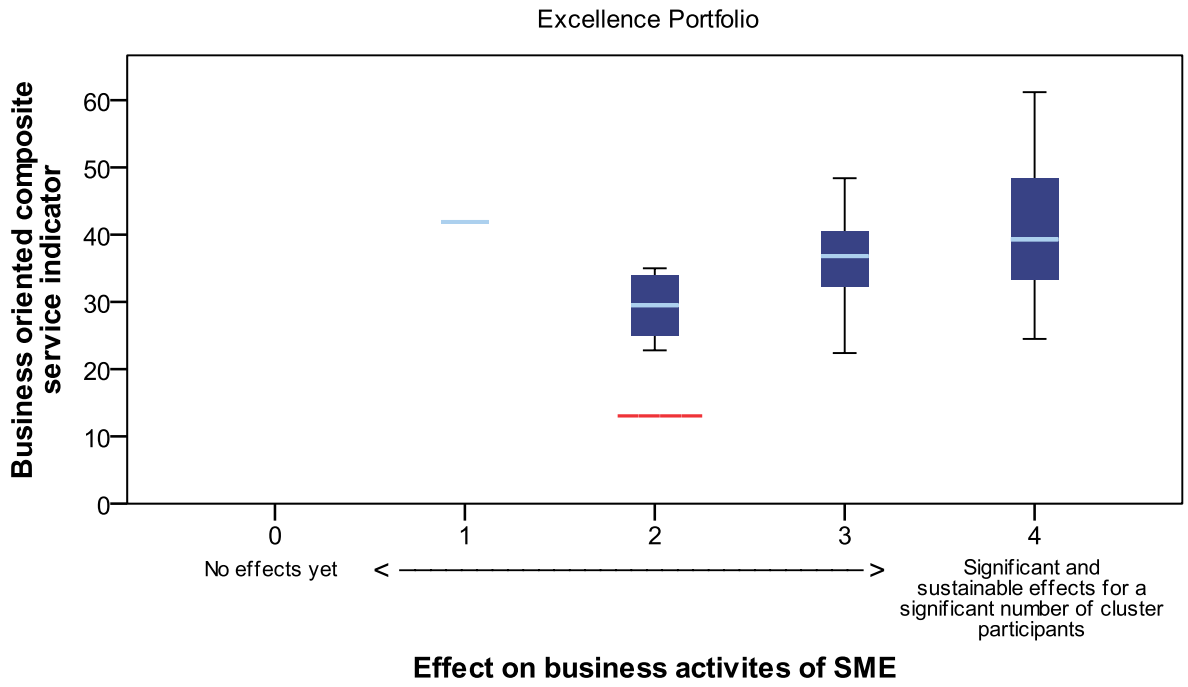


Figure 50: Impact of service spectrum and intensity on SME business activities within the excellence portfolio

3.6.8 Degree of Internationalisation of the Cluster Participants

The degree of internationalisation of the cluster participants is analysed in different categories of participants. The degree of internationalisation reflects for example the number of international cooperation declarations and cooperation projects as well as the existence of branch offices abroad, etc. (Possible) Export shares not only of cluster participants are to be considered in this context.

For each category of cluster's participants the degree of internationalisation is self-assessed by the cluster manager on the following scale:

- from (0): no international activity;
- to (4): significant international activities of a significant number of cluster participants.

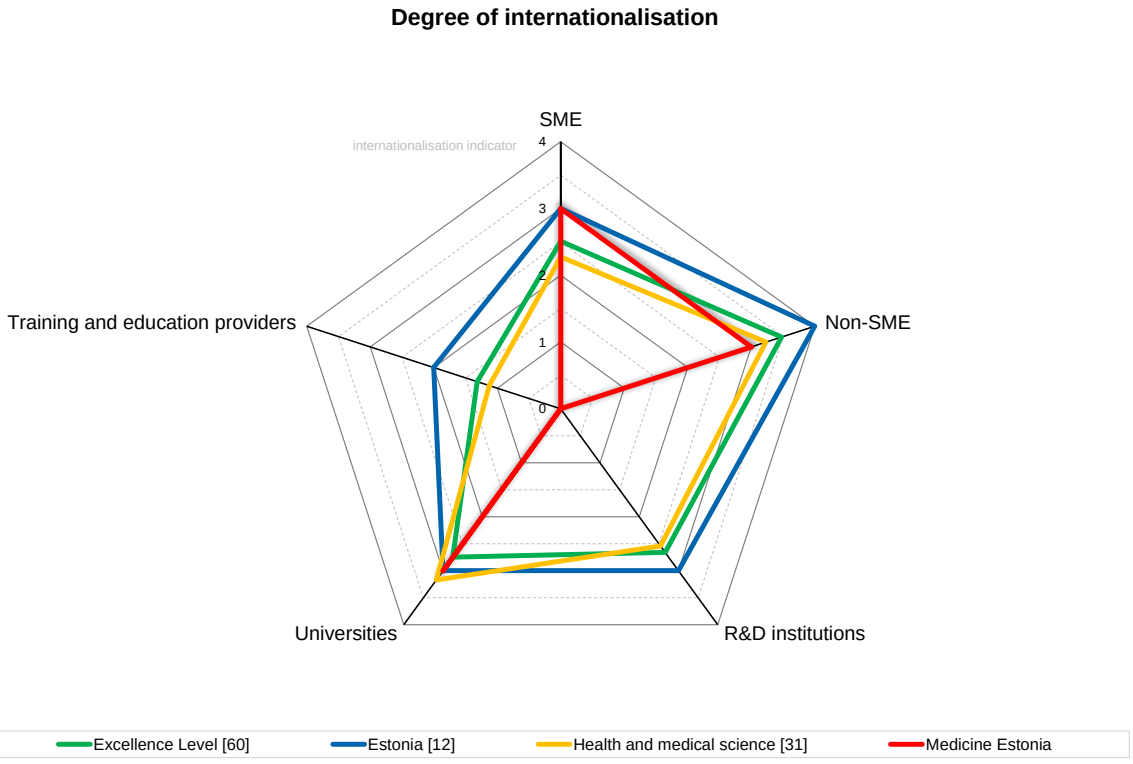


Figure 51: Degree of Internationalisation of cluster's participants

3.6.9 Impact of the Cluster Organisation's Work on the Cluster Participants' International Activities

The impact of the cluster organisation's efforts on the cluster participants' international activities is indicated by the following figure. The spectrum and the frequency of services provided by the cluster management with respect to international activities are expected to affect the cluster's participants. The cluster managers self-assessed the impact of their work according to the following scale:

- (4) Significant and sustainable effects on a significant number of the cluster's participants in the field of international activities;
- (3) Significant and sustainable effects on a reasonable number of the cluster's participants in the field of international activities;
- (2) Measurable effects on a certain number of the cluster's participants in the field of international activities, but not yet really significant and/or sustainable;
- (1) Limited effects on a small number of the cluster's participants in the field of international activities;
- (0) No effect yet.

