



Skill needs and gap

Offer Outcomes

Deliverable 2.8.1



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1 LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
3D	Three-dimensional
ADAS	Advanced Driver-Assistance Systems
AI	Artificial Intelligence
AVG	Average
BASE	Big Data, ADAS and After sales, Supply chain and Sharing, Electrification
BEV	Battery Electric Vehicle
CAD	Computer-Aided Design
CEO	Chief Executive Officer
CO2	Carbon Dioxide
CVET	Continuing Vocational Education and Training
D x.y	Deliverable x.y
DoC	Driver of Change
DRIVES	Development and Research on Innovative Vocational Educational Skills
EASCY	Electrified, Autonomous, Shared, Connected and Yearly updated
EPRS	European Parliamentary Research Service
EQF	European Qualifications Framework
ESCO	European Skills, Competences, qualifications and Occupations
EU	European Commission
EV	Electric Vehicle
HEV	Hybrid Electric Vehicle
HQ	Head Quarter
HR	Human Resource
IT	Information Technology
IVET	Initial Vocational Education and Training
KPI	key Performance Indicator
NACE	Nomenclature statistique des Activités économiques dans la Communauté Européenne
OEM	Original Equipment Manufacturer



ABBREVIATION	MEANING
R&D	Research & Development
R&D&I	Research & Development & Innovation
SME	Small Medium Enterprise
TVET	Technical and Vocational Education and Training
V2X	Vehicle to Everything
VET	Vocational Education and Training
WP	Work Package

Table 1 List of Abbreviations

2 EXECUTIVE BRIEF

This report is an extract of deliverable D2.8 Skill needs and gap Report of the Development and Research on Innovative Vocational Educational Skills project (DRIVES), the Blueprint for Sectoral Cooperation on Skills in the Automotive sector.

The main Deliverable has been divided into two new outcomes:

D2.8.1 Offer Skills need (this report): a picture of the replies coming from the “Offer” survey

D2.8.2 Gaps analysis: the information collected and analysed into Deliverable 2.7 Forecasting dissemination report (result from the “Demand” survey) are compared with the result from the “Offer” survey and evaluated gaps.

Based on the previous questionnaire (Demand) the structure of this report and interaction with stakeholder is aligned with the KPIs used in both the “Demand” survey and D2.7 Forecasting dissemination Report¹, in order to enable analysis of the differences between skills demand and skills provision serving the automotive sector. The KPIs are grouped under the following headings:

- Sample characterisation
- Drivers of Change
- Skills
- Job Roles
- VET provision mechanisms
- Recognition and qualification
- Recruitment and attractiveness

And all the questions and relative KPIs (where available) have been analysed by overall value and filtered by the following selected categories of stakeholders:

- **VET:** including VET schools, Colleges and Universities
- **INSTITUTE:** including Research institute and Accreditation centre/qualification body
- **PRIVATE:** all private companies (excluding other categories above)
- **UMBRELLA ORGANISATION:** association of institutions, who work together formally to coordinate activities or pool resources

A total of 83 respondents completed, or partially completed the survey. Only those respondents completing at least the Drivers of Change section were included for further analysis; the survey was

¹ Deliverable D2.7 Forecasting dissemination Report, DRIVES Project, www.project-drives.eu



disseminated to EU partner countries through project channels and partners networks, such as European umbrella associations and national associations and their members.

The Drivers of Change “CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES” was most likely to be identified as ‘most important’ of respondents indicating this was the case, followed by “STRUCTURAL CHANGE”, meanwhile “STRUCTURAL CHANGES” was the Driver of Change most likely to be ranked first in terms of the level of urgency.

Related to the skills evaluation, the BIG DATA/DATA ANALYTICS skill is ranked first with a significant gap to the second highest score. Based on the categorisation adopted this skill is closely related to DIGITALISATION; SOFTWARE DEVELOPMENT is ranked second and can be termed a TECHNICAL skill; TECHNICAL KNOWLEDGE (another TECHNICAL skill) is in third place with a relatively high AVG number of graduates.

Analysing the best approach related to the training provision mechanisms, “ON THE JOB” and “WORK BASED” training are cited most frequently,

The necessity for “standard(s)” across the EU Automotive sector to enable movement of skilled workers between EU countries and recognition of skill levels relating to training undertaken to support increased mobility of workers is a key focus of the DRIVES project. Even if a pre-determined list of the most recognised standard and qualification frameworks was included in the questionnaire, it is important to underline that a list of “NATIONAL” standards are still considered essential and a further investigation on this topic will be necessary during project lifespan.

Focuses on overall key performance indicators related to “recruitment and attractiveness methods” in relation to the automotive industry the “COOPERATION BETWEEN THE AUTOMOTIVE INDUSTRY AND THE RELEVANT EDUCATION STAKEHOLDERS” for this domain is considered of primary importance.

The current report is an extract of the main Deliverable D2.8 Skill Needs and Gaps where all the KPIs are showed and analysed.

The information has been organised according to:

Chapter 3 “KPI INTRODUCTION” introduces the list of indicators used to analyse the outcomes of the “Offer” survey (Key Performance Indexes).

Chapter 4 “MAIN GOALS AND STRATEGY ADOPTED” outlines the overall research and intelligence work programme implemented throughout the DRIVES project, as context for consultation with VET stakeholders.

Chapter 5 “CURRENT VET IN EUROPE” offer a view of the European VET system in 7 countries, based on a desk-research activity made by DRIVES partners. This activity has been done to increase the accuracy of the Offer survey. Analysed countries are:

- Czech Republic



- Germany
- Italy
- Slovakia
- Spain
- Sweden
- United Kingdom

In the same chapter is also available a brief description of the harmonisation process used to ensure clear and useable data for analysis of the Offer survey.

Chapter 6 “SURVEY AND DESK RESEARCH EXPLANATION” introduces the structure of the “offer” survey and its constituent parts.

Chapter 7 “RESULT OF THE SURVEY”, follows the structure of the survey in terms of sessions and questions and analyse the replies per KPIs and filtered by different point of view; all questions and relevant KPIs (where possible) have been analysed by overall value and filtered by the following selected categories of stakeholder:

- VET: including VET schools, Colleges and Universities
- INSTITUTE: including Research institutes and Accreditation centres/qualification bodies
- PRIVATE: all private companies (excluding other categories above)
- UMBRELLA ORGANISATION: associations of institutions, who work together formally to coordinate activities or pool resources

All KPI are analysed and compared between Demand and Offer to evaluate the current gap.

More detailed information discussed into this report can be found in the Appendix.

3 KPI INTRODUCTION

The Questionnaire has been analysed with reference to a number of different KPIs as indicated in Table 2.

These are clustered into seven groups following the structure of the Questionnaire and are aligned with the KPIs used in both the “demand” survey and D2.7 Forecasting dissemination Report² in order to enable analysis of the differences between skills demand and skills provision serving the automotive sector. The KPIs are grouped under the following headings:

- Sample characterisation
- Drivers of Change
- Skills
- Job Roles
- VET provision mechanisms
- Recognition and qualification
- Recruitment and attractiveness

#	CATEGORY	KPI	INDICATOR TITLE	UOM
1	SAMPLE CHARACTERISATION	1.1	N° OF RESPONDENTS	N°
1	SAMPLE CHARACTERISATION	1.2	CATEGORY	%
1	SAMPLE CHARACTERISATION	1.3	CATEGORY BY TYPE	%
1	SAMPLE CHARACTERISATION	1.4	RESPONDENTS PER COUNTRY	%
1	SAMPLE CHARACTERISATION	1.5	RESPONDENTS JOB TITLE	%
1	SAMPLE CHARACTERISATION	1.6	COURSES PROVIDED	%
1	SAMPLE CHARACTERISATION	1.7	LANGUAGES PROVIDED	%
1	SAMPLE CHARACTERISATION	1.8	LEARNERS ATTEND	%
1	SAMPLE CHARACTERISATION	1.9	EQF OFFERED	%
2	DRIVERS OF CHANGE	2.1	IMPORTANCE OF DRIVERS OF CHANGE GROUPS	%
2	DRIVERS OF CHANGE	2.2	URGENCY OF DRIVERS OF CHANGE GROUPS	%
2	DRIVERS OF CHANGE	2.3	DoC NEW TECHNOLOGIES AND BUSINESS MODELS: IMPORTANCE	%
2	DRIVERS OF CHANGE	2.4	DoC NEW TECHNOLOGIES AND BUSINESS MODELS: URGENCY	%
2	DRIVERS OF CHANGE	2.5	DoC CLIMAT GOALS, ENVIRONNEMENTAL [...]: IMPORTANCE	%
2	DRIVERS OF CHANGE	2.6	DoC CLIMATE GOALS, ENVIRONMENTAL [...]: URGENCY	%
2	DRIVERS OF CHANGE	2.7	DoC SOCIETAL CHANGES AND [...]: IMPORTANCE	%
2	DRIVERS OF CHANGE	2.8	DoC SOCIETAL CHANGES AND [...]: URGENCY	%
2	DRIVERS OF CHANGE	2.9	DoC STRUCTURAL CHANGES: IMPORTANCE	%
2	DRIVERS OF CHANGE	2.10	DoC STRUCTURAL CHANGES: URGENCY	%

² Deliverable D2.7 Forecasting dissemination Report, DRIVES Project, www.project-drives.eu



#	CATEGORY	KPI	INDICATOR TITLE	UOM
2	DRIVERS OF CHANGE	2.11	DoC GLOBALISATION AND RISE OF NEW PLAYERS: IMPORTANCE	%
2	DRIVERS OF CHANGE	2.12	DoC GLOBALISATION AND RISE OF NEW PLAYERS: URGENCY	%
2	DRIVERS OF CHANGE	2.13	DRIVERS OF CHANGE PRIORITY INDEX	N°
3	SKILLS	3.1	SKILL INDEX	N°
3	SKILLS	3.2	SKILL MATRIX EQF / GRADUATES	MATRIX
4	JOB ROLES	4.1	JOB ROLE INDEX	N°
5	VET PROVISION MECHANISMS	5.1	TRAINING APPROACH	%
5	VET PROVISION MECHANISMS	5.6	APPRENTICESHIP EQF LEVELS	%
6	RECOGNITION AND QUALIFICATION	6.1	SKILLS RECOGNITION AND QUALIFICATION FRAMEWORKS	%
7	RECRUITMENT AND ATTRACTIVENESS	7.3	METHODS	%

Table 2: KPI groups

All the questions and relative KPIs (where available) have been analysed by overall value and filtered by the following selected categories of stakeholders:

- VET: including VET schools, Colleges and Universities
- INSTITUTE: including Research institute and Accreditation centre/qualification body
- PRIVATE: all private companies (excluding other categories above)
- UMBRELLA ORGANISATION: association of institutions, who work together formally to coordinate activities or pool resources

The result of this activity is shown in Table 3.

#	CATEGORY	KPI	INDICATOR TITLE	OVER ALL	VET	INSTITUTE	PRIVATE	UMBRELLA ORGANISATION
1	SAMPLE CHARACTERISATION	1.1	N° OF RESPONDENTS	X				
1	SAMPLE CHARACTERISATION	1.2	CATEGORY	X				
1	SAMPLE CHARACTERISATION	1.3	TYPE OF ORGANISATION	X				
1	SAMPLE CHARACTERISATION	1.4	RESPONDENTS PER COUNTRY	X	X	X	X	X
1	SAMPLE CHARACTERISATION	1.5	RESPONDENTS JOB TITLE	X				
1	SAMPLE CHARACTERISATION	1.6	COURSES PROVIDED	X				

#	CATEGORY	KPI	INDICATOR TITLE	OVER ALL	VET	INSTITUTE	PRIVATE	UMBRELLA ORGANISATION
1	SAMPLE CHARACTERISATION	1.7	LANGUAGES PROVIDED	X				
1	SAMPLE CHARACTERISATION	1.8	LEARNERS ATTEND	X				
1	SAMPLE CHARACTERISATION	1.9	EQF OFFERED	X				
2	DRIVERS OF CHANGE	2.1	IMPORTANCE OF DRIVERS OF CHANGE GROUPS	X	X	X	X	X
2	DRIVERS OF CHANGE	2.2	URGENCY OF DRIVERS OF CHANGE GROUPS	X	X	X	X	X
2	DRIVERS OF CHANGE	2.3	DoC NEW TECHNOLOGIES AND BUSINESS MODELS: IMPORTANCE	X	X	X	X	X
2	DRIVERS OF CHANGE	2.4	DoC NEW TECHNOLOGIES AND BUSINESS MODELS: URGENCY	X	X	X	X	X
2	DRIVERS OF CHANGE	2.5	DoC CLIMATE GOALS, ENVIRONMENTAL [...]: IMPORTANCE	X	X	X	X	X
2	DRIVERS OF CHANGE	2.6	DoC CLIMATE GOALS, ENVIRONMENTAL [...]: URGENCY	X	X	X	X	X
2	DRIVERS OF CHANGE	2.7	DoC SOCIETAL CHANGES AND [...]: IMPORTANCE	X	X	X	X	X
2	DRIVERS OF CHANGE	2.8	DoC SOCIETAL CHANGES AND [...]: URGENCY	X	X	X	X	X
2	DRIVERS OF CHANGE	2.9	DoC STRUCTURAL CHANGES: IMPORTANCE	X	X	X	X	X
2	DRIVERS OF CHANGE	2.10	DoC STRUCTURAL CHANGES: URGENCY	X	X	X	X	X
2	DRIVERS OF CHANGE	2.11	DoC GLOBALISATION AND RISE OF NEW PLAYERS: IMPORTANCE	X	X	X	X	X
2	DRIVERS OF CHANGE	2.12	DoC GLOBALISATION AND RISE OF NEW PLAYERS: URGENCY	X	X	X	X	X
2	DRIVERS OF CHANGE	2.13	DRIVERS OF CHANGE PRIORITY INDEX	X	X	X	X	X
3	SKILLS	3.1	SKILL OFFER INDEX	X	X	X	X	X
3	SKILLS	3.2	SKILL MATRIX EQF / GRADUATES	X	X	X	X	X
5	TRAINING PROVISION MECHANISMS	5.1	TRAINING APPROACH	X	X	X	X	X
5	VET PROVISION MECHANISMS	5.6	APPRENTICESHIP EQF LEVELS	X	X	X	X	X



#	CATEGORY	KPI	INDICATOR TITLE	OVER ALL	VET	INSTITUTE	PRIVATE	UMBRELLA ORGANISATION
7	RECOGNITION AND QUALIFICATION	6.1	SKILLS RECOGNITION AND QUALIFICATION FRAMEWORKS	X	X	X	X	X
8	RECRUITMENT AND ATTRACTIVENESS	7.3	METHODS	X	X	X	X	X

Table 3: Detailed KPI filters

4 RESULT OF THE SURVEY

Where possible each KPI has been compared with the relevant KPI in the “demand” questionnaire set out in the box <<Difference between demand and offer>>.

All questions and relevant KPIs (where possible) have been analysed by overall value and filtered by the following selected categories of stakeholder:

- VET: including VET schools, Colleges and Universities
- INSTITUTE: including Research institutes and Accreditation centres/qualification bodies
- PRIVATE: all private companies (excluding other categories above)
- UMBRELLA ORGANISATION: associations of institutions, who work together formally to coordinate activities or pool resources

4.1 SAMPLE CHARACTERISATION

This section profiles responses based on information provided by respondents.

1.1.1. NUMBERS OF RESPONDENTS AND CATEGORIES

A total of 83 respondents completed, or partially completed the survey. Only those respondents completing at least the Drivers of Change section were included for further analysis. Respondents are divided into the following categories for analysis:

- Accreditation, certification or qualification body
- College
- Private company (excluding other categories listed)
- Research institute/centre
- University
- VET school
- VET Umbrella organisation

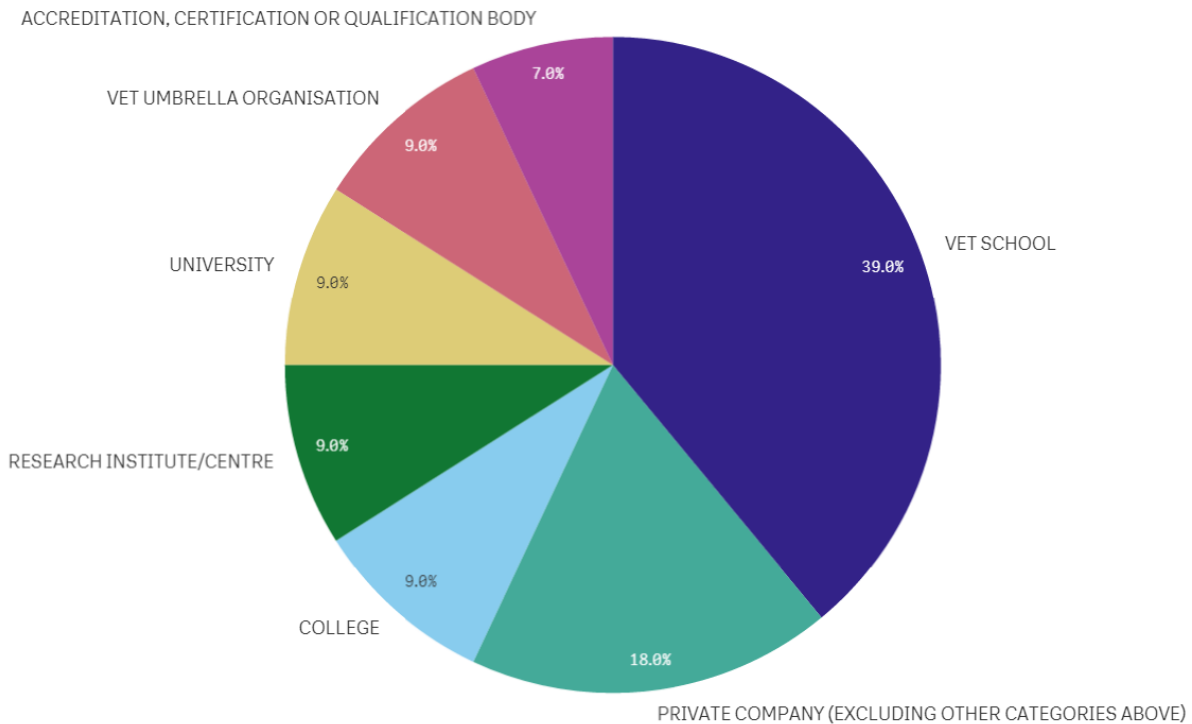


Figure 1: KPI 1.2 (Offer) Categories of Stakeholders

Figure 5 indicates that vocational training schools represent the largest category of respondents, accounting for 39% of the total. Also significant are private companies at 18%, followed by colleges, universities, vocational training umbrella organisations and other institutes and entities focused more on professional certifications related to the automobile sector.

1.1.2. RESPONDERS PER COUNTRY

The survey was disseminated to EU partner countries through project channels and partners networks, such as European umbrella associations and national associations and their members. As outlined in Figures 2 (worldwide view) and Figure 3 (European focus), there is a significant difference in the number of responses from Portugal (22%) and Spain (15.9%) by comparison with the rest of Europe, although most countries are represented to some extent. There are 11 countries where response rates are particularly low, representing 1.2% of the total in each case.

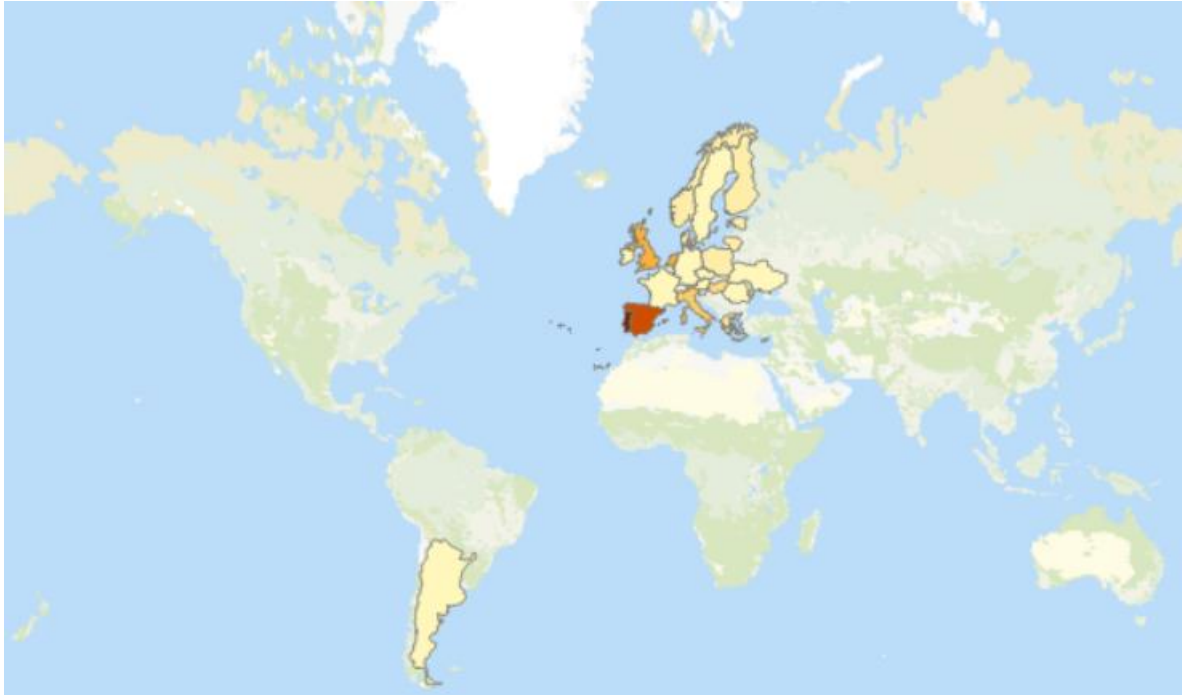


Figure 2: KPI 1.4 (Offer) Responders per country – world – Overall sample

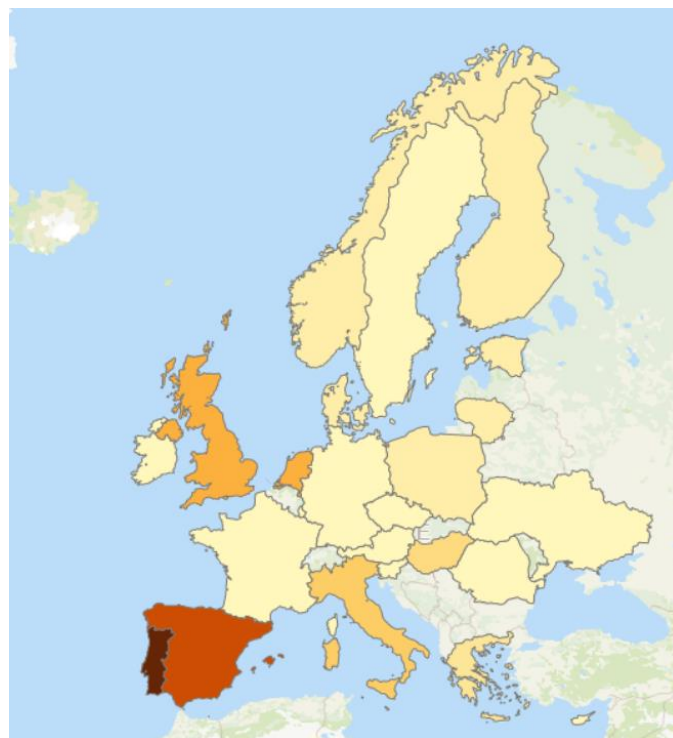


Figure 3: KPI 1.4 (Offer) Responders per country – Europe – Overall sample



Country	Percentage
PORTUGAL	22,0%
SPAIN	15,9%
NETHERLANDS	8,5%
UNITED KINGDOM	8,5%
ITALY	6,1%
HUNGARY	4,9%
GREECE	3,7%
DENMARK	2,4%
ESTONIA	2,4%
FINLAND	2,4%
LITHUANIA	2,4%
MALTA	2,4%
NORWAY	2,4%
POLAND	2,4%
AUSTRIA	1,2%
CYPRUS	1,2%
CZECH REPUBLIC	1,2%
FRANCE	1,2%
GERMANY	1,2%
IRELAND	1,2%
LUXEMBOURG	1,2%
ROMANIA	1,2%
SLOVENIA	1,2%
SWEDEN	1,2%
UKRAINE	1,2%

Table 4: KPI 1.4 (Offer) Respondents per country – Overall sample

1.1.3. CATEGORY & STUDENTS

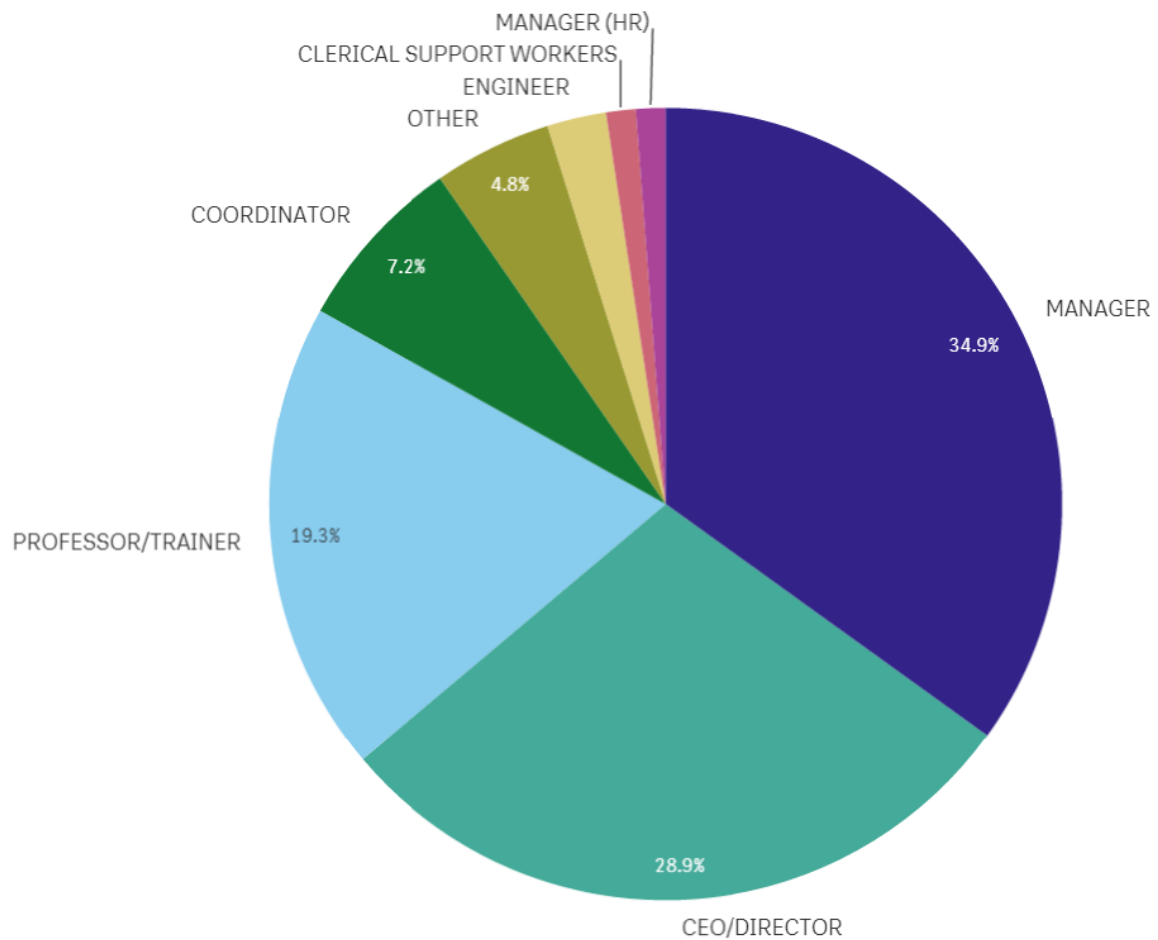


Figure 4: KPI 1.5 (Offer) Respondents Job Title

Figure 4 indicates that in most of the cases, it is managers or directors/CEO's of training schools or companies that have responded to the survey. However, the number of professors/trainers that have responded is also significant, representing almost a fifth of all respondents (19.3%).

1.1.4. COURSES PROVIDED GEO DISTRIBUTION

The available response options, regarding the on-site courses provided were:

- Europe (all)
- Specific countries
- Worldwide

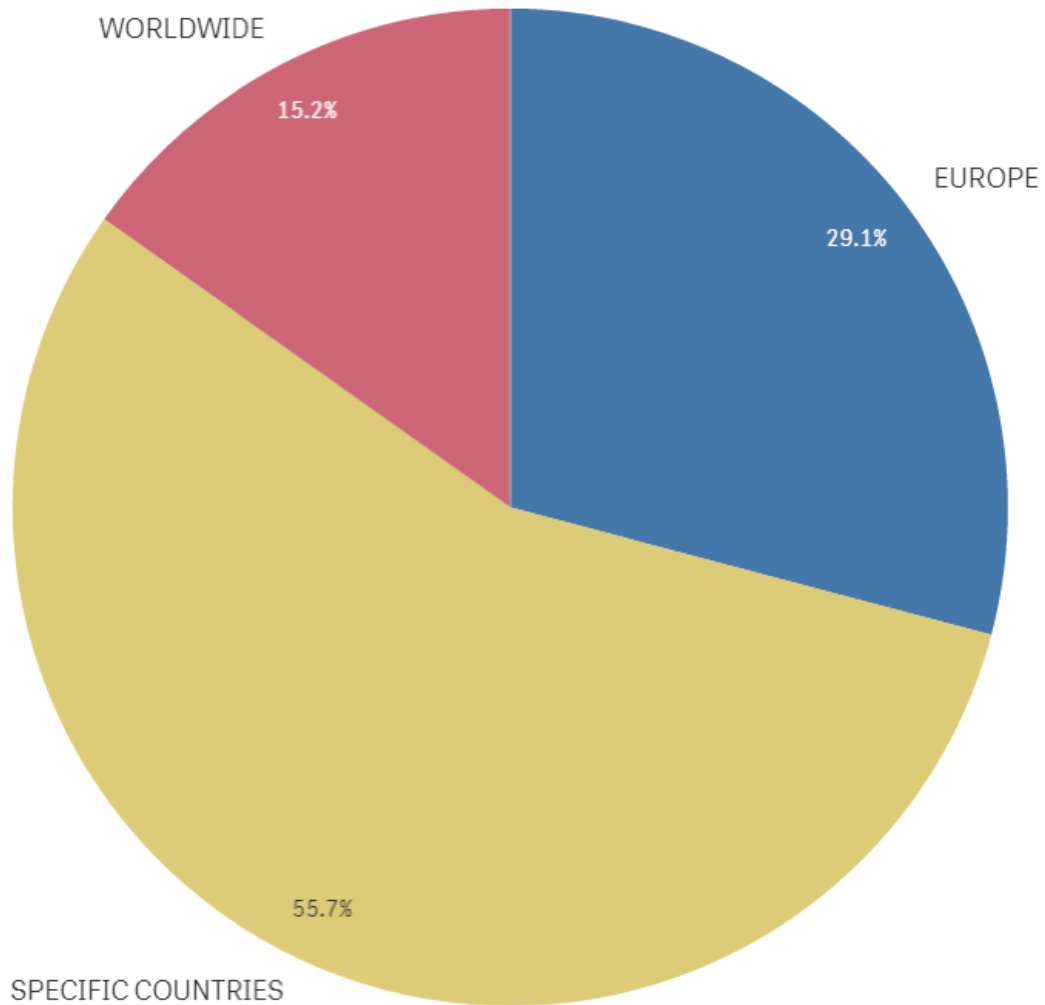


Figure 5: KPI 1.6 (Offer): course on-site provided – Overall sample

Figure 5 indicates that of those respondents providing courses on site, just over half (55.7%) did so in specific countries, 29.1% delivered EU wide courses on site, with the remaining 15.2% providing worldwide on site provision.

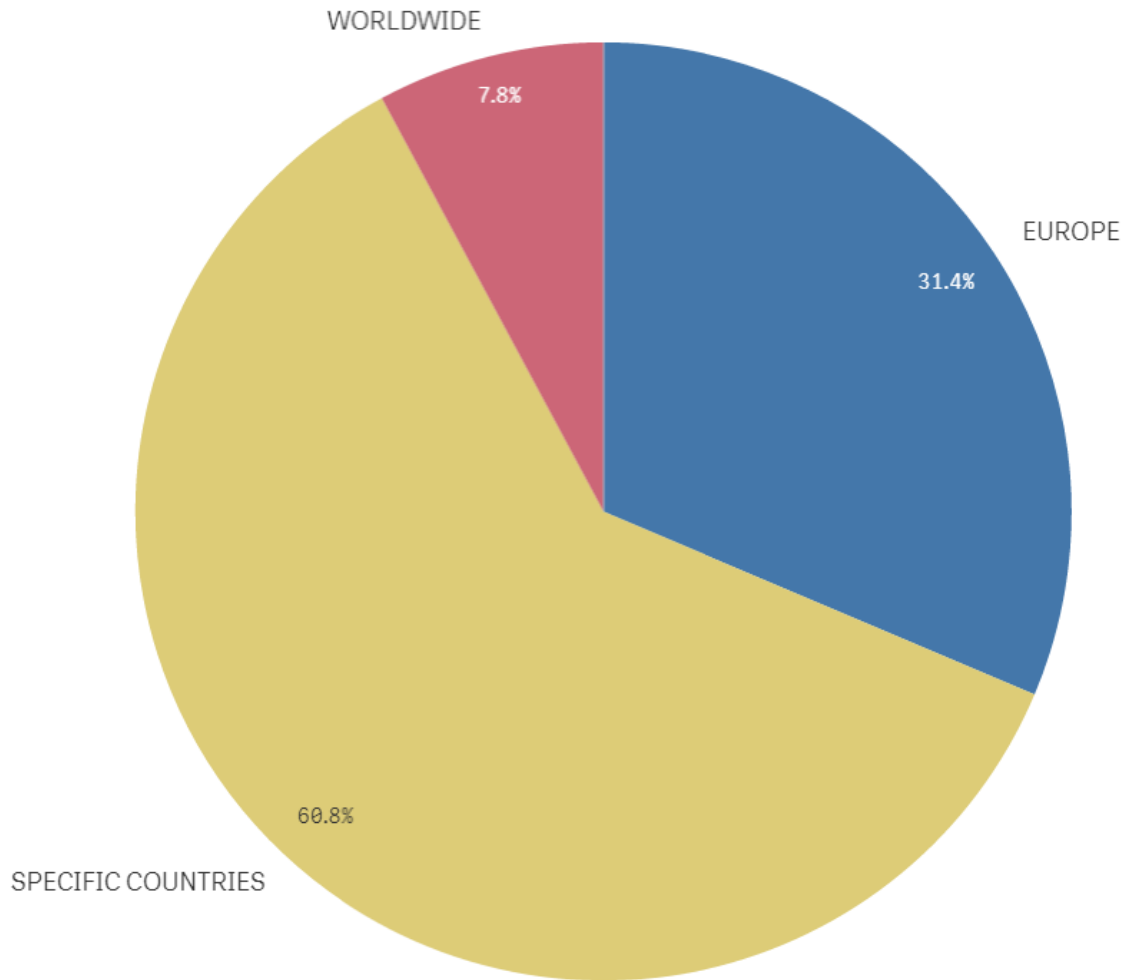


Figure 6: KPI 1.6 (Offer): course on-site provided – VET sample

With respect to Vocational Training schools, Figure 6 indicates that of those respondents providing courses on site about six in ten (60.8%) did so in specific countries, 31.4% delivered EU wide courses on site, with the remaining 7.8% providing worldwide on site provision.

