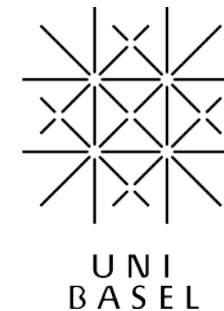


The FUTURE of SWISS HYDROPOWER

An INTEGRATED ASSESSMENT of OPERATION, INVESTMENT and SUSTAINABILITY

Results of the online questionnaire

Collection of the results // 9th of March 2015



Structure of the questionnaire

- 50 principal questions (and many sub-questions)
- (3) 2 parts :
 - (Formal presentation)
 - Factors and drivers affecting the future of hydropower
 - Impacts resulting from the awaited development of hydropower

Results analysis

- Open online from the 10th of February 2015 until the 7th of March 2015 (Collection of the data: 9th of March 2015)

- 35 participants:

Business/Industry	16
Parliament/Council	0
NGO	1
Administration (federal, cantonal)	3
University/Research Institute	12
Other	3

- **1st approach** : Analysis of the frequency of similar answers in the questionnaire
- **2nd approach**: Division of the participants into two main groups (includes the very large majority of the participants)
 - University and research institute representative (Uni&RI)
 - Business and industry representative (Bus&Ind)

and subsequent analysis in terms of means.

- We assume the following results will show trends and reflections for further discussions

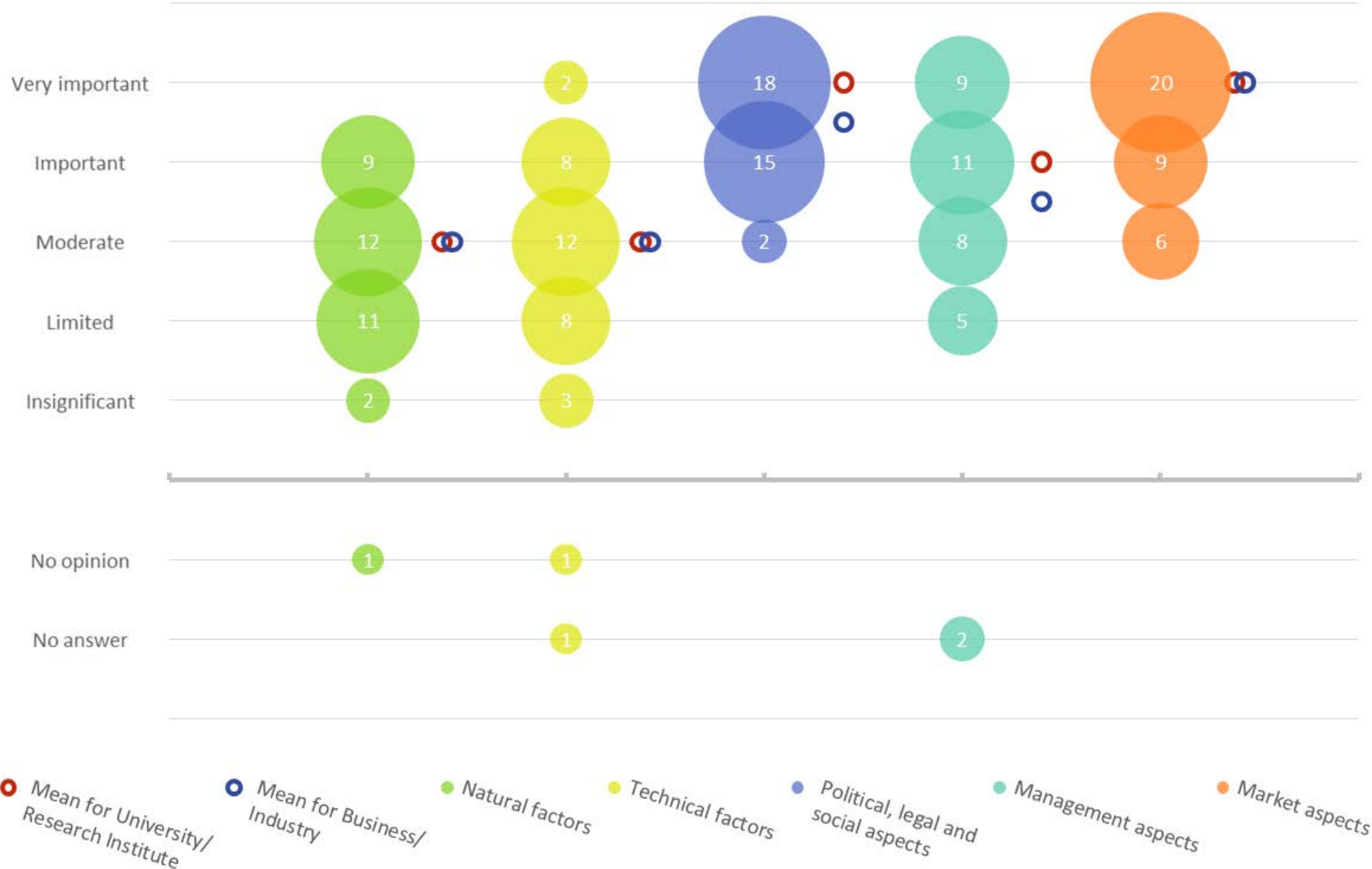
Results presentation

- Presentation of two charts for each group of factors/impacts (short and long term perspective)
 - Includes both the frequency and the answers means analysis
 - Highlights of the most noticeable trends/observations between the different factors, the short and long term, and the means between Uni&IR and Bus&Ind.
 - The difference between the group means is only highlighted if it is equal to one magnitude of importance
- Open questions ensuing from the results
 - We expect the results to lead to open questions, which will be discussed either at the end of the present presentation, or during the two following panels in the afternoon. Don't hesitate to raise questions or observations at the end of the presentation!

Part I: Factors

Principal factors

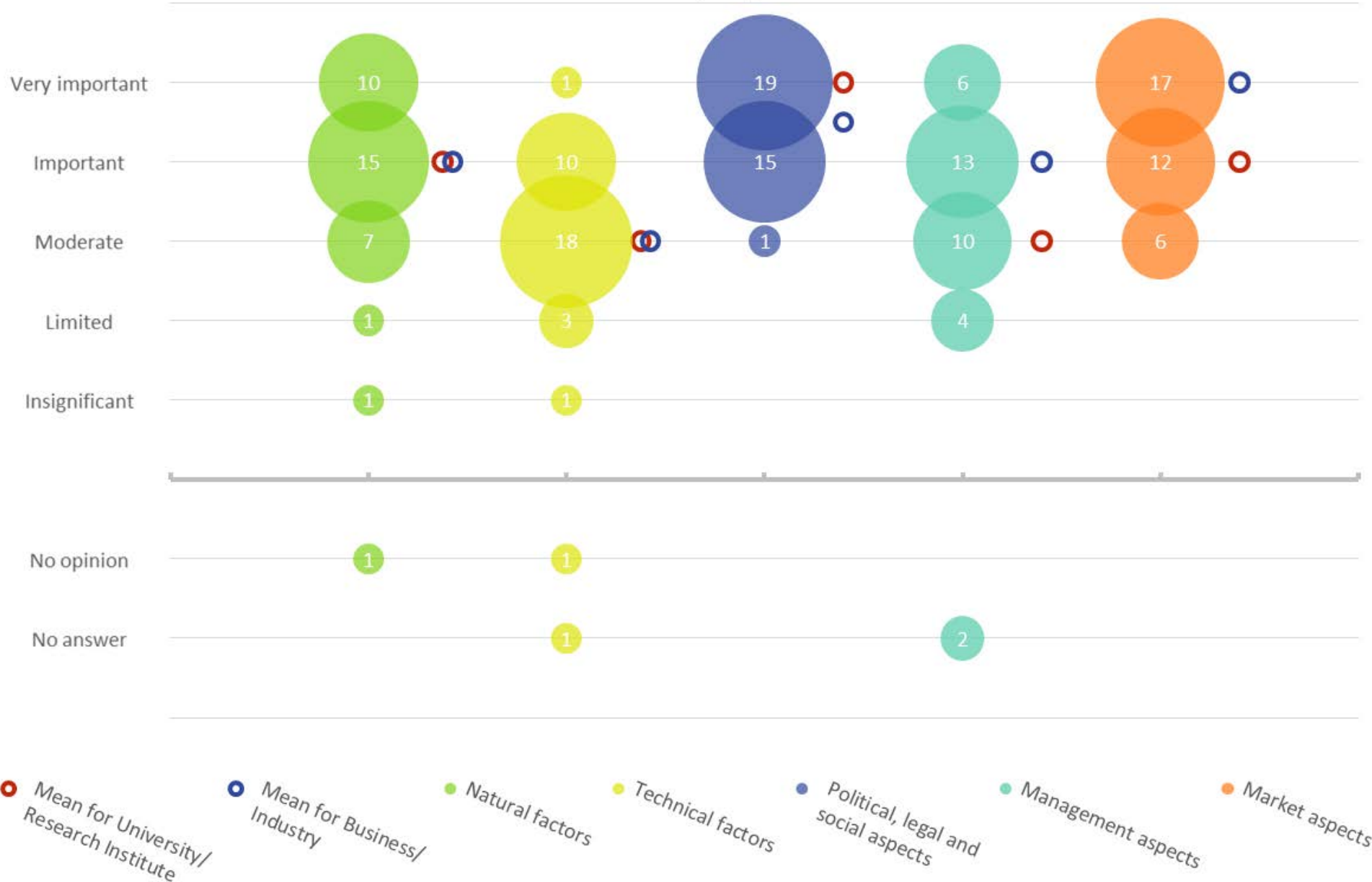
Relative influence of each group of factors on the future development of Swiss HP - SHORT TERM perspective



Main trends and reflections:

- *Political, legal and social aspects* and *Market aspects* are considered as the most important factors
- *Management aspects* also considered as important, to a lesser extend
- Hard to distinguish the differences between *Natural factors* and *Technical factors*