The self-assessment covers different categories of the cluster's participants (SME, Non-SME, universities, R&D organisations, and training and education providers).

The work of **Medicine Estonia** has no impact yet on the inter-national activities of its participants. The results of the comparative portfolios are represented in the graph.

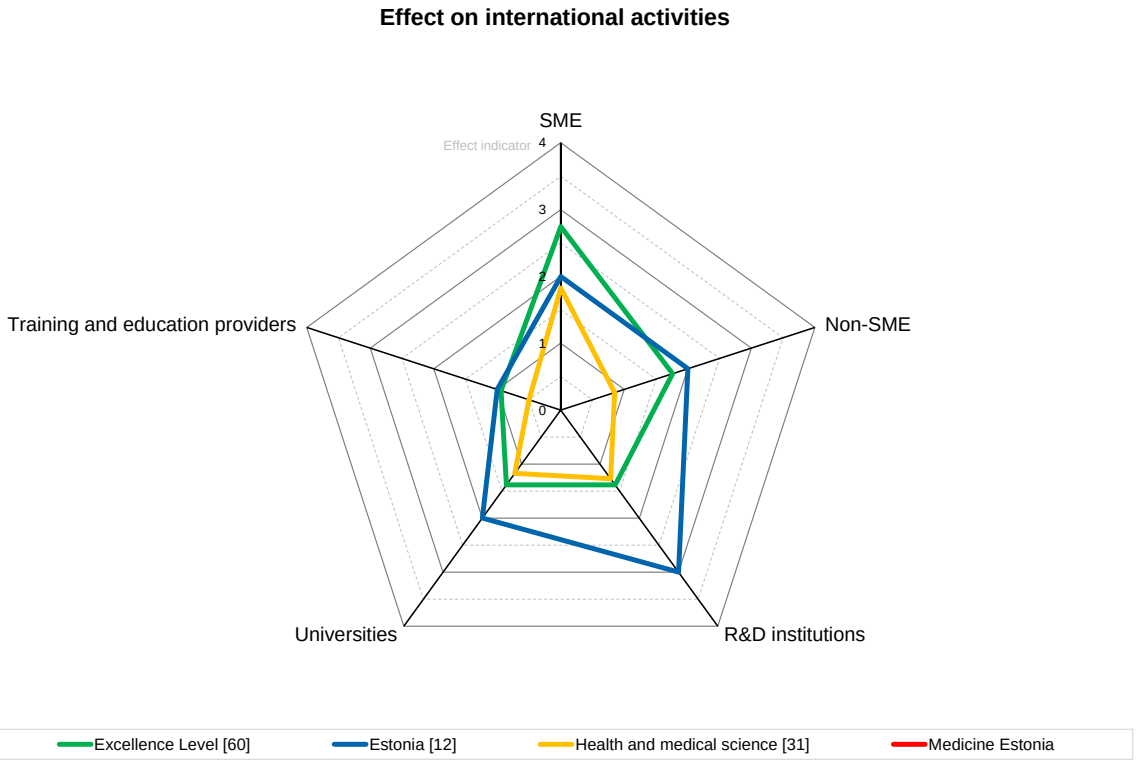


Figure 52: Impact of the cluster organisations' work on international activities of cluster's participants

4. Assessment of the Cluster Management

4.1 Benchmarking as the First Step towards Measuring the Cluster Management Excellence

Benchmarking results are based on information provided to an external benchmarking expert by the cluster manager. Neither does the expert receive detailed justification nor is she/he able to confirm or approve the collected information. The cluster manager is expected to provide fair answers in order to present a realistic view on the position of the cluster compared to the comparative portfolios. Benchmarking is a self-assessment and therefore cannot be compared to an evaluation.

Although it does not qualify for any rankings, the benchmarking helps to identify the relative position of the cluster with regard to the "best-in-class" cluster and thus allows for an assessment of the cluster performance.

The following table presents the results of this assessment at a glance. It gives the opportunity to see where the cluster management already fulfils future quality levels and where actions for improvement are recommended.

The performance of the benchmarked cluster management is highlighted in the following table. The colours in the table indicate the three following levels:

- GREEN: Excellent. Only minor improvements are - if at all – possible;
- YELLOW: Reasonable. Potential for improvement;
- RED: Certain minimal criteria for good practice in cluster management are not met. It is recommended to consider this issue for improvement.

These three levels have been defined on the basis of ESCA's experience on cluster management, as well as on the basis of the quality indicators defined within the European Cluster Excellence Initiative.

	GREEN	YELLOW	RED
STRUCTURE OF THE CLUSTER			
Age of the cluster organisation (3.1.1)	More than 4 years old	Between 2 and 4 years old	**Less than 2 years old**
Legal form of the cluster organisation (3.1.2)	**Registered association / Limited liability company**	Any other legal form	No legal form
Composition of the cluster membership (Committed participants) (3.1.5)	More than 70 % coming from industry (enterprises of different sizes) AND At least one research and one educational organisations AND At least one of the categories: Intermediates, government / public organisations, marketing	**More than 50 % coming from industry** **AND** **At least one type of research and / or educational organisation**	Less or equal 50 % coming from industry OR No research or educational organisation
Geographical concentration of the cluster participants (Committed participants) (3.1.6)	**More than 70 % within a distance of 150 km from the headquarters or any regional office**	50-70 % within a distance of 150 km of the headquarters or any regional office	Less than 50 % within a distance of 150 km of the headquarters or any regional office
Utilisation of regional growth potential (3.1.7)	The cluster has a satisfying regional coverage in terms of membership or maximal potential is already reached. (Sector III of the graph, chapter 3.1.7)	**The cluster has an at least good regional coverage of its participants and/or has experienced significant growth in the last 24 months. It is assumed that growth dynamic of the past will continue in the near future. (Sector II of the graph, chapter 3.1.7)**	The cluster has potential for further growth in terms of participants. There is still a high amount of partners in the region who are not committed to the cluster work. The cluster would certainly benefit from an increased participation of regional actors. (Sector I of the graph, chapter 3.1.7)
CLUSTER MANAGEMENT AND GOVERNANCE			
Level of governance: clear definition of the roles of the cluster management team / Implementation of a governing body / Degree of involvement of the cluster participants in the strategic decision making (3.2.2)	**Strong**	Moderate	Weak
Number of cluster participants per employee (FTE) of the cluster organisation team (3.2.3)	**Appropriate (see Table[5])**	Moderate (see Table[5])	Insufficient (see Table[5])