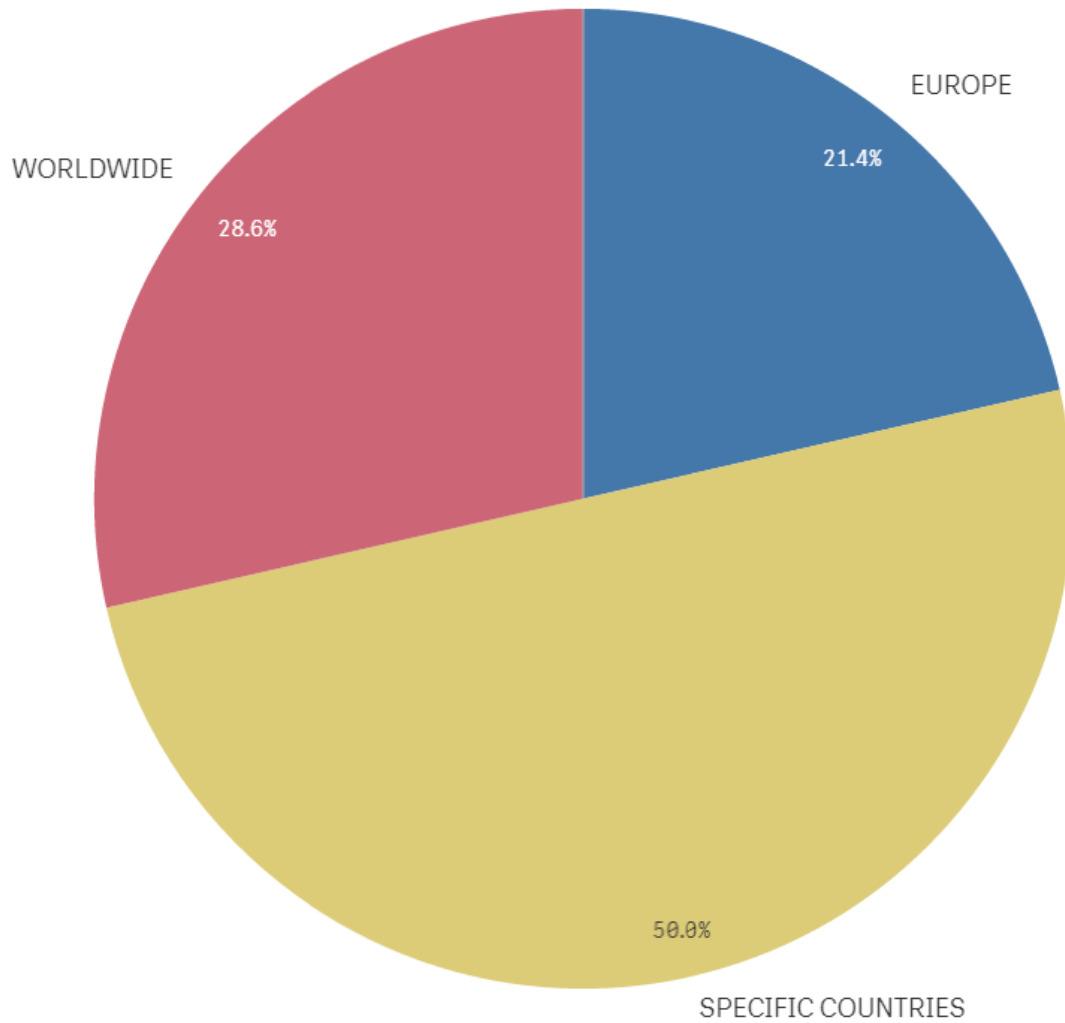


Figure 7: KPI 1.6 (Offer): course on-site provided – INSTITUTE sample

With respect to Institutes, Figure 7 indicates that of those respondents providing courses on site, half did so in specific countries, 21.4% delivered EU wide courses on site, with the remaining 28.6% providing worldwide on site provision.

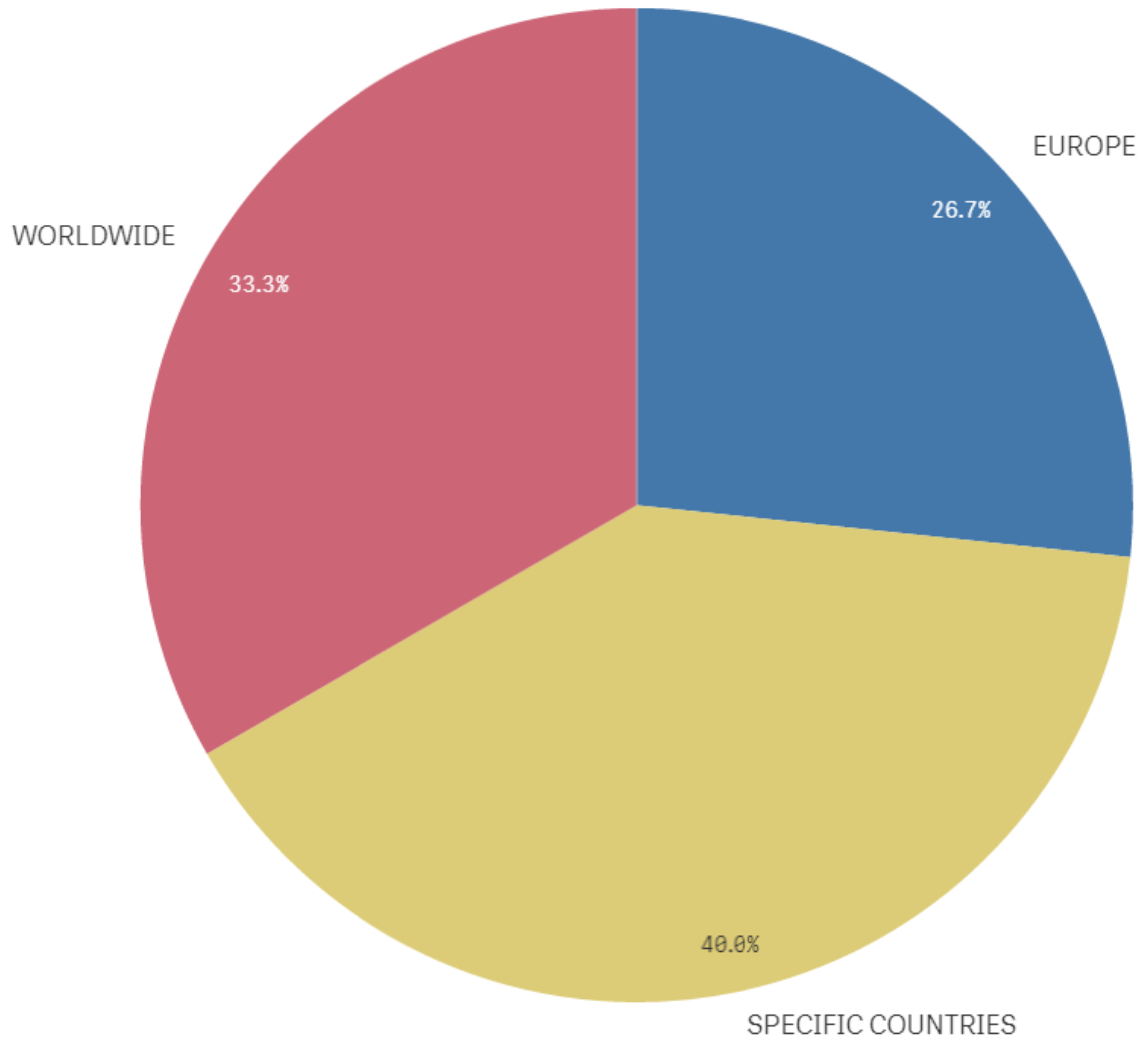


Figure 8: KPI 1.6 (Offer): course on-site provided – PRIVATE COMPANY sample

With respect to Private companies, Figure 8 indicates that of those respondents providing courses on site, 40% did so in specific countries, 27% delivered EU wide courses on site, with a somewhat higher proportion (33%) providing worldwide on site provision.

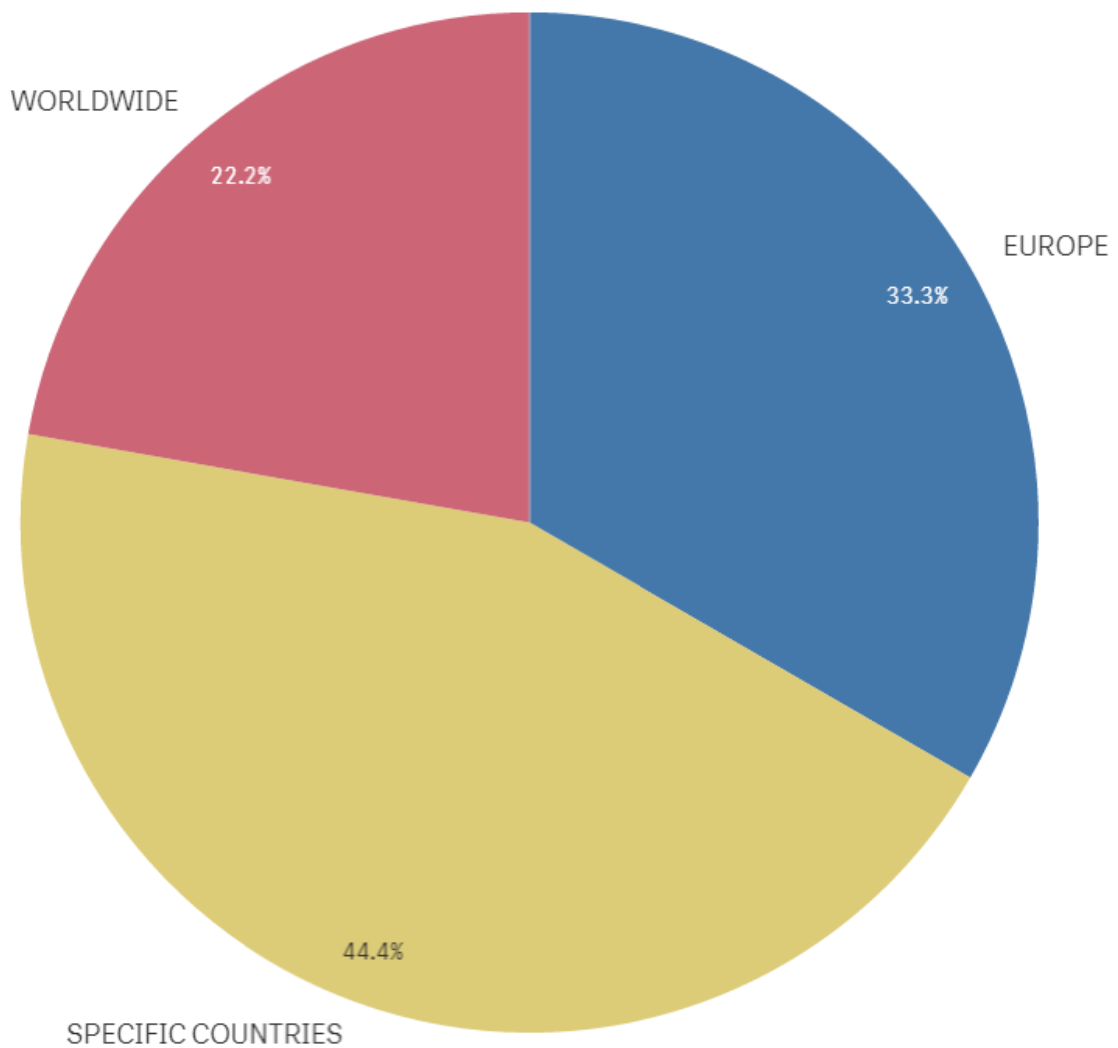


Figure 9: KPI 1.6 (Offer): course on-site provided – UMBRELLA ORG. sample

With respect to Umbrella organisations, Figure 9 indicates that of those respondents providing courses on site 44% did so in specific countries, 22% delivered EU wide courses on site, with 33% providing worldwide on site provision.

1.1.5. EQF OFFERED

VET providers were asked to indicate the different European Qualification Framework (EQF)³ levels (from 3-8) at which they offered courses.

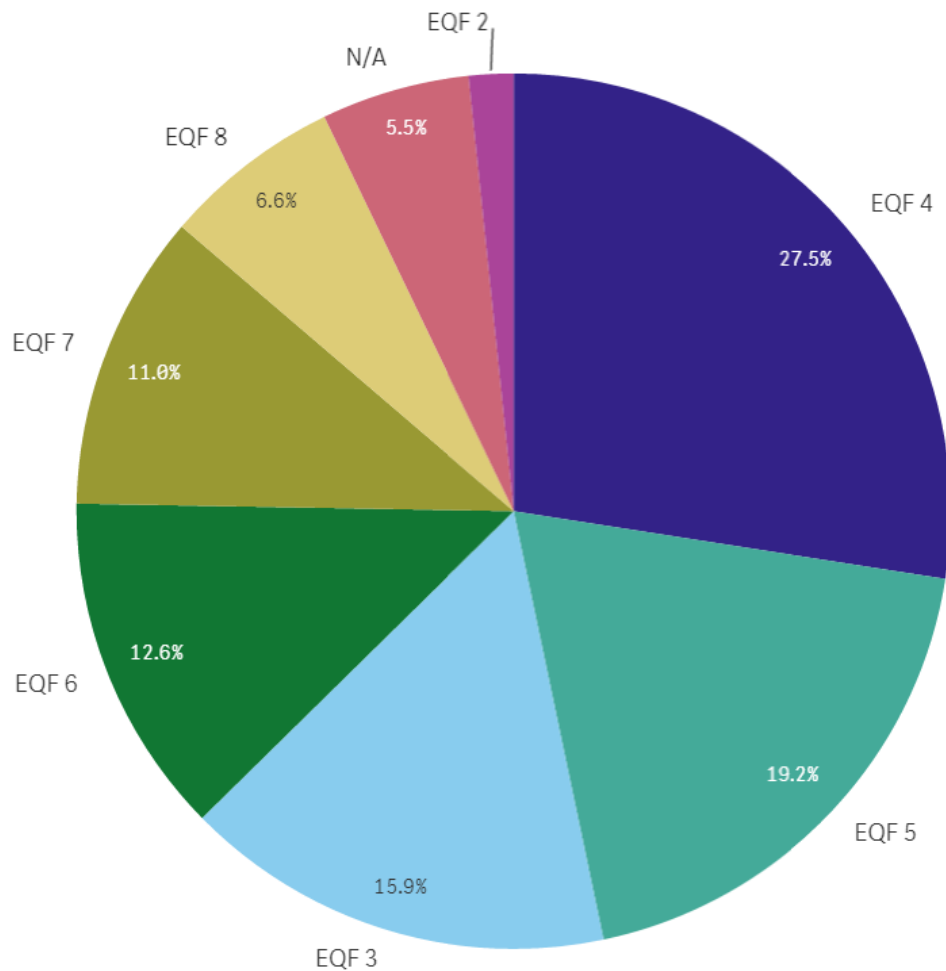


Figure 10: KPI 1.9 (Offer): EQF course level provided – Overall sample

Analysing all responses including those organisations providing courses at a range of different EQF levels points to a relatively broad spread of provision by level as outlined in Figure 10, with 27.5% of all responses at EQF level 4, followed by the EQF level 5 (19.2%), EQF level 3 (15.9%), EQF level 6(12.6%) and EQF level 7 accounting for 11% of all responses.

³ <https://ec.europa.eu/ploteus/en/content/descriptors-page>

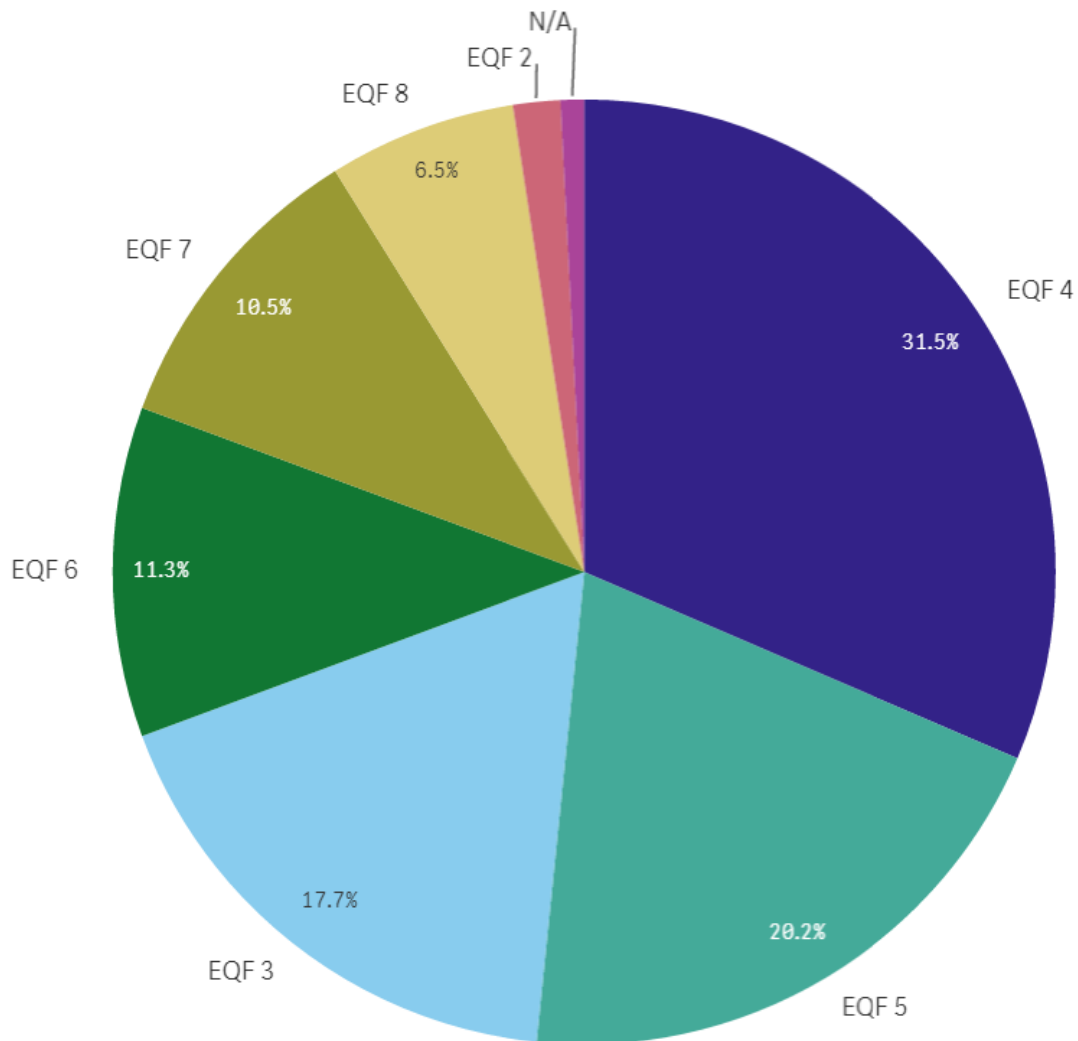


Figure 11: KPI 1.9 (Offer): EQF course level provided – VET sample

The same analysis but just for vocational training schools indicates that EQF level 4 is again the most common level of provision (31.5%), with the profile of provision at other levels broadly following the same pattern as that for all VET stakeholders, with the figures for EQF levels 5, 3, 6, 7 and 8 being 20.2%, 17.7%, 11.3%, 10.5% and 6.5% of responses respectively. Again, the number of responses relating to EQF 2 level is insignificant.

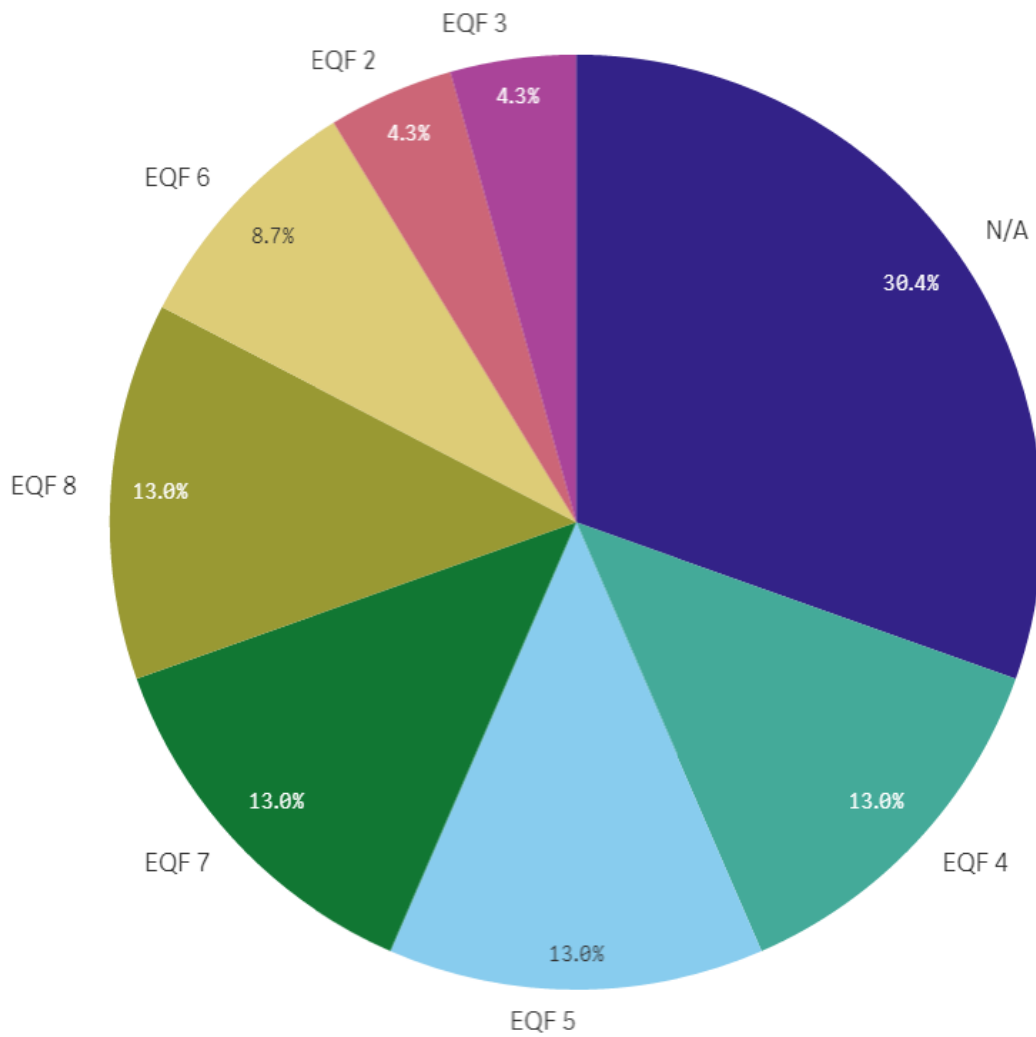


Figure 12: KPI 1.9 (Offer): EQF course level provided – INSTITUTE sample

The same analysis but for Institutes indicates that for 30% of respondents EQF level is not applicable (N/A), with responses for EQF levels 4, 5, 7 and 8 at a 13% each respectively. The incidence of provision at EQF levels 2 and 3 is somewhat lower (4% in each case) and EQF level 6 is at 9%

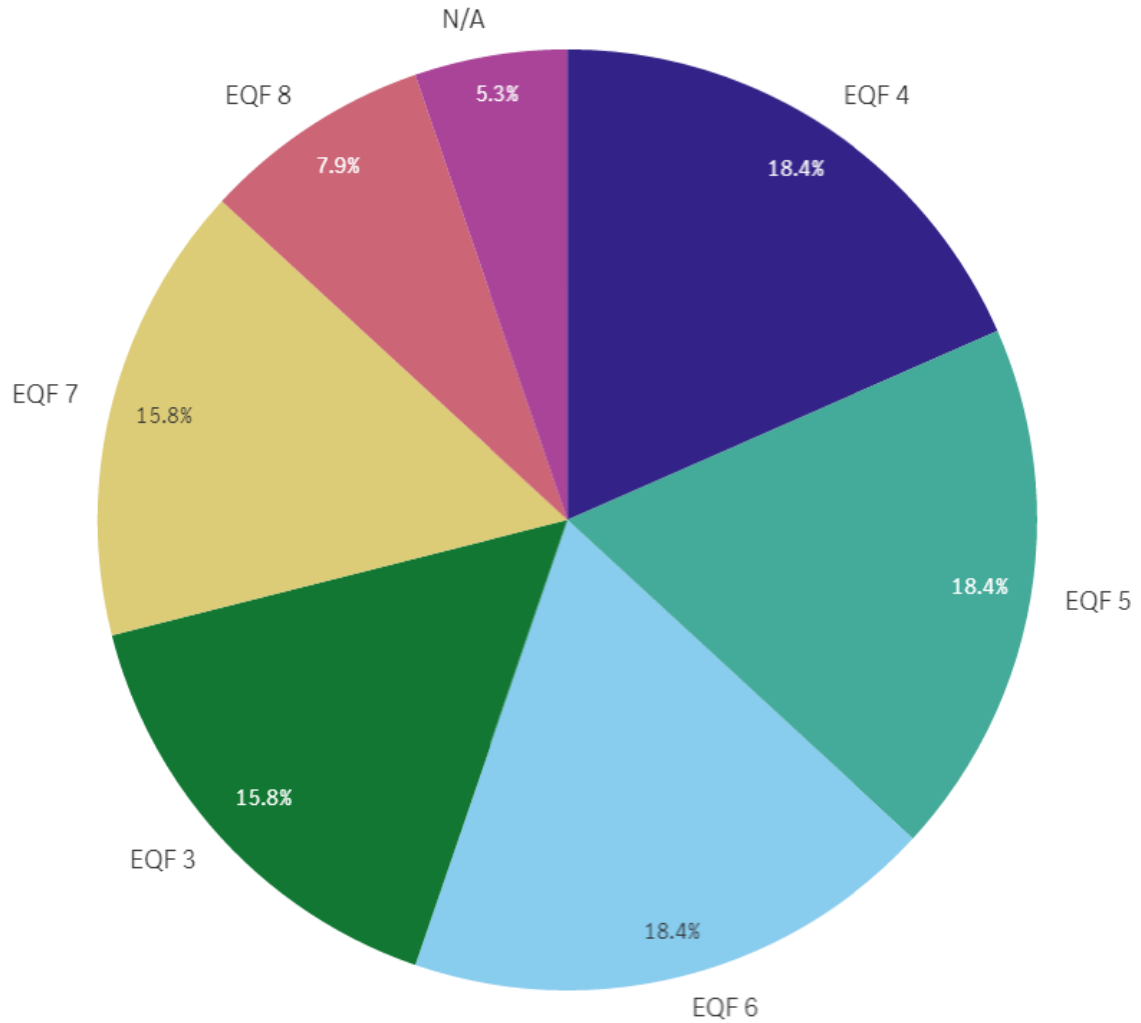


Figure 13: KPI 1.9 (Offer): EQF course level provided – PRIVATE COMPANY sample

The profile of provision by private companies is outlined in Figure 13. This indicates that the bulk of provision is at EQF levels 4, 5 and 6, accounting for 18% of responses in each case, with EQF levels 3 and 7 accounting for a further 16% in each case. A somewhat lower incidence of provision at level EQF8 is evident (8%).

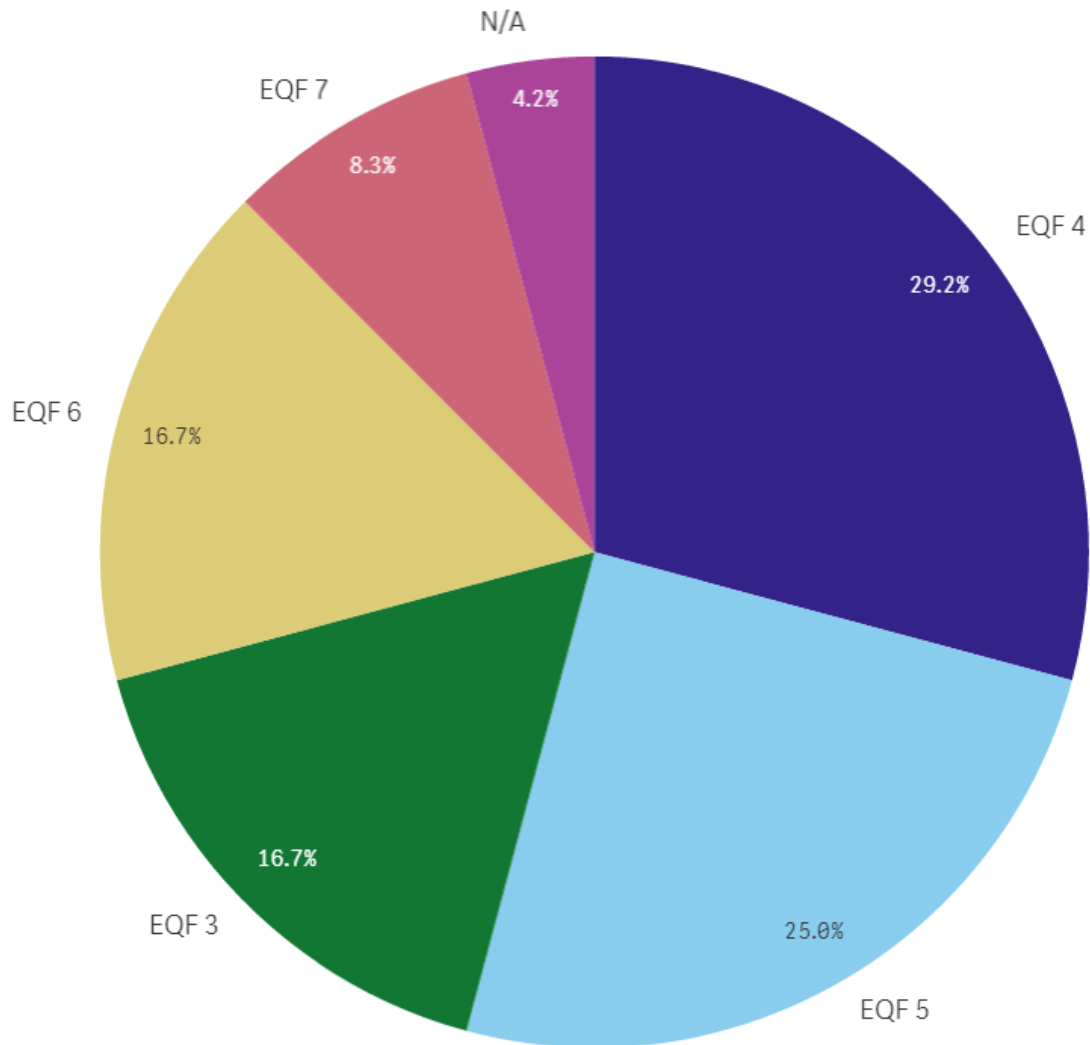


Figure 14: KPI 1.9 (Offer): EQF course level provided – UMBRELLA ORG. sample

With respect to Umbrella organisations, Figure 14 indicates that EQF level 4 is the most common level of provision (29% of all responses) followed closely by EQF level 5 (25%) and a significantly lower incidence at EQF level 3 and 6 at 17% in each case.

4.2 DRIVERS OF CHANGE

For each Driver of Change, respondents were asked to comment on two key issues:

- **Importance:** The relative importance of each Driver of Change for the respondents' particular business using a ranking from 0 to 5

- 0 = not applicable
 - 1 = not important
 - 2 = slightly important
 - 3 = moderately Important
 - 4 = important
 - 5 = very important
- **Urgency:** Respondents were asked to identify the relative importance of the impact of each specific Driver of Change over the periods up to 2020, 2025 and 2030
 - by 2020: 5 = very urgent
 - by 2025, 3 = urgent
 - by 2030 and later, 1 = not urgent

4.2.1 IMPORTANCE OF DRIVERS OF CHANGE GROUPS

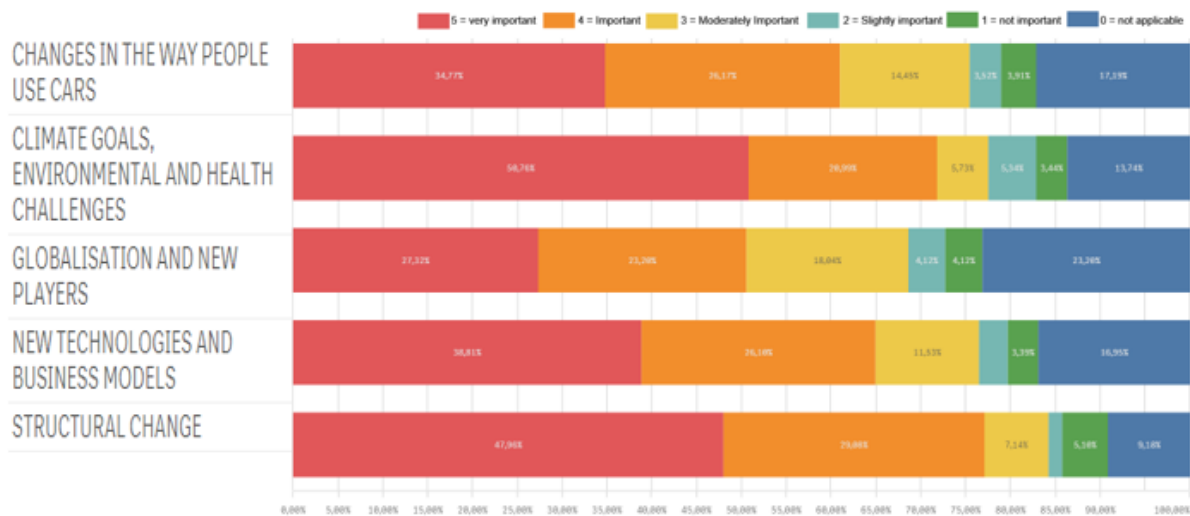


Figure 15: KPI 2.1 (Offer): DRIVERS OF CHANGE Groups: IMPORTANCE – Overall sample

Figure 15 provides an overview of DRIVERS of Change ‘macro’ Groups based on importance from the perspective of the offer. The figure indicates that the Drivers of Change “CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES” was most likely to be identified as ‘most important’ (score 5) with 51% of respondents indicating this was the case, followed by “STRUCTURAL CHANGE” (48%). “NEW TECHNOLOGIES AND BUSINESS MODELS” and “CHANGES IN THE WAY PEOPLE USE CARS” were ranked third and fourth on this basis at 39% and 35% respectively. Again, based on this analysis, the Driver of Change “GLOBALISATION AND NEW PLAYERS” was the least important at 28%.