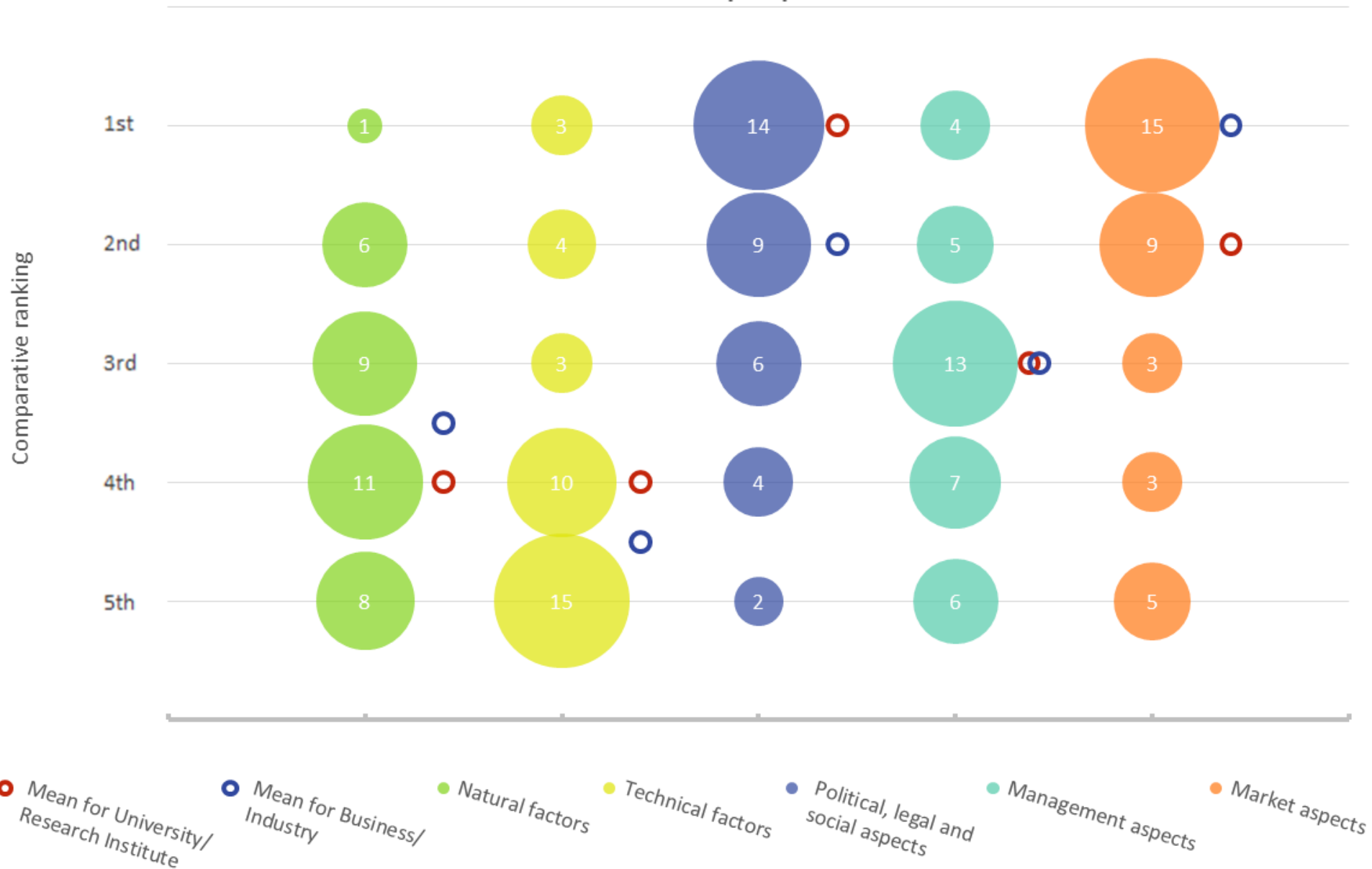
Relative influence of each group of factors on the future development of Swiss HP - LONG TERM perspective



Main trends and reflections:

- *Political, legal and social aspects* and *Market aspects* are considered as the most important
- Increase of importance regarding *Natural factors*.
- Uni&RI tend to assess a **decrease** of importance for *Management aspects* (from important to moderate)
- Bus&Ind tend to assess an **increase** of importance for *Management aspects* (from important/moderate to important).
- Uni&RI tend to assess a **decrease** of importance for *Market aspects* (from very important to important).

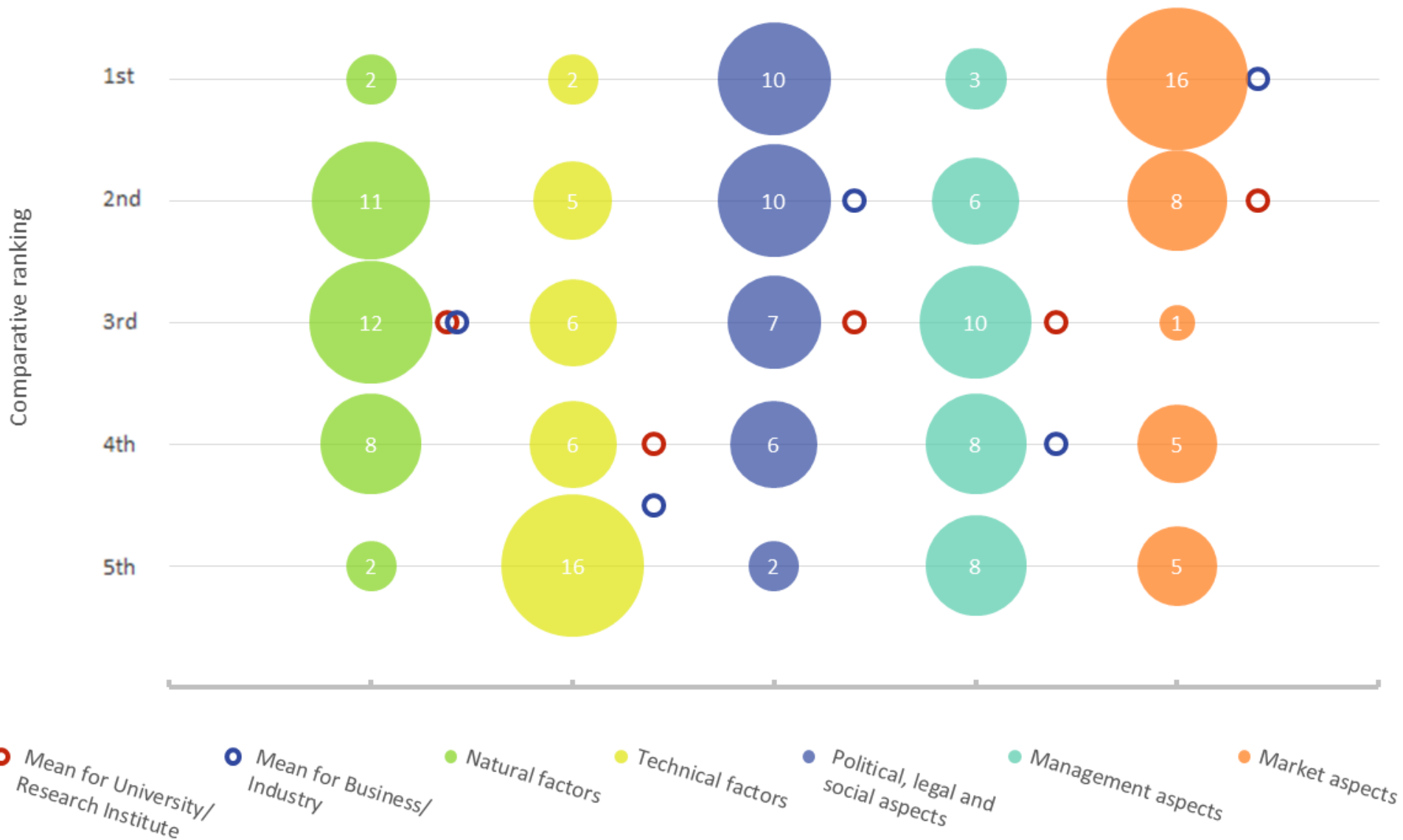
Comparative ranking of each group of factors on the future development of Swiss HP - SHORT TERM perspective



Main trends and reflections:

- *Political, legal and social aspects* and *Markets aspects* assessed as the 1st place ranking.
- *Uni&RI* tend to consider the first one (*Political, legal and social aspects*) as the first in terms of importance (*Political, legal and social aspects*)
- *Bus&Ind* tend to attribute this first position to the second one (*Markets*)

Comparative ranking of each group of factors on the future development of Swiss HP - LONG TERM perspective



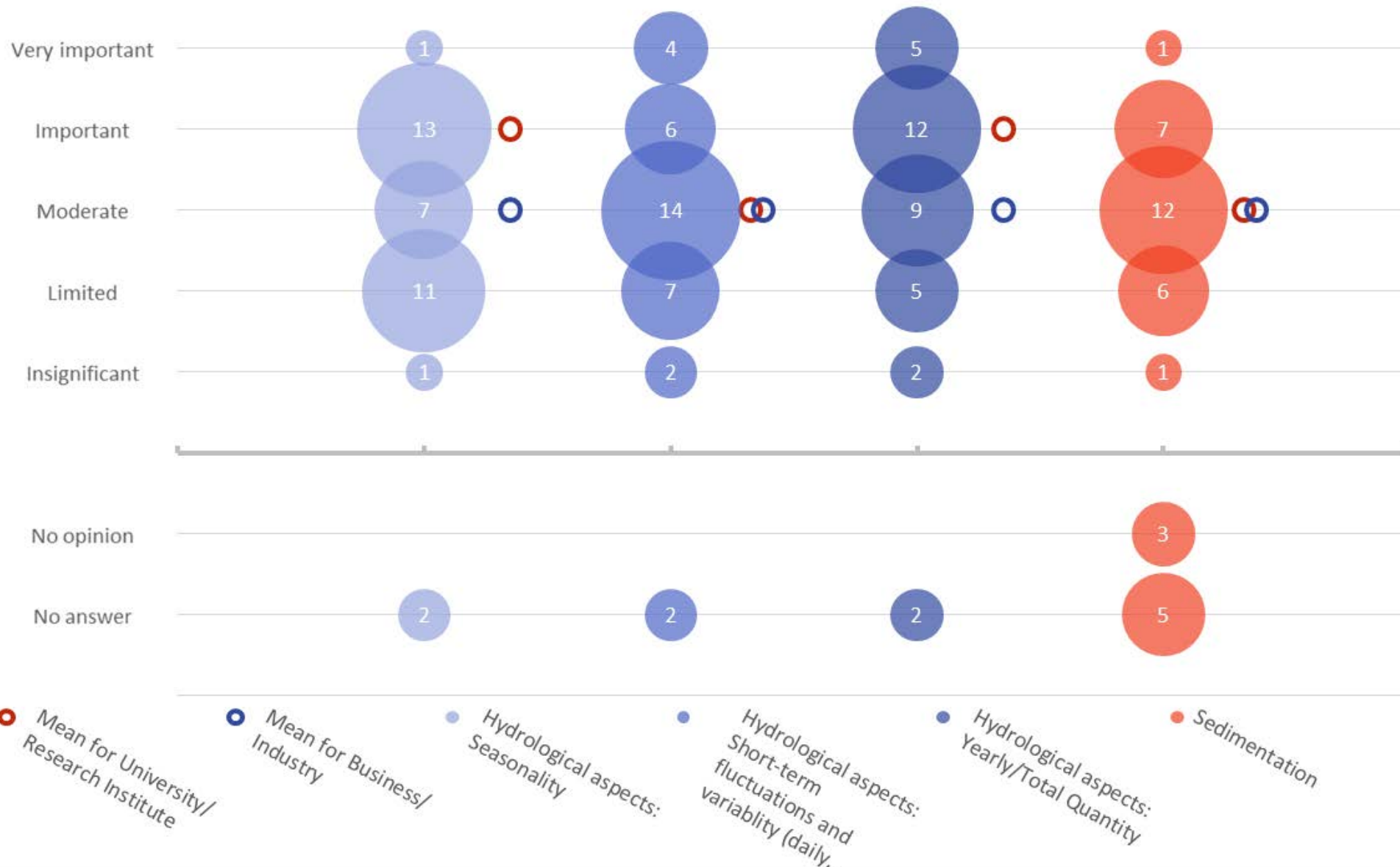
Main trends and reflections:

- *Market* appears as the 1st factor in terms of importance in the long term.
- In the long term, Uni&RI seem to assess a drop rank of *political, legal and social aspects* (from 1st to 3rd place).
- Uni&RI tend to rank *Market aspects* 2nd and *Management aspects* 3rd (along with other).
- Bus&Ind tend to rank *Market* as the 1st and *Management* as the 4th