[5]Number of Cluster Participants per Employee (FTE) of the Cluster Organisation

FTE	Green	Yellow	Red
1	Max. 20 cluster participants in total	21-50	>50 cluster participants in total
2	Max. 50	51-110	>110
3	Max. 90	91-180	>180
4	Max. 140	141-260	>260
5	Max. 200	201-350	>350
6	Max. 270	271-450	>450
7	Max. 350	351-560	>560
8	Max. 440	441-680	>680
9	Max. 540	541-810	>810
10	Max. 650	651-950	>950

	GREEN	YELLOW	RED
Human resource competences and development in the cluster organisation (3.2.4)	High	**Medium**	Low
Number of Personal Contacts between Cluster Management Team and Participants (3.2.5)	**Appropriate**	Moderate	Insufficient
Number of Personal Contacts between Cluster Participants (3.2.6)	**Appropriate**	Moderate	Insufficient
Strategic planning and implementation processes (3.4.1)	Strategy exists and is reviewed regularly and a monitoring system is in place	**Any other answer**	No strategy
FINANCING OF THE CLUSTER ORGANISATION			
Financial sustainability of the cluster organisation (3.3.2	Secured in the long term	**Secured in the short and medium term**	Critical / very critical
Monitoring of the Financial Status of the Cluster Organisation (3.3.3)	**Day-to-day financial controlling and reporting system**	Some tools exist	No tool
SERVICES PROVIDED BY THE CLUSTER ORGANISATION (SPECTRUM AND INTENSITY)			
Acquisition of third party funding (3.5.1)	3 out of 4 service intensities above average of clusters in the same technology area	NO ACTIVITY	3 out of 4 service intensities below average of clusters in the same technology area
Collaborative technology development, technology transfer, or R&D (3.5.2)	3 out of 5 service intensities above average of clusters in the same technology area	Value in between	**3 out of 5 service intensities below average of clusters in the same technology area**
Information, matchmaking and exchange of experience among participants (3.5.3)	3 out of 4 service intensities above average of clusters in the same technology area	**Value in between**	3 out of 4 service intensities below average of clusters in the same technology area
Development of human resources (3.5.4)	3 out of 4 service intensities above average of clusters in the same technology area	NO ACTIVITY	3 out of 4 service intensities below average of clusters in the same technology area
Development of entrepreneurship (3.5.5)	2 out of 3 service intensities above average of clusters in the same technology area	NO ACTIVITY	2 out of 3 service intensities below average of clusters in the same technology area
Matchmaking and networking with external partners/promotion of cluster location (3.5.6)	4 out of 6 service intensities above average of clusters in the same technology area	Value in between	**4 out of 6 service intensities below average of clusters in the same technology area**
Internationalisation of cluster participants (3.5.7)	4 out of 6 service intensities above average of clusters in the same technology area	Value in between	**4 out of 6 service intensities below average of clusters in the same technology area**
ACHIEVEMENTS AND RECOGNITION OF THE CLUSTER ORGANISATION			
Number of general external requests for cooperation received by the cluster organisation (3.6.2)	Large number of external cooperation requests	**Moderate number of external cooperation requests**	No external cooperation request
Media visibility (3.6.4)	High visibility	**Any answer in between**	No visibility

Table 5: Assessment of the benchmarked cluster

4.2 Recommendations

Based on the assessment in the previous chapter, it is now possible to give recommendations for improving actions towards cluster management excellence. However, these recommendations should be adapted to the individual context of the cluster organisation in each case. In some cases it might be the result of specific circumstances or strategic considerations that certain weaknesses occur which have to be accepted.

STRUCTURE OF THE CLUSTER

Age of the cluster organisation (3.1.1):

The cluster organisation is still quite young. This is not a weakness itself, but in general a "cluster organisation age" of at least four years is necessary in order to avoid typical "freshman mistakes" and to gain sustainable stability and recognition. Thus, it is recommended to establish contacts with mature cluster organisations to learn from their experiences. The cluster could be active in the same technology area, but as well insights into approaches to cluster management from other technology areas might be useful.

SERVICES PROVIDED BY THE CLUSTER ORGANISATION (SPECTRUM AND INTENSITY)

Acquisition of third party funding (3.5.1)

The acquisition of third party funding could become one of the objectives of the cluster organisation's work. As the range of services in this service category and/or the intensity of them are lower than the average of the comparative portfolios, it is recommended to implement a broader range of tailor-made services or to run existing services with a higher intensity. Such actions should be based on an analysis of the participants' needs in close cooperation with the potential beneficiaries.

Collaborative technology development, technology transfer or R&D (3.5.2)

Collaborative technology development, technology transfer or R&D activities without third party funding are some of the objectives of the cluster organisation's work. As the range of services in this service category and/or the intensity of them are lower than the average of the comparative portfolios, it is recommended to implement a broader range of tailor-made services or to run existing services with a higher intensity. Such actions should be based on an analysis of the participants' needs in close cooperation with the potential beneficiaries.

Development of human resources (3.5.4)

The development of human resources could become one of the objectives of the cluster organisation's work. As the range of services in this service category and/or the intensity of them are lower than the average of the comparative portfolios, it is recommended to implement a broader range of tailor-made services or to run existing services with a higher intensity. Such actions should be based on an analysis of the participants' needs in close cooperation with the potential beneficiaries.

Development of entrepreneurship (3.5.5)

The development of entrepreneurship could become one of the objectives of the cluster organisation's work. As the range of services in this service category and/or the intensity of them are lower than the average of the comparative portfolios, it is recommended to implement a broader range of tailor-made services or to run existing services with a higher intensity. Such actions should be based on an analysis of the participants' needs in close cooperation with the potential beneficiaries.

Matchmaking and networking with external partners/promotion of cluster location (3.5.6)

Matchmaking and networking with external partners and the promotion of the cluster location are some of the objectives of the cluster organisation's work. As the range of services in this service category and/or the intensity of them are lower than the average of the comparative portfolios, it is recommended to implement a broader range of tailor-made services or to run existing services with a higher intensity. Such actions should be based on an analysis of the participants' needs in close cooperation with the potential beneficiaries.