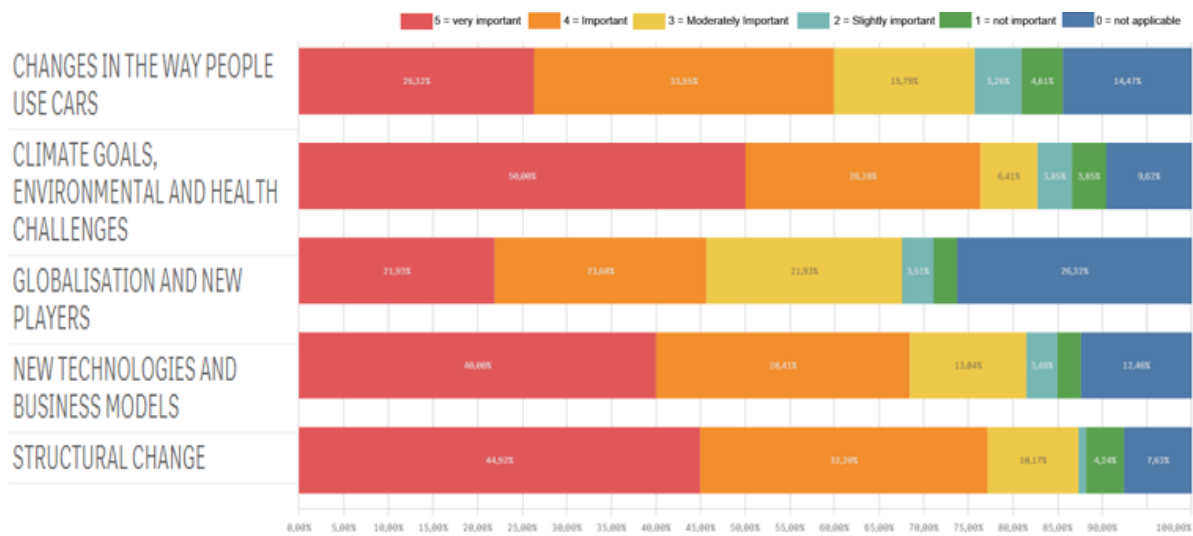


Figure 16: KPI 2.1 (Offer): DRIVERS OF CHANGE Groups: IMPORTANCE – VET sample

Figure 16 outlines the same analysis, but based solely on VET respondents. The analysis points to a similar pattern to that of the overall sample, with “CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES” again the most frequently cited driver of change (50%). This was followed by “STRUCTURAL CHANGE” (45%) and “NEW TECHNOLOGIES AND BUSINESS MODELS” (40%). “CHANGES IN THE WAY PEOPLE USE CARS” and “GLOBALISATION AND NEW PLAYERS” were ranked fourth and the fifth based on this analysis, with 26% and 22% of respondents citing each of these drivers of change as most important.

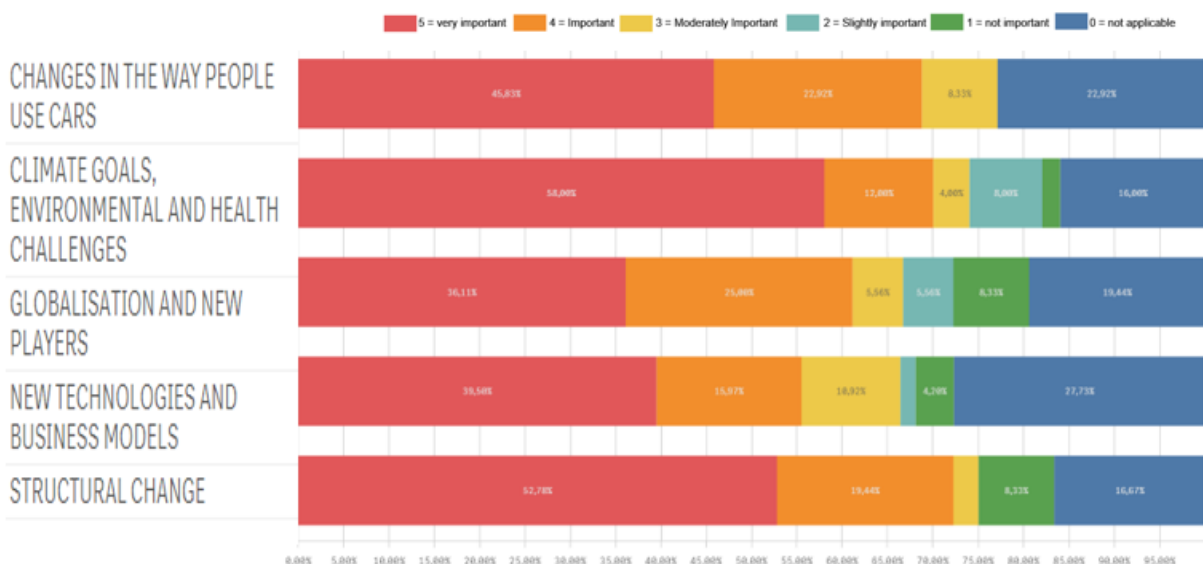


Figure 17: KPI 2.1 (Offer): DRIVERS OF CHANGE Groups: IMPORTANCE – INSTITUTE sample

Figure 17 provides a summary of responses from the perspective of Institutes with “CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES”, again the most frequently cited as ‘most important

(58%). This was followed by “STRUCTURAL CHANGE” (53%). The analysis indicates that “CHANGES IN THE WAY PEOPLE USE CARS” is also considered an important driver of change with 46% citing this as ‘most important’. Based on this criteria “NEW TECHNOLOGIES AND BUSINESS MODELS” and “GLOBALISATION AND NEW TRENDS” were ranked fourth and the fifth, with close to 40% of respondents citing each driver as ‘most important’.

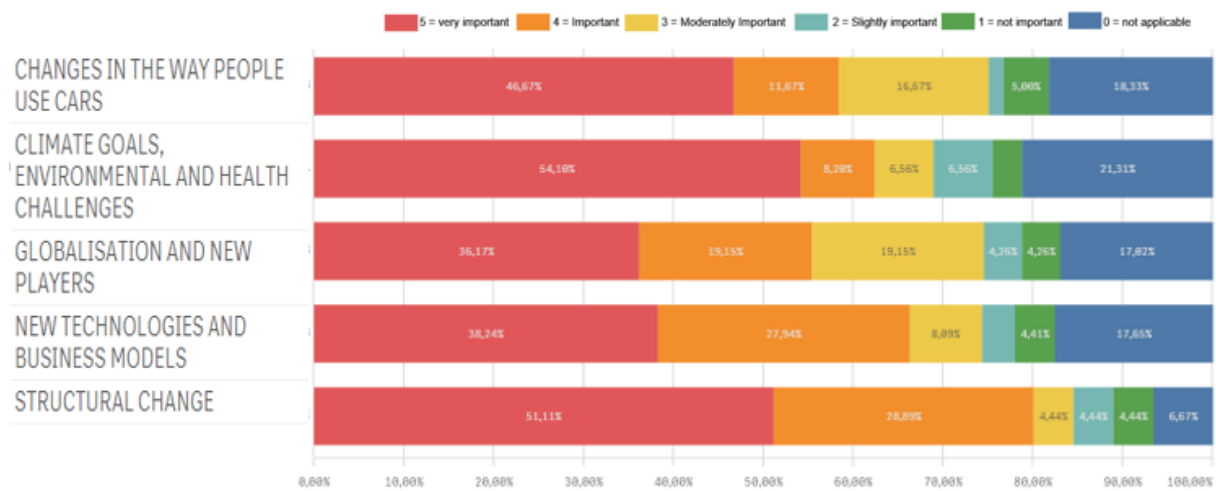


Figure 18: KPI 2.1 (Offer): DRIVERS OF CHANGE Groups: IMPORTANCE – PRIVATE COMPANY sample

Figure 18 outlines the same analysis but from the perspective of private companies. The analysis points to a similar pattern to those of Institutes, as outlined in the previous Figure 21.



Figure 19: KPI 2.1 (Offer): DRIVERS OF CHANGE Groups: IMPORTANCE – UMBRELLA ORG. sample

Figure 19 summarises survey responses from the perspective of umbrella organisations. The analysis indicates that based on the proportion of respondents citing each driver of change as ‘most important’ “STRUCTURAL CHANGES” is ranked first with 71% of respondents scoring this Driver of Change as 5.

Ranked second is “CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES” (59%) followed by “NEW TECHNOLOGIES AND BUSINESS MODELS” (48%) and “CHANGES IN THE WAY PEOPLE USE CARS” (42%). Most respondents to the survey indicated “GLOBALISATION AND NEW TRENDS” was the least important Driver of Change, (29% citing this as ‘most important’).

4.2.2 URGENCY OF DRIVERS OF CHANGE GROUPS

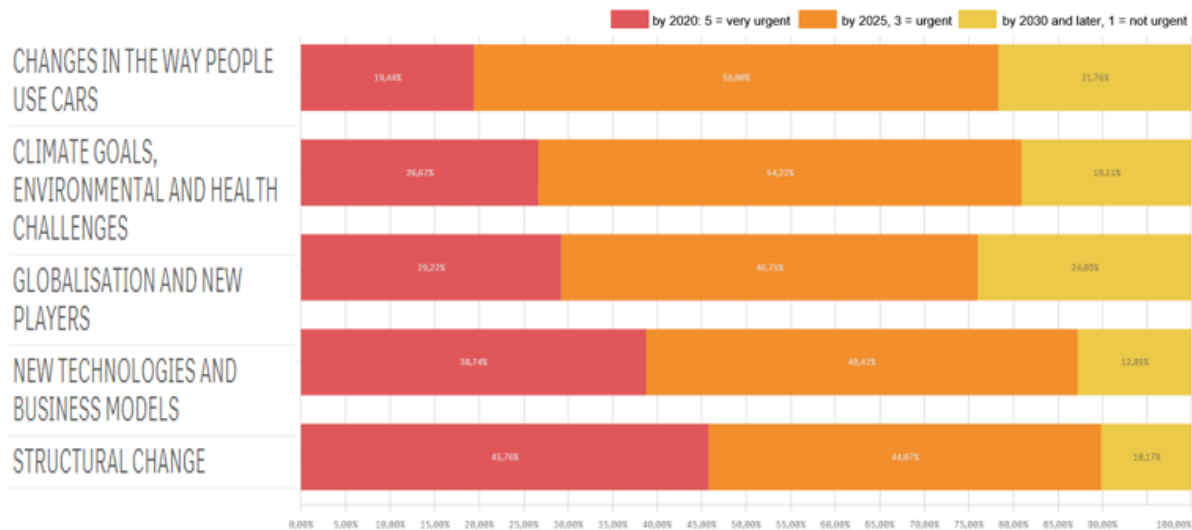


Figure 20: KPI 2.2 (Offer): DRIVERS OF CHANGE Groups: URGENCY – Overall sample

Figure 20 sets out an analysis of the urgency of Drivers of Change from the perspective of the provision ‘offer’. “STRUCTURAL CHANGES” was the Driver of Change most likely to be ranked first in terms of the level of urgency with 46% responses indicating this will impact on the need for changes in provision to meet changing skill requirements in the sector by 2020 (very urgent). Ranked second on this basis was “NEW TECHNOLOGIES AND BUSINESS MODELS” (scored very urgent by 39% of respondents) followed by “GLOBALISATION AND NEW PLAYERS” (29%); “CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES” (27%) and “CHANGES IN THE WAY PEOPLE USE CARS” (19%).

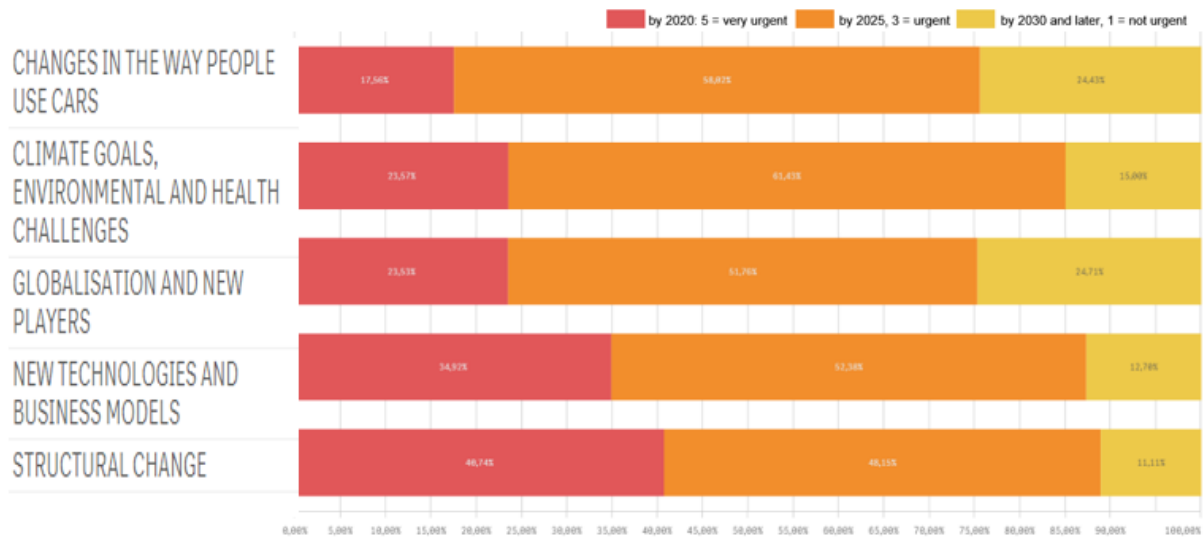


Figure 21: KPI 2.2 (Offer): DRIVERS OF CHANGE Groups: URGENCY – VET sample

Figure 21 sets out the same analysis but from the perspective of VET providers. This analysis almost mirrors the position for the overall sample. The only slight differences being that “CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES” (24%) and “GLOBALISATION AND NEW PLAYERS” were ranked third and fourth respectively by (24%).

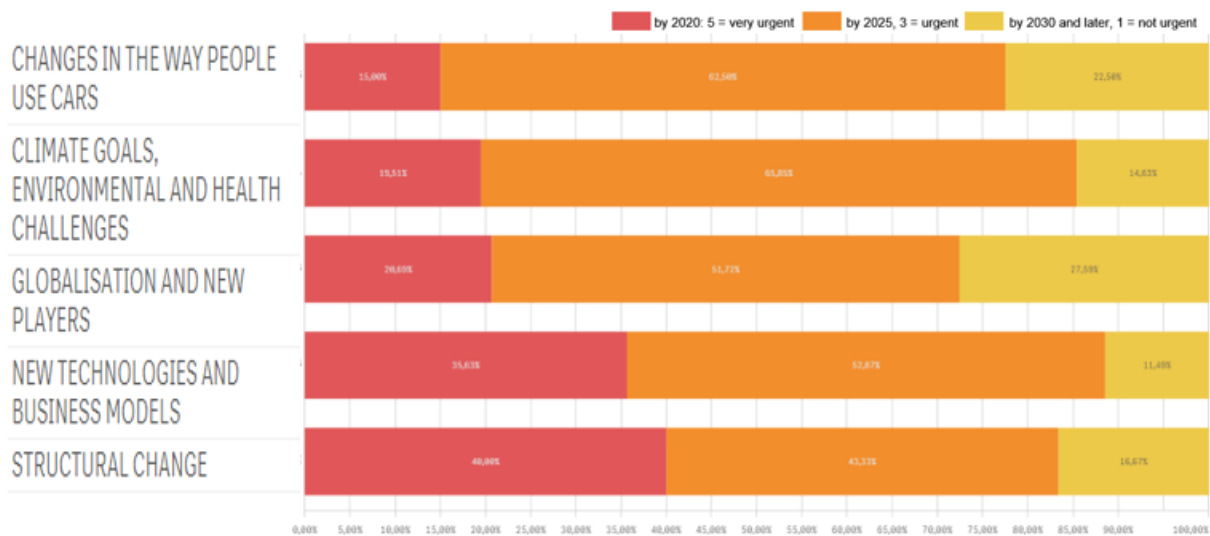


Figure 22: KPI 2.2 (Offer): DRIVERS OF CHANGE Groups: URGENCY – INSTITUTE sample

Figure 22 outlines the same analysis but for Institutes. The analysis points to a similar picture to that of the overall sample: “STRUCTURAL CHANGES” ranked first in terms of level of urgency (40% respondents indicating this is ‘very urgent’), followed by “NEW TECHNOLOGIES AND BUSINESS MODELS” (36%) and the “GLOBALISATION AND NEW PLAYERS”, at third (21%). The respective proportions for “CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES” and “CHANGES IN THE WAY PEOPLE USE CARS” were 20% and 15%.

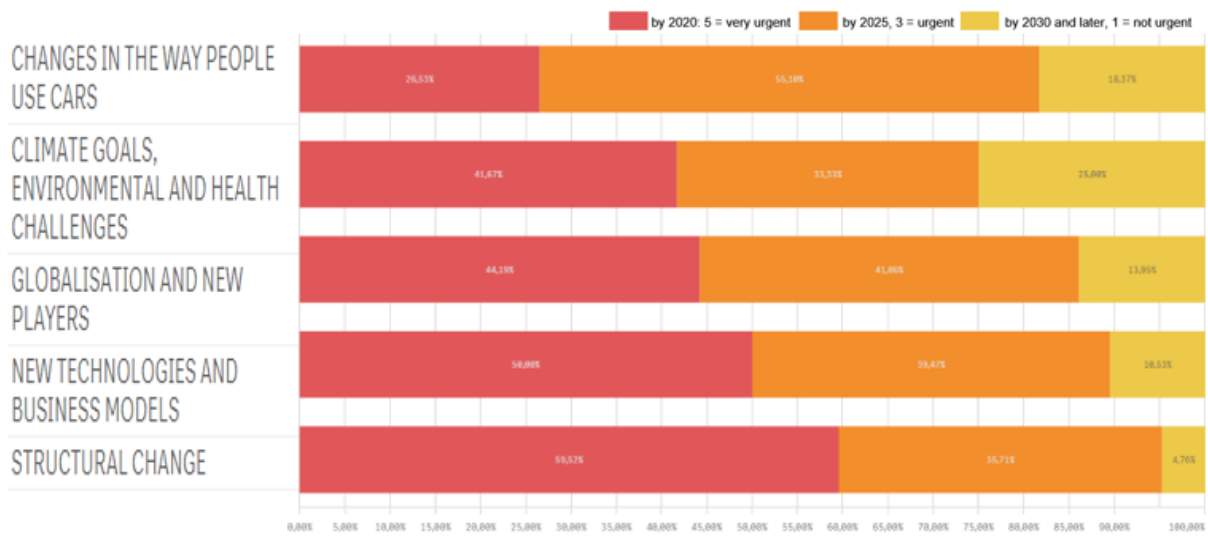


Figure 23: KPI 2.2 (Offer): DRIVERS OF CHANGE Groups: URGENCY – PRIVATE COMPANY sample

Responses of private companies reflect those of institutes in terms of the ranking of Drivers of Change based on relative urgency but vary in terms of the actual proportion of respondents identifying each respective Driver of Change as ‘very urgent’. “STRUCTURAL CHANGES” are ranked first in terms of level of urgency with 60% responses assigned as very urgent, followed by “NEW TECHNOLOGIES AND BUSINESS MODELS” (50%). “GLOBALISATION AND NEW PLAYERS”, third (44%) followed by “CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES” (42%) and “CHANGES IN THE WAY PEOPLE USE CARS” (27%).

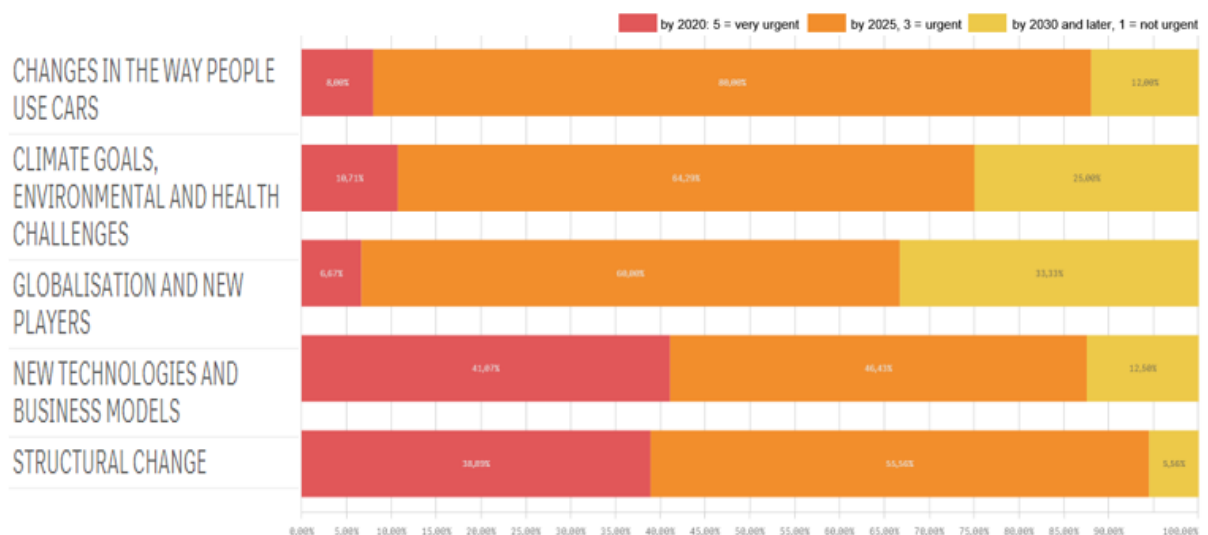


Figure 24: KPI 2.2 (Offer): DRIVERS OF CHANGE Groups: URGENCY – UMBRELLA ORG. sample

The responses of umbrella organisations are outlined in Figure 24. In this case the “NEW TECHNOLOGIES AND BUSINESS MODELS” are ranked first based on the proportion indicating this as



the most urgent Driver of Change (41% of respondents), followed by the “STRUCTUREAL CHANGES” (39%). For all drivers of change the most likely time period by which this will impact on the need for changes in provision to meet changing skill requirements in the sector is by 2025.

4.2.3 NEW TECHNOLOGIES AND BUSINESS MODELS

These developments will lead to changes in the production and capability of vehicles. They will require substantial funding and/or financial support. Public authorities will have a key role to play in facilitating the roll-out of automated driving and alternative powertrains by putting in place relevant policies that will allow the sector to accommodate new requirements in a timely manner, together with the necessary financing frameworks to support these changes.

Companies in the automotive sector are facing constant developments in the area of advanced manufacturing, materials and the complexity of global supply chains. This will result in many jobs and processes needing to be redefined to take advantage of the potential that automation offers the sector.

Individual Drivers of Change in this category are:

- **Connected and Automated Driving (CAD), Advanced Driver Assistance Systems (ADAS)**

These are aspects related to the assistance and automation of the driving activities to reduce road fatalities by minimising human errors, providing new services and accessibility, improving traffic flows and moving a vehicle without active driver interventions

- **Electrification**

It is clear that running out of crude oil and the need for CO₂ global reduction are both critical issues in Europe. Electrification of the whole powertrain is a possible strategy to tackle this issue.

Electrification has been identified as one of the possible solutions to help achieve CO₂ global reduction and improve local air quality.

- **Handling of / access to, vehicle data**

Increasing technology inside a vehicle and the relative necessity to be connected drive the needs to manage and access huge quantities of data quickly. Big data and analytics will allow players to optimise vehicle usage and forecast maintenance requirements (predictive maintenance).



- **Advanced manufacturing, digitalisation and robotization of the manufacturing process**

Firms in the automotive sector are facing constant developments in the area of advanced manufacturing and integrating the results of technological research into manufacturing processes. Moreover, Manufacturing 4.0 can create efficiency and reduce (indirect) costs.

- **Alternative powertrains:**

The variation from internal combustion to a CO₂ neutral mobility is directly connected to changes in powertrains.

- **New communications technologies:**

In the near future the vehicle will be connected, with digital technologies changing the way data is transferred and utilised. These new communication technologies have a key strategic importance in relation to changes in the sector.

- **3D printing:**

It is a technology that can lead to a reduction in the costs of production as well as a reduction in defects and will also have an impact on jobs and skill requirements. Moreover, it is useful for rapid prototyping and advanced manufacturing and enables prototypes to be 'moved' between different players within the supply chain very quickly and efficiently.

- **New / advanced materials**

Modern car parts are increasingly made of lighter materials and these new / advanced materials are driving the strategies for future evolution in terms of product, design and performance.

- **OEM products standardisation and plug & play**

The car assembly process will be performed by robots with higher AI and the tendency will be to use ready-built and plug & play parts to make activities more efficient and faster; moreover, OEMs will improve process and cost efficiency and might be able to set the standards in a market where brand attractiveness will diminish (due to the shift between car-owner to car-user). Common online platforms might connect supply and demand globally to increase the efficiency of players across the supply chain.

4.2.3.1 *New Technologies and Business Models: Importance*

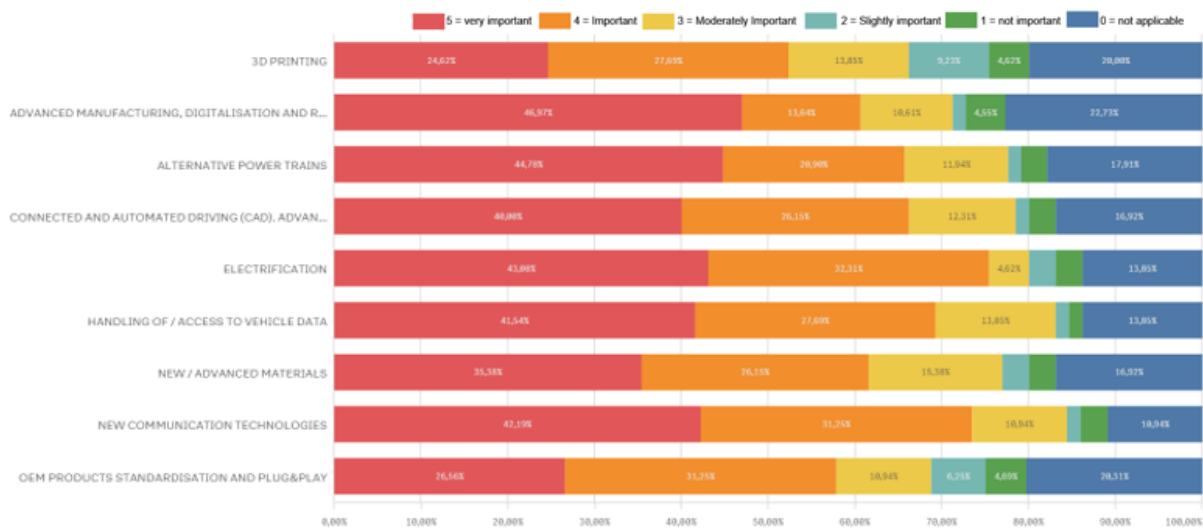


Figure 25 KPI 2.3 (Offer) Drivers of Change – Group NEW TECHNOLOGIES AND BUSINESS MODELS – IMPORTANCE – Overall sample

Figure 25 sets out analysis of the overall sample of respondents based on importance with respect to the provision offer related to the Driver of Change “NEW TECHNOLOGIES AND BUSINESS MODEL GROUP”. “ADVANCED MANUFACTURING, DIGITALISATION AND ROBOTIZATION OF THE MANUFACTURING PROCESS”, “ALTERNATIVE POWERTRAINS”, and “ELECTRIFICATION” are ranked as the TOP3 specific Drivers of Change based on the proportion of respondents identifying these as ‘most important’ (Score of 5) . If the ‘very important’ (score of 5) and ‘important’ (score of 4) scores are combined, “ELECTRIFICATION”, “NEW COMMUNICATION TECHNOLOGIES”, and “HANDLING OF / ACCESS TO VEHICLE DATA” are ranked as the TOP3 drivers. The analysis points to the conclusion that currently the greatest demand for support relates to the above Drivers of Change.

Relatively low importance for support based on the relative importance attached to each Driver of Change is evident in relation to OEM PRODUCTS STANDARDISATION AND PLUG&PLAY” and “3D PRINTING”..

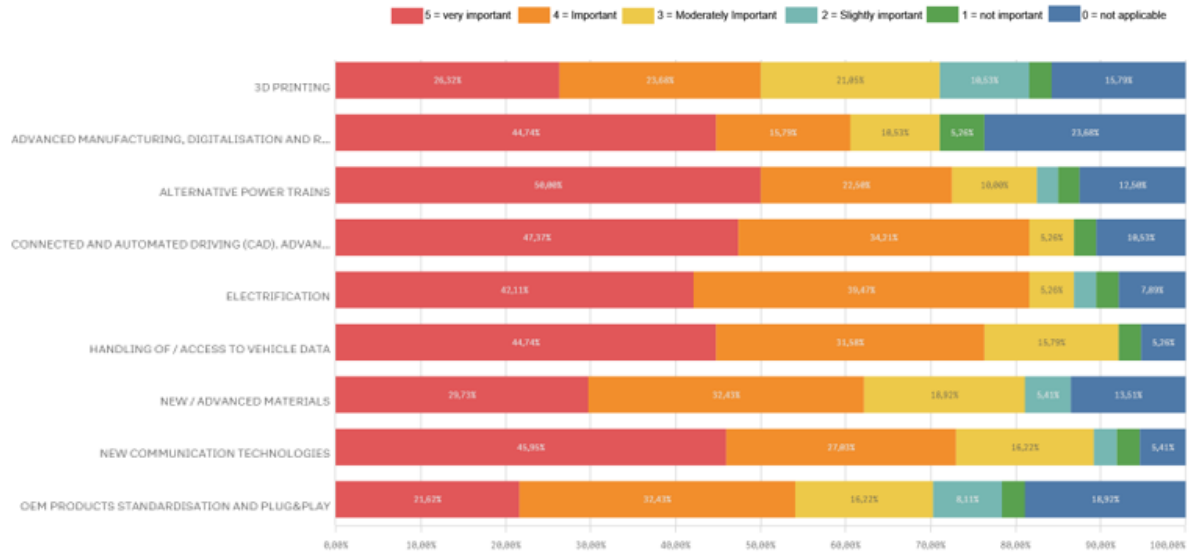


Figure 26 KPI 2.3 (Offer) Drivers of Change – Group NEW TECHNOLOGIES AND BUSINESS MODELS – IMPORTANCE – VET sample

Figure 26 sets out analysis of the VET sample of respondents based on importance with respect to the of provision offer related to the Driver of Change “NEW TECHNOLOGIES AND BUSINESS MODEL GROUP”. Based on the proportion of respondents identifying each specific Driver of Change as ‘very important’ (score of 5) or ‘important’ (score of 4), the greatest demand for support is evident in relation to “CONNECTED AND AUTOMATED DRIVING” and “ELECTRIFICATION” followed by “HANDLING OF / ACCESS TO VEHICLE DATA” and “ALTERNATIVE POWERTRAINS”. These are all ICT related skills. On this basis, the least demand for support is evident in relation to “3D PRINTING” and “OEM PRODUCTS STANDARDISATION AND PLUG&PLAY”.

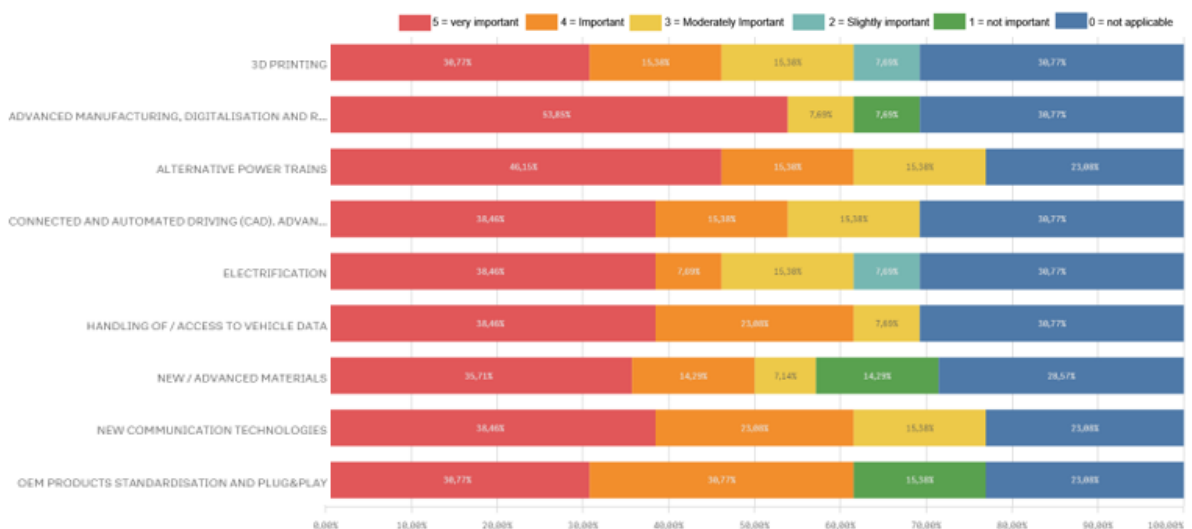


Figure 27: KPI 2.3 (Offer) Drivers of Change – Group NEW TECHNOLOGIES AND BUSINESS MODELS – IMPORTANCE – INSTITUTE sample

Figure 27 sets out the same analysis but in relation to responses from Institutes. This sample includes research institutes, accreditation, certification or qualification bodies. In terms of those respondents identifying each specific Driver of Change as ‘very important’ “ADVANCED MANUFACTURING, DIGITALISATION AND ROBOTIZATION OF THE MANUFACTURING PROCESS” is ranked first. If the scores for “very important” and “important” are combined “ALTERNATIVE POWER TRAINS”, “HANDLING OF / ACCESS TO VEHICLE DATA”, “NEW COMMUNICATION TECHNOLOGIES”, and “OEM PRODUCTS STANDARDISATION AND PLUG&PLAY” are ranked highest, pointing to the priorities attached to specific types of support by this group of respondents.