Part I: Factors

Specific, sub-factors

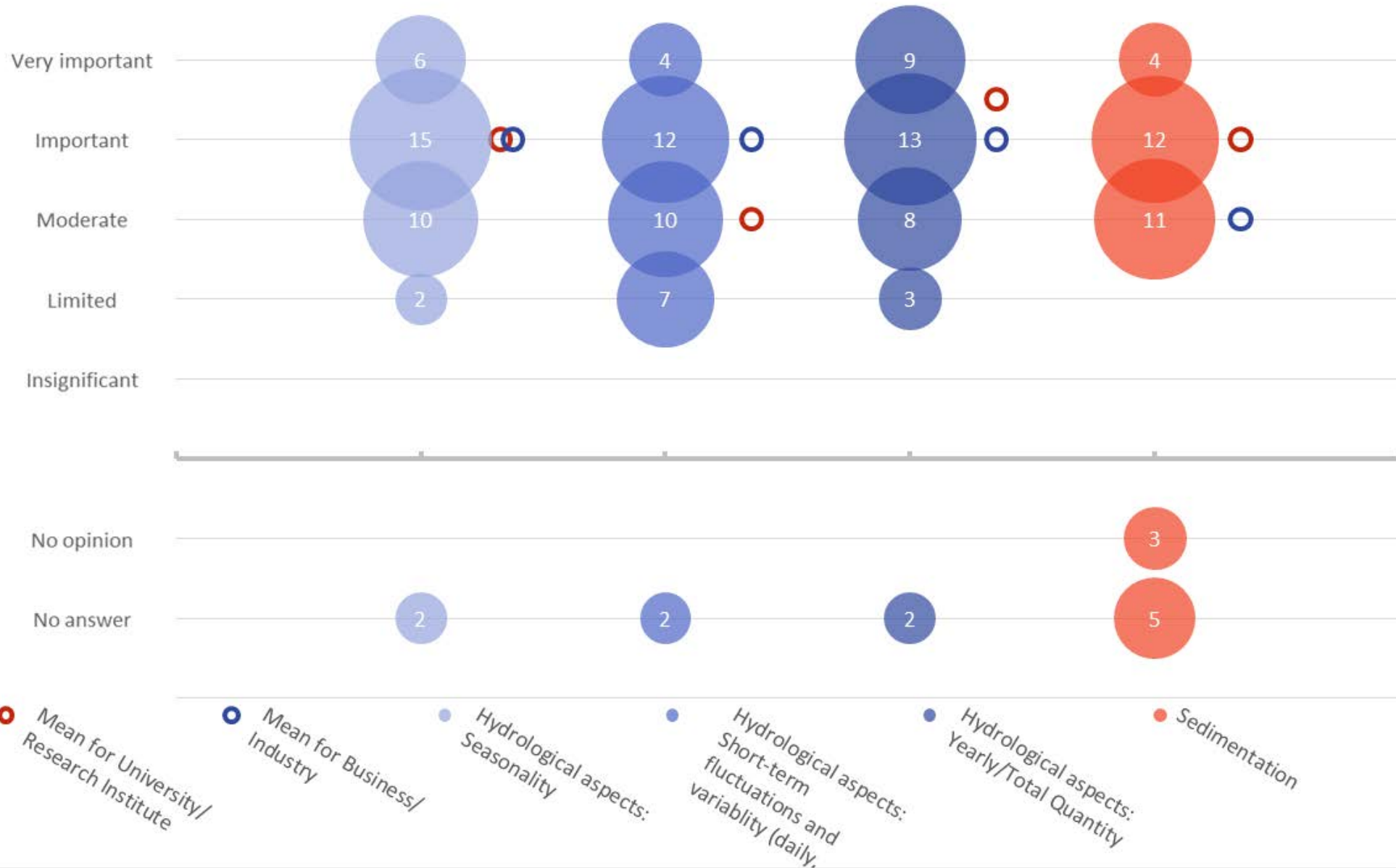
Influence of *Natural Inputs* on the future development of Swiss HP - SHORT TERM perspective



Main trends and reflections:

- *Hard to distinguish which of the hydrological aspects is the most important (Yearly/total quantity?)*
- *Seasonality and Yearly/Total Quantity appear as more important for Uni&RI than for Bus&Ind*

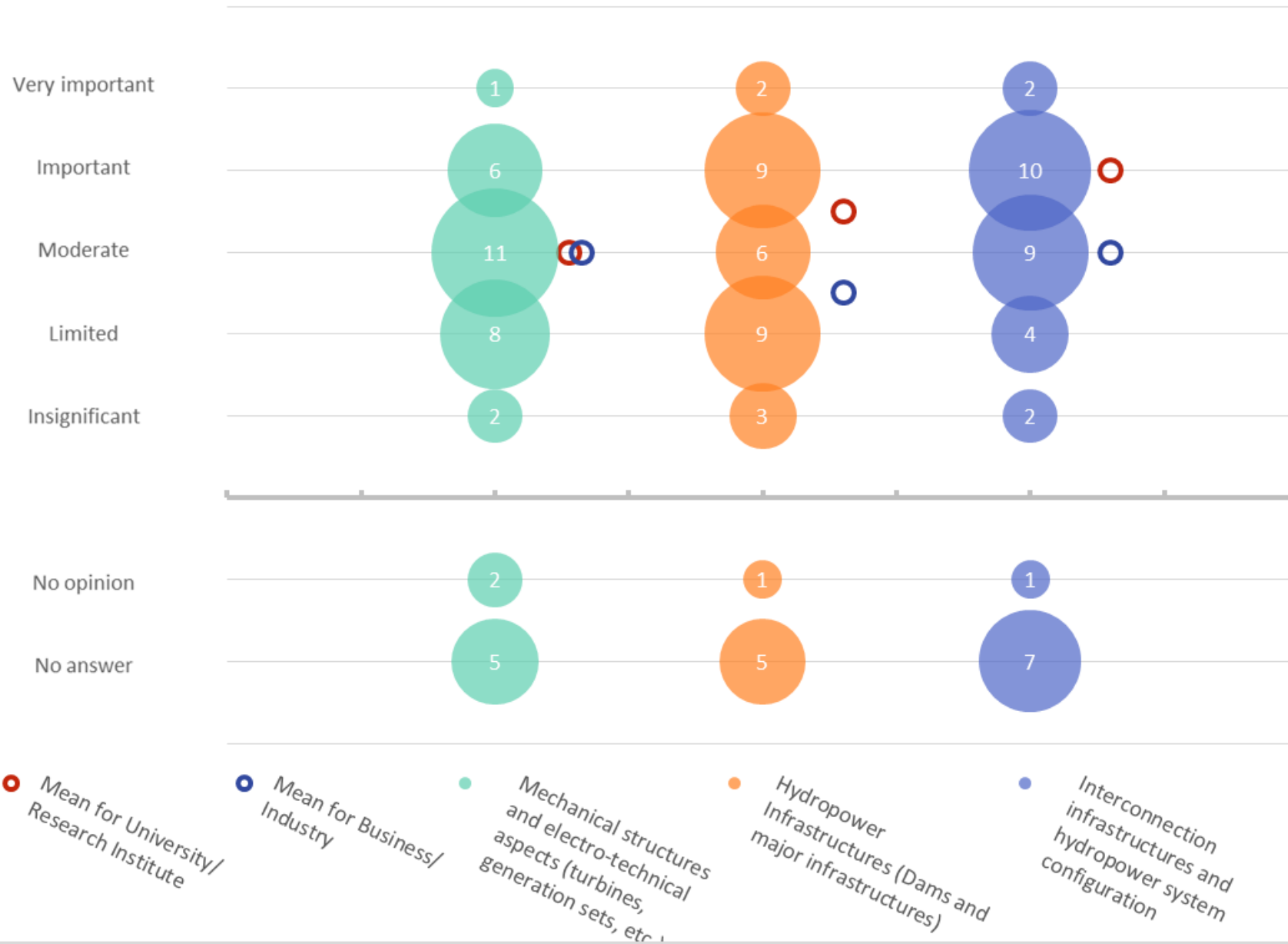
Influence of *Natural Inputs* on the future development of Swiss HP - LONG TERM perspective



Main trends and reflections:

- *Hydrological aspects* look even more similar for the LT
- Compared to ST, Bus&Ind assess an increase from moderate to important for the all three *Hydrological aspects*.
- Sedimentation is considered as more important for the LT by Uni&RI (from moderate to important).

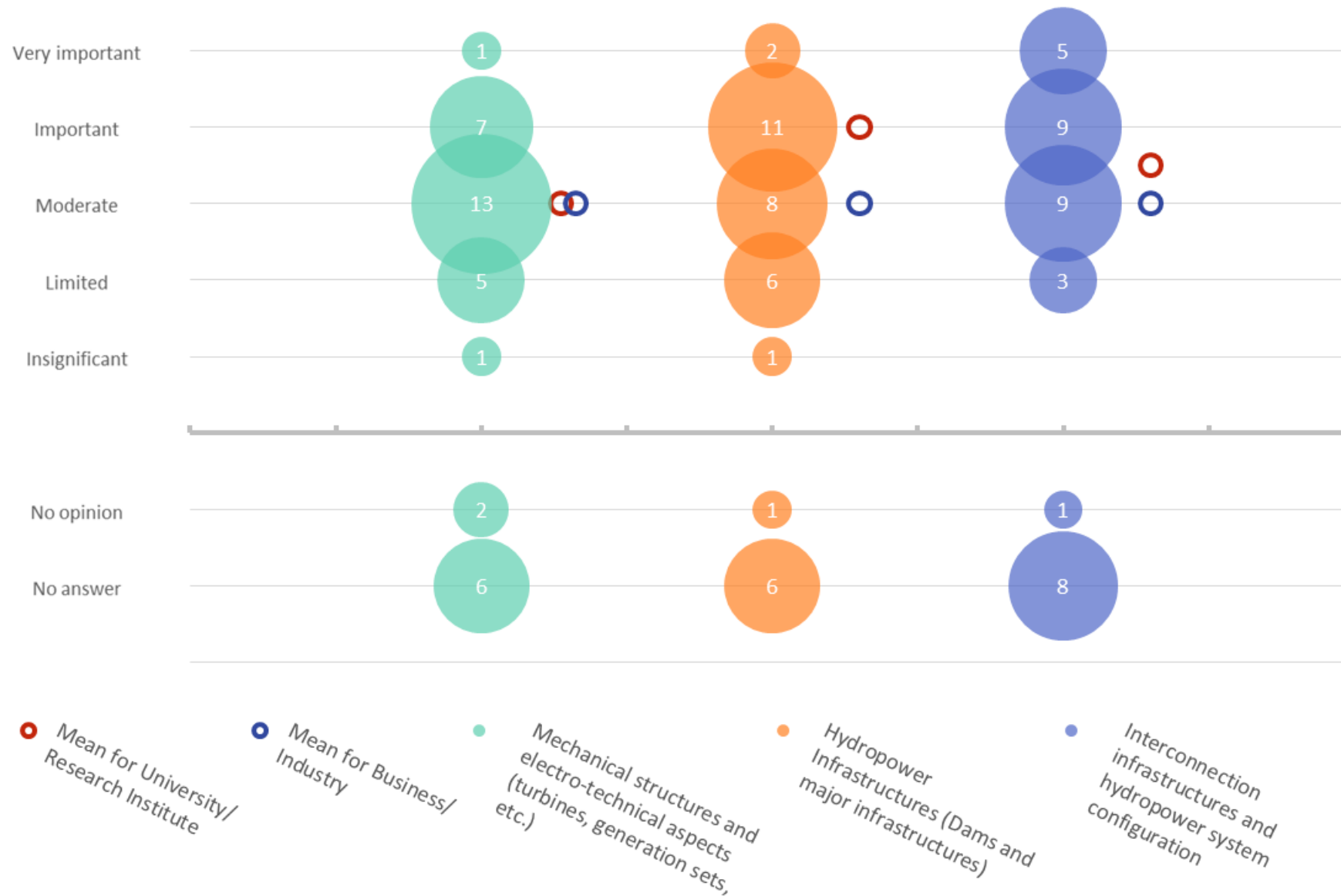
Influence of *Technical Inputs* on the future development of Swiss HP - SHORT TERM perspective



Main trends and reflections:

- Hard to distinguish which of the *Technical inputs* is the most important (*Interconnection infrastructure and hydropower configuration?*)
- Uni&RI seems to give a higher importance to *Hydropower infrastructure* and *interconnection infrastructures*.