Internationalisation of cluster participants (3.5.7)

The internationalisation of cluster participants is one of the objectives of the cluster organisation's work. As the range of services in this service category and/or the intensity of them are lower than the average of the comparative portfolios, it is recommended to implement a broader range of tailor-made services or to run existing services with a higher intensity. Such actions should be based on an analysis of the participants' needs in close cooperation with the potential beneficiaries.

5. ANNEX I: Cluster Organisations in Europe – Insights from Assessments by ESCA

Two years after the completion of the European Cluster Excellence Initiative (ECEI) and the continuous activities of ESCA, it is interesting to list insights[6] that have been gathered in the several hundreds of cluster organisation benchmarking cases. Furthermore, it was possible to gain additional, more detailed insights in the context of assessing cluster organisations' management capabilities in respect of the ESCA quality labelling processes.

What are characteristics of good/excellent cluster management, where can general weaknesses be determined, or where could examples of good practice inspire other cluster organisations to revise their strategy and service portfolio?

[6] Lämmer-Gamp, T., Kergel, H. and Nerger, M. (2014): Cluster organisations in Europe – insights from Bronze and Gold Label assessments – Input paper for the workshop "Moving forward the EU policy agenda on cluster excellence", Brussels, September 23rd, 2014 - see www.cluster-analysis.org

5.1 Clusters and Innovation – it does not Work without a Proper Strategy

The elaboration and well-implemented strategy is the key issue for successful cluster development. Such strategies are ideally developed by the cluster organisation in close collaboration with the cluster participants. Stimulating and conduction a process for strategy-building is a key activity for the cluster organisation. Such a (clear) process for developing and regularly updating the strategy should be well defined and conducted, including the following activities:

- Identification of the industry and market challenges, e.g. by conducting an industry analysis on the attractiveness of the strategic segments in which the cluster participants (companies) compete or could compete, based on own studies and/or existing studies. Identifying the attractiveness of the current strategic segment and/or analysing new, more attractive strategic segments. Where appropriate, including opportunities around great societal challenges. In most cases the scope must not only be national, but global.
- Understanding the different business models by analysing the value chain and value systems regarding the existing industrial/technological sector and needed value systems for the transformation of the cluster strategy into a new, more attractive strategic segment. The possibilities of accessing and exploiting necessary knowledge need to be determined and described from outside the cluster as well, and need to be used in this strategic process.
- A proactive attitude coming from the cluster manager is required, in monitoring not only technological but also business trends in the sector, and in identifying and proposing new and more attractive business models/strategic segments. When proposing new models, the cluster manager should identify which activities in the current value chain need to improve and use international references. Benchmarking with other clusters or benchmarking of certain selected activities in comparison to these from other clusters is necessary in order to launch actions/projects to improve innovation. The cluster manager should not only act as a facilitator of projects or as a cluster's secretary, but should show leadership by anticipating trends, questioning weak business models and helping to change it if necessary.

- The links to other strategies need to be understood and articulated so it can clearly be seen that the cluster strategy is in line with other strategies at European, member state, regional, sectoral and of course also societal levels. This will include an explanation of how the cluster strategy will help to deliver the other strategies and vice versa.
- Typical strategy-building tools should be used wherever appropriate: Workshops for small groups, internally and/or externally moderated, strategic planning tools such as SWOT analyses or similar instruments should be considered, feedback-loops with stakeholders, etc.
- As the involvement of the cluster participants should be considered, the cluster participants' feedback (in surveys, specific feedback workshops, etc.) can be obtained. Such results can then be taken into account. The involvement of cluster participants and companies is essential.

5.2 Cluster Organisations' and Cluster Participants' Support Services

There is no doubt that services are a cluster management organisation's key instrument for facilitating collaboration among cluster participants. With their tools and instruments cluster management organisations can trigger certain behaviour from companies, research institutions, universities and other cluster stakeholders which not only have an impact on the individual cluster actor, but also on the cluster in its entirety.

Experience has shown that there is a causal relation between a cluster organisation's services and R&D and business activities of SMEs. There are key impact-relevant services that should be offered by any cluster management organisation in support of cluster participants' activities. It is not about an "either/or" of services, but about the integrated offer of services to commercialise R&D results and thus to trigger innovation-based economic growth. Cluster management organisations that feature such an integration of services are typically based on a strategy that addresses the cluster participants' support needs. The following figure shows such an integrated portfolio of key impact-relevant services that has an effect on business and R&D activities of SME cluster participants by sequencing services such as internal member matching to bring cluster participants together, organising workshops or thematic events to further discuss ideas that evolved from the matchmaking and apply to the funding of projects that are the outcome of workshops or thematic events.

The analysis of the relationship between the intensity of individual services and the overall effect of the cluster management's activities on business and R&D activities of SMEs demonstrated that a high intensity of service provision does not necessarily result in a large impact from the cluster management's activities. Creating effects is therefore not only about the quantity of service provision, but in particular about the quality of service provision in terms of development, content and delivery of services. It is also the combination and interaction of different services that creates the effect of the cluster management's activities on the R&D and business activities of SMEs. This refers to the cluster management organisation's quality or excellence in terms of a professional development and implementation of services that address the needs of the cluster participants.