Figure 28: KPI 2.3 (Offer) Drivers of Change – Group NEW TECHNOLOGIES AND BUSINESS MODELS – IMPORTANCE – PRIVATE COMPANY sample

The importance attached to specific Drivers of Change in terms of the impact on provision requirements identified by private companies is set out in Figure 28. The analysis points to a fairly broad spread of drivers likely to impact on provision, reflecting the diverse range of skills private companies support. If the scores for “very important” and “important” are combined, only “3D PRINTING” is identified as less important by comparison with other groups. “ELECTRIFICATION”, “NEW COMMUNICATION TECHNOLOGIES” and “NEW / ADVANCED MATERIALS” were identified as the most important specific Drivers-of-Change on this basis.

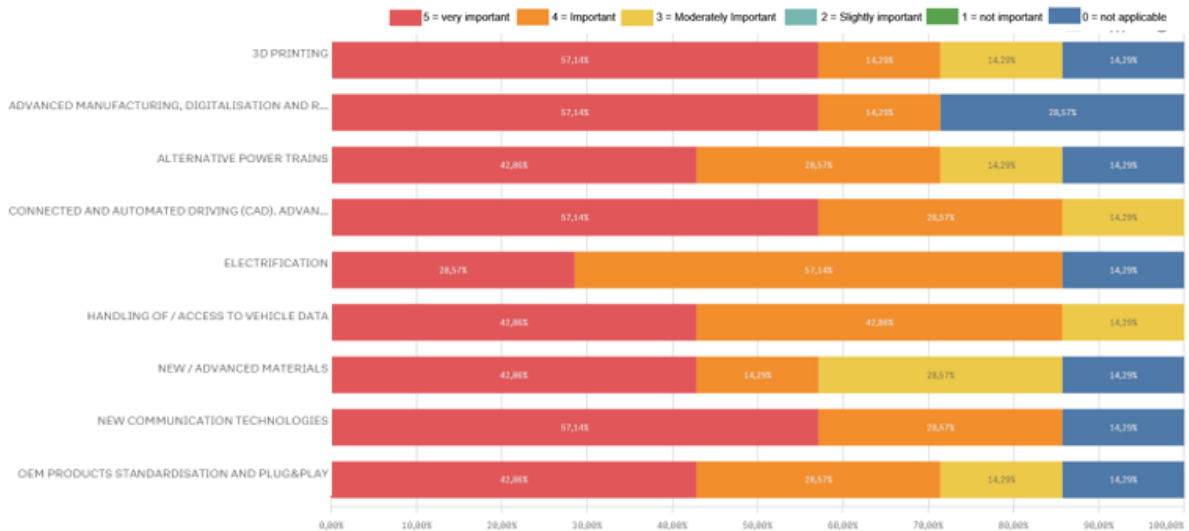


Figure 29: KPI 2.3 (Offer) Drivers of Change – Group NEW TECHNOLOGIES AND BUSINESS MODELS – IMPORTANCE – UMBRELLA ORG. sample

Figure 29 sets out the same analysis from the perspective of umbrella organisations, with patterns of response broadly similar to that of private companies. Again, if the scores for (“very important” and “important”) are combined, two major clusters of Drivers of Change in terms of importance are evident. Firstly: “CONNECTED AND AUTOMATED DRIVING”, “HANDLING OF / ACCESS TO VEHICLE DATA”, “NEW COMMUNICATION TECHNOLOGIES”, and “ELECTRIFICATION”. The second cluster comprises: “3D PRINTING”, “ADVANCED MANUFACTURING, DIGITALISATION AND ROBOTIZATION OF THE MANUFACTURING PROCESS”, “ALTERNATIVE POWERTRAINS” and “OEM PRODUCTS STANDARDISATION AND PLUG&PLAY”.

The notable exception to the above is “NEW/ADVANCED MATERIALS”, which appears to be identified as of lesser importance by umbrella organisations.

4.2.3.2 New Technologies and Business Models: Urgency

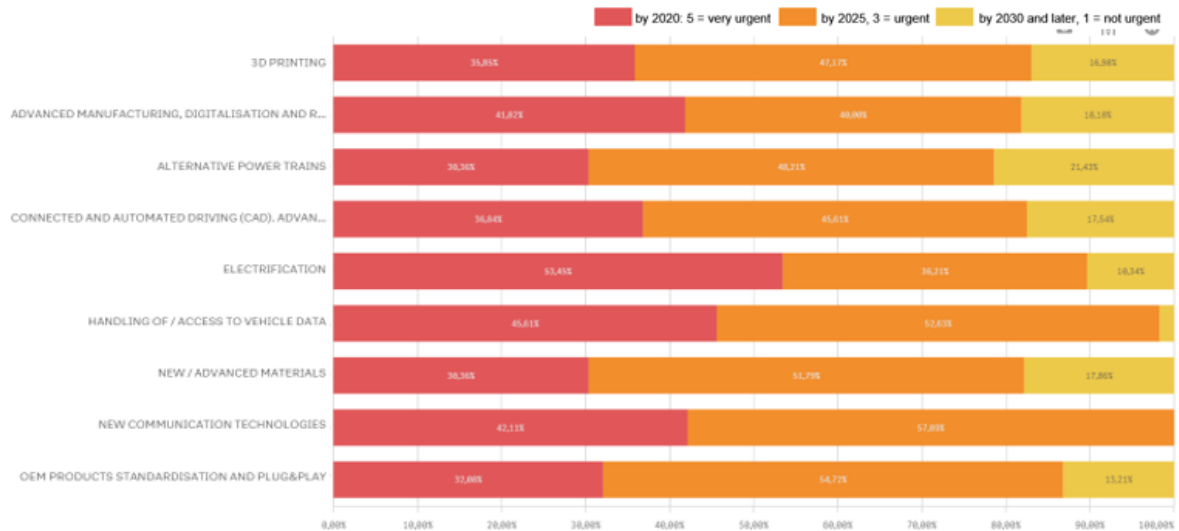


Figure 30: KPI 2.4 (Offer) Drivers of Change – Group NEW TECHNOLOGIES AND BUSINESS MODELS - URGENCY - Overall

Figure 30 sets out an analysis of the timeframe (urgency) within which the “NEW TECHNOLOGIES AND BUSINESS MODEL GROUP” Drivers of Change will impact on the need for changes in provision to meet changing skill requirements. “NEW COMMUNICATION TECHNOLOGIES”, “HANDLING OF / ACCESS TO VEHICLE DATA” and “ELECTRIFICATION” are ranked as the TOP3 in terms of urgency, based on the combined scores for ‘very urgent’ (score of 5) and ‘urgent’ (score of 4). This is also the case if the scores for ‘very urgent’ action is considered, indicating there is little change in priorities over the next 5 years.

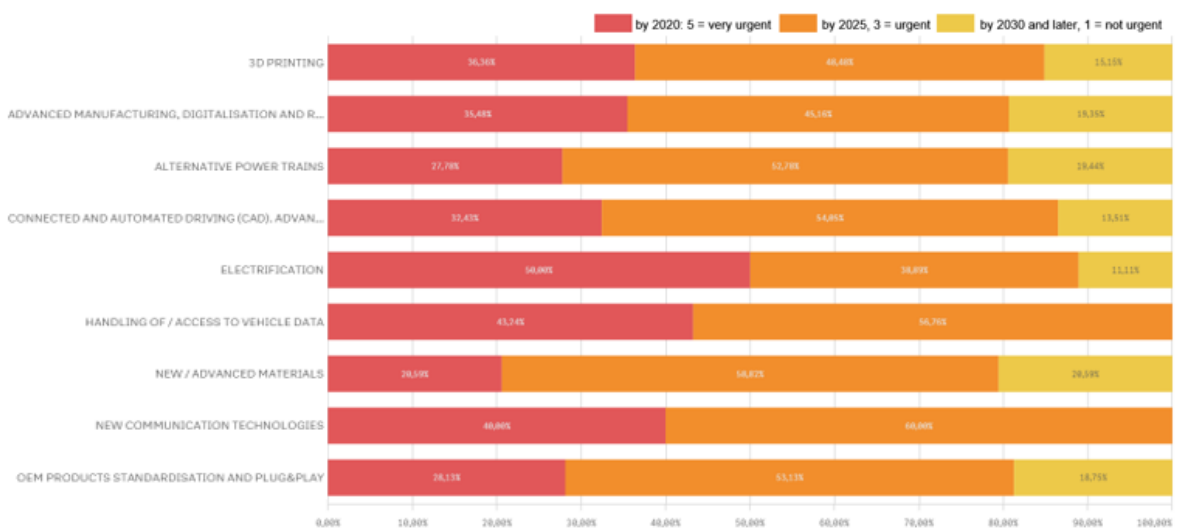


Figure 31: KPI 2.4 (Offer) Drivers of Change – Group NEW TECHNOLOGIES AND BUSINESS MODELS - URGENCY – VET sample

Figure 31 sets out the same analysis but from the perspective of VET providers. The analysis points to a broadly similar pattern in relation to levels of urgency for both “very urgent (by 2020)” and “urgent (by 2025).”

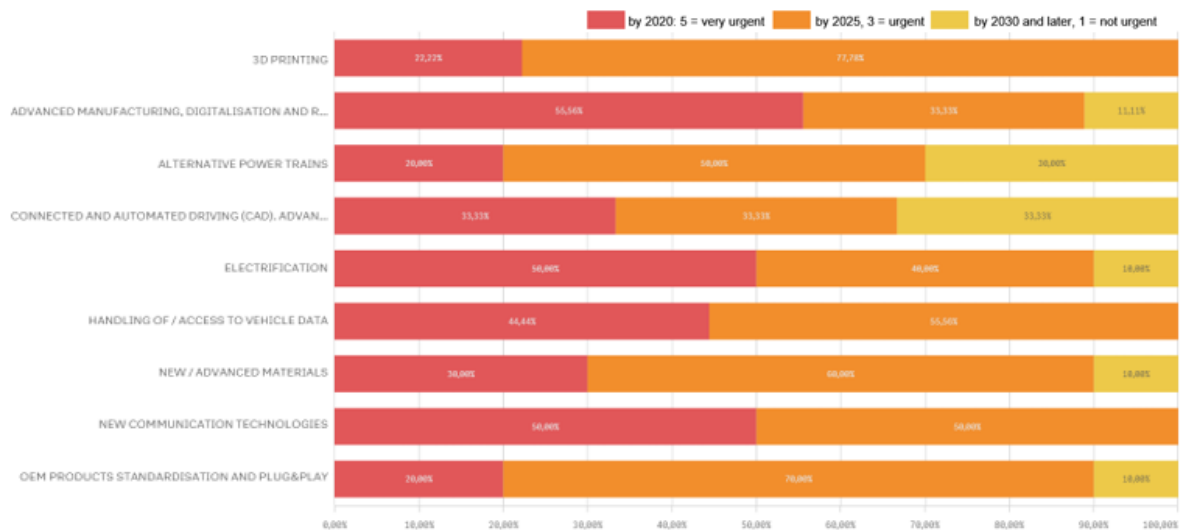


Figure 32: KPI 2.4 (Offer) Drivers of Change – Group NEW TECHNOLOGIES AND BUSINESS MODELS - URGENCY – INSTITUTE sample

Figure 32 outlines the same analysis but from the perspective of Institutes. The analysis indicates that for this group of stakeholders the need for “very urgent (by 2020)” action is less frequently cited in a number of areas such as 3D PRINTING”, “ALTERNATIVE POWERTRAINS” and “OEM PRODUCTS STANDARDISATION AND PLUG&PLAY”. If those identifying the need for action as “very urgent (by 2020)” and/or “urgent (by 2025)” is considered, the TOP 3 most urgent specific Drivers of Change are “3D PRINTING”, “HANDLING OF VEHICLE DATA”, and “NEW COMMUNICATION TECHNOLOGIES”.

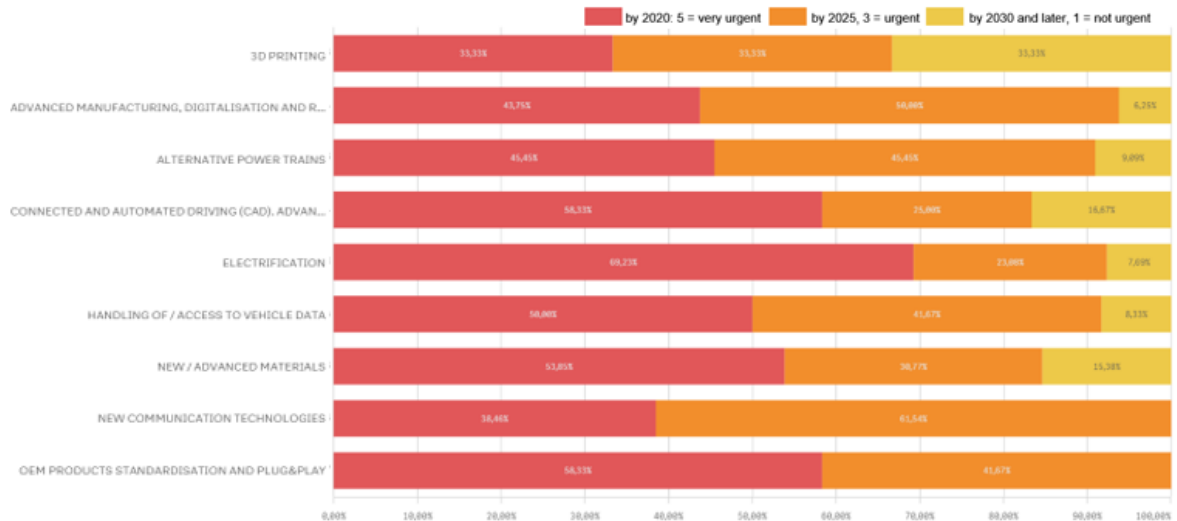


Figure 33: KPI 2.4 (Offer) Drivers of Change – Group NEW TECHNOLOGIES AND BUSINESS MODELS - URGENCY - PRIVATE sample

The need for changes in provision to meet changing skill requirements will impact over a longer time horizon in the case of “3D PRINTING” according to private companies, as set out in Figure 33. The need for changes over the next 5 years is identified as greatest with respect to the impacts of “NEW COMMUNICATION TECHNOLOGIES” and “OEM PRODUCTS STANDARDISATION AND PLUG&PLAY”. This might be linked to the fact that “3D PRINTING” technologies are more of a niche area for many companies and not adopted widely, unlike ICT skills which impacts on the majority of companies.

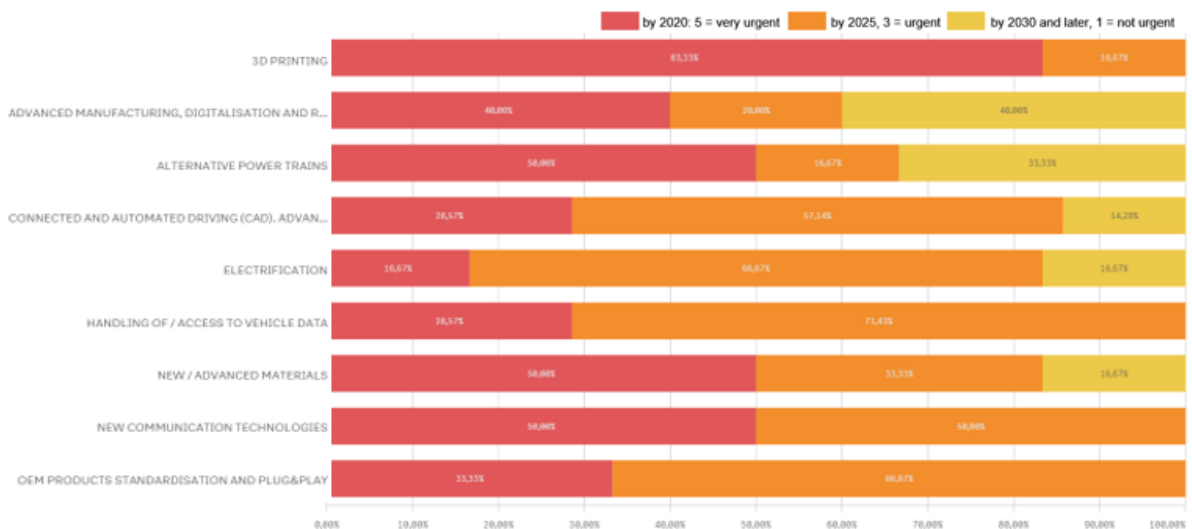


Figure 34: KPI 2.4 (Offer) Drivers of Change – Group NEW TECHNOLOGIES AND BUSINESS MODELS - URGENCY - UMBRELLA ORG. sample

Figure 34 outlines the same analysis but for Umbrella organisations. The analysis indicates that the impacts of “ADVANCED MANUFACTURING, DIGITALISATION AND ROBOTIZATION OF THE MANUFACTURING PROCESS” and “ALTERNATIVE POWERTRAIN” technologies is not perceived as



primarily an issue to tackle over the next 5 years in terms of changes to provision. The more urgent priorities over the next 5 years (“very urgent” and/or “urgent”) are identified as “OEM PRODUCTS STANDARDISATION AND PLUG&PLAY” , “NEW COMMUNICATION TECHNOLOGIES”, “HANDLING OF / ACCESS TO VEHICLE DATA”, and “3D PRINTING”, with 100% of respondents indicating action is required over this period.

4.2.4 CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES

The 2030 climate targets will require a significantly larger proportion of new cars to be low-and zero-emission. Encouraged by both consumer demand and public action, the automotive industry is stepping-up its efforts to find viable alternatives that can reduce the negative effect of car pollution in the run up to 2030 and beyond. The process of managing the complete lifecycle of a product from concept to design, manufacture, service and disposal of manufactured products supports a reduction in waste and pollution, whilst at the same time providing opportunities for significant cost reductions and a need for new skills in different areas.

Individual Drivers of Change in this category are:

- **Batteries efficiency**

The necessity to store electric energy within a vehicle is an intrinsic necessity of a car. In the case of an electric vehicle, the battery can be compared to the gasoline/diesel tank of an internal combustion engine car: it is the place where the energy to move the vehicle is stored. An increase in its efficiency means more range for the vehicle and a rapid refuelling.

- **Low and Zero-emission vehicles**

The automotive market is being challenged to develop more energy-efficient engines and alternative powertrains to comply with the evolving standards in terms of pollution and CO2 emissions. Due to new international regulations, consumers will have the possibility to choose from a mix of powertrains that best meet their lifestyle needs, for example, more efficient internal combustion engines, battery electric vehicles (BEVs), hybrid electric vehicles (HEVs), Plug-in Hybrid Electric Vehicle (PHEVs), fuel cells and vehicles powered by natural gas.

- **Improved charging/refuelling infrastructure**

The need for a widespread refuelling infrastructure is a key driver to boost the commercialisation of a technology based on a new energy carriers. The easier the access to a

rapid refuelling and recharging infrastructure the quicker will be the development of such new technologies.

- **Greater range autonomy**

The range autonomy of a vehicle is an essential factor to be considered when a new powertrain technology arises and innovations relating to this are a key driver of change in the sector.

4.2.4.1 Climate Goals, Environmental and Health Challenges: Importance

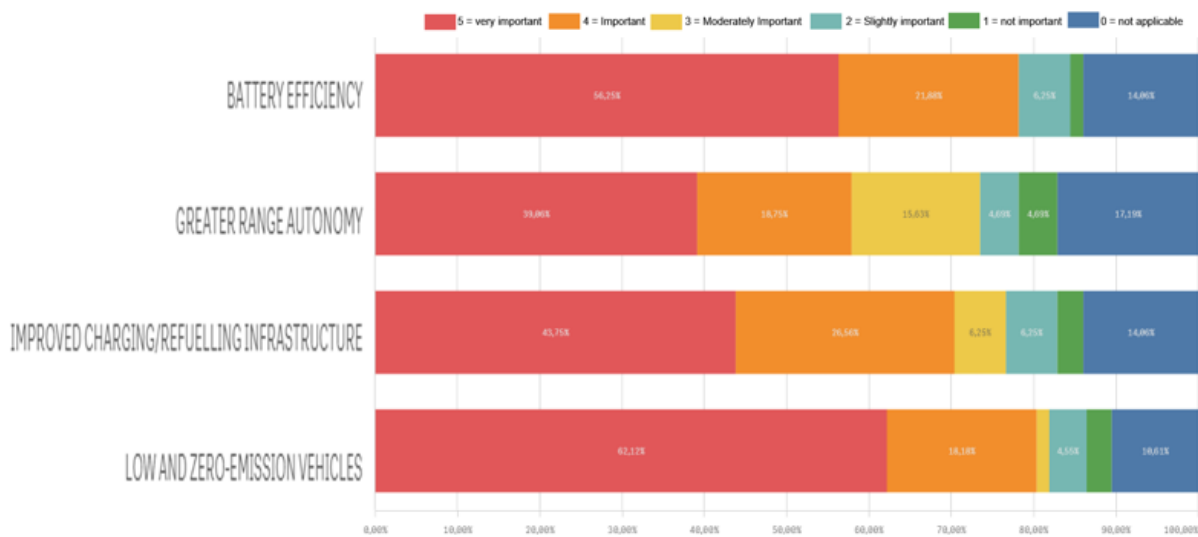


Figure 35: KPI 2.5 (Offer) Drivers of Change – Group CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES - IMPORTANCE – Overall sample

Figure 35 shows the relative importance of each specific Driver of Change within the “CLIMATE GOAL, ENVIRONMENTAL AND HEALTH CHALLENGES” ‘macro’ Driver of Change, based on responses from all stakeholders participating in the ‘offer’ survey. Taking into account only those responses with a score of 5, “LOW AND ZERO-EMISSION VEHICLES” is ranked as the most important driver of change (62%), followed by “BATTERY EFFICIENCY” with a slightly lower percentage (56%). Based on this criteria, “IMPROVED CHARGING/REFUELLING INFRASTRUCTURE” and “GREATER RANGE AUTONOMY” are ranked third and fourth respectively.

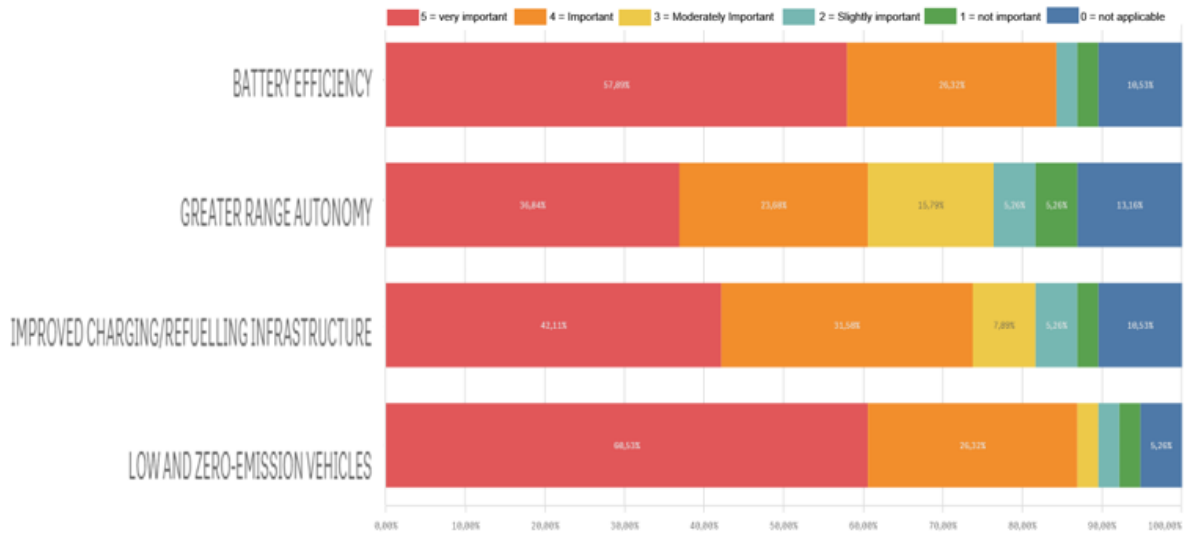


Figure 36: KPI 2.5 (Offer) Drivers of Change – Group CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES - IMPORTANCE – VET sample

Figure 36 shows the relative importance of each specific Driver of Change, for the VET centres. The analysis is similar to that for all stakeholders with the most important Drivers of Change (based on a score of 5) being: “LOW AND ZERO-EMISSION VEHICLES” ranked first, followed by “BATTERY EFFICIENCY”, second, and “IMPROVED CHARGING/REFUELLING INFRASTRUCTURE” and “GREATER RANGE AUTONOMY”, third and fourth respectively.

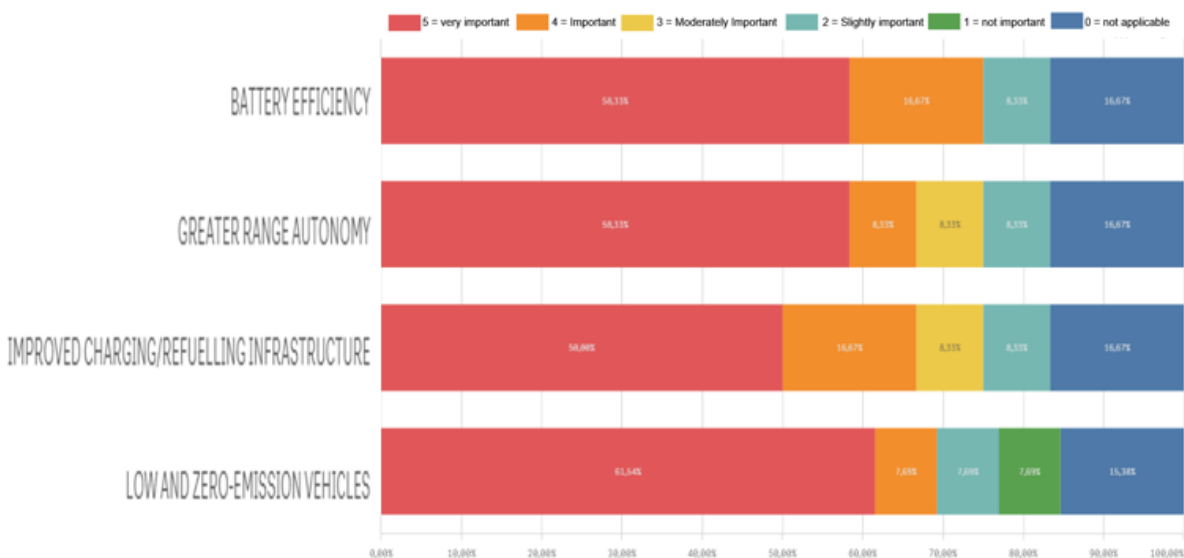


Figure 37: KPI 2.5 (Offer) Drivers of Change – Group CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES - IMPORTANCE – INSTITUTE sample

Figure 37 sets out the same analysis but with respect to Institutes. The analysis indicates that the perceptions of Institutes are significantly different to the results for all stakeholders, with a broadly similar level of importance attached to all specific Drivers. Looking in more detail, “LOW AND ZERO

“EMISSION VEHICLES” is the most important Driver of Change, based on those respondents assigning a score of 5 (61%), followed by “GREATER RANGE AUTONOMY” and “BATTERY EFFICIENCY”, both at 58%. If the combined scores of 4 and 5 are considered, “BATTERY EFFICIENCY” becomes the most important Driver of Change.

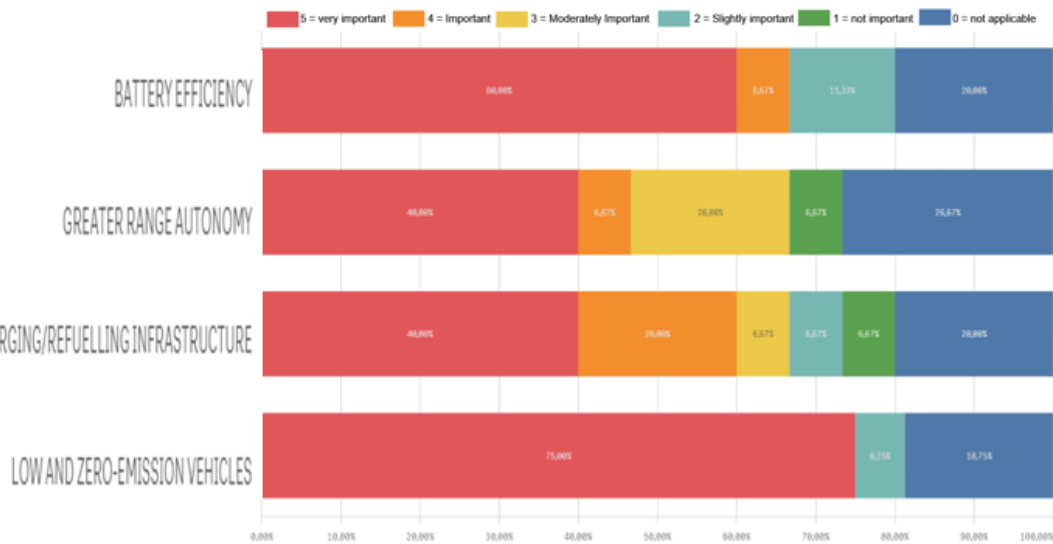


Figure 38: KPI 2.5 (Offer) Drivers of Change – Group CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES - IMPORTANCE – PRIVATE COMPANY sample

Figure 38 sets out the analysis of the importance of the “CLIMATE GOAL, ENVIRONMENTAL AND HEALTH CHALLENGES” macro Driver of Change, but for Private Companies. Taking just those responses with a score of 5, a similar to pattern to that of responses from all stakeholders is evident: “LOW AND ZERO-EMISSION VEHICLES” is ranked first, followed by “BATTERY EFFICIENCY”, ranked second, and “IMPROVED CHARGING/REFUELLING INFRASTRUCTURE” and “GREATER RANGE AUTONOMY”, third and fourth respectively. However, it should be noted that in the case of Private Companies the gap between the first and the second ranked categories has increased, and so has the gap between these first two categories and that of “GREATER RANGE AUTONOMY” and “IMPROVED CHARGING/REFUELLING INFRASTRUCTURE” both at 40%.

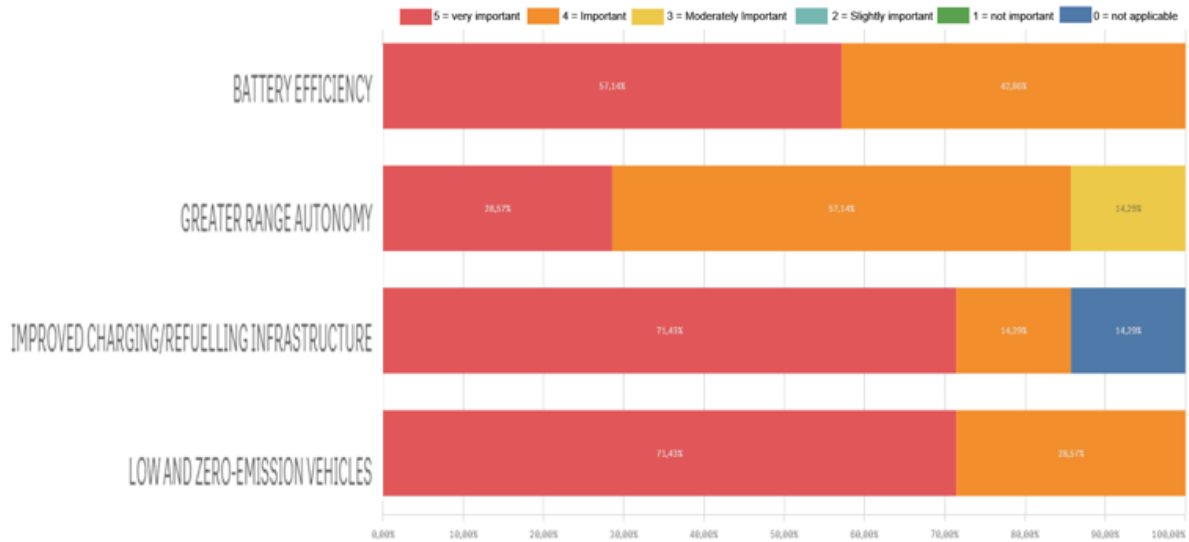


Figure 39: KPI 2.5 (Offer) Drivers of Change – Group CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES - IMPORTANCE – UMBRELLA ORG. sample

Responses in relation to umbrella organisations, as outlined in Figure 39, point to a number of differences to responses from other groups of stakeholders. In this case both “IMPROVED CHARGING/REFUELLING INFRASTRUCTURE” and “LOW AND ZERO EMISSION VEHICLES” are ranked joint first, when only those responses with a score of 5 are considered at 71%, and “BATTERY EFFICIENCY” falls to third position (57%). However, when scores of 4 and above are considered, both “BATTERY EFFICIENCY” and “LOW AND ZERO EMISSION VEHICLE” are joint first at 100%.