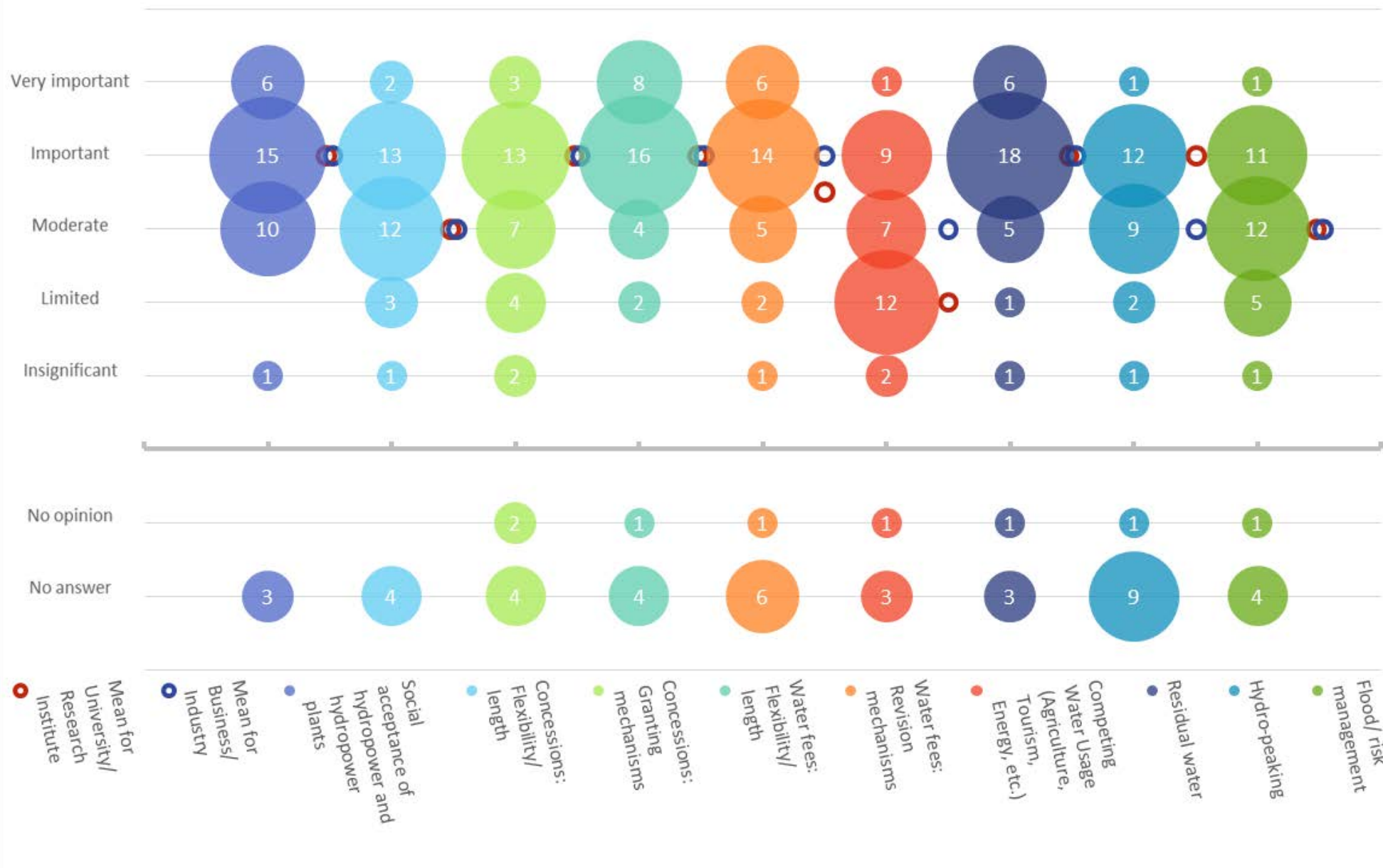
Influence of *Technical Inputs* on the future development of Swiss HP - LONG TERM perspective



Main trends and reflections:

- Hard to distinguish differences in terms of importance than for the ST.
- Difference between Uni&RI and Bus&Ind remains for the *Hydropower infrastructures*, while decrease for *interconnection infrastructure*

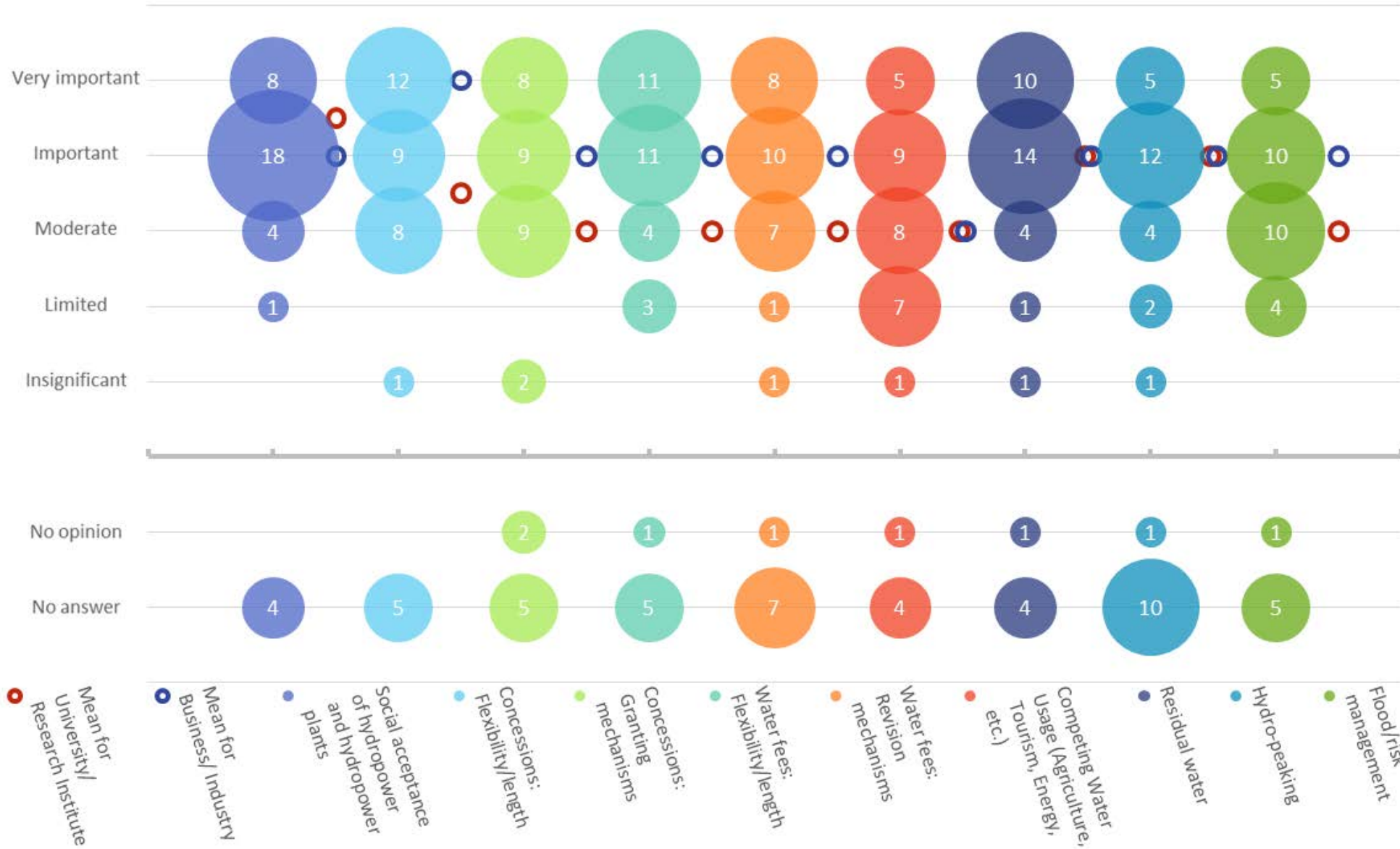
Influence of *Political, legal and social aspects* on the future development of Swiss HP - SHORT TERM perspective



Main trends and reflections:

- All the factors seems to have similar and comparable results, except for *competing water usage* (lower importance and difference between the two groups) and *Hydro-peaking* (highest number of no-answers and difference between the two groups)

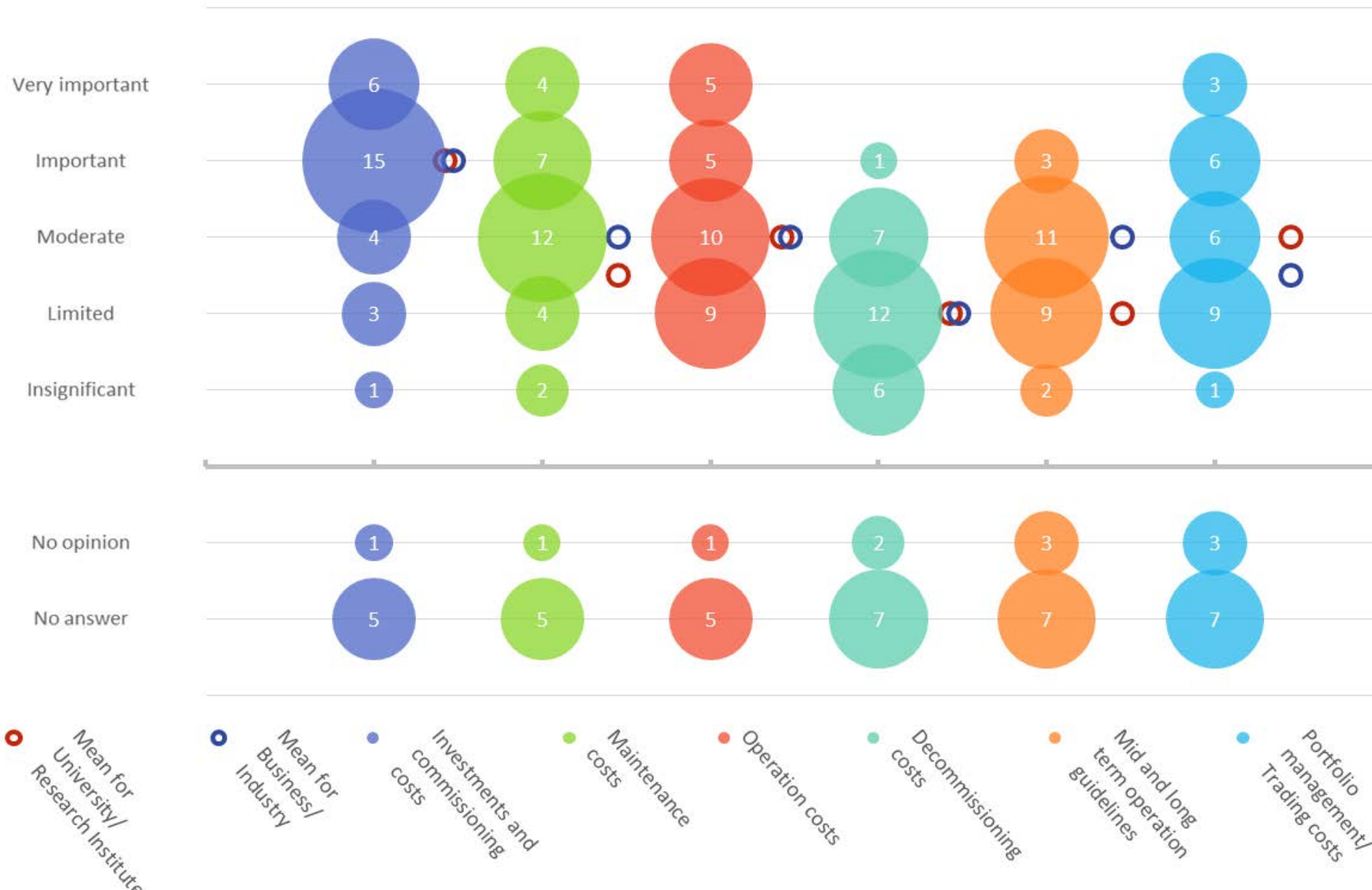
Influence of *Political, legal and social aspects* on the future development of Swiss HP - LONG TERM perspective



Main trends and reflections:

- No clear tendencies between the frequency of answers
- For *Concessions, Water fees* and *Flood/risk management*, Bus&Ind consider them as more important than Uni&RI.