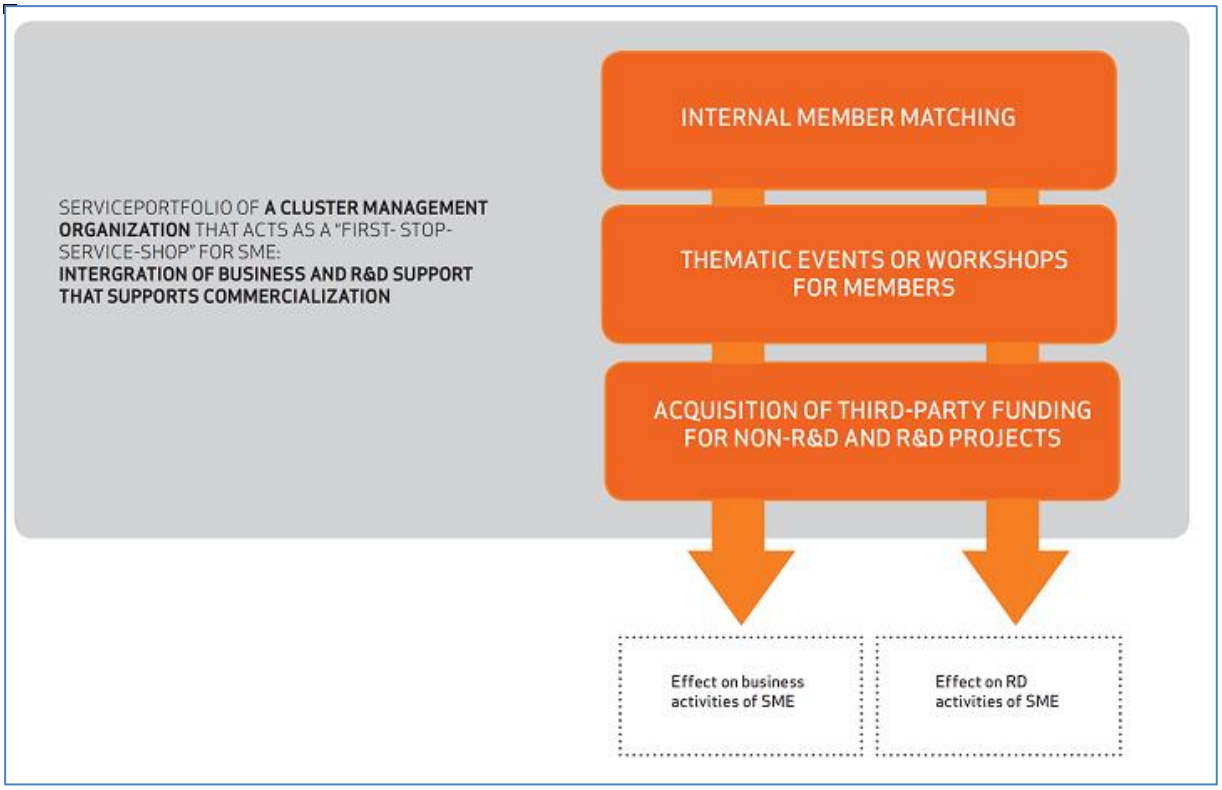


Figure 53: Integrated service portfolio of a cluster organisation

As cross-sectoral collaboration becomes more important for clusters, it is of interest how cluster organisations can stimulate and promote this in an appropriate manner. Not all, but many of the excellent cluster organisations address cross-sectoral collaboration as a key strategic priority in the future. They have realised that the development of new value chains is crucial for the development of their industry. In order to translate their strategic objectives into tangible results, they combine different instruments to facilitate cross-sectoral collaboration, including matchmaking events, working groups or R&D projects. The question is not whether a cluster organisation needs specific cross-sectoral collaboration instruments, but how already existing instruments are coordinated in a service portfolio that strategically addresses cross-sectoral collaboration.

Every new value chain or emerging industry starts with the observation that there is an opportunity for the development of a new market (= “market intelligence services”), then partners are needed to develop ideas on how one can take advantage of these opportunities (= “matchmaking services”). Once ideas are born, they need to be translated into projects (= “project development services”), new knowledge might be worth sharing with others (= “technology transfer services”) and funding is required (= “innovation vouchers”). Last but not least, it is of outmost importance to reach out to other sectors on a constant basis (= “strategic cross-cluster collaboration”).

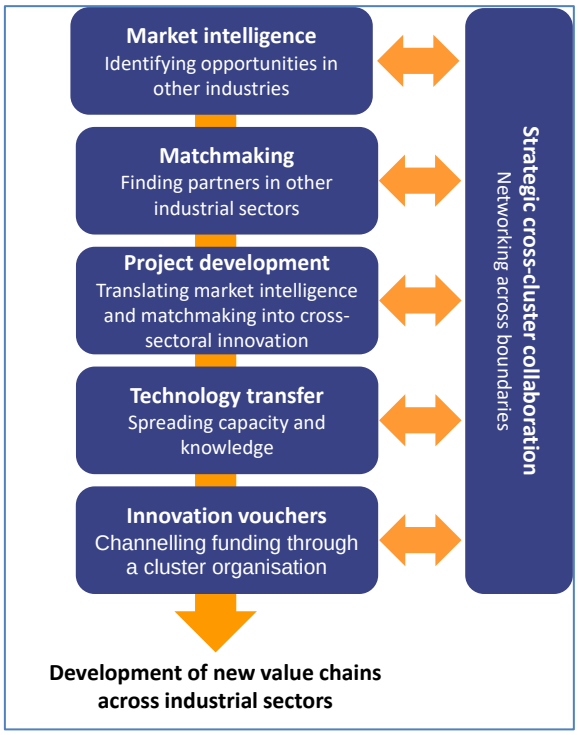


Figure 54: Service portfolio for the strategic promotion of cross-sectoral collaboration

5.3 Communication and (Self) Marketing

The best strategy, complemented by the best services, and the generation of many positive effects and impacts should be used for promotion: internally within the cluster demonstrating the appropriateness of the ongoing actions to all participants, but also externally promoting the cluster as such towards the various levels, policy, science, industry as well as supporting the cluster participants' individual communication approaches.

A well-structured web-appearance, in the local language and also at least in English language, is fundamental. Priority should be given to the clarity and clear structure of the page, while not all aspects need to be included in a public web presence. On the other hand, available public material should be accessible, if it is still relevant content-wise.

Any communication and appearance in media should be monitored, nationally and internationally (if internationalisation is of importance in the strategy). How visible is the cluster in the technological/business community, does the recognition match the expectations according to targets being set as part of the strategy?

External communication should certainly be complemented by internal communication which is for cluster participants only. The number of cluster organisations using a Customer Relation Management tool is increasing. With such a tool, an information filtering process can be supported to provide information to cluster participants in a very individual manner.

Experience shows that well-managed clusters generally reach high quality levels in these overall aspects of communication and (self) marketing.

5.4 Weak Areas Related to the Management of Cluster Organisations

Slightly more than half of the cluster organisations in Europe have a critical relationship between committed and non-committed cluster participants, meaning a higher percentage of cluster participants (> 20 %) to be considered as non-committed.

Committed participation of companies and research actors is a key requirement for the successful development and implementation of cluster projects. If companies and research actors commit themselves by contributing financial means (e. g. membership fees) and/or by actively participating in cluster activities such as projects or matchmaking events on a regular basis, the cluster organisation can better reach its strategic objectives. Non-committed cluster participants are often mere followers of cluster activities looking for access to advantages without costs or without the provision of own contributions to the entire cluster.