4.2.4.2 Climate Goals, Environmental and Health Challenges: Urgency

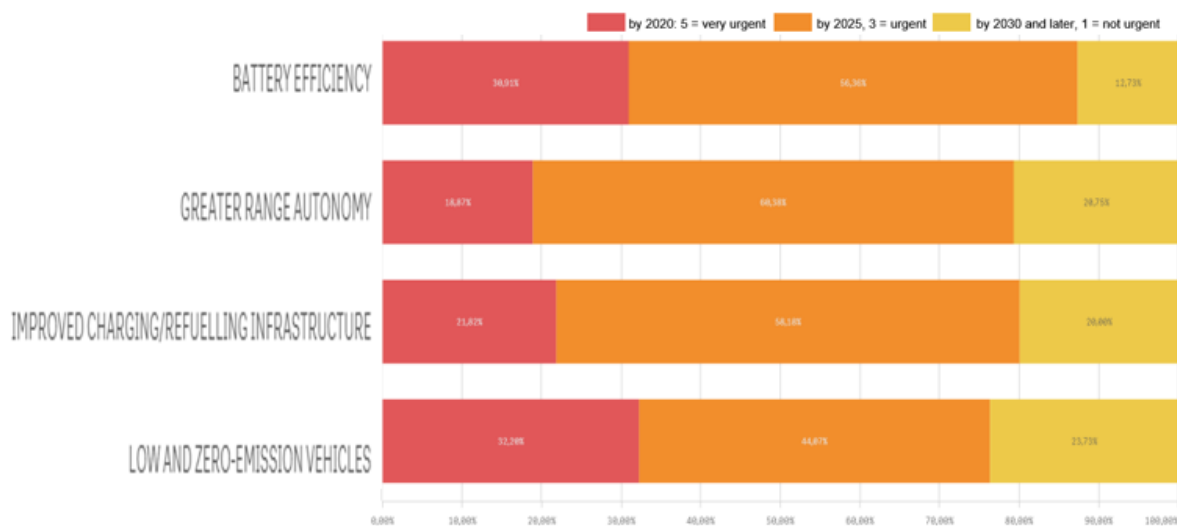


Figure 40: KPI 2.6 (Offer) Drivers of Change – Group CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES - URGENCY – Overall sample

Figure 40 sets out an analysis of the timeframe (urgency) within which the “CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES” Drivers of Change will impact on the need for changes in provision to meet changing skill requirements. The most frequently cited time period is “by 2025”, this being the case for between 44-60% of responses relating to all specific Drivers of Change in this group. Between 12 and 23% of responses pointed to a less urgent need for action (by 2030 or later).

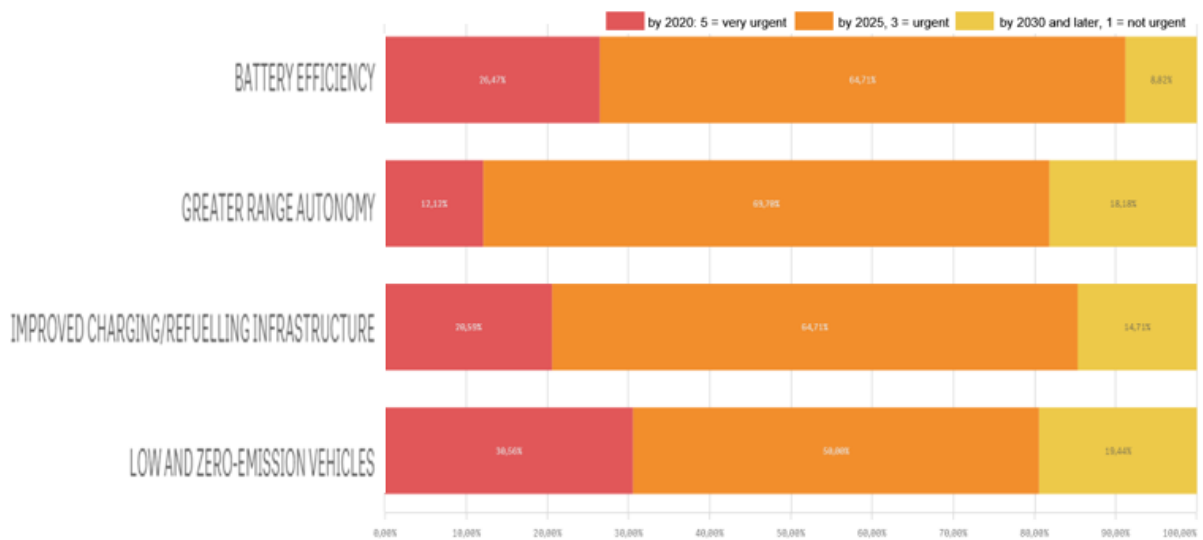


Figure 41 KPI 2.6 (Offer) Drivers of Change – Group CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES - URGENCY – VET sample

Figure 41 sets out responses of VET centres and indicates that responses broadly follow the same pattern to that of the whole sample, although VET centres were somewhat less likely to indicate the need for shorter term action (Very urgent by 2020) and more likely to identify the need for medium-term action (by 2025).

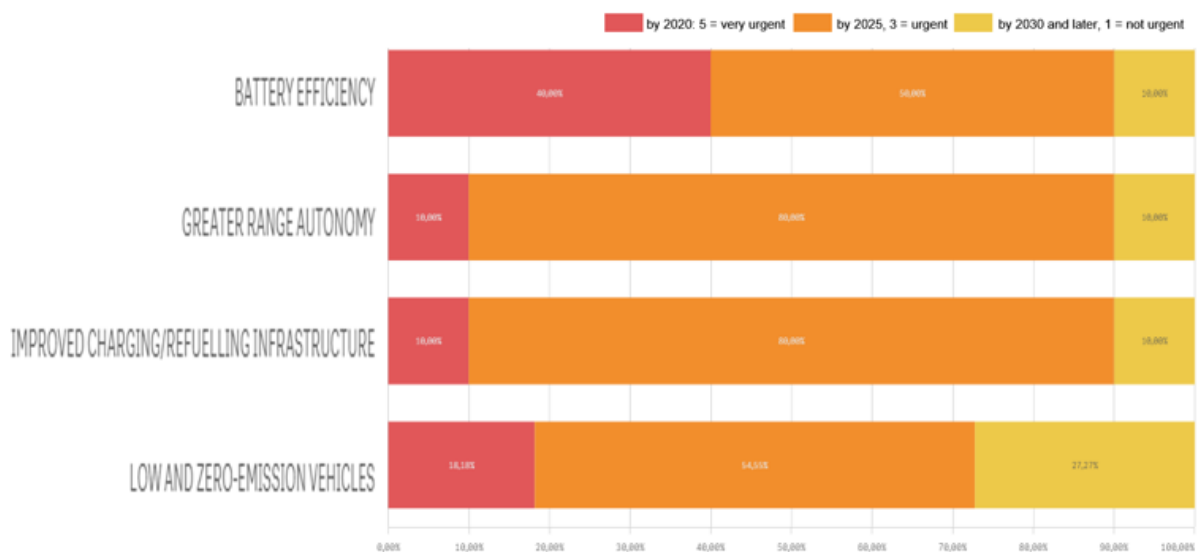


Figure 42: KPI 2.6 (Offer) Drivers of Change – Group CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES - URGENCY – INSTITUTE sample

Figure 42 sets out the same analysis but for Institutes. The analysis indicates that a relatively high proportion (40%) indicated ‘very urgent’ action was required in the case of “BATTERY EFFICIENCY”. The need to respond to changes over the medium term (by 2025) was most frequently cited in the case of “GREATER RANGE AUTONOMY” and “IMPROVED CHARGING AND REFUELLING INFRASTRUCTURE” (80% in each case). “LOW AND ZERO EMISSION VEHICLES” is the Driver of Change ranked second in terms of the proportion of responses indicating a ‘very urgent’ response is needed (18%). However, this contrasts with 27% of responses from these stakeholders indicating that a response to these changes is only needed in the longer-term (by 2030 or later).

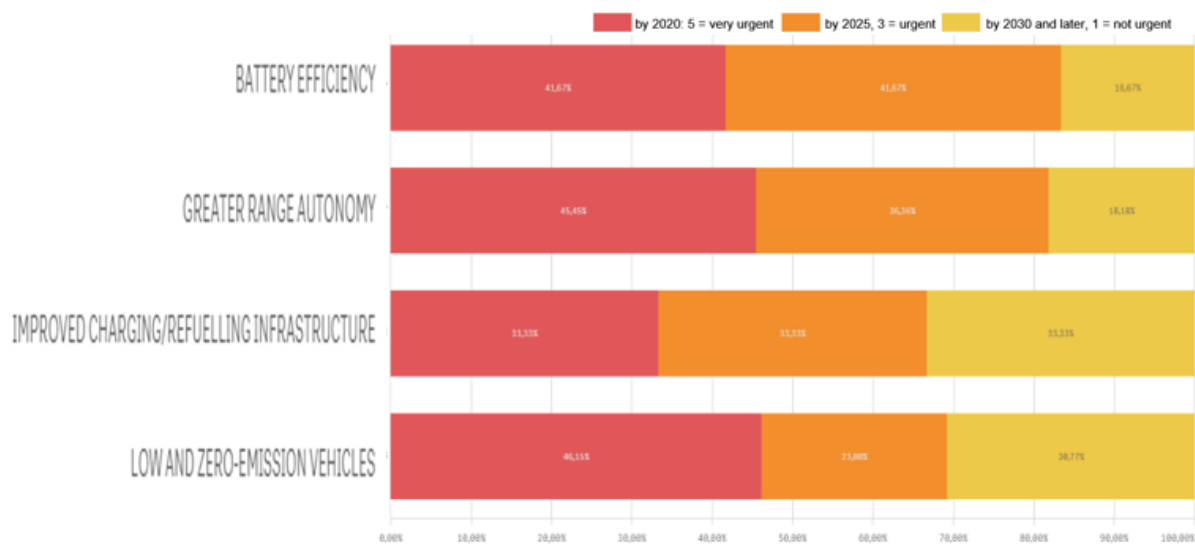


Figure 43: KPI 2.6 (Offer) Drivers of Change – Group CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES - URGENCY – PRIVATE

As shown in Figure 43, private companies are more likely to assign action as ‘very urgent’ with respect to all the drivers of change, particularly “LOW AND ZERO EMISSION VEHICLES” (46% by 2020) and “GREATER RANGE AUTONOMY” (45% by 2020). This group is also least likely to assign action as “not urgent”, when compared to the whole sample and other categories of stakeholders, with the proportion of such responses ranging from 15% to 30%.

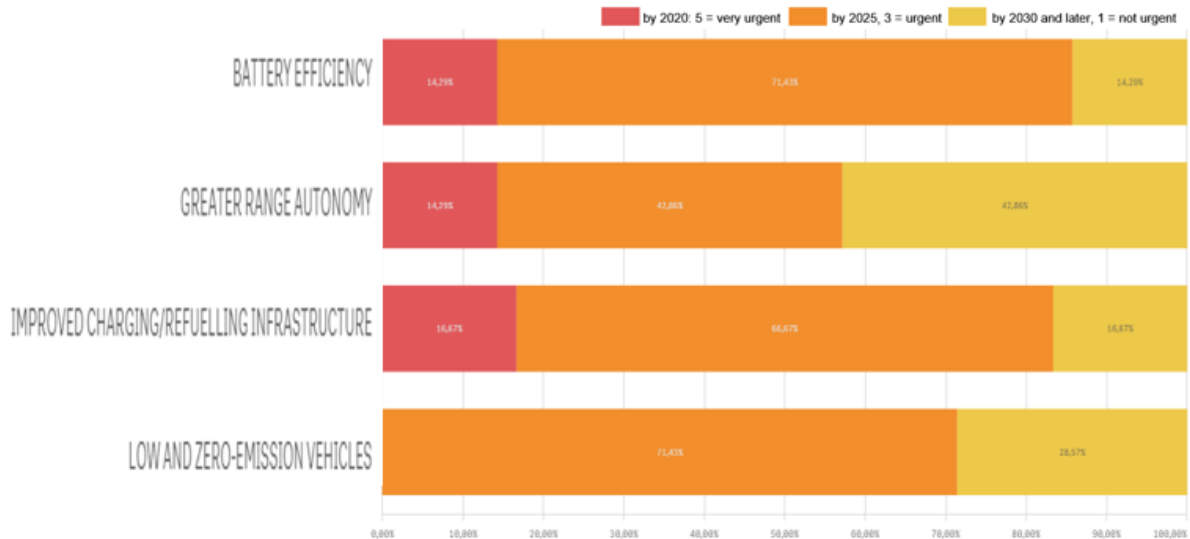


Figure 44: KPI 2.6 (Offer) Drivers of Change – Group CLIMATE GOALS, ENVIRONMENTAL AND HEALTH CHALLENGES - URGENCY – UMBRELLA ORG. sample

Figure 44 indicates that responses from Umbrella organisations differ somewhat when compared to other stakeholders. Umbrella organisations are more likely to consider action as “not urgent” with respect to all Drivers of change, particularly in the case of “GREATER AUTONOMY” (42% by 2030) and least likely to identify action as ‘very urgent’ (by 2020).

4.2.5 SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS

The way that consumers access, purchase and use cars and other modes of transport is changing due to increasing connectivity and the greater use of e-commerce. New technologies and the massive use of the internet will have a huge impact on the use and concept of mobility (less product and more service oriented). There is also growing public expectation that greater automation will lead to even higher standards of road safety and higher connectivity of vehicles, opening a wide range of new services. This development will also generate large amounts of new data and issues around Cyber Security. The demand for horizontal skills and occupations coming from other sectors will be influenced by these changes.

Individual Drivers of Change in this category are:

- **Mobility as a Service (MaaS)**

Car-sharing and ride-hailing mobile apps are a couple of examples of how the concept of mobility is changing, with consumers more and more interested in the “final service” than in

the product. Using, instead of owning might be an important driver changing the approach to product, market and services within the automotive sector.

- **Increased connectivity / infrastructure (V2X)**

A vehicle is a connected entity able to monitor, in real time, its own parts and safety conditions around it. This trend is growing, and the car of the future will be connected to other vehicles (V2V- vehicle to Vehicle) and to any entity (V2X- Vehicle to Everything) that may affect the vehicle itself. The acronyms V2X refers to a form of technology that allows vehicles to communicate with moving parts of the traffic system around them and vice-versa. In this context, different communication technologies such as 5G (long-range) and/or ITS-G5 (short-range system) infrastructure will be deployed along major terrestrial transport paths.

- **Data Access**

Higher connectivity of vehicles will also generate large amounts of new data. This will need to be considered as appropriate policy and legal solutions are found for the problems of vehicle integrity, security, road safety and liability. These will support the emergence of new business models and it is likely that this will include provision for direct, safe and secure access to a wide set of vehicle data for the provision of connected services.

- **Cybersecurity**

There will also be an impact from evolving legal requirements, consumer demands and acceptance of new technologies.

4.2.5.1 Societal Changes and Change in the Way that Consumer Access, Purchase and Use the Cars: Importance

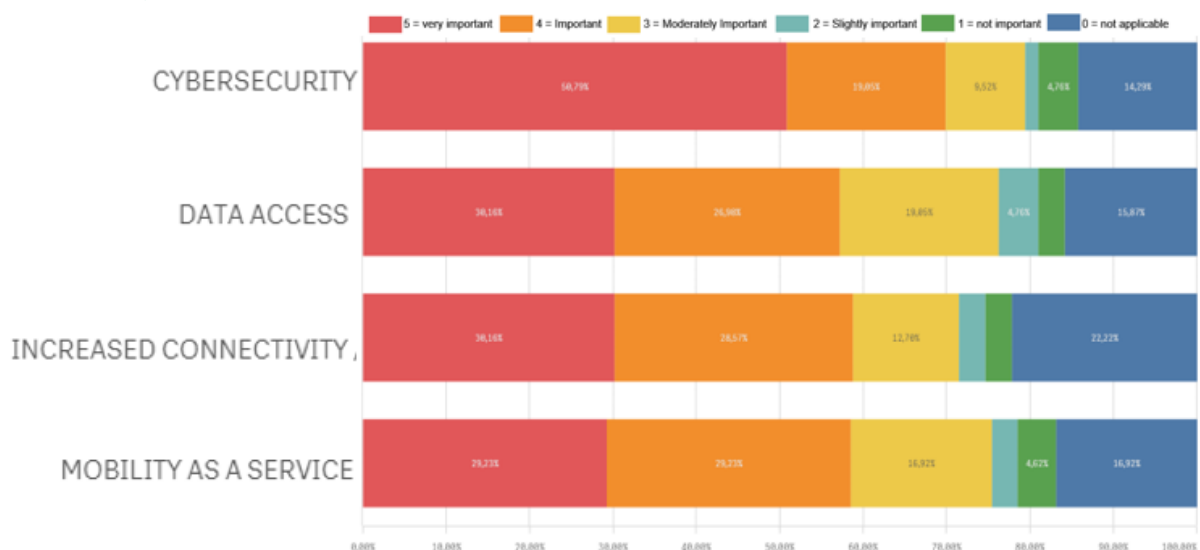


Figure 45: KPI 2.7 (Offer): Drivers of Change – Group SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS: IMPORTANCE – Overall sample

Figure 45 shows the relative importance of each specific Driver of Change within the “SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS” ‘macro’ Driver of Change, based on responses from all stakeholders participating in the ‘offer’ survey. Considering only those responses with a score of 5, “CYBERSECURITY” is the most important specific Driver of Change, followed by “DATA ACCESS” and “INCREASED CONNECTIVITY / INFRASTRUCTURE (V2X)”, (both at 30%). This is followed closely by “MOBILITY AS A SERVICE” (29% assigning a score of 5) on this basis. If all responses scoring between 3-5 in terms of importance are considered, “CYBERSECURITY” is ranked first in terms of importance (73%), followed closely by “DATA ACCESS” (76%), “MOBILITY AS A SERVICE” (75%) and “INCREASED CONNECTIVITY / INFRASTRUCTURE (V2X)” (71%).



Figure 46: KPI 2.7 (Offer): Drivers of Change – Group SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS: IMPORTANCE – VET sample

Looking at the same analysis but just in relation to the VET sample of stakeholders, Figure 46 indicates that if all scores of 3 or above are included, “CYBERSECURITY” is identified as of greatest importance (84%), followed by “DATA ACCESS” (76%).

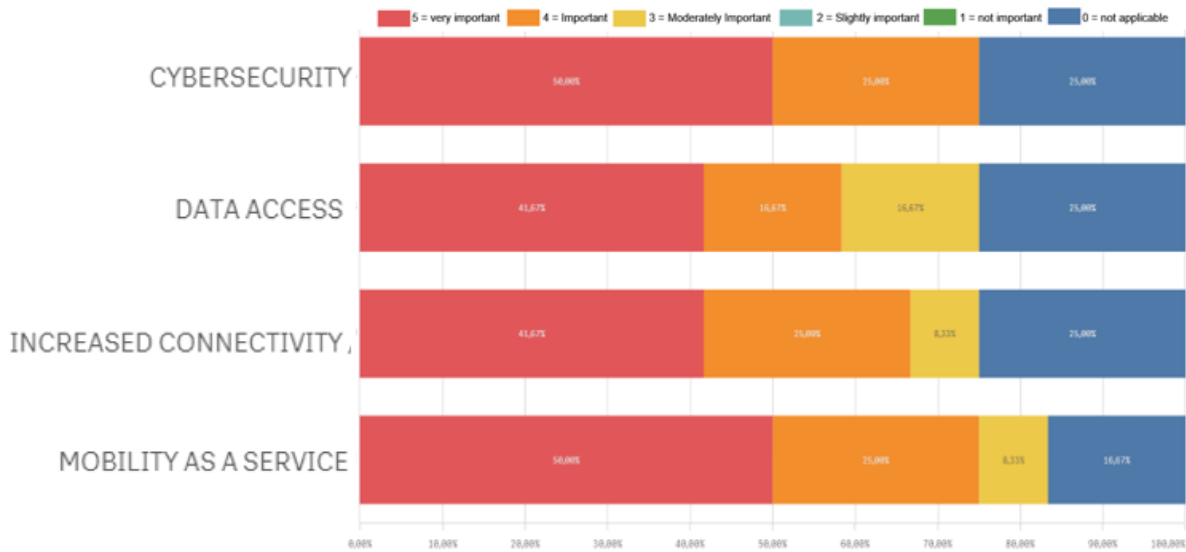


Figure 47: KPI 2.7 (Offer): Drivers of Change – Group SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS: IMPORTANCE – INSTITUTE sample

Undertaking the same analysis but solely in relation to responses from INSTITUTES, “MOBILITY AS A SERVICE” is identified as the most important specific Driver of Change based on those assigning a score of 3-5, with all other Drivers of Change receiving the same proportion of responses measured on this basis. A relatively high proportion of “not relevant” responses should be noted in relation to Institutes.

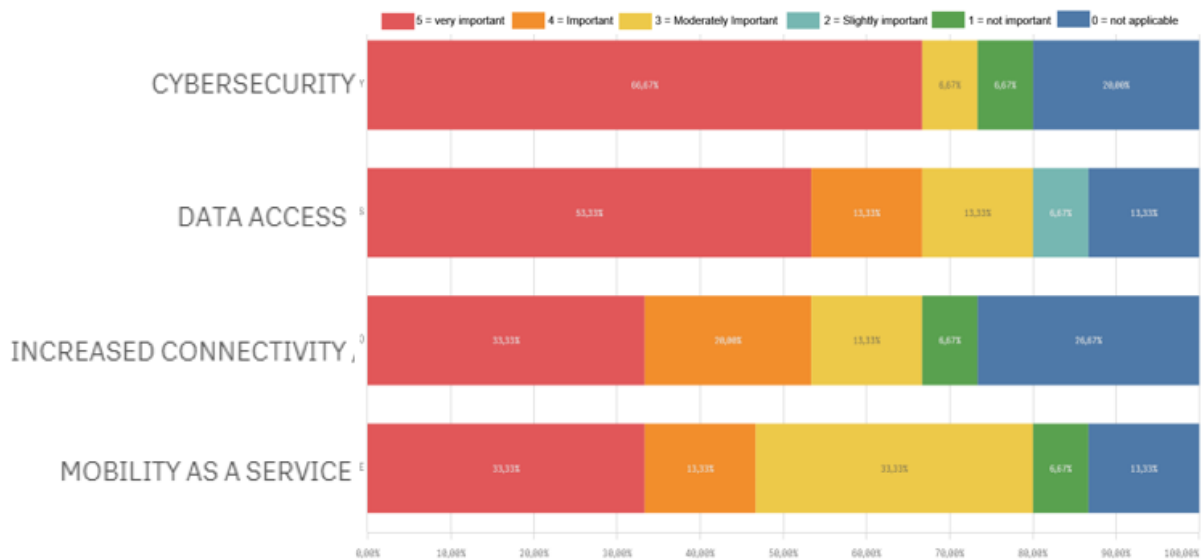


Figure 48: KPI 2.7 (Offer): Drivers of Change – Group SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS: IMPORTANCE – PRIVATE COMPANY sample

Figure 48 sets out the same analysis for KPI 2.7 with respect to the responses from the PRIVATE COMPANY sample. “DATA ACCESS” and “MOBILITY AS A SERVICE” received most preferences for importance scores of 3 or above, while “INCREASED CONNECTIVITY / INFRASTRUCTURE (V2X)” was rated the least important measured on this basis (67% of responses). In relation to “CYBERSECURITY”

a relatively high proportion of responses were rated as ‘very important’ (5) with 67%, followed by “DATA ACCESS”, with 53%.



Figure 49: KPI 2.7 (Offer): Drivers of Change – Group SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS: IMPORTANCE – UMBRELLA ORG. sample

Figure 49 set out the same analysis but for UMBRELLA ORGANISATIONS and indicates that all stakeholders (100%) in this category that responded considered “CYBERSECURITY” at least moderately important (score of 3 or above). “INCREASED CONNECTIVITY / INFRASTRUCTURE (V2X)” was considered important (4) or very important (5) by 83% of the such respondents. “MOBILITY AS A SERVICE” was considered as ‘very important’ by only 14% of these respondents, but as, at least, moderately important by 86% of the sample.

4.2.5.2 Societal Changes and Change in the Way that Consumer Access, Purchase and Use the Cars: Urgency

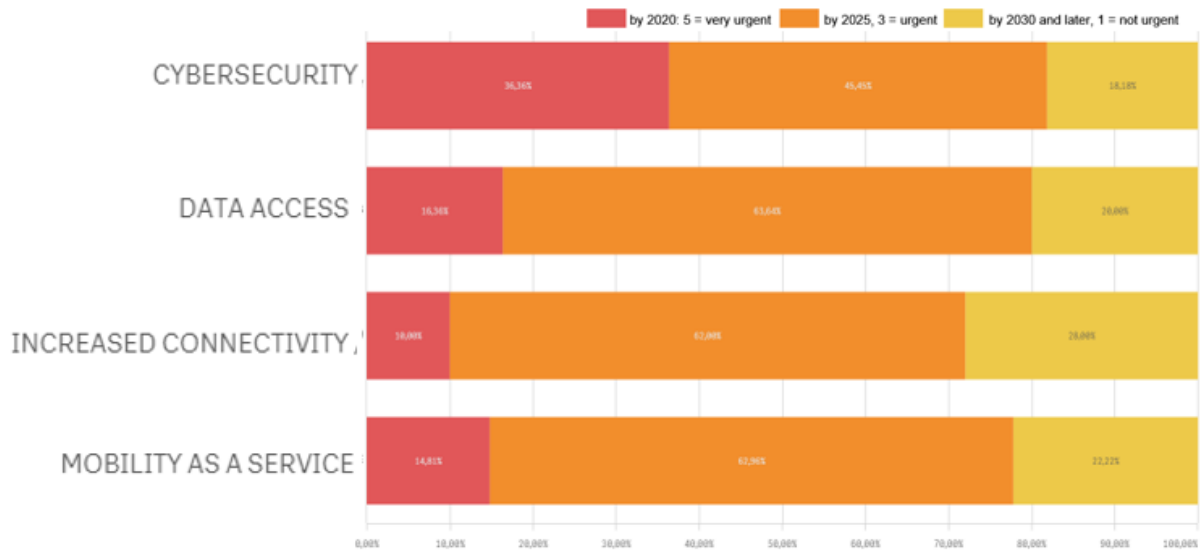


Figure 50: KPI 2.9 (Offer) Drivers of Change – Group SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS: URGENCY – Overall sample

In terms of the ‘urgency’ of action in relation to each specific Driver of Change, Figure 50 indicates that the most frequent time period identified was “by 2025”. Only in the case of “CYBERSECURITY”, is the time horizon considered more urgent, with 36% of the providers responding to the “OFFER” survey indicating ‘by 2020’ as the most likely timeframe for action.

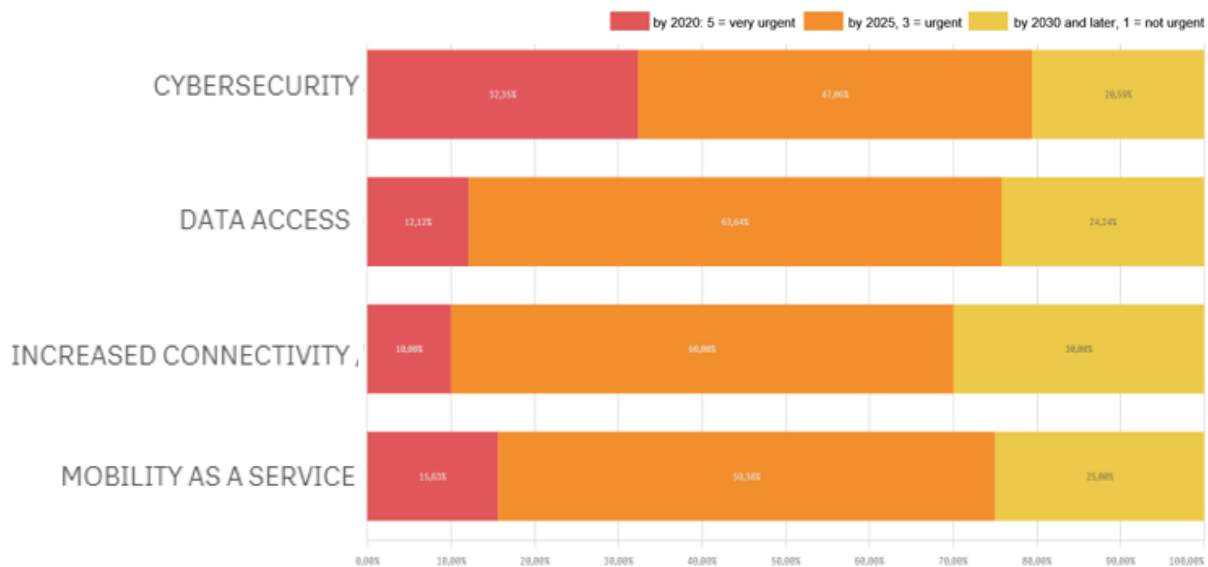


Figure 51: KPI 2.9 (Offer) Drivers of Change – Group SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS: URGENCY – VET sample

Figure 51 highlights the same analysis but for the VET sample, with ‘by 2025’ again being the most frequently identified time horizon for action. “CYBERSECURITY” (32%), is again the Driver of Change most likely to be identified as impacting on the need for changes in provision to meet changing skill

requirements. This is followed (but some distance behind measured on this basis) by MOBILITY AS A SERVICE (15%).



Figure 52: KPI 2.9 (Offer) Drivers of Change – Group SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS: URGENCY – INSTITUTE sample

Figure 52 represents the same analysis for KPI 2.9 but in relation to INSTITUTES. Again, ‘by 2025’ is the most frequently cited time horizon for action. And, as is the case for other stakeholders, “CYBERSECURITY” is highlighted as requiring more immediate action (by 2020), by 30% of these respondents.

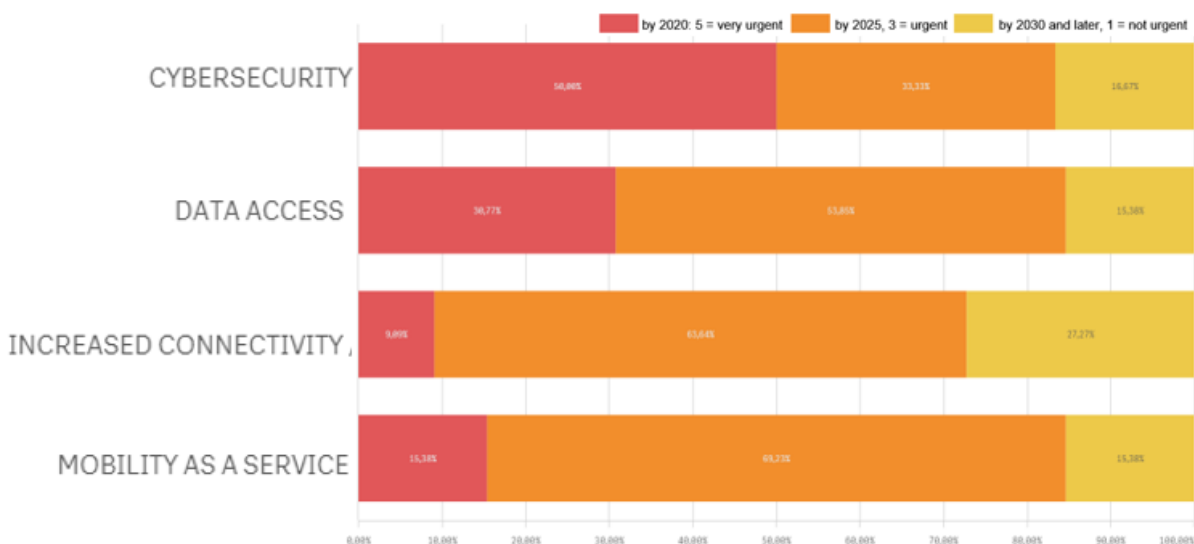


Figure 53: KPI 2.9 (Offer) Drivers of Change – Group SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS: URGENCY – PRIVATE COMPANY sample

Figure 53 outlines responses from the PRIVATE COMPANY sample, in relation to KPI 2.9. This is the only sample of responses with half or more indicating a VERY URGENT need for action in relation to

CYBERSECURITY (50%). A significant proportion 31% of these respondents also indicated that action relating to DATA ACCESS was also very urgent (by 2020). For the remainder of the specific drivers of change relating to this KPI, a time horizon for action of ‘by 2025’ is the predominant response.

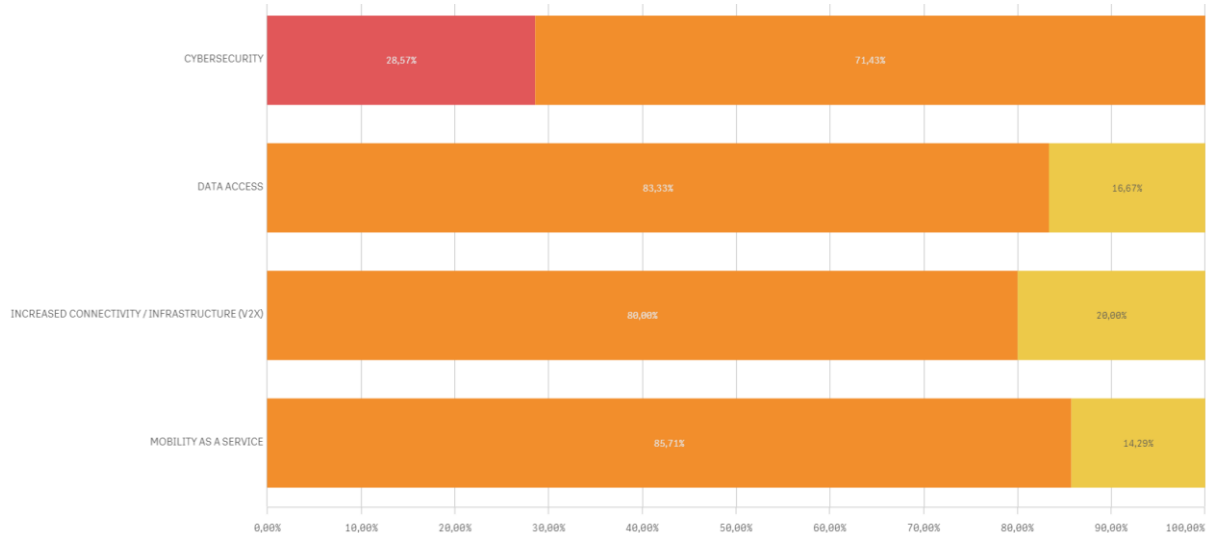


Figure 54: KPI 2.9 (Offer) Drivers of Change – Group SOCIETAL CHANGES AND CHANGE IN THE WAY THAT CONSUMER ACCESS, PURCHASE AND USE THE CARS: URGENCY – UMBRELLA ORG. sample

Figure 54 outlines responses from the UMBRELLA ORGANISATIONS responding to the survey. For these stakeholders, only CYBERSECURITY is considered as requiring a high level of urgency (by 2020), whilst all other drivers of change are considered urgent (by 2025) in terms of the time horizon for action.