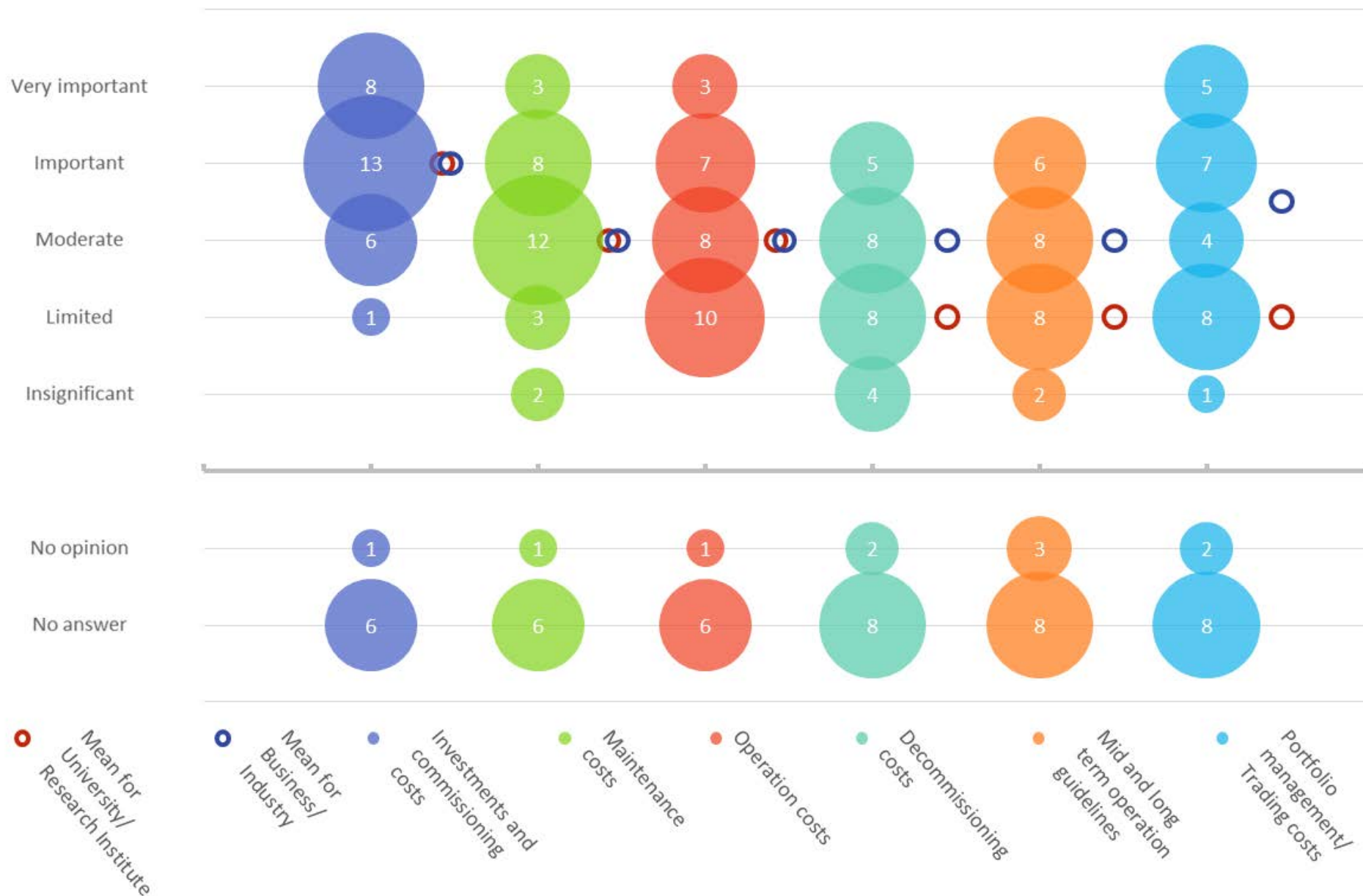
Influence of *Management and cost aspects* on the future development of Swiss HP - SHORT TERM perspective



Main trends and reflections:

- *Investment and commissioning costs* are considered as more important than the others
- *Mid and long term operation guidelines* have a different assessment from the two main groups of participants

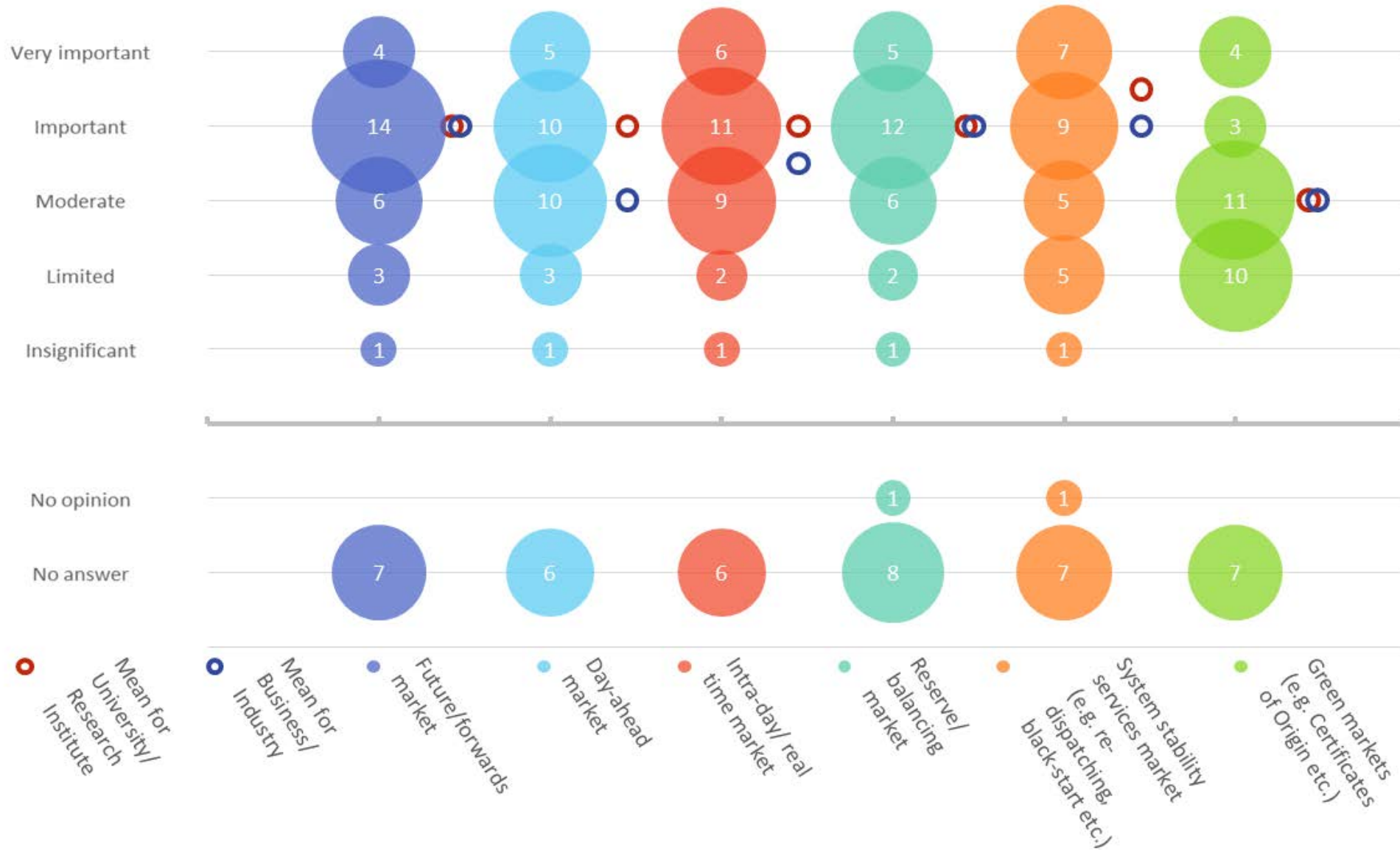
Influence of *Management and cost aspects* on the future development of Swiss HP - LONG TERM perspective



Main trends and reflections:

- The frequency of answers are very similar between ST and LT.
- Uni&RI estimate the *Decommissioning costs* and *Mid and long term operation guidelines* as less important compared to Bus&Ind
- In the short term, Bus&Ind tend to perceive the importance of *Portfolio management/trading costs* as less important than Uni&RI. It is the opposite perspective in the long term

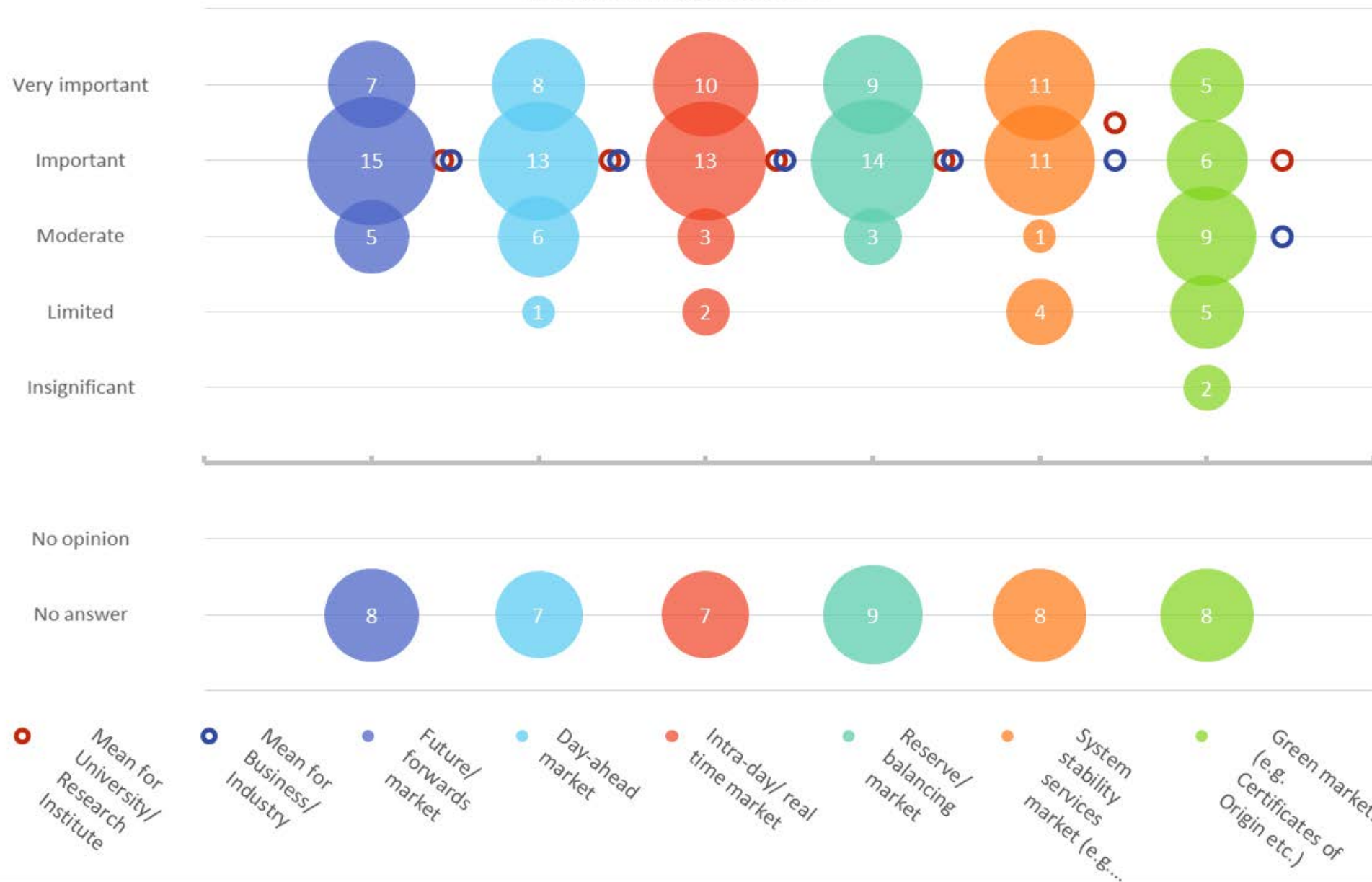
Influence of *Markets, part I* on the future development of Swiss HP - SHORT TERM perspective