Clusters should have the right balance between companies, universities, research institutions, service providers and government agencies. Again, slightly more than half of the cluster organisations face challenges in this regard, either because the share of companies in the cluster is too small in comparison to the number of research actors and intermediaries or because they lack research actors and/or any other intermediaries at all.

About three-quarters of the cluster organisations do not pay enough attention to further education and training of their staff (life-long learning). As industries are constantly developing, it is of outmost importance that the cluster management keeps itself updated by participating in technical and management training on a regular basis and in a planned manner while having resources earmarked accordingly. In fact, a reason for the neglect of further education and training is often a lack of financing.

65 % of the cluster organisations do not have a stable financial outlook that goes beyond the next two years. The reason for this can be found in the fact that many cluster organisations receive financial support from public programmes. These programmes generally are limited in time, with funding periods of 2-3 years. Another explanation is that they have not yet developed a convincing “business case” that encourages cluster participants to finance the cluster management on a more long-term basis.

Cluster organisations were asked to present success stories to provide evidence of their influence on industry development. Although most of the cluster organisations are able to present good projects and initiatives that indeed demonstrate good work, only a few cluster organisations can present success stories that qualify as “excellent success stories” meaning that projects are somehow unique and ground-breaking in terms of entering new territories of cluster development and activities that change existing structures in a profound way, e. g. joint development of study courses with universities that contribute to the development of skills in emerging industries.

40 % of the cluster organisations do not conduct satisfaction surveys among their cluster participants, although such surveys help to collect information about the support needs of cluster participants and provide feedback on how successful the cluster organisation’s work is. Such feedback is essential for the further development of a strategy and a service portfolio that facilitates the development of the cluster. It may also help to develop services for which cluster participants are ready to pay.

Further weaknesses could be determined in particular when analysing cluster organisations from the Central, Southern and Eastern European Member States. Reasons however, could not be extracted from the data available:

- Several clusters feature a sub-critical number of committed cluster participants. Two thirds of the clusters have less than 40 participants. As an outcome of ECEI it was stated that a minimum of 40 participants appears to be necessary to have a well-prepared and not only sufficient nurturing ground for the development of ideas and projects within a cluster.

- Clusters are less integrated in the national and regional innovation system. While universities and research institutions participate in the clusters, clusters interact only to a limited extent with relevant intermediaries, as innovation service providers, business incubators, technology transfer agencies, financial institutions, etc.

- 65 % of the cluster organisations offer only a limited number of services to the cluster participants or focus only on few areas. In order to support innovation, the service portfolio of cluster organisations should include at least the following service areas: information/market intelligence, matchmaking, initiation of R&D and innovation projects, promotion of the cluster and internationalisation. Human development initiatives or support of entrepreneurship are also important areas.

5.5 The New Challenge: Cross-Sectoral Collaboration

There is a lot of discussion about what role cluster organisations can play for the development of new value chains and emerging industries. Policy makers raised high expectations to cluster organisations in this respect, expecting them to be a favourable environment for facilitating entrepreneurship and cross-sectoral collaboration.

Cluster organisations whose main rationale it is to match different stakeholders within a cluster are ideal intermediaries for creating an “open space” or brokerage platform, where businesses, knowledge institutions and business support organisations can meet to search for and explore radically new, cross-sectoral business solutions. Moreover, this is only possible with a strategy that goes beyond the generation of individual projects or innovations driven more by chance than logic.

Insights into cluster strategies and service portfolios of cluster organisations demonstrate that the majority of cluster organisations do not yet follow a strategy in their daily work that aims for “holistic approaches”. Although guided by a strategy, they are following an “ad hoc approach” that is informed mainly by the priorities of the R&D and business development funding programmes that are available at a given point in time. This results in a number of rather solitaire projects that have limited or even no strategic perspective. This observation applies in particular to cluster organisations that are mainly driven by public stakeholders or cluster programmes without clear targets. These cluster organisations are mostly following an approach focussing on a specific industry and trying to replicate successful cluster organisations. They can be successful in terms of promoting industrial development along an existing value chain, but it is not likely that they will create entirely new value chains.

In contrast, more and more cluster organisations are looking beyond the borders of industrial sectors by integrating different sectors within an existing or newly emerging value chain. Projects of these cluster organisations are not driven by chance, but pursue the com-

mon objective of the cluster actors to develop systemic solutions for new markets and technology areas. Their strategies are much more sophisticated and combine R&D projects with technology transfer and market development activities that are coordinated by a highly professional cluster organisation based on a business model that is owned by all cluster stakeholders. Such strategies result from evolutionary processes.

6. ANNEX II: European Cluster Excellence Initiative

6.1 Assessment of the Cluster Organisation According to the Set of Quality Indicators Developed in the European Cluster Excellence Initiative (ECEI)

The "European Cluster Excellence Initiative (ECEI)", conducted 2009-2012, was an international project, co-financed by the European Commission, DG Enterprise and Industry (today DG GROWTH), which aimed to develop measurement procedures and approaches to assess cluster management excellence and appropriate tools for its improvement. An independent, voluntary proof of cluster organisation management excellence which is accepted and recognised all over Europe, or even beyond, was sought.

A methodology was developed, aiming to identify weak spots and to motivate cluster managers to take part in an improvement process, to become better by comparing themselves to others and learning from the best.

Thus, materials and tools were elaborated and provided in order to help cluster managers to become "excellent cluster managers", today available by the "European Foundation for Cluster Excellence (EFCE)[7].

Secondly, a "Cluster Organisation Management Excellence Label (Quality Label)" was to be developed to award "excellent cluster managers", based on a set of harmonised indicators. This development resulted in the "Cluster Management Excellence Label GOLD – Proven for Cluster Excellence" now being offered by ESCA to interested cluster organisations worldwide.

Furthermore, a concept for a "European Cluster Manager Club" was foreseen which in the long term shall serve as a communication and experience exchange platform for excellent cluster managers. Today, the "Cluster Excellence Expert Group", a gathering of cluster managers awarded with the GOLD label can partly be considered as such.

The cluster benchmarking approach and the approach for assessing cluster management excellence according to ECEI are very similar and are built on one other. Many of the indicators used within the benchmarking exercise are the same as in the ECEI approach. The main difference is that the benchmarking exercise approach is a self-assessment and no further proof for the data is required. In contrast, the ECEI approach is based on an external assessment which states whether a cluster management fulfils certain quality criteria or not, based on proof of evidence being provided. Consequently, the ECEI indicators reflect excellence thresholds, which is not the case in the benchmarking exercise.