4.2.6 STRUCTURAL CHANGES

The automotive sector is a major European employer and the impact on the workforce resulting from the transition to new technologies will be significant. The demand for new skills and experience will contrast with a fall in demand for other more traditional skills. This implies a need for a skill restructuring that balances out existing skills mismatches and which in turn, will require significant investment in new technologies, production processes and in the reskilling and training of the workforce.

Individual Drivers of Change in this category are:

- **Restructuring**

The European automotive sector is expected to undergo structural changes due to the development of digital technologies and the shift towards low and zero emission mobility. The industry, in particular SMEs, will need to assess and, if necessary, redefine their position in the value chain as well as increase their capacity to integrate digital technologies, alternative

powertrains and circular economy concepts in their products portfolio and production processes.

- **Acquisition of new skills**

The transformation of the automotive industry will have a significant impact on the industry's workforce and the acquisition of new skills will be a key factor enabling employees to be equipped to deal with these changes. These changes will lead to both the creation of new occupations and the need for new skills and competences amongst the existing workforce.

- **Continuous training**

Continuous training is always useful but during periods of disruptive change continuous training is essential to align competences to changing skill requirements. These activities also need to be supported by actions to improve mobility and transferability of skills, linked to the development of an efficient apprenticeship market and encouragement of informal learning.

4.2.6.1 Structural Changes: Importance

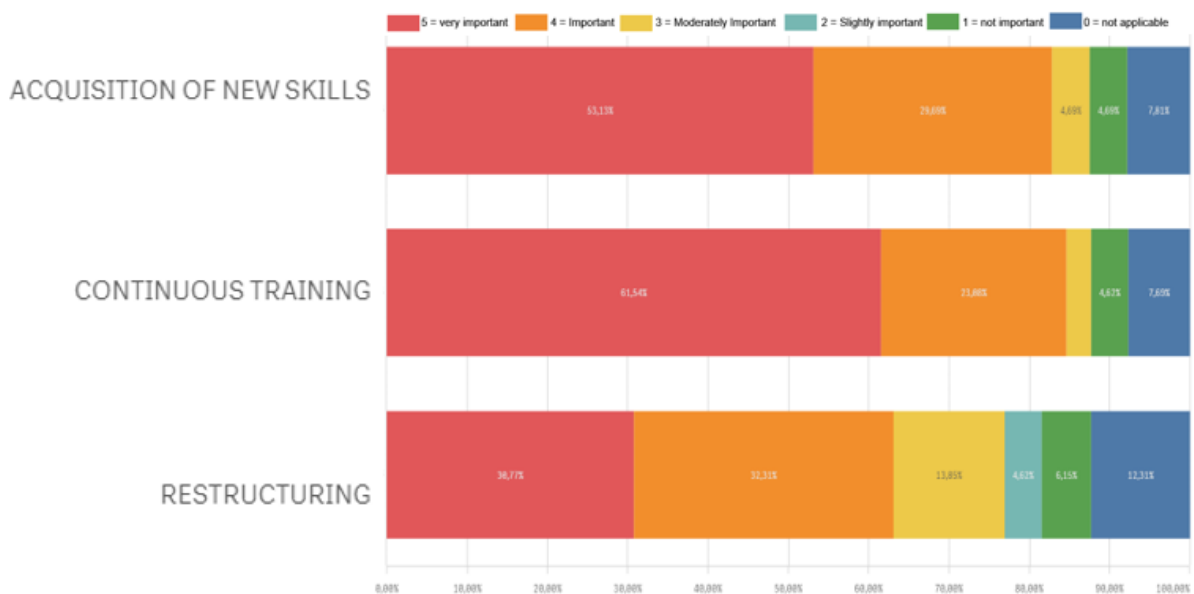


Figure 55: KPI 2.9 (Offer) Drivers of Change – Group STRUCTURAL CHANGES: IMPORTANCE – Overall sample

Figure 55 indicates that “CONTINUOUS TRAINING” is identified as the most important Driver of Change in relation to the overall STRUCTURAL CHANGE category, followed by the “ACQUISITION OF NEW SKILLS”. Less than 5% of respondents considered these two Drivers as not important. If ‘very important’ and ‘important’ responses are added together more than 80% of respondents consider “CONTINUOUS TRAINING” and “ACQUISITION OF NEW SKILLS” as important and this is the case for more than 60% of

respondents with respect to “RESTRUCTURING”. The responses are in line with the general EU strategy, supporting lifelong learning and the acquisition and recognition of new skills.

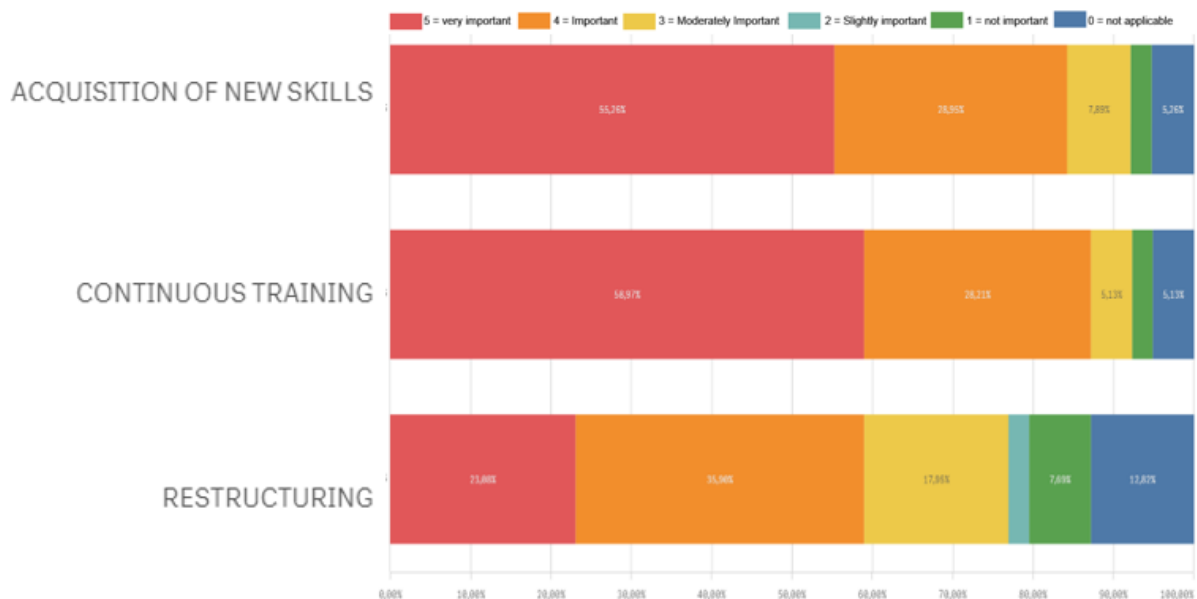


Figure 56: KPI 2.9 (Offer) Drivers of Change – Group STRUCTURAL CHANGES: IMPORTANCE – VET sample

The Responses from VET organisations are broadly aligned with those of the overall sample as Figure 56 outlines. “CONTINUOUS TRAINING” and “ACQUISITION OF NEW SKILLS” is the primary concern of these respondents with over 80% indicating these are ‘very important’ or ‘important’ . As with the case with the overall sample, VET providers attached a somewhat lower level of importance to “RESTRUCTURING”.



Figure 57: KPI 2.9 (Offer) Drivers of Change – Group STRUCTURAL CHANGES: IMPORTANCE – INSTITUTE sample

The responses from research institutes, accreditation, certification or qualification bodies is set out in Figure 57 and is broadly aligned with the overall sample. Again, both “CONTINUOUS TRAINING” and “ACQUISITION OF NEW SKILLS” were rated as very important or important by more than 80% of respondents. However, it should be noted that a large proportion of institutions replied that the question was ‘Not applicable’. Again, “RESTRUCTURING” was rated as of lower importance than the other two Drivers of Change.

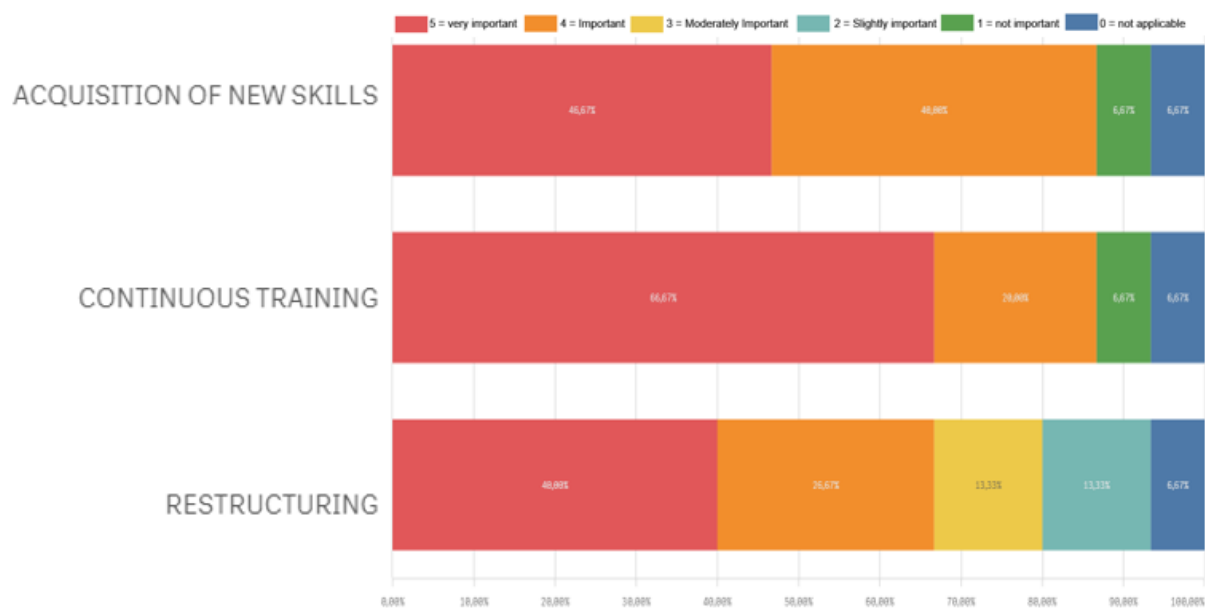


Figure 58: KPI 2.9 (Offer) Drivers of Change – Group STRUCTURAL CHANGES: IMPORTANCE – PRIVATE COMPANY sample

Figure 58 indicates that private companies involved into the VET System rate “CONTINUOUS TRAINING” as the most important driver in relation to STRUCTURAL CHANGES. Both “ACQUISITION OF NEW SKILLS” and “RESTRUCTURING” were rated as roughly equal in importance, if only ‘very important’ responses are considered (46% vs 40%). If the scores for ‘very important’ and ‘important’ are combined, “CONTINUOUS TRAINING” and “ACQUISITION OF NEW SKILLS” account for more than 85% of responses in each case, again in line with all stakeholders. No private companies considered these two drivers as of slight/moderate importance.

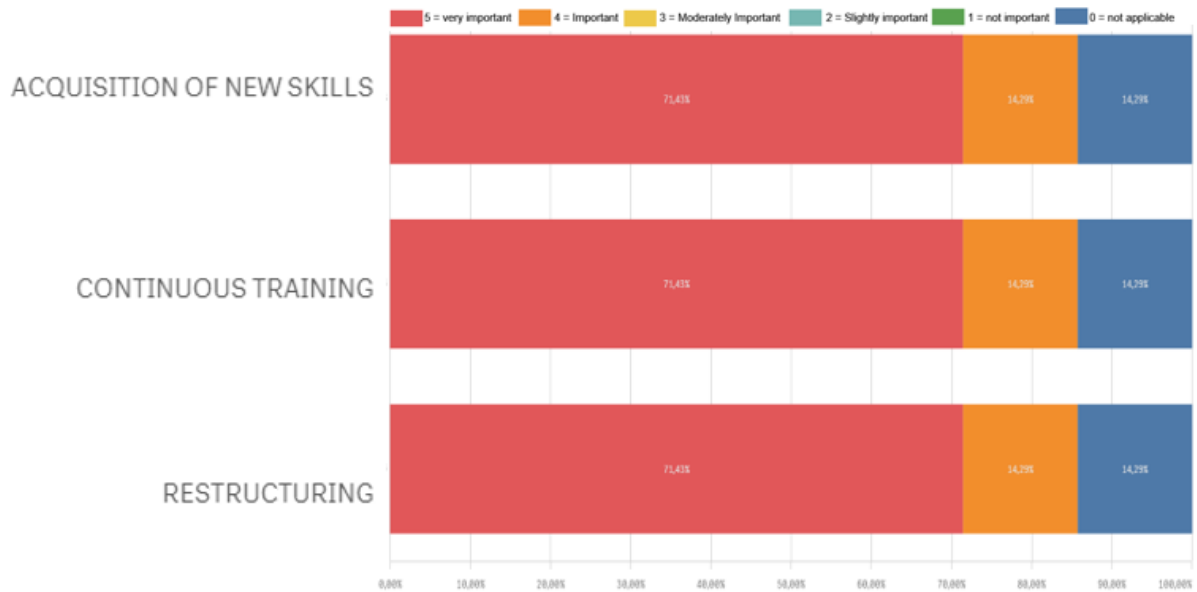


Figure 59: KPI 2.9 (Offer) Drivers of Change – Group STRUCTURAL CHANGES: IMPORTANCE – UMBRELLA ORG. sample

Figure 59 outlines responses from VET umbrella / international organisations and confirms the importance attached to “CONTINUOUS TRAINING” and “ACQUISITION OF NEW SKILLS”, although “RESTRUCTURING” is also considered as important by these stakeholders.

4.2.6.2 Structural Changes: Urgency

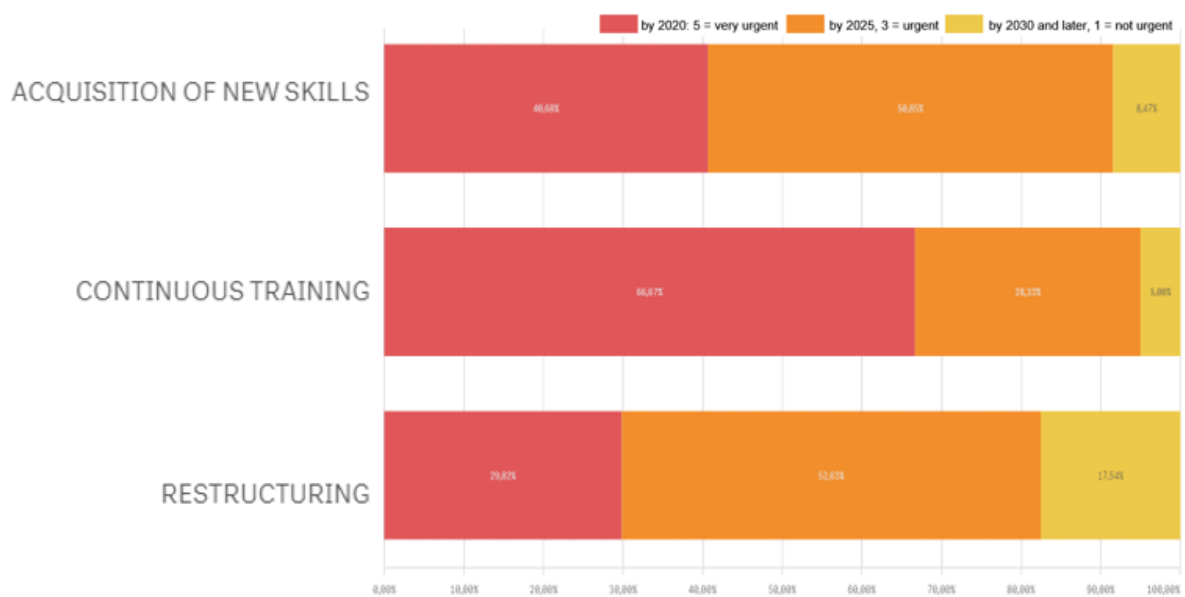


Figure 60 KPI 2.10 (Offer) Drivers of Change – Group STRUCTURAL CHANGES - URGENCY – Overall sample

Figure 60 sets out an analysis of the timeframe (urgency) within which the “STRUCTURAL CHANGES” Drivers of Change will impact on the need for changes in provision to meet changing skill requirements. The analysis indicates that “CONTINUOUS TRAINING” has been identified as ‘very urgent’ by 66% of the respondents, followed by “ACQUISITION OF NEW SKILLS” (40% of respondents). This is aligned with general EU policy to support continuous learning and acquisition of new skills through lifelong learning programmes. Based on the combined scores for ‘very urgent’ (score of 5) and ‘urgent’ (score of 4), “CONTINUOUS TRAINING” is ranked first (95%), followed by “ACQUISITION OF NEW SKILLS” (91%), followed by “RESTRUCTURING” (82%).

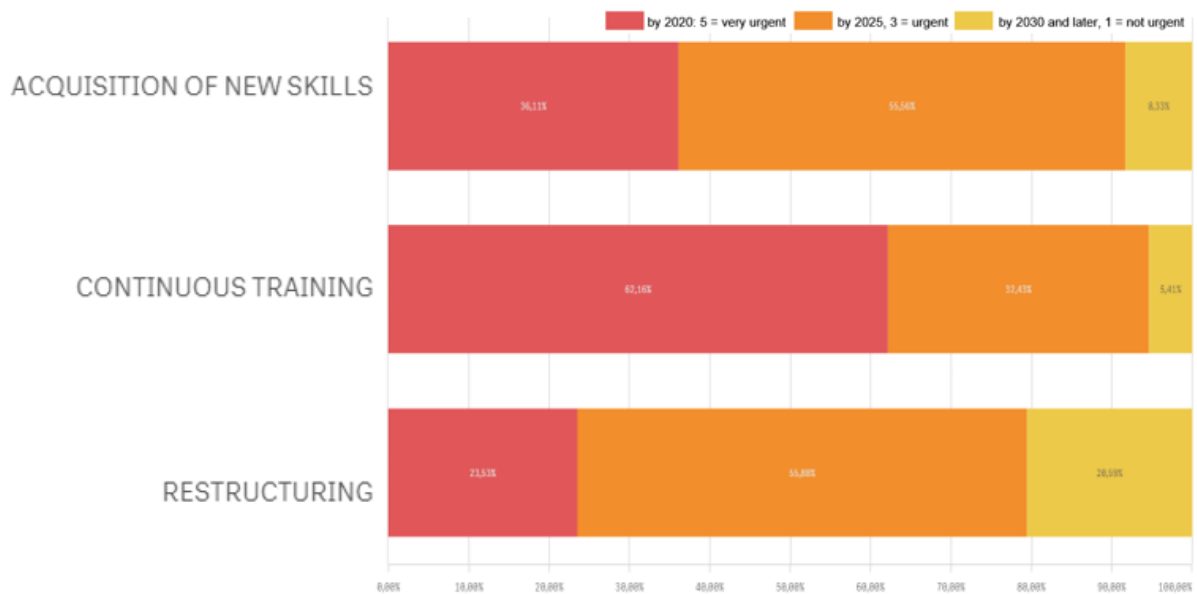


Figure 61: KPI 2.10 (Offer) Drivers of Change – Group STRUCTURAL CHANGES - URGENCY – VET sample

The Responses from VET institutions are broadly aligned with the overall sample results as set out in Figure 61. Again “CONTINUOUS TRAINING” has been ranked number one based on the proportion of ‘very urgent’ responses (62%), followed by the “ACQUISITION OF NEW SKILLS” (36%). Based on the combined scores for ‘very urgent’ (score of 5) and ‘urgent’ (score of 4), “CONTINUOUS TRAINING” is again ranked first (95%), followed by “ACQUISITION OF NEW SKILLS” (92%), and “RESTRUCTURING” (79%).

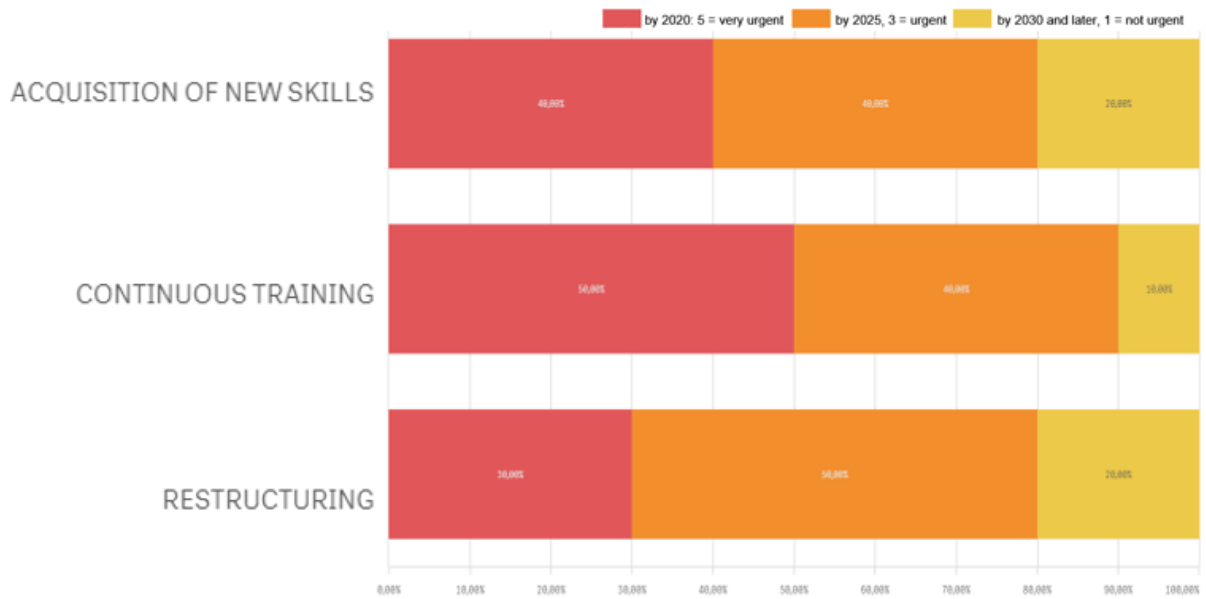


Figure 62: KPI 2.10 (Offer) Drivers of Change – Group STRUCTURAL CHANGES - URGENCY – INSTITUTE sample

The responses from research institutes, accreditation, certification or qualification bodies is also broadly aligned with overall sample results and, based on the proportion of respondents identifying the time horizon for action as ‘very urgent’ (by 2020) are outlined in Figure 62. On this basis “CONTINUOUS TRAINING” has been ranked as number one, by 50% of respondents, followed by “ACQUISITION OF NEW SKILLS” (40%). The major difference by comparison with responses from other stakeholders is that when a medium-term time horizon (by 2025) is considered, “RESTRUCTURING” is cited most frequently.

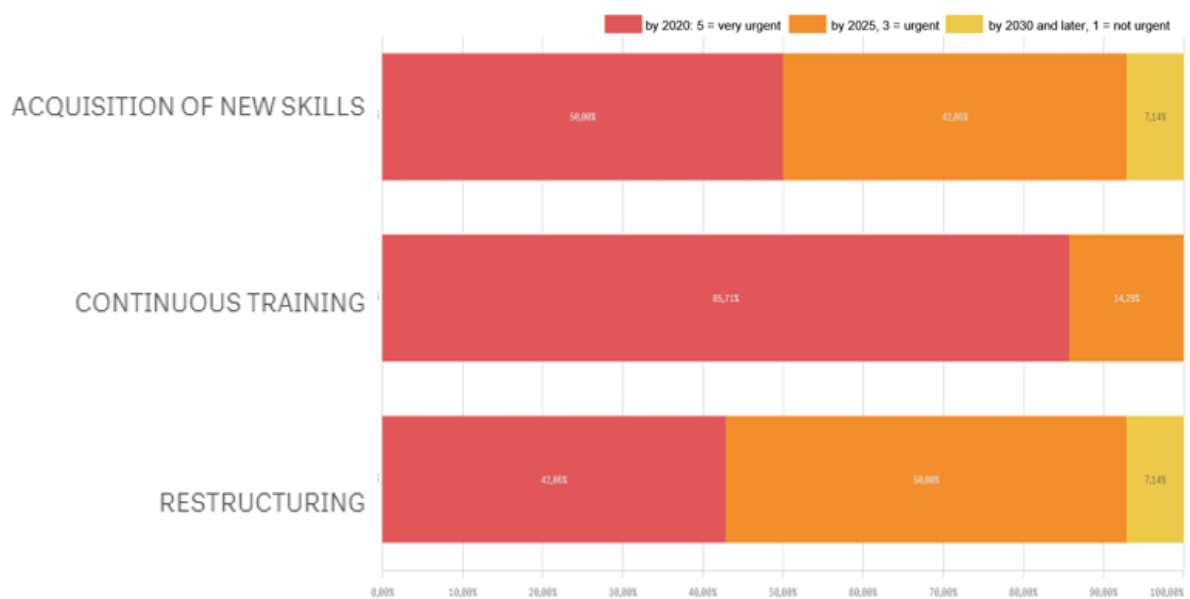


Figure 63: KPI 2.10 (Offer) Drivers of Change – Group STRUCTURAL CHANGES - URGENCY – PRIVATE COMPANY sample

From the perspective of private companies involved in VET delivery, not surprisingly “CONTINUOUS TRAINING” is ranked first when the time horizon for action is considered ‘very urgent’ (85%). If a medium-term time horizon for action is considered (by 2025) the “ACQUISITION OF NEW SKILLS” (43%) and “RESTRUCTURING” (50%) become more important.

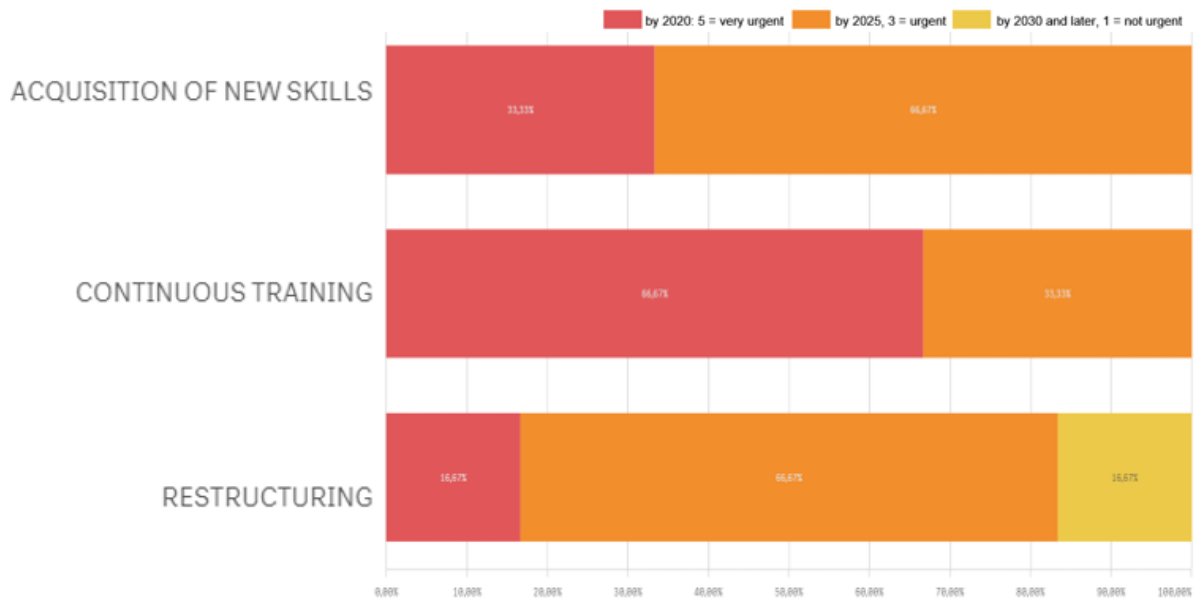


Figure 64: KPI 2.10 (Offer) Drivers of Change – Group STRUCTURAL CHANGES - URGENCY – UMBRELLA ORG. sample

For VET umbrella / international organisations responses broadly mirror those from other stakeholders when the time horizon for action is considered ‘very urgent’. On this basis, “CONTINUOUS TRAINING” is ranked first (66%). When a medium-term time horizon is considered (by 2025) “ACQUISITION OF NEW SKILLS” and “RESTRUCTURING” becomes more important. This underlines the logic of automotive companies having first to focus on continuous training as demand for this is more immediate, with a focus on restructuring and the acquisition of new skills a slightly longer term priority.

4.2.7 GLOBALISATION AND RISE OF NEW PLAYERS

The EU automotive sector is facing growing competition from non-EU markets and competitors. Over the next few years, production in global markets is expected to grow strongly, whilst EU production is predicted to remain relatively flat. Maintaining the EU’s global competitiveness will depend on ensuring high levels of investment in new and emerging areas. This will be particularly important in the area of product standardisation, supported by global technical harmonisation developed through regulatory dialogue with the EU’s main trading partners, in order to guarantee a stable access to (key) raw materials. Also, continued support to guarantee the investment in R&D will facilitate the development of the new expertise required to meet evolving customer requirements.



Individual Drivers of Change in this category are:

- **Global technical harmonisation**

The supply chain structure within the Automotive sector will need to meet the challenges posed by the introduction of new technology, but also meet changing market conditions. New mobility concepts; new standards and product harmonisations will also be necessary to create scale economies and to satisfy a possible increased demand for white label components and unbranded vehicles (for example, the possibility for new car-sharing platforms to have a “standard” fleet where the core product is the service and not the car-brand).

- **Global regulatory dialogue**

The EU Single Market is a key element for the maintenance of EU competitiveness. Future advantages are likely to be linked to increased standardisation between member states. It is evident that such processes cannot be put in place by social partners or industry alone; the Commission and in general, Governments and public administrations will need to play a fundamental role in the elaboration of policies and strategies that will support the competitiveness of the European Automotive sector.

- **Access to raw materials**

In a disruptive scenario, activities linked to raw materials become critical, especially if some resources (limited in terms of quantity or geographical presence) are necessary to produce key components. From this point of view, the automotive sector will need to develop sourcing strategies to ensure a stable supply of critical and key raw materials (eg. Lithium) to insulate them from the risk of shortages and potential price spikes. Also, the importance of supporting the circular economy by finding ways to improve the supply chain and resource efficiencies and finding better methods to reuse and recycle materials will require the necessary skilled people to meet these technology requirements.

7.2.1.1. Globalisation and Rise of New Players: Importance

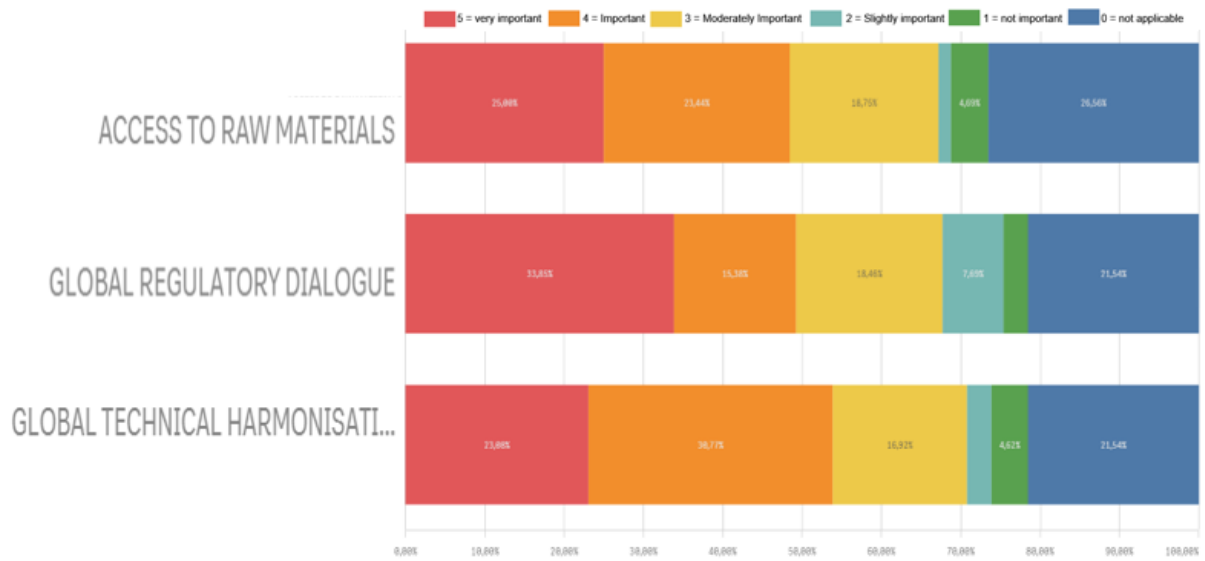


Figure 65: KPI 2.11 (Offer): Drivers of Change – Group GLOBALISATION AND RISE OF NEW PLAYERS: IMPORTANCE – Overall sample

Figure 65 sets out analysis of the relative importance of each Driver of Change within the “GLOBALISATION AND RISE OF NEW PLAYERS” category, based on responses to the ‘offer’ survey from all stakeholders. The role of Governments and public administrations in the elaboration of policies and strategies, to support the competitiveness of the European Automotive sector is considered the most important driver of change, as “GLOBAL REGULATORY DIALOGUE” is ranked first, based on responses with a score of 5, followed by “ACCESS TO RAW MATERIALS”, ranked second, and “GLOBAL TECHNICAL HARMONISATION”, third. However, the proportion of scores 3 and above is higher for “GLOBAL TECHNICAL HARMONISATION”, with nearly 71% of the respondents, followed by “GLOBAL REGULATORY DIALOGUE” (68%) and “ACCESS TO RAW MATERIALS” (67%). It is important to mention the significant percentage of “Not applicable” responses: 22% for “GLOBAL TECHNICAL HARMONISATION” and “GLOBAL REGULATORY DIALOGUE” and 27% for “ACCESS TO RAW MATERIALS”.