Main trends and reflections:

- *Green Markets* is the only factor that clearly seem less important than the others.
- Difference between Uni&RI and Bus&Ind regarding the *Day-ahead* market.

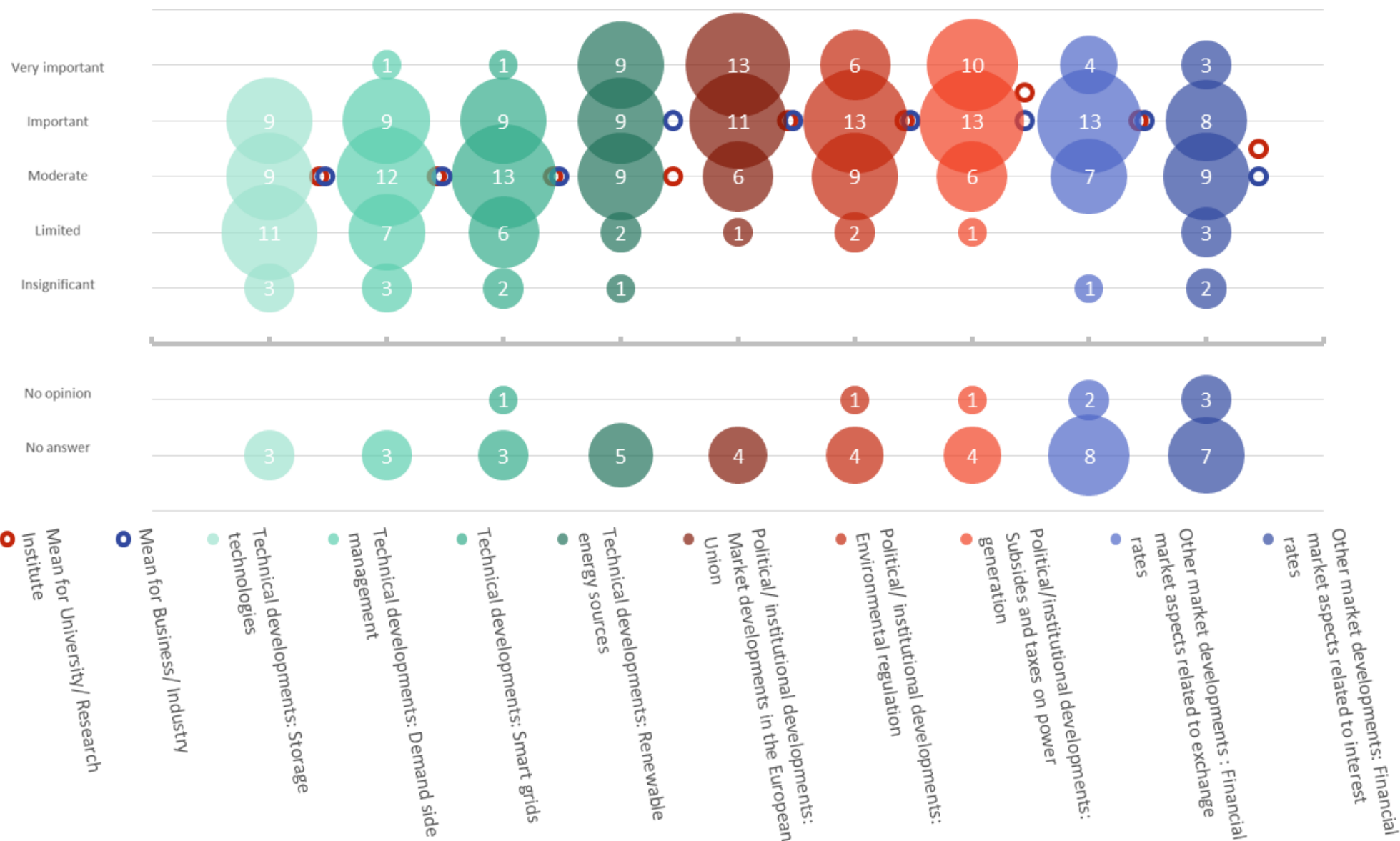
Influence of *Markets, part I* on the future development of Swiss HP - LONG TERM perspective



Main trends and reflections:

- The importance of all the markets (except green markets) seem very high and similar.
- Uni&RI assess a higher importance of *Green markets* than Bus&Ind.

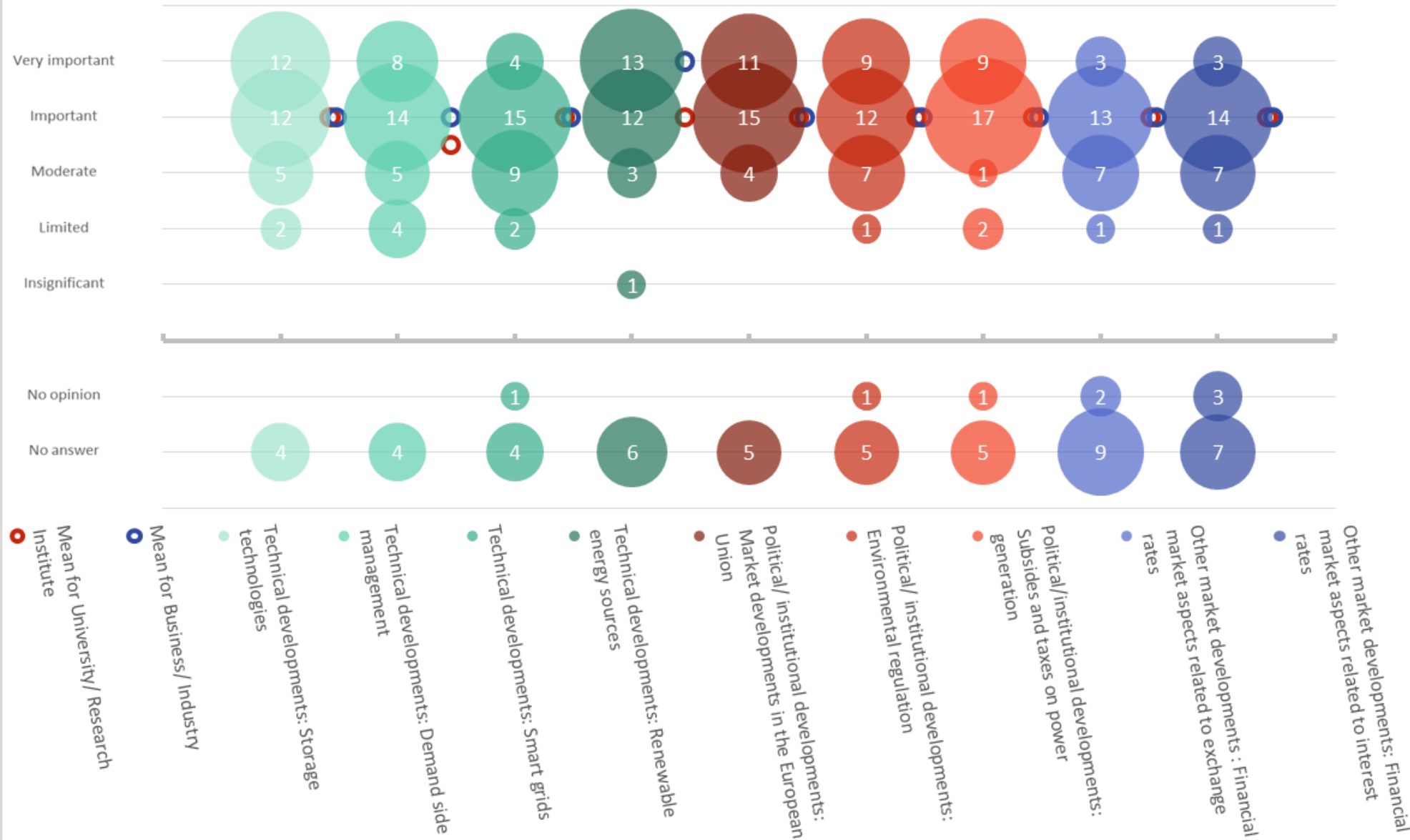
Influence of Markets part II: technical, political/institutional and other market developments on the future development of Swiss HP - SHORT TERM perspective



Main trends and reflections:

- Differences between Uni&RI and Bus&Ind regarding the *Renewable energy sources*.
- The group *Technical development* is of a lower importance than *Political/institutional developments*

Influence of *Markets part II: technical, political/institutional and other market developments* on the future development of Swiss HP - LONG TERM perspective