A set of 31 quality indicators, measurement procedures and excellence thresholds have been elaborated in ECEI. A list of these quality indicators is published under www.cluster-analysis.org. A process was defined leading to the "Cluster Management Excellence Label GOLD – Proven for Cluster Excellence" for excellent cluster organisations (see Chapter 6.3).

The following table lists selected cluster organisation management excellence indicators of ECEI where relevant data was collected within the benchmarking exercise (the full set of ECEI indicators is not covered here). In the three columns on the right it is indicated how the cluster

[7] see www.clusterexcellence.org

organisation performs according to the quality level defined by ECEI.

The colours indicate the level of performance as follows:

- GREEN: Excellent level of performance. Only minor improvements are – if at all – possible;
- YELLOW: Reasonable level of performance. Potential for improvements;
- RED: Certain minimal criteria for good practise in cluster management are not reached and/or it is recommended to take these weak spots into consideration for the further development of the cluster organisation management.

Thus, a quick overview is provided in areas of improvement for reaching a level of cluster management excellence which could lead to the GOLD Label. However, it has to be clearly noted that the data for this overview was assessed in a different manner during the benchmarking as it would have been assessed within a GOLD label assessment procedure and that some of the projections do not represent the full scope of the details of the ECEI indicators.

	GREEN Quality Level	YELLOW Quality Level	RED Quality Level
STRUCTURE OF THE CLUSTER			
Committed cluster participation		x	
Composition of the cluster participants		x	
Number of committed cluster participants in total		x	
Geographical concentration of the cluster participants	x		
TYPOLOGY, GOVERNANCE, COOPERATION			
Maturity of the cluster management			x
Human resources available for cluster management	x		
Lifelong learning aspects for the cluster management team			x
Stability and continuity of human resources of the cluster management team	x		
Stability of cluster participation	x		
Clarity of roles – involvement of stakeholders in decision making processes	x		
Direct personal contacts between the cluster management team and the cluster participants	x		
Degree of cooperation within the cluster participants	x		
Integration of the cluster organisation in the innovation system			x
FINANCING			
Prospects of the financial resources of the cluster organisation		x	
Share of financial resources from private sources	x		
STRATEGY, OBJECTIVES, SERVICES			
Documentation of the cluster strategy	x		
Review of the cluster strategy and implementation plan	x		
Degree of fulfilment of the implementation plan			x
Financial controlling system	x		
Activities and services of the cluster management			x
Working groups	x		
Cluster organisation's web presence		x	
ACHIEVEMENTS, RECOGNITION			
Recognition of the cluster in publications, press, media		x	
Success stories		**No data provided**	
Cluster participants' satisfaction surveys			x

Table 6: ECEI set of quality indicators

6.2 Requirements to Excellence According to Relevant ECEI Indicators

The following requirements are supposed to be fulfilled by the cluster organisation in order to reach the level of excellence “GREEN” according to the ECEI indicators.

STRUCTURE OF THE CLUSTER

Committed Cluster Participation

Participants of a cluster should commit themselves by some kind of written agreement. Such a document should indicate potential benefits for the participants but also their duties as a committed cluster participant. At least 80% of the cluster participants should be committed participants. The idea behind this limitation is that the cluster management should be able to focus its activities on the needs of the committed participants; therefore the number of non-committed participants is to be very limited. Companies, research stakeholders or any other parties that have registered just for an email-newsletter or have attended a workshop or event just once without contributing anything to the progress of the cluster should not be considered as committed cluster participants.

Composition of the cluster participants

More than 70 % of the committed participants of the cluster should originate from industry (both SME and non-SME). The cluster should also count at least one research institution and at least one education organisation as committed participants. Finally, the cluster should incorporate at least one committed participant from the following categories: Intermediates, government/public organisations, marketing, others.

Number of committed cluster participants in total

A membership of more than 40 committed participants is considered necessary to create a critical mass for projects that benefit the entire cluster.

TYPOLOGY, GOVERNANCE, COOPERATION

Maturity of the cluster management

As it takes time to successfully develop and implement activities for a cluster, a cluster organisation should normally need at least four years to reach a sufficient maturity.

Lifelong learning aspects for the cluster management team

Measures for lifelong training for the cluster management team should be planned and based on a sufficient budget. They should be implemented on a regular basis with more than two training days per year for every staff member.

Integration of the cluster organisation in the innovation system

The cluster organisation should maintain good cooperation contacts with other institutional innovation support and service providers, business and innovation promoters, funding authorities, etc. At least three of these actors should either be official committed participants of the cluster or have implemented strategic partner agreements with the cluster. They should play an active role for the general benefits of the cluster participants. By this, the cluster organisation can be considered as well integrated into the national/regional/local innovation system, which is seen beneficiary for the committed cluster participants.

FINANCING

Prospects of financial resources

The financial situation of a cluster organisation can be considered as excellent if the budget is secured for the next two years of activity and if there is a positive outlook beyond.

STRATEGY, OBJECTIVES, SERVICES

Degree of fulfilment of the implementation plan

The implementation plan with measurable targets and dedicated budgets should exist in a written form and fit to the strategic challenges. The degree of fulfilment of the implementation plan during the last year of activity should be above 80 %.

Activities and services of the cluster management

It has been proven that a certain intensity of activities and services initiated and/or performed by the cluster management is necessary in order to achieve positive effects, for the cluster participants as well as for the industrial/technological sector in general. Certain continuity and a regular schedule of activities and services as well are necessary. However, cluster management should focus on the most promising areas of activity, according to the demands of the cluster participants and/or the strategic challenges being documented in the cluster strategy and the related implementation plan.

Cluster organisation's web presence

A regularly updated content about the cluster organisation should be available in the local language on a website and on social networks/platforms like LinkedIn, the European Cluster Collaboration Platform or Facebook, giving a general overview and details on the work of the cluster and possibly the technology area as well as important contact points. As internationalisation of clusters is an important issue, the public part of the web presence should be available in the English language, plus the languages of the key countries targeted for collaborations and market opportunities. Furthermore, contacting cluster participants should be possible via the web presence where the appropriate contact details should be available.

ACHIEVEMENTS, RECOGNITION

Recognition of the cluster in publications, press, media

Public relation activities could be increased, there seems to be a limited awareness of the cluster on the local/regional level, on national/international level and/or within the industrial sector.