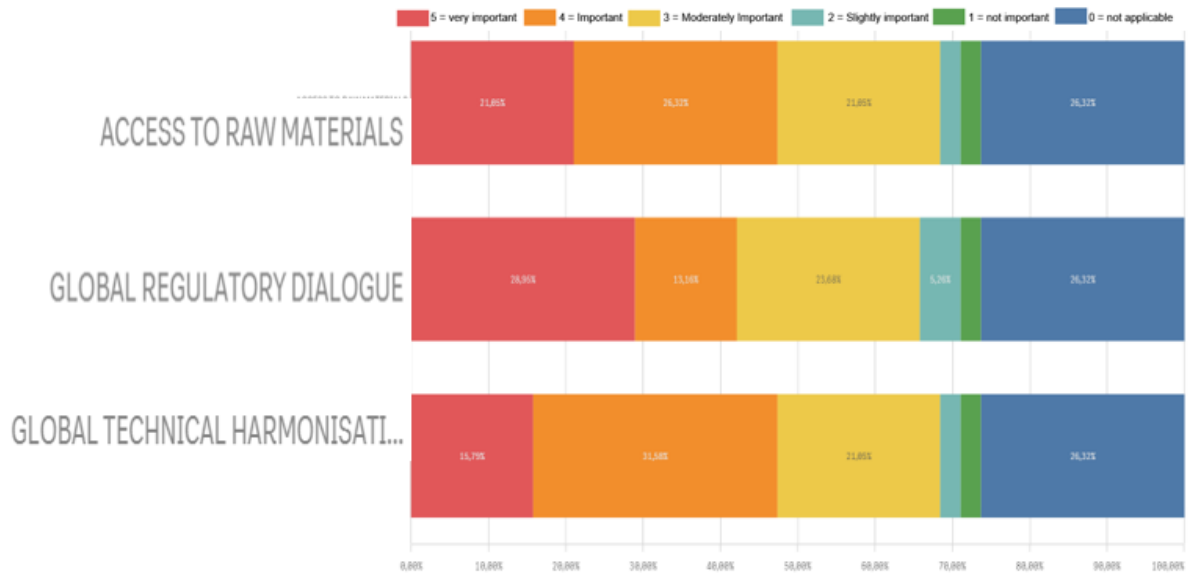


Figure 66: KPI 2.11 (Offer): Drivers of Change – Group GLOBALISATION AND RISE OF NEW PLAYERS: IMPORTANCE – VET sample

Figure 66 outlines the responses of VET centres. The results for the most important driver of change, responses with a score of 5, show a pattern similar to the results of the whole sample: “GLOBAL REGULATORY DIALOGUE” is ranked first, followed by “ACCESS TO RAW MATERIALS”, ranked second, and “GLOBAL TECHNICAL HARMONISATION”, third. However, “GLOBAL TECHNICAL HARMONISATION” and “ACCESS TO RAW MATERIALS” show the same proportion of scores above 3 (68%), whereas “GLOBAL REGULATORY DIALOGUE” is cited less frequently (66%). Again, there are a significant percentage of “Not applicable” responses: 26% in the three specific drivers of change considered.

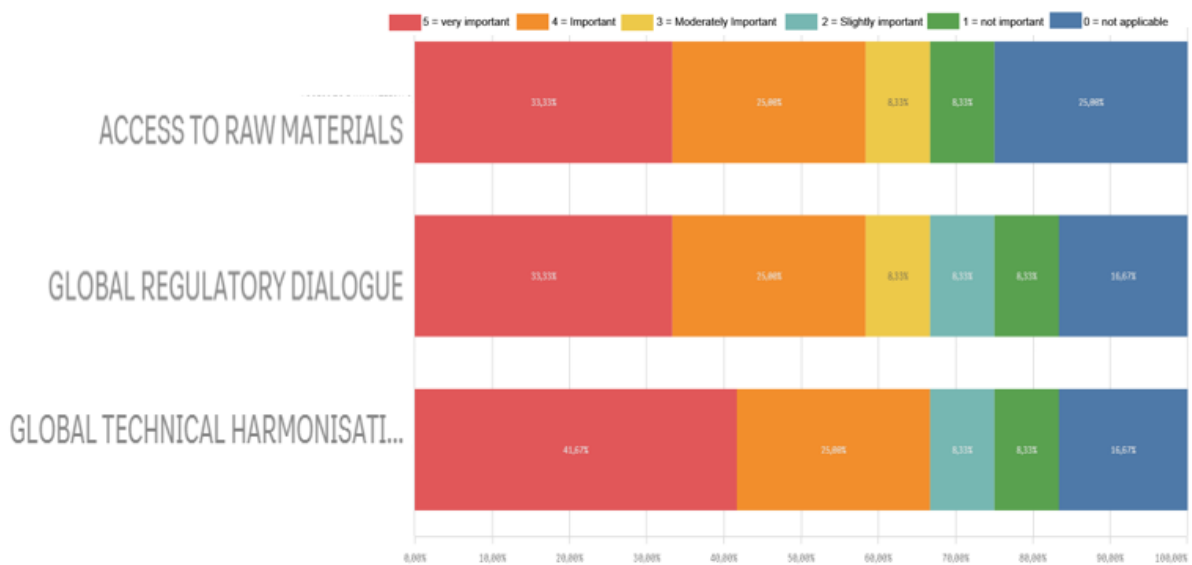


Figure 67: KPI 2.11 (Offer): Drivers of Change – Group GLOBALISATION AND RISE OF NEW PLAYERS: IMPORTANCE – INSTITUTE sample

Responses of Institutes are set out in Figure 67. In this case, the “GLOBAL TECHNICAL HARMONISATION” is ranked first as most important driver of change, with 42% of responses with a score of 5, and 67% with a score of 4 or above, whereas “ACCESS TO RAW MATERIALS” and the “GLOBAL REGULATORY DIALOGUE” had the same number of responses: 33% with a score of 5 and 58% with score 4 or higher. In this case, the percentage of “Not applicable” responses was higher for “ACCESS TO RAW MATERIALS” (25%), than for the two other drivers of change “GLOBAL TECHNICAL HARMONISATION” and “GLOBAL REGULATORY DIALOGUE” (17% in both cases).

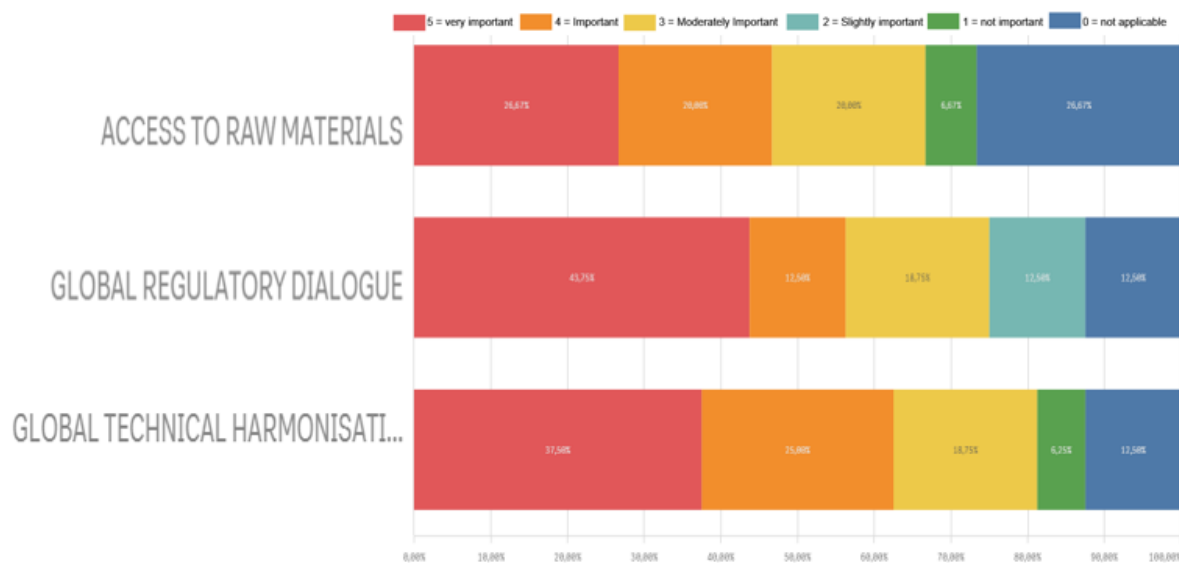


Figure 68: KPI 2.11 (Offer): Drivers of Change – Group GLOBALISATION AND RISE OF NEW PLAYERS: IMPORTANCE – PRIVATE COMPANY sample

As outlined in Figure 68, responses of private companies point to a somewhat different pattern: “GLOBAL REGULATORY DIALOGUE” was ranked first, when responses with a score of 5 are considered (44%), followed by “GLOBAL TECHNICAL HARMONISATION”, ranked second (37%), and “ACCESS TO RAW MATERIALS”, third (27%). However, “GLOBAL TECHNICAL HARMONISATION” had a higher proportion of responses with a score above 3 (81%), followed by “GLOBAL REGULATORY DIALOGUE” (75%) and “ACCESS TO RAW MATERIALS” (67%).

In this case, the percentage of “Not applicable” responses was higher for “ACCESS TO RAW MATERIALS” (27%), than for the two other drivers of change “GLOBAL TECHNICAL HARMONISATION” and “GLOBAL REGULATORY DIALOGUE” (12% in both cases).

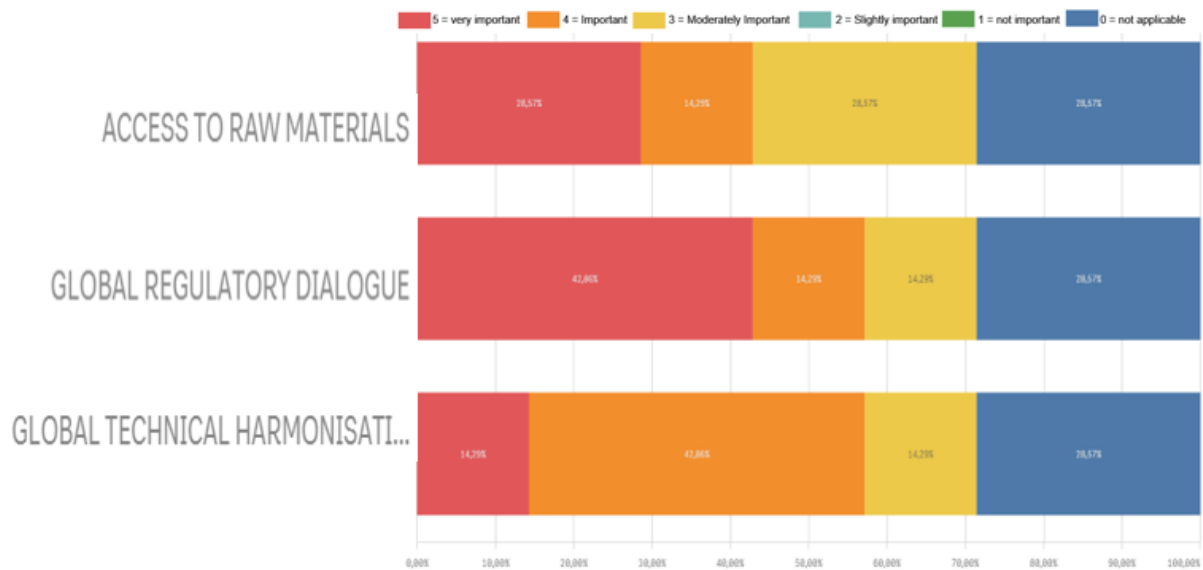


Figure 69: KPI 2.11 (Offer): Drivers of Change – Group GLOBALISATION AND RISE OF NEW PLAYERS: IMPORTANCE – UMBRELLA ORG. sample

Responses of umbrella organisations, as set out in Figure 69, differs from responses from other stakeholders. “GLOBAL REGULATORY DIALOGUE” is again ranked first, when responses with a score of 5 are considered (43%) with “ACCESS TO RAW MATERIALS” ranked second (29%) and “GLOBAL TECHNICAL HARMONISATION”, third with only 14%. However, when scores 4 or above are considered, both “GLOBAL TECHNICAL HARMONISATION” and “GLOBAL REGULATORY DIALOGUE” are the same in terms of the number of responses (57%), with the three drivers of change equal in terms of the proportion of responses if scores above 3 are taken into account (71%). In this case, the percentage of “Not applicable” responses is the same (29%) for the three specific drivers of change.

7.2.1.2. Globalisation and Rise of New Players: Urgency

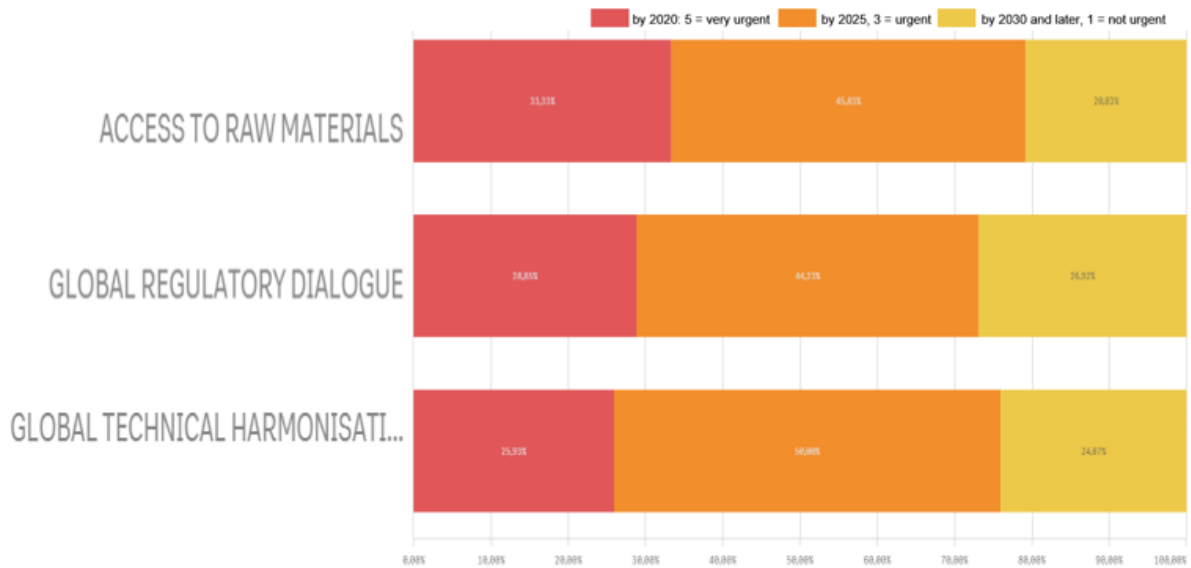


Figure 70: KPI 2.12 (Offer) Drivers of Change – Group GLOBALISATION AND RISE OF NEW PLAYERS - URGENCY – Overall sample

Figure 70 shows the relative urgency of the drivers of change included in the group “GLOBALISATION AND RISE OF NEW PLAYERS”, as indicated by all respondents. The most relevant time period for the three drivers of change is “by 2025”, with 44-50% of responses. The percentage of less urgent responses (by 2030 or later) ranges from 21 to 27%.

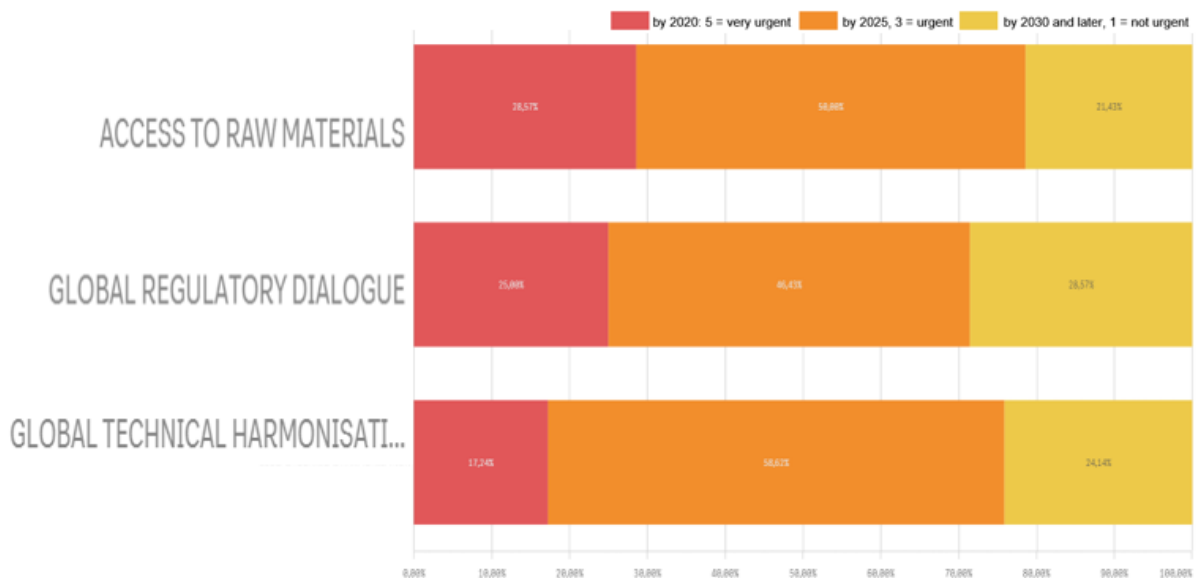


Figure 71: KPI 2.12 (Offer) Drivers of Change – Group GLOBALISATION AND RISE OF NEW PLAYERS - URGENCY – VET sample

The responses of the VET centres sample, shown in Figure 71, follows a similar to that of the whole sample, although proportion of respondents pointing to the need for shorter term action (very urgent

- by 2020) are lower and the proportion indicating the need for medium-term responses (by 2025) higher than for the overall sample.

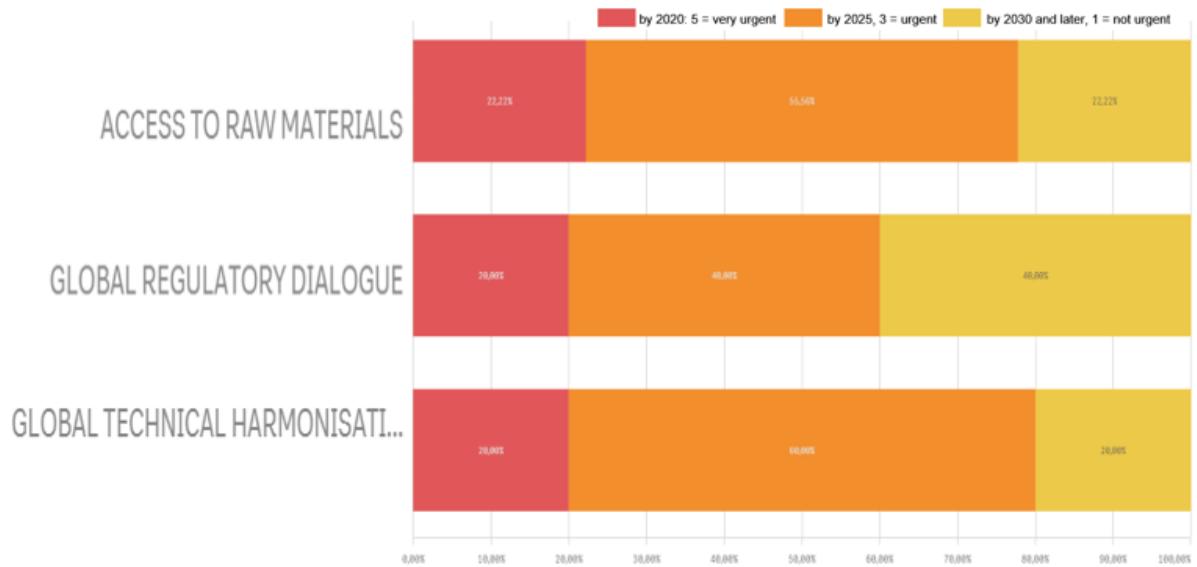


Figure 72: KPI 2.12 (Offer) Drivers of Change – Group GLOBALISATION AND RISE OF NEW PLAYERS - URGENCY – INSTITUTE sample

Responses for the Institutes sample is outlined in Figure 72, and also points to a longer-term time horizon for action, particularly in the case of the “GLOBAL REGULATORY DIALOGUE” driver of change, for which 40% of respondents assigned the lowest urgency score.

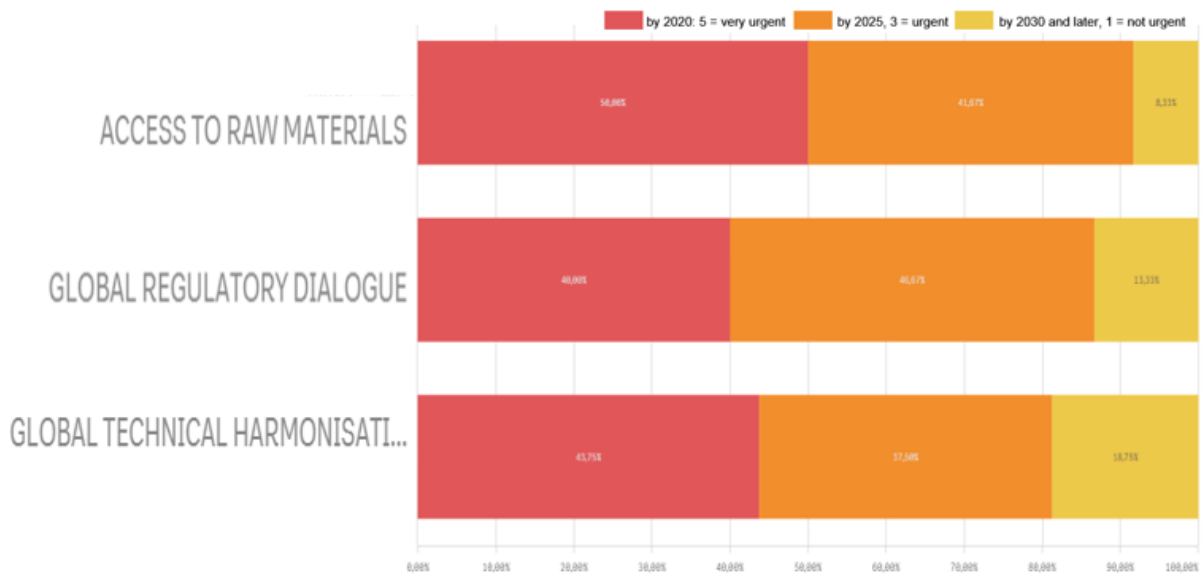


Figure 73: KPI 2.12 (Offer) Drivers of Change – Group GLOBALISATION AND RISE OF NEW PLAYERS - URGENCY – PRIVATE COMPANY sample

As shown in Figure 73, private companies are more likely to assign the highest urgency levels to the three drivers of change, particularly “ACCESS TO RAW MATERIALS” (50% responses with the highest urgency score, “by 2020”) and “GLOBAL TECHNICAL HARMONISATION” (44% “by 2020”). These stakeholders are also less likely to assign “not urgent” scores, by comparison with the whole sample and other stakeholders (Under 20% for each of the three drivers of change considered).

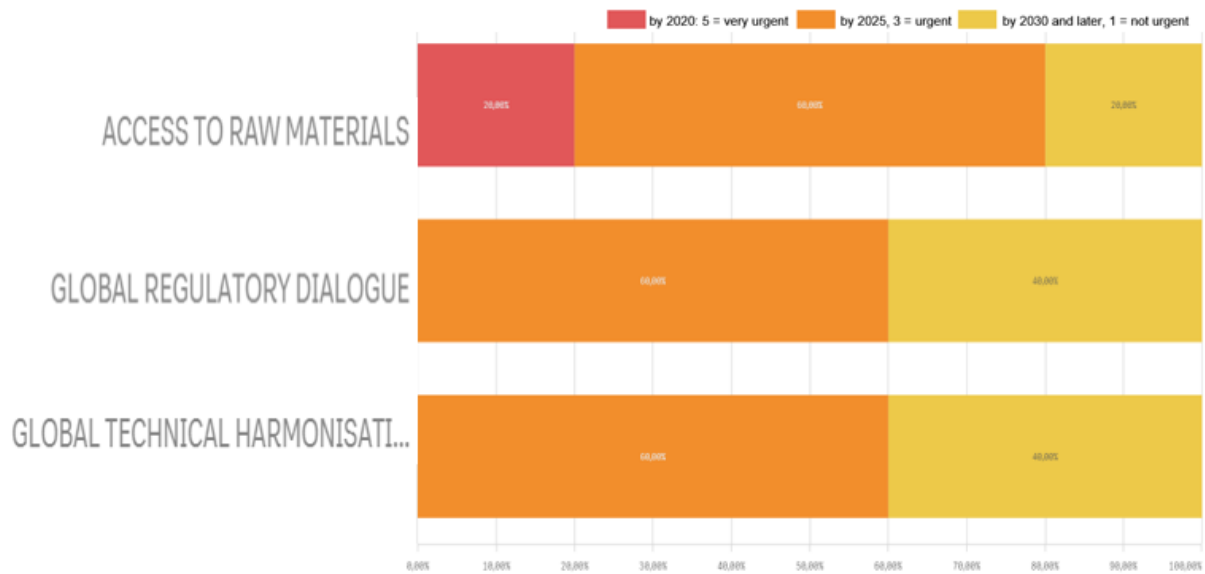


Figure 74: Figure 122: KPI 2.12 (Offer) Drivers of Change – Group GLOBALISATION AND RISE OF NEW PLAYERS - URGENCY – UMBRELLA ORG. sample

As outlined in Figure 74, umbrella organisations have the lowest urgency scores out of all stakeholders. “ACCESS TO RAW MATERIALS” was considered the most urgent driver of change, the only one with any responses pointing to a ‘very urgent’ need for action (20%). The other drivers of change “GLOBAL REGULATORY DIALOGUE” and “GLOBAL TECHNICAL HARMONISATION” were considered of very low urgency (by 2030 or later) by 40% of respondents in each case.

4.2.8 DRIVER OF CHANGE PRIORITY INDEX

The creation of an index to combine ‘importance’ and ‘urgency’ criteria for each Driver of Change is essential in order to develop an overall priority index that provides a simple ranking of responses relating to different stakeholders vision of the sector.

In a simplified form, the DoC PRIORITY INDEX is stated as:

Priority (1 to 5) x Timeframe (2020=5, 2025=3, 2030 and further=1).

A more precise formula is as follows:

$$\text{PRIORITY DoC INDEX} = \sum_{i=1}^n \text{DoC} [\textit{priority}]_i * \text{DoC} [\textit{urgency}]_i$$

Where:

i = number of replies to the questionnaire

$\text{DoC} [\textit{priority}]_i$ = score attributed to i DoC in the priority section, with a scale:

- 0 = not applicable
- 1 = not important
- 2 = Slightly important
- 3 = Moderately Important
- 4 = Important
- 5 = very important

$\text{DoC} [\textit{urgency}]_i$ = score attributed to i DoC in the urgency section with a scale:

- by 2020: 5 = very urgent
- by 2025, 3 = urgent
- by 2030 and later, 1 = not urgent

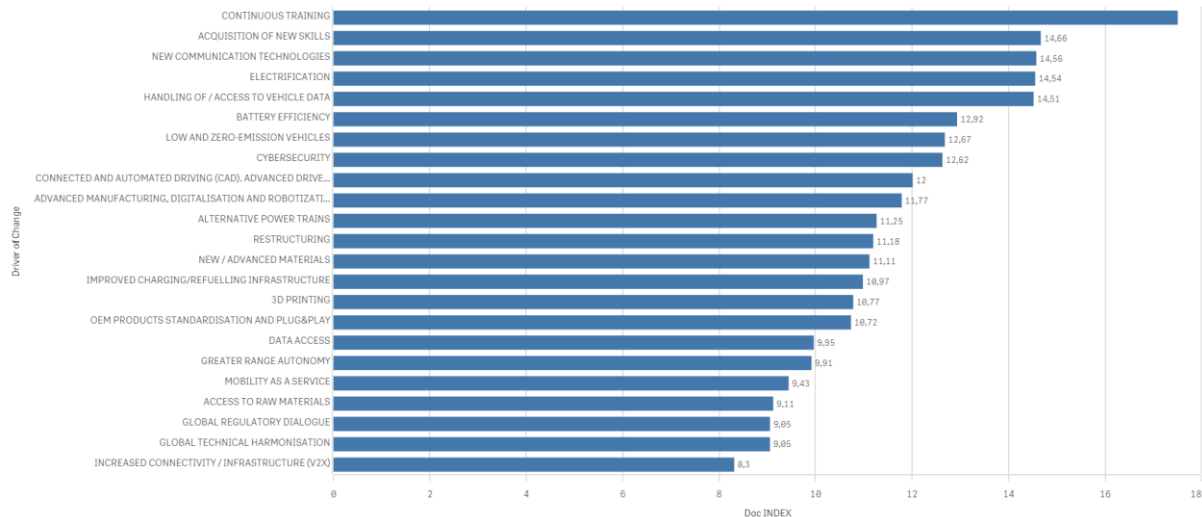


Figure 75 KPI 2.13 (Offer) Drivers of Change – Priority Index – Overall sample

Figure 75 shows the overall PRIORITY DoC INDEX where „CONTINUOUS TRAINING“ is ranked as the key Driver of Change measured on this basis. This is followed by a cluster of 4 Drivers of Change with minimal differences in overall scores. „ACQUISITION OF NEW SKILLS“, „NEW COMMUNICATION TECHNOLOGIES“, „ELECTRIFICATION“ and „HANDLING OF / ACCESS TO VEHICLE DATA“ reflect the importance of understanding technological changes in the automotive sector in order to respond effectively to upskilling and reskilling challenges.

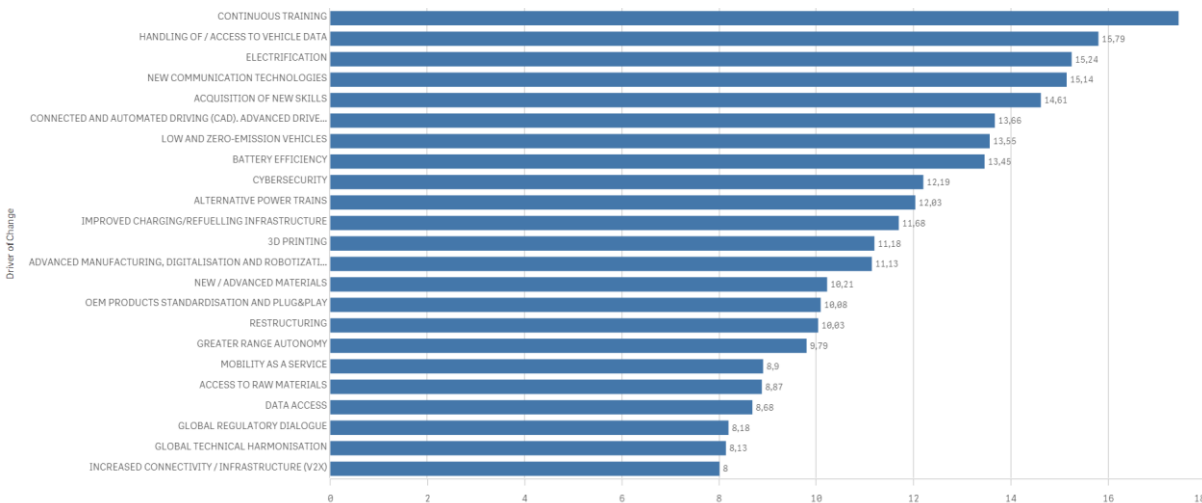


Figure 76: KPI 2.13 (Offer) Drivers of Change – Priority Index – VET sample

Looking now at the PRIORITY DoC INDEX purely in relation to VET respondents, Figure 76 indicates that VET responses closely mirror those from all stakeholders. With one exception the same TOP10 Drivers of Change are identified. Unlike the responses from all stakeholders, from the perspective of VET providers “ACQUISITION OF NEW SKILLS” has moved to 5th place beyond “HANDLING OF / ACCESS TO

VEHICLE DATA”, “ELECTRIFICATION” and “NEW COMMUNICATION TECHNOLOGIES”. “ADVANCED MANUFACTURING, DIGITALIZATION AND ROBOTIZATION OF THE MANUFACTURING PROCESS” falls out of the list for the TOP10 and has been replaced by “ALTERNATIVE POWER TRAINS”.

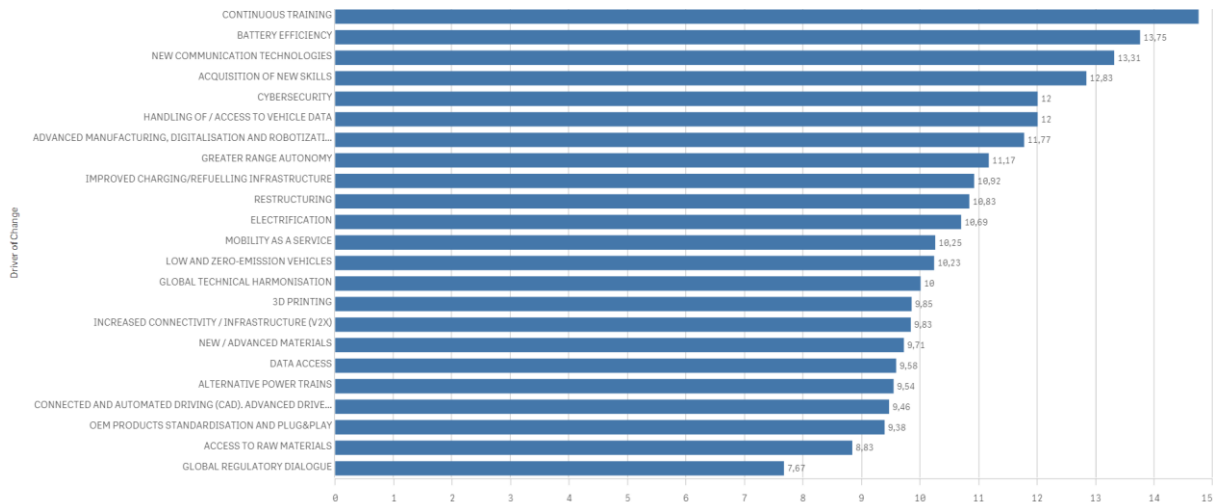


Figure 77: KPI 2.13 (Offer) Drivers of Change – Priority Index – INSTITUTE sample

Figure 77 outlines the PRIORITY DoC INDEX by applying the same analysis for INSTITUTES. On this basis, “CONTINUOUS TRAINING” and “BATTERY EFFICIENCY” are the first two priority Drivers of Change, with “NEW COMMUNICATION TECHNOLOGIES” ranked third. „ACQUISITION OF NEW SKILLS” and „CYBERSECURITY” are ranked fifth and sixth respectively. “ELECTRIFICATION” and “LOW AND ZERO-EMISSION VEHICLES” fall out of TOP 10. “GREATER RANGE AUTONOMY” and “IMPROVED CHARGING/REFUELLING INFRASTRUCTURE” are also identified as high priority DoCs, reflecting the importance and urgency attached to these by INSTITUTE’s, as set out previously.