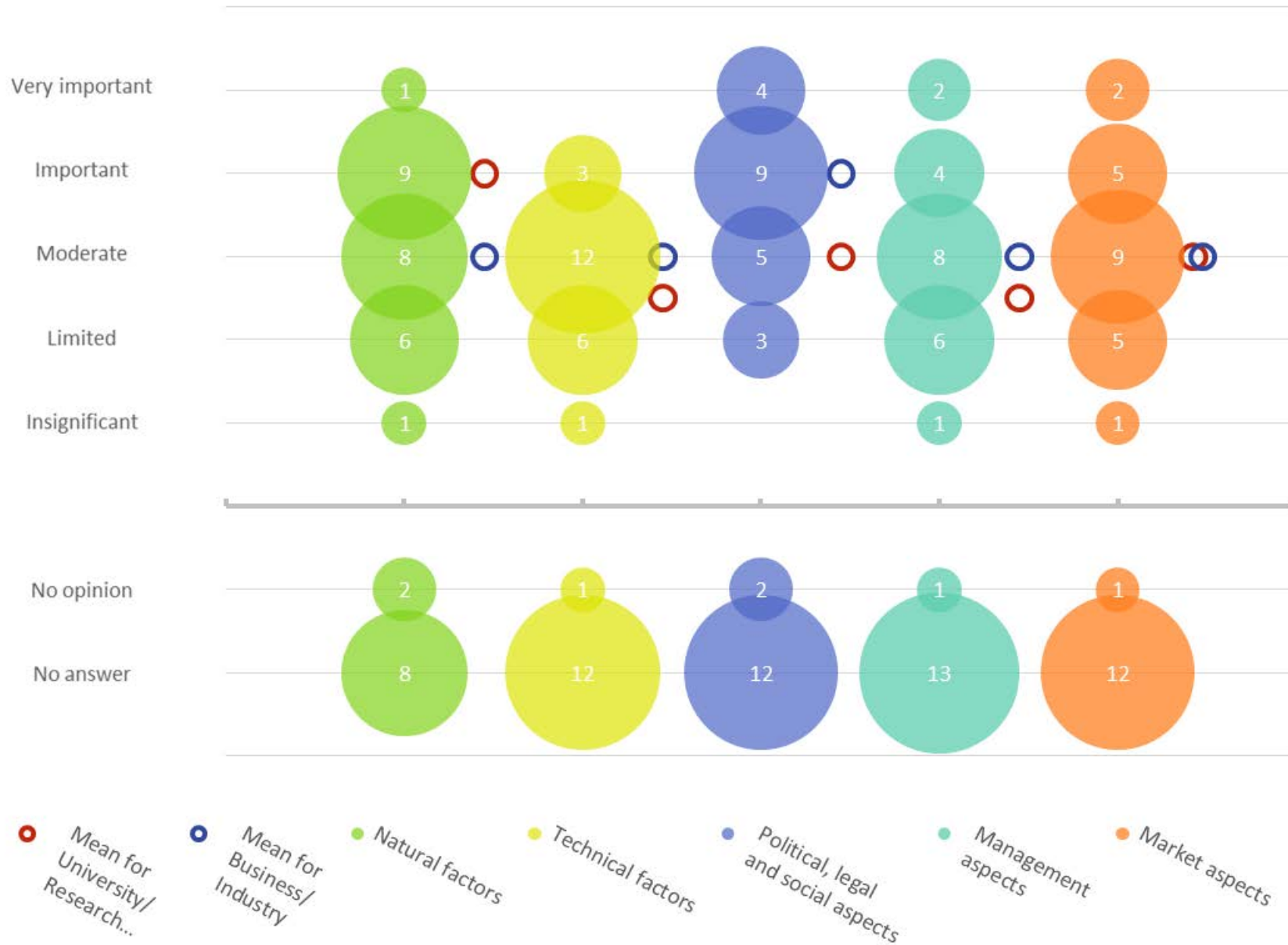
Main trends and reflections:

- Differences between Uni&RI and Bus&Ind regarding the *Renewable energy sources*.
- All the developments seem of a equal importance in the long term

Part II: Impacts

- High number of no-answers in this section

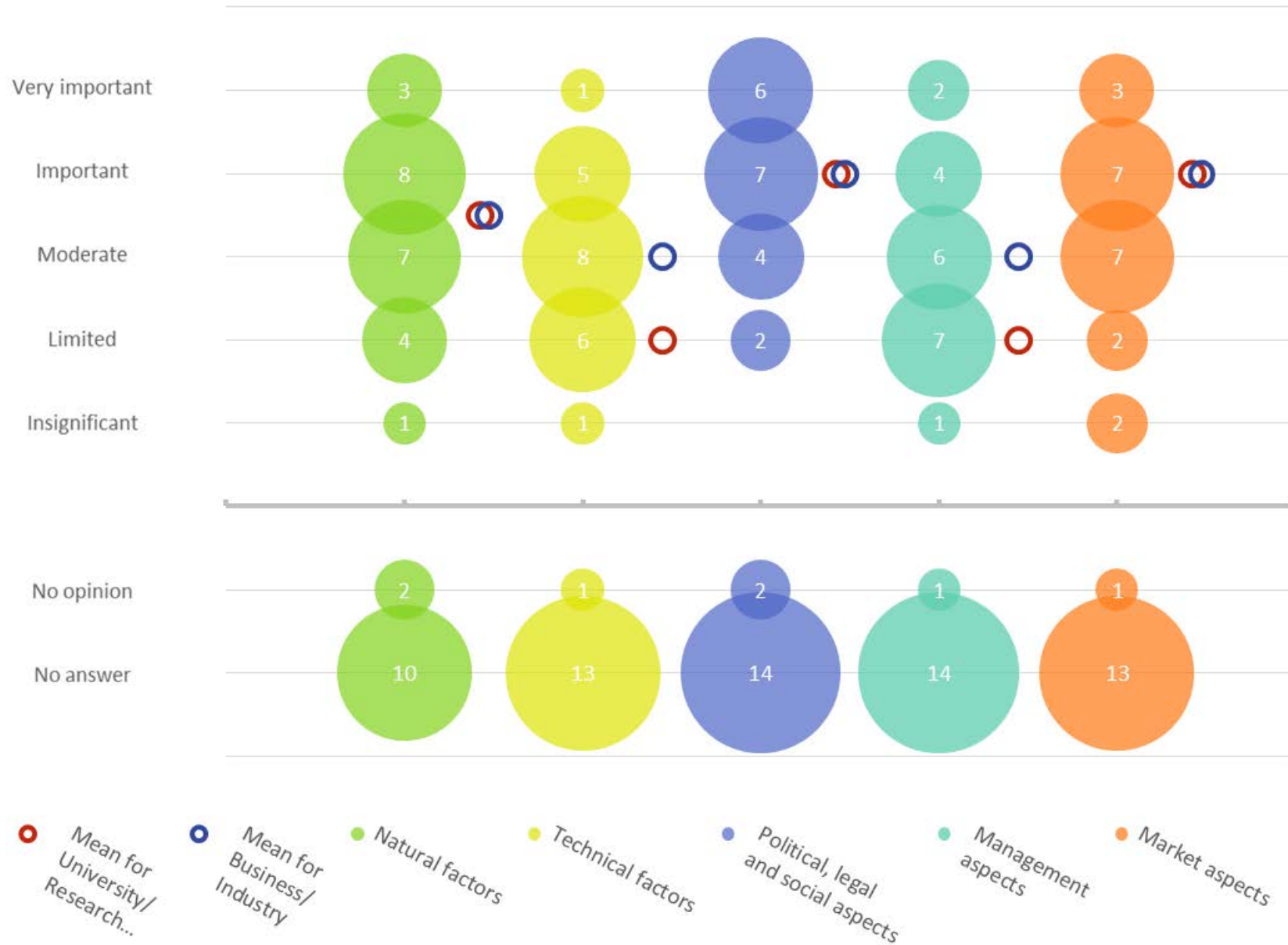
ENVIRONMENTAL impacts of each groups of factors, SHORT TERM perspective



Main trends and reflections:

- High level of similarities between short and long term
- High differences between *Uni&RI* and *Bus&Ind*

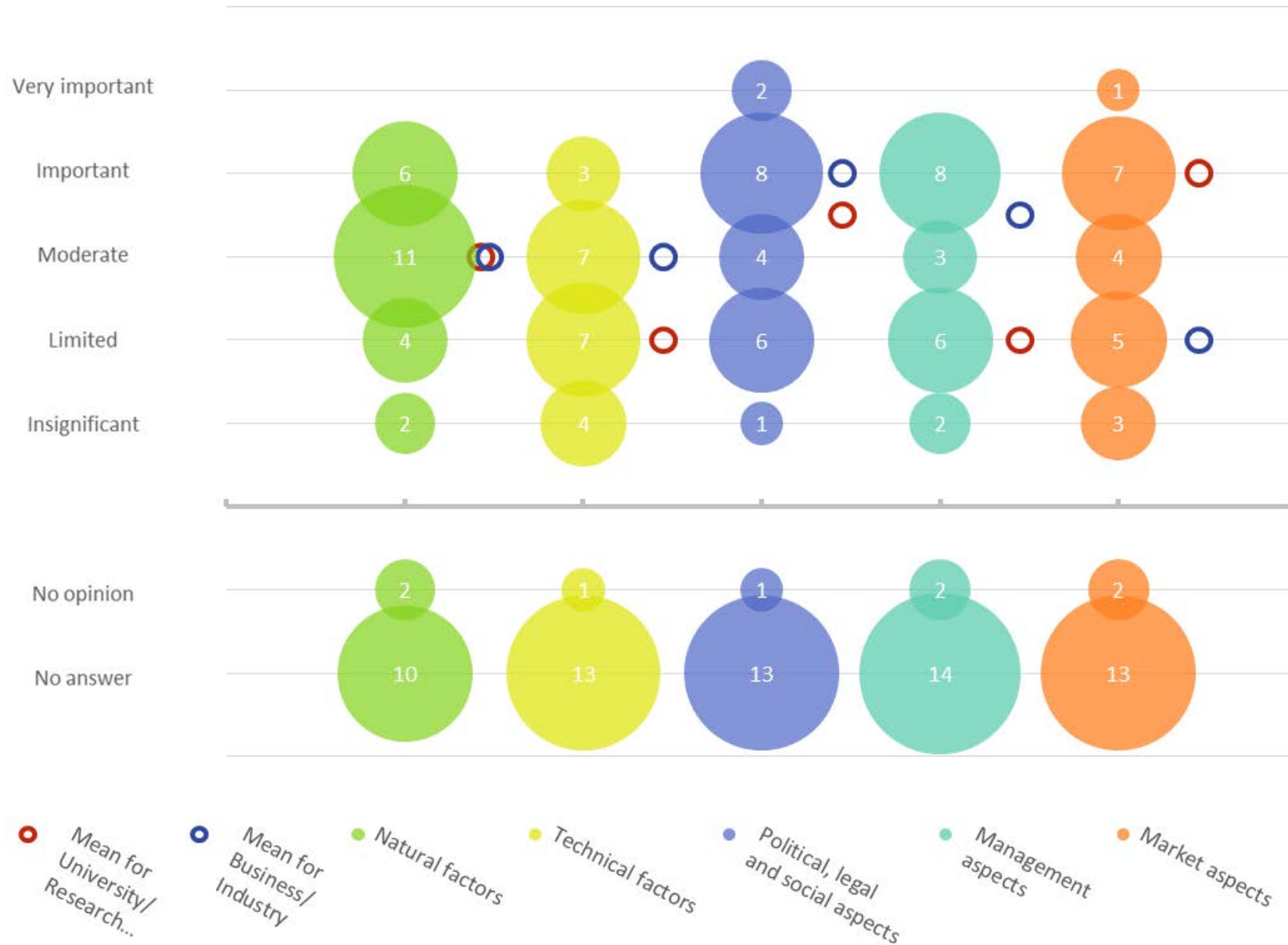
ENVIRONMENTAL impacts of each groups of factors, LONG TERM perspective



Main trends and reflections:

- High level of similarities between short and long term
- High differences between *Uni&RI* and *Bus&Ind*