Success stories

Success stories of the cluster or its participants – if significantly supported by the activities of the cluster organisation – should be communicated by the cluster organisation. The success stories should highlight the following points:

- The complexity of the objectives and activities;
- The positive impact on the majority of the cluster participants and industry in general;
- The relevance and degree of contribution to the achievement of the cluster's strategic objectives;
- The contribution to the sustainability of the cluster organisation development.

Cluster participants' satisfaction surveys

Cluster participants' satisfaction surveys should be carried out and analysed, in terms of updating strategy and implementation plan, at least bi-annually. Cluster management should serve and aim for the benefit of their committed cluster participants. This however implies that the cluster organisation is aware of the needs of the participants and is informed of any specific demands. The degree of satisfaction of the cluster participants and/or even external stakeholders of the cluster should be assessed on a more or less regular basis.

6.3 ECEI Labels Recognising Improvements and Excellence in Cluster Management

The aim of the ECEI project was the development and implementation of a set of tools and methodologies dedicated to cluster organisations, in order to improve their work and to demonstrate their excellence in cluster management. One of the instruments developed and being introduced starting 2011 is the ECEI label system, recognising the status, improvements and excellence in cluster management.

Cluster organisations, which have taken part in an ESCA cluster benchmarking exercise as described in this report are awarded with the Cluster Management Excellence Label "BRONZE – Striving for Cluster Excellence". This benchmarking provides a documented initial level of improvement processes for cluster management and uses indicators similar to the quality indicators of ECEI. The validity of the BRONZE label is limited to two years from the date of the benchmarking interview. The label cannot be considered to be a justification of an excellence status that is already reached, but rather a justification that the cluster organisation is considering and working on improvements of its cluster management's activities.

The "Cluster Management Excellence Label SILVER – Dedicated to Cluster Excellence" certifies a longer-term ongoing successful process of improving cluster management in the cluster organisation. The eligibility criteria for applying for this label are:

- having achieved a BRONZE label more than 1.5 years ago and being able to present full proof of evidence in at least three areas where significant improvements could be achieved since the last benchmarking interview AND
- all minimum criteria of the indicators in regard to the GOLD label are met.

The SILVER label is awarded upon positive validation of these improvements by an ESCA expert. The SILVER label, valid for two years, therefore indicates that a cluster organisation is successfully working on improving cluster management in the long term.

The "Cluster Management Excellence Label "GOLD – Proven for Cluster Excellence" certifies excellent cluster management according to the approach developed in ECEI. The GOLD label is awarded to cluster organisations, which have reached a cluster management excellence score of ≥ 80 % during an external expert assessment, according to the 31 quality indicators elaborated within ECEI. The procedures of expert assessment and award of the label are monitored by a "Cluster Excellence Expert Group", consisting of all cluster managers holding a valid GOLD label. By this an international recognition of the GOLD label is guaranteed.

The validity of the GOLD label is limited to two years. It can be extended in validity for another two years in various manners:

- Improvement projects have successfully been implemented and validated according to „EFQM Committed to Excellence"[8] during the course of the GOLD label validity.
- Successful management improvement projects being conducted during the two years of GOLD label validity have been certified by

[8] all details, see www.efqm.org

any well-recognised authority for management certification (upon application and pre-approval of procedure by ESCA)

- Re-assessment of ECEI quality indicators has been carried out by ESCA experts.

The described labelling system for cluster organisations can be considered to be one of the main results of the ECEI project. The former ECEI partners and the European Commission as co-financing authority of ECEI have mandated ESCA to follow-up the ECEI results regarding benchmarking and labelling of cluster organisations.

ESCA therefore acts as a one-stop shop for cluster organisations interested in being awarded with these labels and for this purpose cooperates with a pool of specifically trained ESCA experts from all over Europe, who are involved in performing benchmarking interviews and the on-site assessments. See an updated list of experts on www.cluster-analysis.org.

Furthermore, monitoring and decision-making bodies regarding the award of labels are implemented:

- The "**Technical Advisory Board Cluster Management Excellence**" is responsible for the continuous development of the methodology, indicators, assessment procedures, mainly for the GOLD label.
- The "**High-Level Policy Group**" is responsible for promoting the approaches of cluster management excellence on policy and programme level in different countries and regions.
- The "**Cluster Excellence Expert Group**", consisting of cluster managers holding a valid GOLD label, supervises ESCA in respect to the assessments and awards of the GOLD label.

All groups cooperate with each other and with ESCA. ESCA provides information regarding organisational issues and experiences of the work as inputs to these groups. Individual data provided by cluster organisations in any assessment process in general is not distributed. Only selected individual data is provided to the "Cluster Excellence Expert Group" in the context of GOLD label assessments (however, data is pre-discussed and approved by the cluster organisation before provision).

Please contact ESCA for any details on the necessary steps that have to be taken and the costs for achieving any of the labels and/or consult: www.cluster-analysis.org.

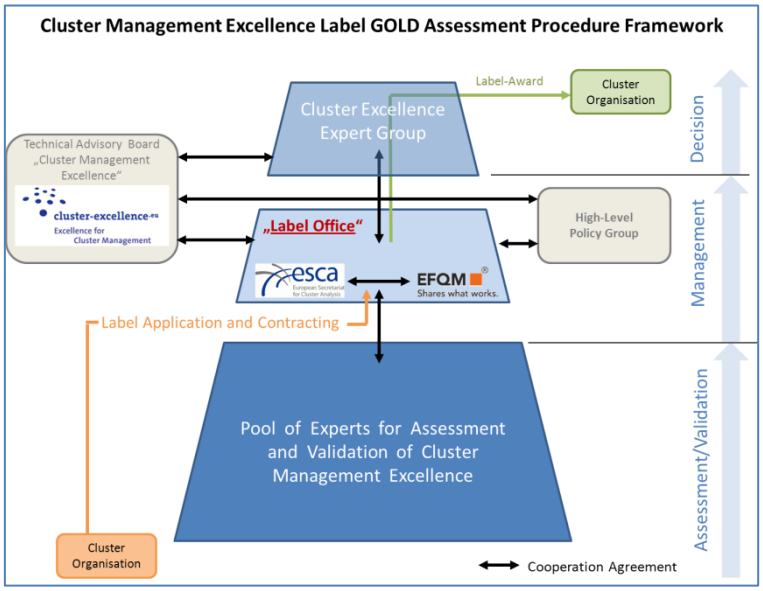


Figure 55: Cluster Management Excellence Label GOLD Assessment Procedure Framework