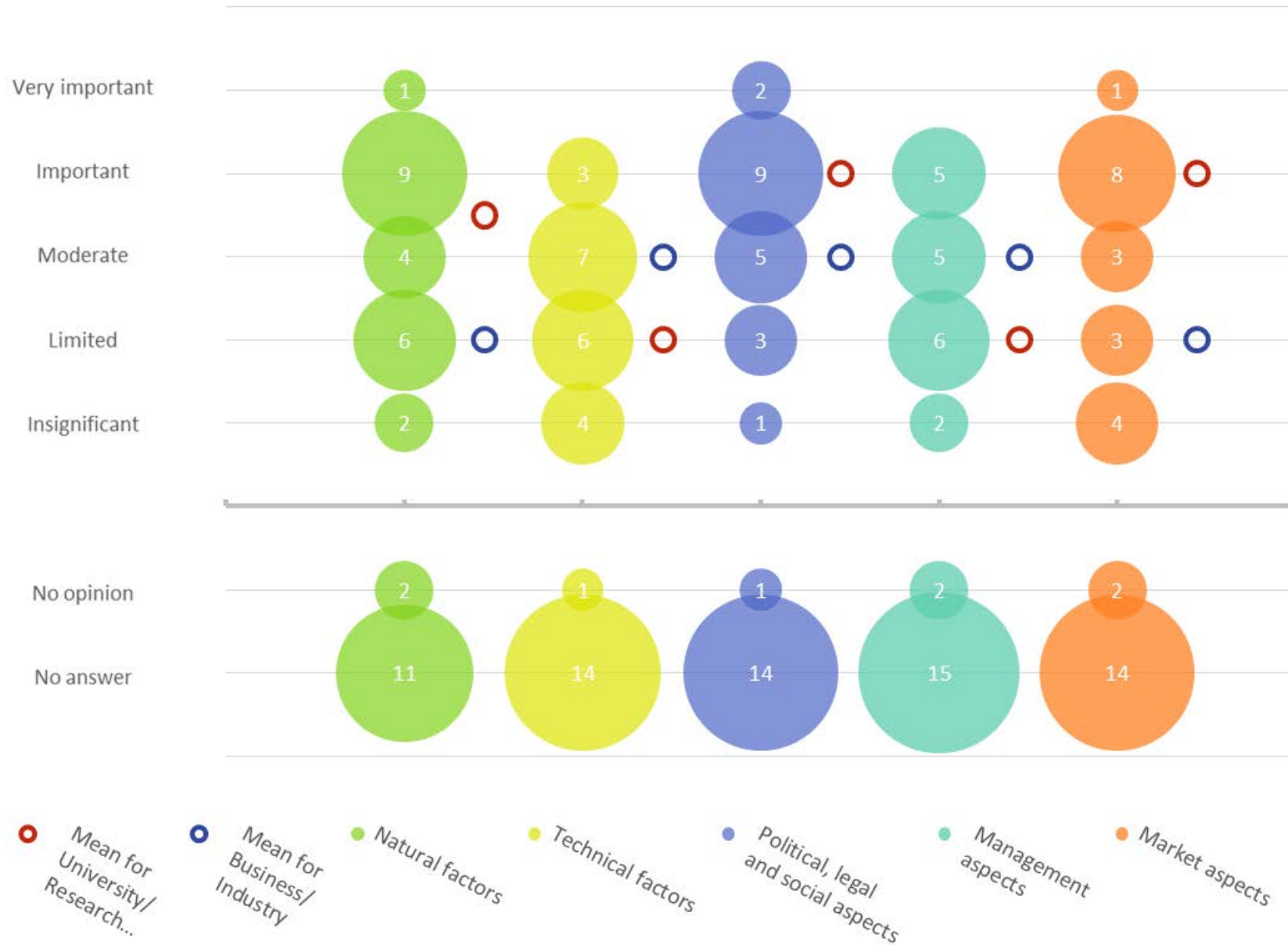
SOCIAL impacts of each groups of factors, SHORT TERM perspective



Main trends and reflections:

- High level of similarities between short and long term
- High differences between *Uni&RI* and *Bus&Ind*

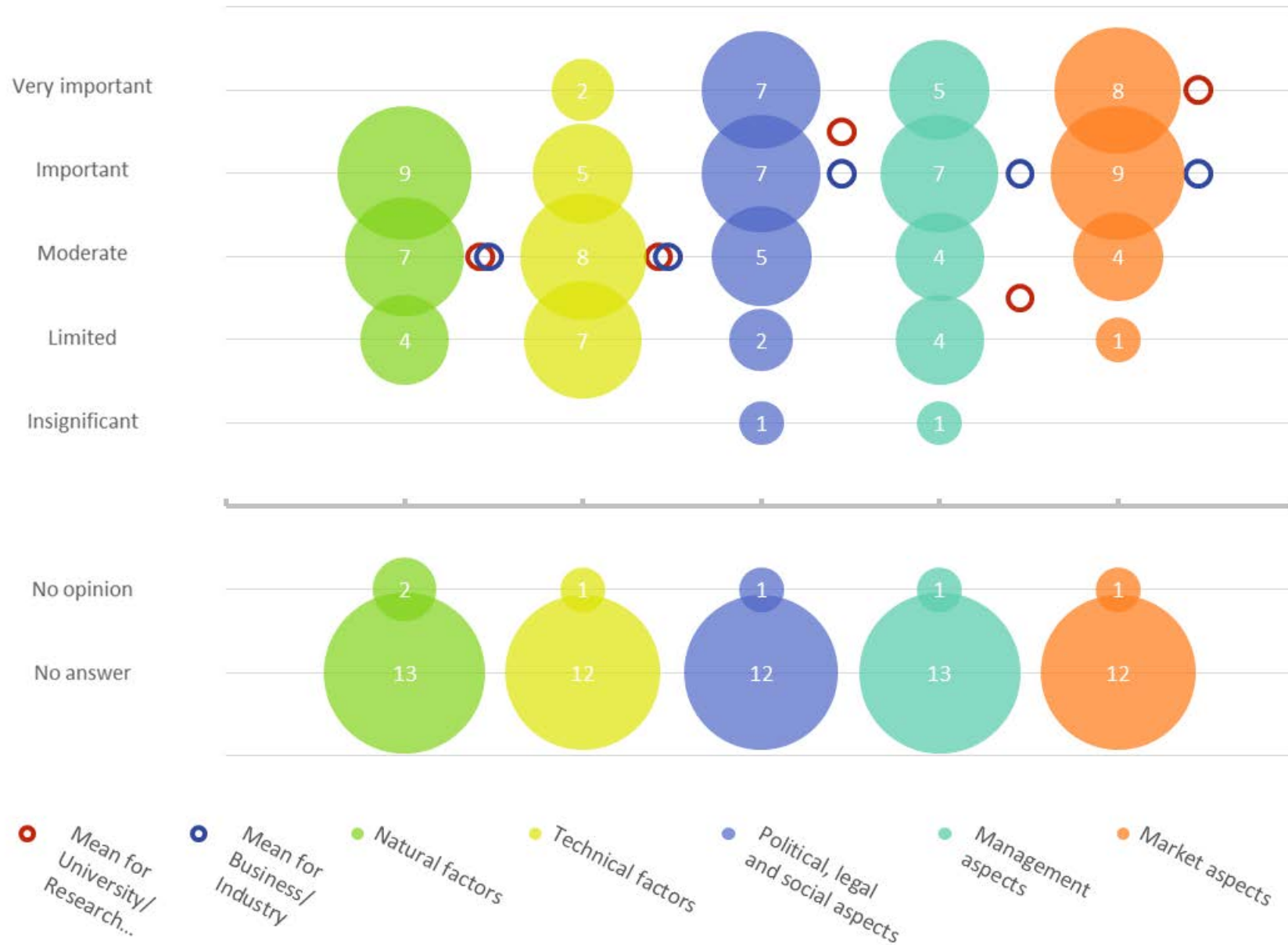
SOCIAL impacts of each groups of factors, LONG TERM perspective



Main trends and reflections:

- High level of similarities between short and long term
- High differences between *Uni&RI* and *Bus&Ind*

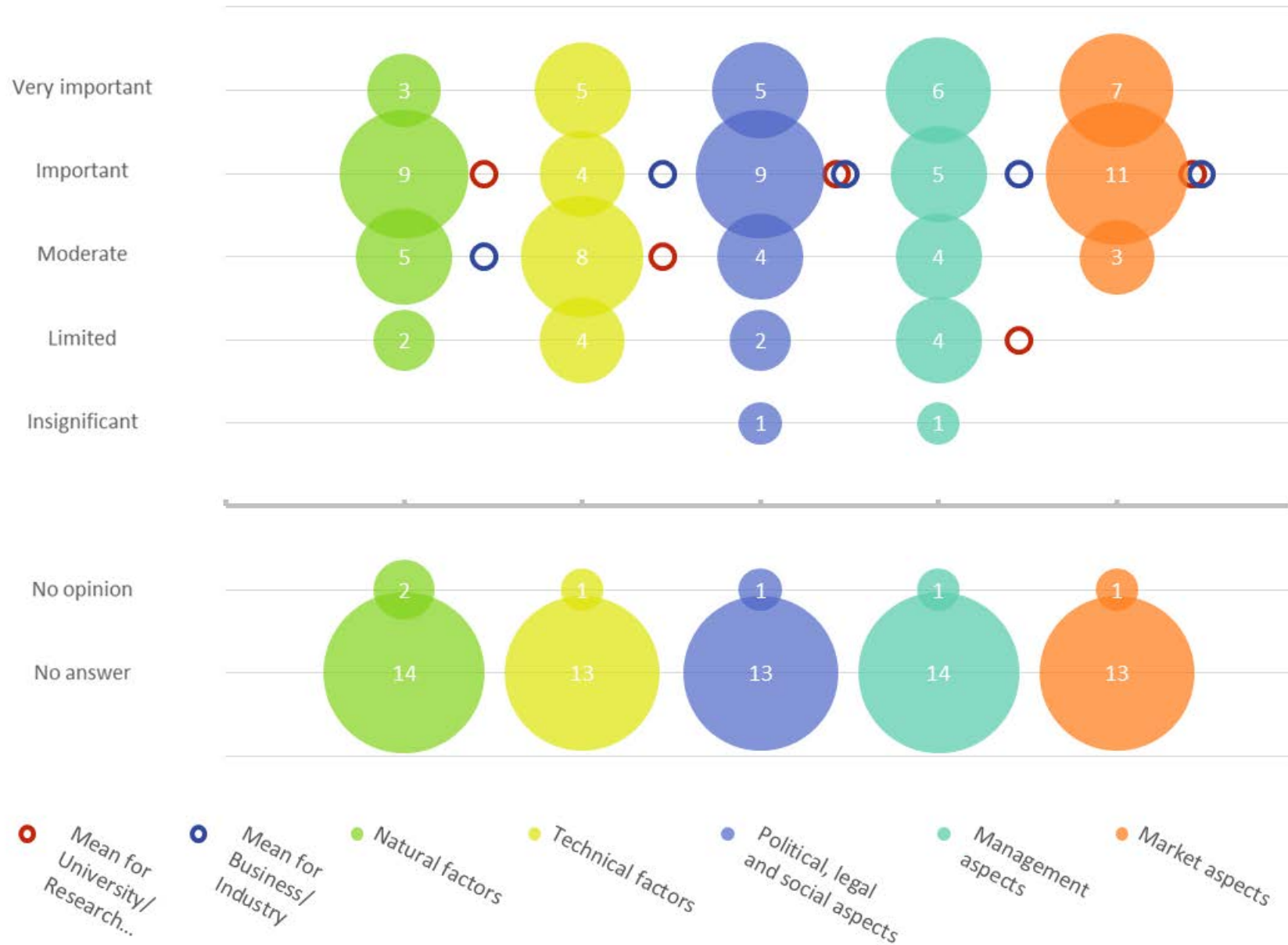
ECONOMIC impacts of each groups of factors, SHORT TERM perspective



Main trends and reflections:

- High level of similarities between short and long term
- High differences between *Uni&RI* and *Bus&Ind*

ECONOMIC impacts of each groups of factors, LONG TERM perspective



Main trends and reflections:

- High level of similarities between short and long term
- High differences between *Uni&RI* and *Bus&Ind*

Questions and discussion