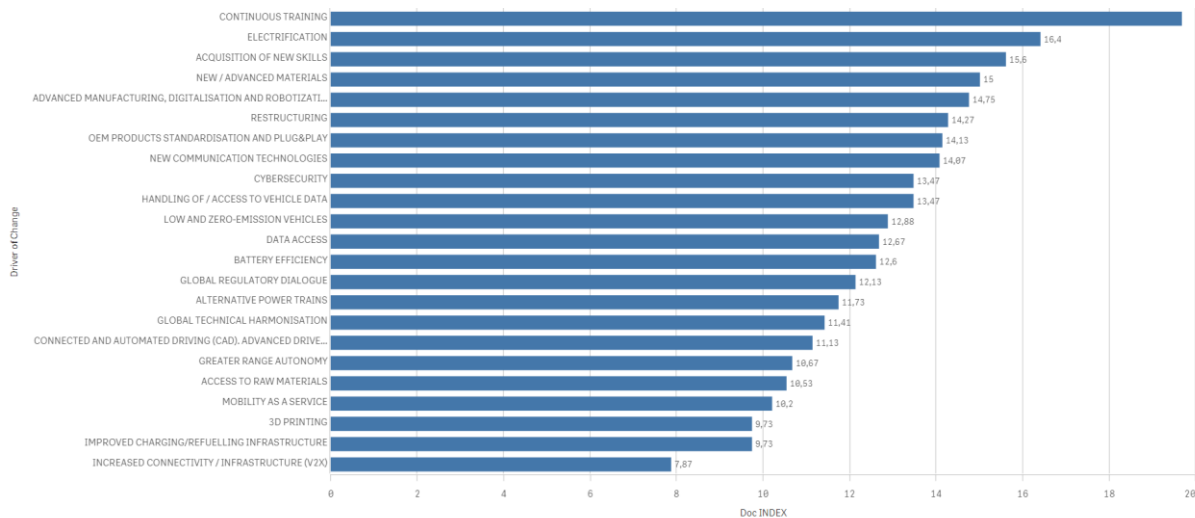


Figure 78: KPI 2.13 (Offer) Drivers of Change – Priority Index – PRIVATE COMPANY sample

Figure 78 outlines the PRIORITY DoC INDEX in relation to PRIVATE COMPANY stakeholders who are VET providers. „CONTINUOUS TRAINING“, „ELECTRIFICATION“ and „ACQUISITION OF NEW SKILLS“ are the first three priority Drivers of Change. By comparison with the overall sample, VET stakeholders and INSTITUTE’s a slightly different pattern of responses emerges, with „NEW / ADVANCED MATERIALS“, „RESTRUCTURING“, „OEM PRODUCTS STANDARDISATION AND PLUG&PLAY“ now appearing in the list of the TOP10. By contrast, “BATTERY EFFICIENCY” and “LOW AND ZERO-EMISSION VEHICLES” falls out of the TOP10. This could be linked to the need for more tangible solutions and necessity to react quickly to changing requirements of the VET market.

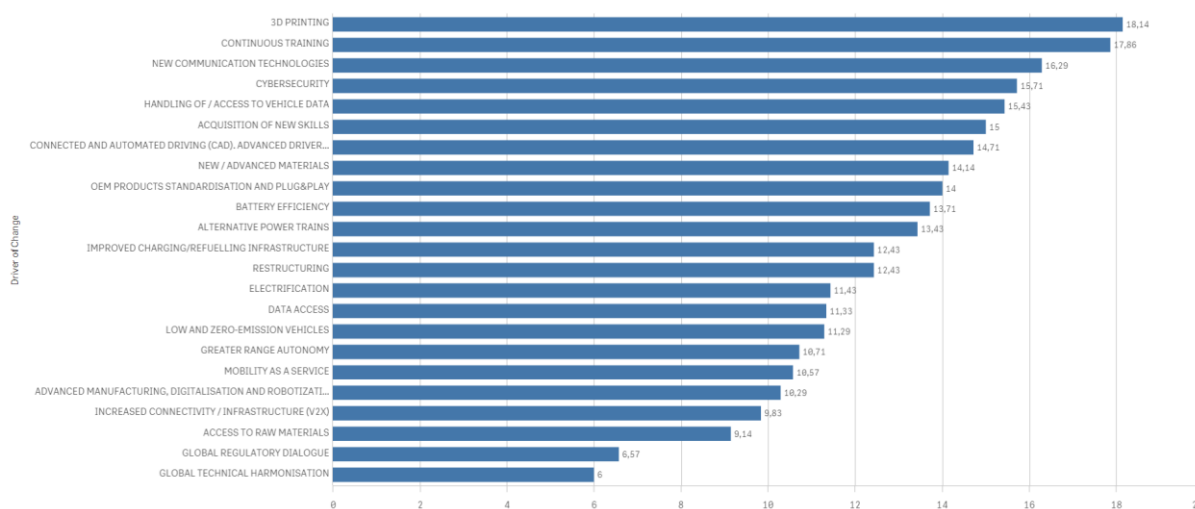


Figure 79: Figure 131: KPI 2.13 (Offer) Drivers of Change – Priority Index – UMBRELLA ORG. sample

Applying the same analysis for UMBRELLA ORGANISATIONS, the PRIORITY DoC INDEX is outlined in Figure 79. The Index indicates „3D PRINTING“ is ranked first , with „CONTINUOUS TRAINING“ and

„ACQUISITION OF NEW SKILLS“ second and third respectively. Together with PRIVATE COMPANY and UMBRELLA stakeholders „NEW / ADVANCED MATERIALS“ and „OEM PRODUCTS STANDARDISATION AND PLUG&PLAY“ are identified as priority Drivers of Change. „ELECTRIFICATION“ and „LOW AND ZERO-EMISSION VEHICLES“ are also identified as low priority, similar to responses from INSTITUTES.

4.3 SKILLS

5 main categories or clusters of skills have been identified from previous demand-survey normalisation activity: 4 of these being “technical” and the 5th related to previously identified “soft skills”. Specific job roles comprise different combinations of these skills. (Refer to CHAPTER 6.4 for more details).

Based on replies and normalisation activity undertaken in relation to the previous questionnaire⁴ (Demand) identified skills have been ranked using an index.

In a simplified form, the SKILLS INDEX is stated as:

Occurrence (of each skill) x Priority DoC Index (average for each skill⁵)

A more precise formula is stated as:

$$\text{Skills Index} = \sum_{i=1}^n \text{Skill [occurrence]}_i * \text{AVG DoC priority index}_i$$

Where:

i = number of responses to the questionnaire

$\text{Skill [occurrence]}_i$ = number of times the i skill has been mentioned

$\text{AVG DoC priority index}_i$ = the average of the priority DoC index linked to the Skill_i identified by the respondent

With this index it was possible to merge two important sets of information and present this as one number: specifically, how many times a skill has been mentioned in relation to the linked Driver of Change, ranked within one index.

A complete list of SKILLS addressed through available provision taught on an annual basis (Based on outcomes from the offer survey) is available in APPENDIX A.

⁴ Deliverable D2.7 Forecasting dissemination Report, DRIVES Project, www.project-drives.eu

⁵ Respondents were given the opportunity to indicate for each Skill, the related Drivers of Change interacting with this skill. With this index it is possible to link skills with appropriate Drivers of Change

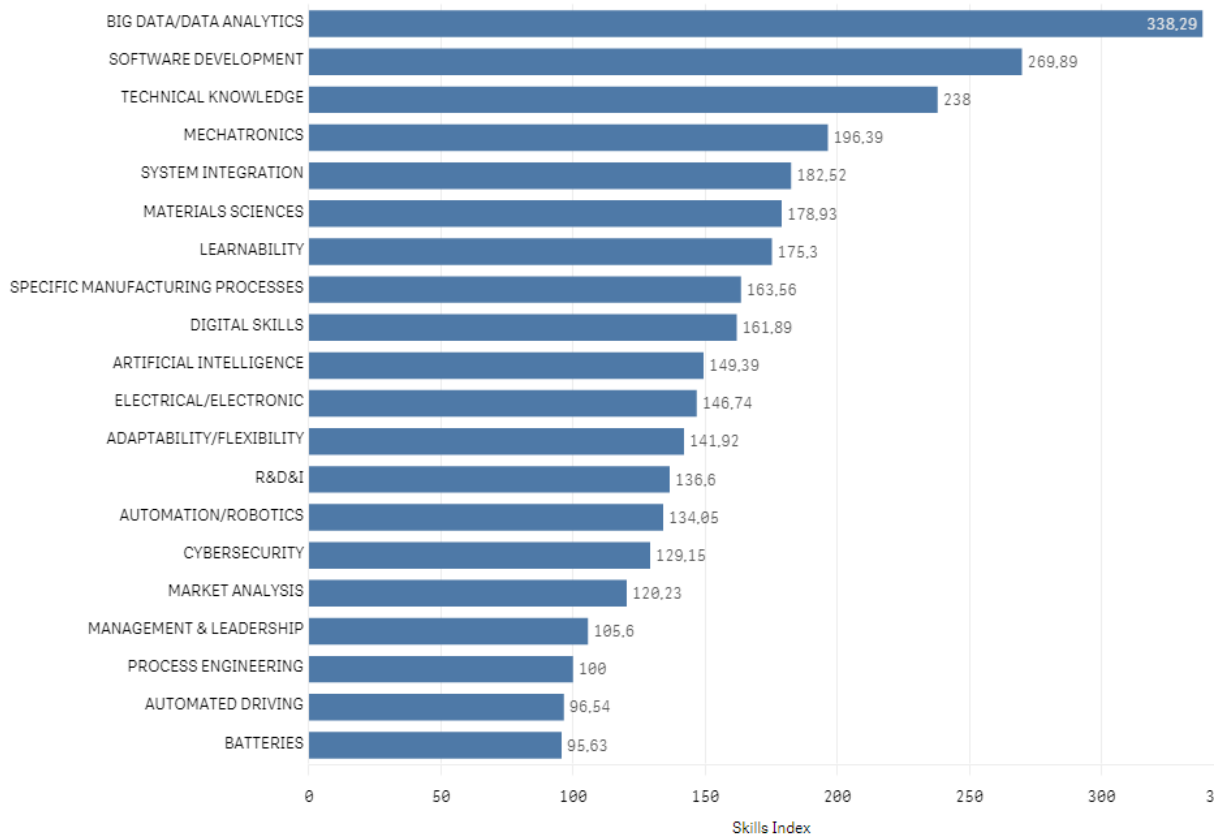


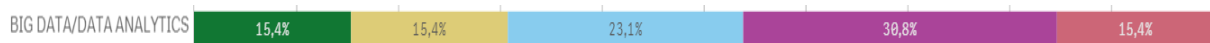
Figure 80: KPI 3.1 Skill Index (demand) – Overall sample

Figure 80 outlines the TOP20 Overall Skills ranked according to the Skillindex, which reflects the occurrence of each skill and the relationship of that skill to Drivers of Change identified in the Demand survey, as set out in the in the D2.7 Forecasting dissemination Report. Results of analysis for individual skills in relation to the number of relevant graduates and EQF level are presented below.

Each graph below is ordered by EQF level and ranked according to the Skillindex :

EQF

- EQF 3
- EQF 4
- EQF 5
- EQF 6
- EQF 7
- EQF 8



1. BIG DATA/DATA ANALYTICS is ranked first on the Skillindex with a significant gap to the second highest score. Based on the categorisation adopted this skill is closely related to DIGITALISATION. The average number of graduates within the EU is 794 per year and based on responses from the VET OFFER survey, provision is most likely to be at EQF 7 (30.8%) and EQF 6 (23.1%). Level EQF 3 is not relevant in this case.



2. SOFTWARE DEVELOPMENT is ranked second according to the Skillindex and can be termed a TECHNICAL skill with an AVG, 1764 graduates. Provision covers all EQF levels, most commonly at EQF 6 and 7 (both 22.7%), followed by EQF 8 with 18.2%



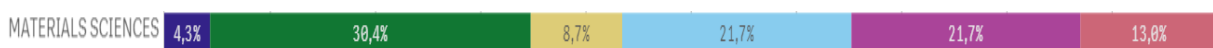
3. TECHNICAL KNOWLEDGE (another TECHNICAL skill) is in third place with a relatively high AVG number of graduates, at 27.376 per year. Provision is available at all EQF levels, but with a focus on lower levels, particularly at EQF4 (35.4%) and EQF3 and 5 (both 16.7%)



4. MECHATRONICS with an AVG of 3.336 graduates is another TECHNICAL skill provided mainly at EQF levels 4 (44,1%), 5(20,6%) and 6 (14,7%)



5. SYSTEM INTEGRATION is ranked fifth and is a sub-category of ELECTRIFICATION (VEHICLE SYSTEM profiles). The AVG number of graduates is 1290 per year, with provision mainly at the EQF levels 4 (50%), 6 (18,2%) and 5(13,6%)



6. MATERIALS SCIENCE is a further TECHNICAL skill with a relatively high AVG number of graduates (12.189 per year). Provision is concentrated at EQF level 4 (30,3%), but with a significant proportion of provision also at the higher levels of EQF 6,7 (both 21,7%) and 8 (13%).



7. LEARNABILITY is the highest ranked SOFT SKILL in the TOP20, with an AVG number of graduates of 13.967 per year. Provision is focussed in particular at levels EQF 4 (37.5%) and EQF 3 (25%)



8. **SPECIFIC MANUFACTURING PROCESSES** with an AVG number of 1.017 graduates per year is the highest ranked Production / Manufacturing skill (Life cycle / product - process chain sub-category) in the TOP 20. Provision is focussed particularly at EQF levels 4 (43,8%) and 5 (25%). EQF Level 3 is not relevant.



9. **DIGITAL SKILLS** relate to DIGITALISATION with an AVG of 8.464 graduates per year. Provision is predominantly at at EQF levels 4 (46,2%), 5(19,2%) and 6 (15,4%). EQF Level 8 is not relevant



10. **ARTIFICIAL INTELLIGENCE** also relates to DIGITALISATION, with a somewhat lower AVG number of graduates (1.196 per year) than is the case in DIGITAL SKILLS. AI is provided at all levels with a slightly higher share at EQF levels 7 and 8.



11. **ELECTRICAL/ELECTRONIC** is another TECHNICAL skill, with an AVG of 7.402 graduates, with provision focussed in particular at EQF levels 4 (45,1%) and 5 (17,6%).



12. **ADAPTABILITY/FLEXIBILITY** is a second SOFT SKILL, with an AVG of 9.138 graduates per year, predominantly at EQF levels 3 (32%), 4 and 5.



13. **R&D&I** provision, relating to the Life cycle / product - process chain is relatively uncommon, with an AVG of 247 graduates per year. No EQF levels 3 and 4 is recorded, with most provision focussed at EQF levels 6 and 7.



14. **AUTOMATION/ROBOTICS**, which is an example of the sub-category PRODUCTION/MANUFACTURING (Life cycle / product - process chain) has an AVG of 2.464 graduates per year and is characterised by a high proportion of provision at EQF level 4.



15. CYBERSECURITY, which relates to DIGITALISATION has a relatively small AVG number of graduates (619 per year) with provision spread fairly evenly across different EQF levels.



16. MARKET ANALYSIS is another skill relating to the wider Life cycle / product - process chain profile, with a small AVG number of graduates (147 per year). With the exception of EQF level 5 (none recorded) and EQF level 4 where most provision is recorded, the remainder is spread evenly across other EQF levels.



17. MANAGEMENT & LEADERSHIP which is an example of the wider SOFT SKILL profile, has an AVG of 1.571 graduates. With the exception of an absence of EQF level 3 provision it is fairly evenly sprad across other EQF levels.



18. PROCESS ENGINEERING relates to the wider Life cycle / product - process chain profile with a relatively high AVG number of graduates (11.093 per year). Provision is concentrated in particular at EQF levels 4 (probably influenced by a larger number of respondents for this level) and 7 and 8.



19. AUTOMATED DRIVING represents an evolving VEHICLE SYSTEM profile with a small AVG number of graduates (745 per year). No provision at EQF levels 3 and 5 is recorded.



20. BATTERIES is another sub-category of ELECTRIFICATION (VEHICLE SYSTEM profiles) ranked within the TOP20 of the Skillsindex, with an AVG of 992 graduates spread across all EQF levels. The high concentration of EQF level 4 provsion is probably influenced by a larger number of VET school organisation respondents.



4.4 TRAINING PROVISION MECHANISMS APPROACH

Vocational Education and Training (VET) aims to equip people with knowledge, know-how, skills and/or competences required in particular occupations, or more broadly within the labour market.

The 3 most relevant types of VET in the context of the DRIVES project are:

- CVET⁶: Continuing vocational education and training is defined as "education or training after initial education or entry into working life, aimed at helping individuals to improve or update their knowledge and/or skills; acquire new skills for a career move or retraining; and/or continue their personal or professional development"
- IVET⁷: General or vocational education and training carried out in the initial education system, usually before entering working life. Some training undertaken after entry into working life may be considered as initial training (e.g. retraining); initial education and training can be carried out at any level in general or vocational education (full-time school-based or alternance training) pathways or apprenticeships.
- TVET⁸: Technical and Vocational Education and Training (TVET) is concerned with the acquisition of knowledge and skills for the world of work. Over time, various terms have been used to describe aspects now considered as comprising TVET. These include: Apprenticeship Training, Vocational Education, Technical Education, Technical-Vocational Education (TVE), Occupational Education (OE), Vocational Education and Training (VET), Professional and Vocational Education (PVE), Career and Technical Education (CTE), Workforce Education (WE), Workplace Education (WE), etc. Several of these terms are commonly used in specific geographic areas.

This section provides information about VET approaches and explores different ways of approaching training and learning. It is considered an important factor when defining the overall skills strategy and understanding the preferences of stakeholders in relation to VET provision and also supports the design and orientation of all the project work packages;

The "Demand" survey was in <<open format>> with most questions not guided by a multiple choice menu; the analysis has been undertaken only in relation to the main (normalised) responses. In the

⁶ http://www.cedefop.europa.eu/files/3070_en.pdf

⁷ [https://www.eqavet.eu/eu-quality-assurance/glossary/initial-education-and-training-\(ivet\)](https://www.eqavet.eu/eu-quality-assurance/glossary/initial-education-and-training-(ivet))

⁸ <https://unevoc.unesco.org/go.php?q=What+is+TVET>

“Offer” survey a multiple choice option was available with all the normalised replies originating from the “Demand” survey-. The complete list of possible replies were:

- **Augmented reality / Virtual reality:** A three-dimensional virtual simulated environment mimics and enhances reality by providing digital information, allowing learners to practice skills and understand the implications of their actions.
- **Blended learning:** This is a mix of online and classroom-based learning
- **Classroom based training:** the classic school method, where skills are learned in a theoretical environment, with a preference for academic and analytical approaches.
- **Closest relation with university/VET providers:** provides the potential to create a planned and continuous close cooperation between companies and service providers, offering counselling, support and training.
- **Dual system:** includes both school training and work experience with an emphasis on apprenticeships.
- **Gamifications:** This describes the application of typical elements of game playing (e.g. point scoring, competition with others, rules of play, etc.) to other areas of activity. It is often used e.g. as an online marketing technique to encourage engagement with a product or service.
- **Intense learning:** This is the concentration of learning into a short period of time, e.g. workshops are intended to be an intensive learning experience for intermediate to advanced topics.
- **Mentoring:** Similar to the previous on the job training but now the "training by doing" activity is supported by a mentor (an identified skilled person) who follows and supports individuals who need or want the same skills and advantages to move up in work, skill level, or school performance.
- **Networking and exchange information of employees/experts/employers:** This describes the action or the process of interacting with others to exchange information and develop professional or social contacts.
- **On the job training:** employees learn in the environment where they will need to practice the knowledge and skills obtained during training.
- **Online courses:** This is a mix between a ‘theoretical’ vocational training (without the physical presence of the employee = online) and the possibility to have more interaction with user forums to support community interactions among students, professors, and teaching assistants as well as immediate feedback to tests and assignments

- **Work based training:** It is an educational strategy to provide students with real-life work experiences where they can apply academic and technical skills and improve employability. It is usually a series of educational courses which integrate the school or university curriculum with the workplace in order to create a different learning paradigm. Work-based learning encompasses a diversity of formal, non-formal and informal arrangements including apprenticeships, work placement and informal learning on the job
- **University:** high-level educational studies to obtain degrees (and above) and where academic research is performed

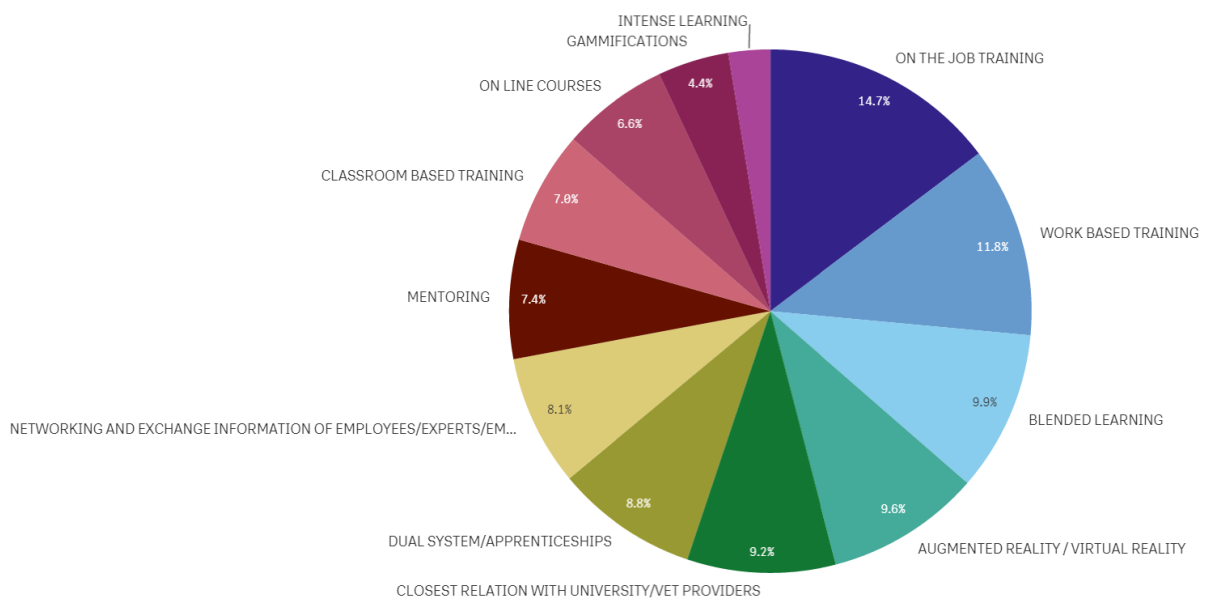


Figure 81: KPI 5.1 (Offer) VET Approaches – Overall sample

Figure 81 summarises all responses relating to the effectiveness of current VET approaches. “On the job” and “work based” training is cited most frequently accounting for roughly 25% of all 13 different identified approaches. Excluding these two approaches there is a broadly even distribution of other categories. “Intensive learning” and “Gamifications” are listed least with less than 5% each. It is noticeable that “online course” are cited relatively infrequently (6.6 %) given that the DRIVES project is focussing in particular on this type of training approach.

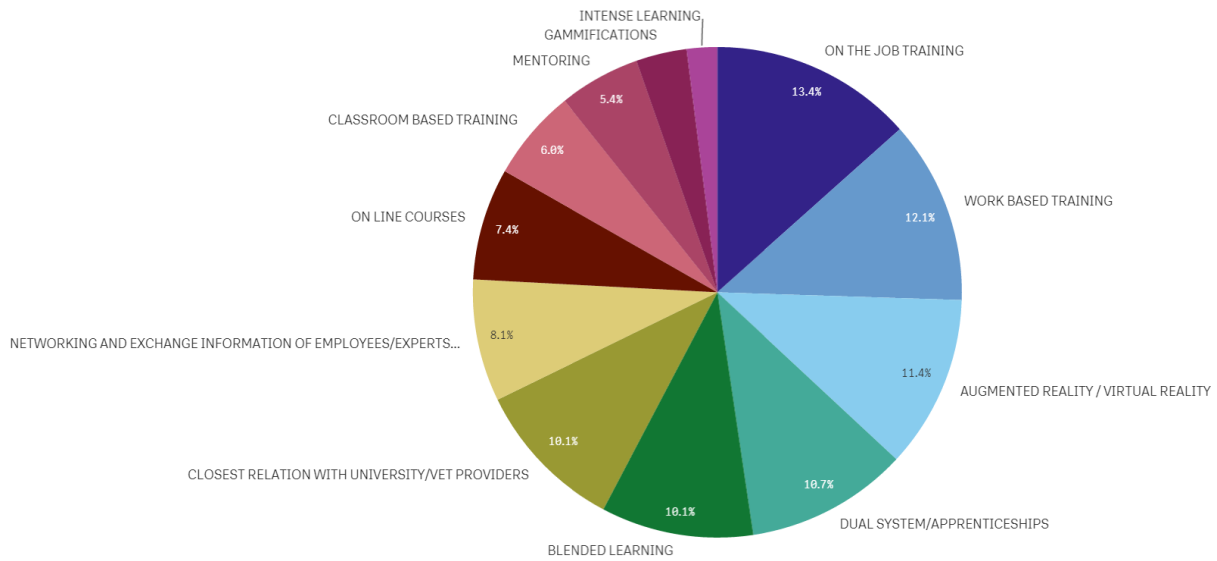


Figure 82: KPI 5.1 (Offer) VET Approaches – VET sample

Figure 82 outlines the same analysis but solely from the perspective of VET providers, schools and universities. Only slight differences are evident when compared with responses from all stakeholders. Again, “on the job” and “work based” training accounts for more than 25% of all approaches cited, whereas “Intensive learning” and “Gamifications” are cited the least, at less than 5 % each. Of particular note is that “augmented reality/ virtual reality” is ranked 3rd in terms of frequency (more than 10%) even though this is a relatively new concept.

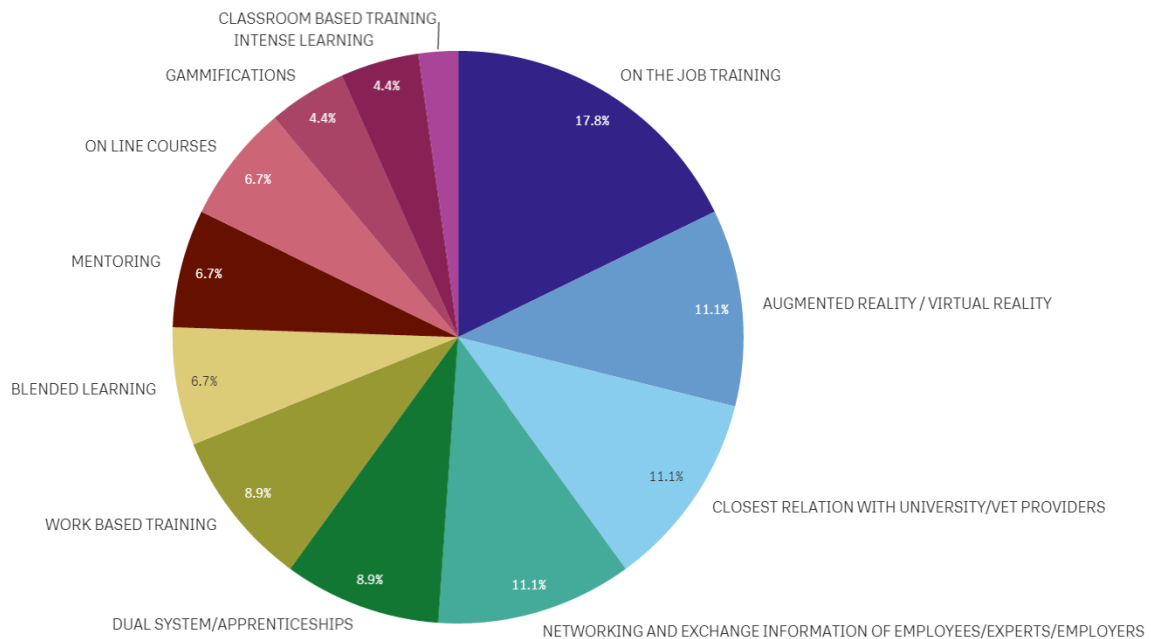


Figure 83 KPI 5.1 (Offer) VET Approaches – INSTITUTE sample

Figure 83 outlines responses from institutes in relation to the effectiveness of current VET approaches. As before, “on the job training” is ranked highest (> 17 %). As was the case with VET providers, “augmented reality/ virtual reality” is also cited quite frequently (11.1 %), as is “closest relation with university/VET providers” (11.1%).

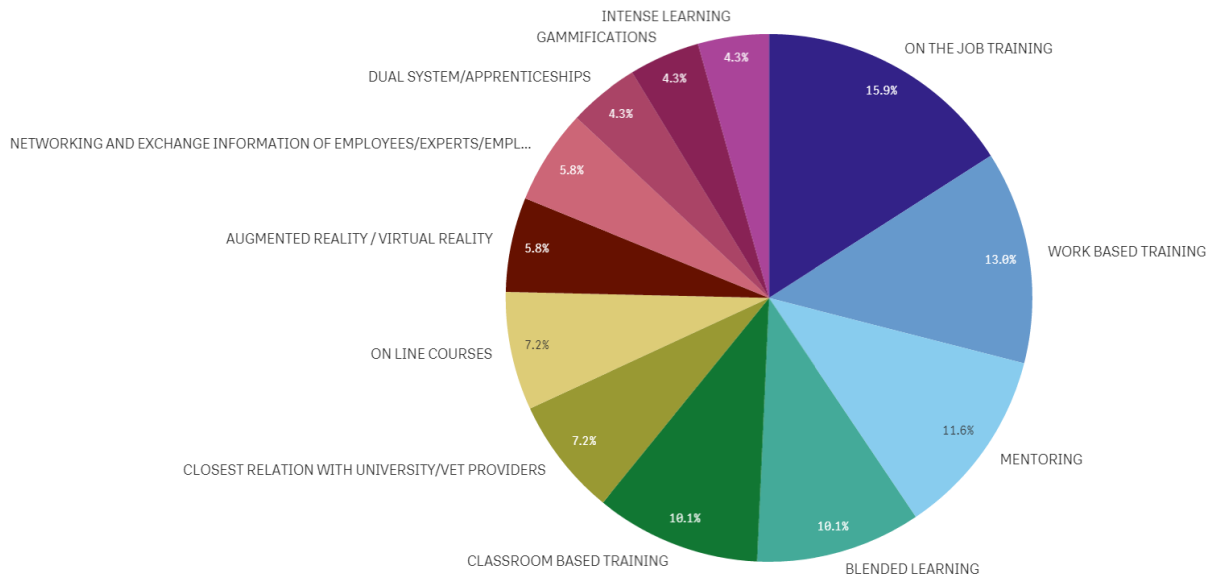


Figure 84 KPI 5.1 (Offer) VET Approaches – PRIVATE COMPANY sample

Results from the perspective of private companies involved in provision of VET is outlined in Figure 84. Again, “on the job” and “work based” training accounts for more than 25% of all approaches cited. Of particular note is that for private companies “mentoring” is cited quite frequently, accounting for 11 % of responses.

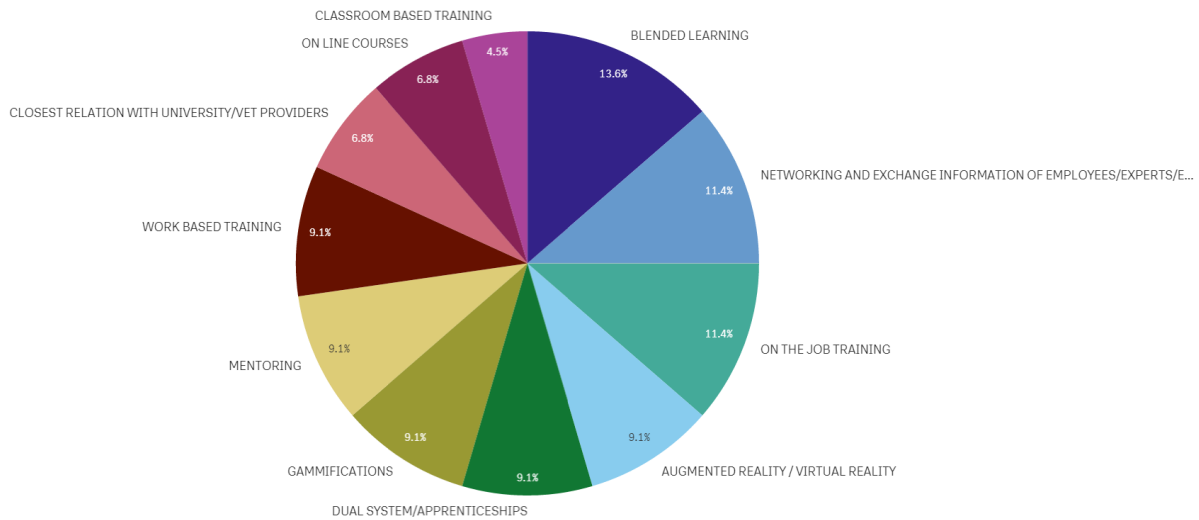


Figure 85 KPI 5.1 (Offer) VET Approaches – UMBRELLA ORG. sample

Figure 85 outlines the same analysis but from the perspective of umbrella organisations. It is striking that perceptions of the effectiveness of approaches to provision differ significantly from all other stakeholders. “Blended learning” (13.6 %) and “networking” (11.4 %) are most commonly cited effective, accounting for 25% of all responses while “worked based training” (9.1 %) was cited relatively infrequently.

4.5 RECOGNITION AND QUALIFICATION FRAMEWORKS

The necessity for “standard(s)” across the EU Automotive sector to enable movement of skilled workers between EU countries and recognition of skill levels relating to training undertaken to support increased mobility of workers is a key focus of the DRIVES project. A pre-determined list of the most recognised standard and qualification frameworks was included in the questionnaire, with the option for stakeholders to add to this list. The pre-determined list comprised five possible choices coming from the previous “Demand” survey, plus the possibility to add others; the activity has been undertaken with reference to 5 key qualification frameworks listed in the questionnaire (the “other” possibility has been normalised with “NATIONAL” recognition where available):

- BUREAU VERITAS⁹
- ECQA¹⁰
- EQF¹¹
- IATF¹²

⁹ <https://group.bureauveritas.com/>

¹⁰ <https://www.ecqa.org/>

¹¹ <https://www.cedefop.europa.eu/en/events-and-projects/projects/european-qualifications-framework-efqf>

¹² <https://www.iatfglobaloversight.org/>

- NATIONAL: specific standards used into an EU nation and not recognised abroad
- TUV SUD¹³
- VDA-QMC¹⁴

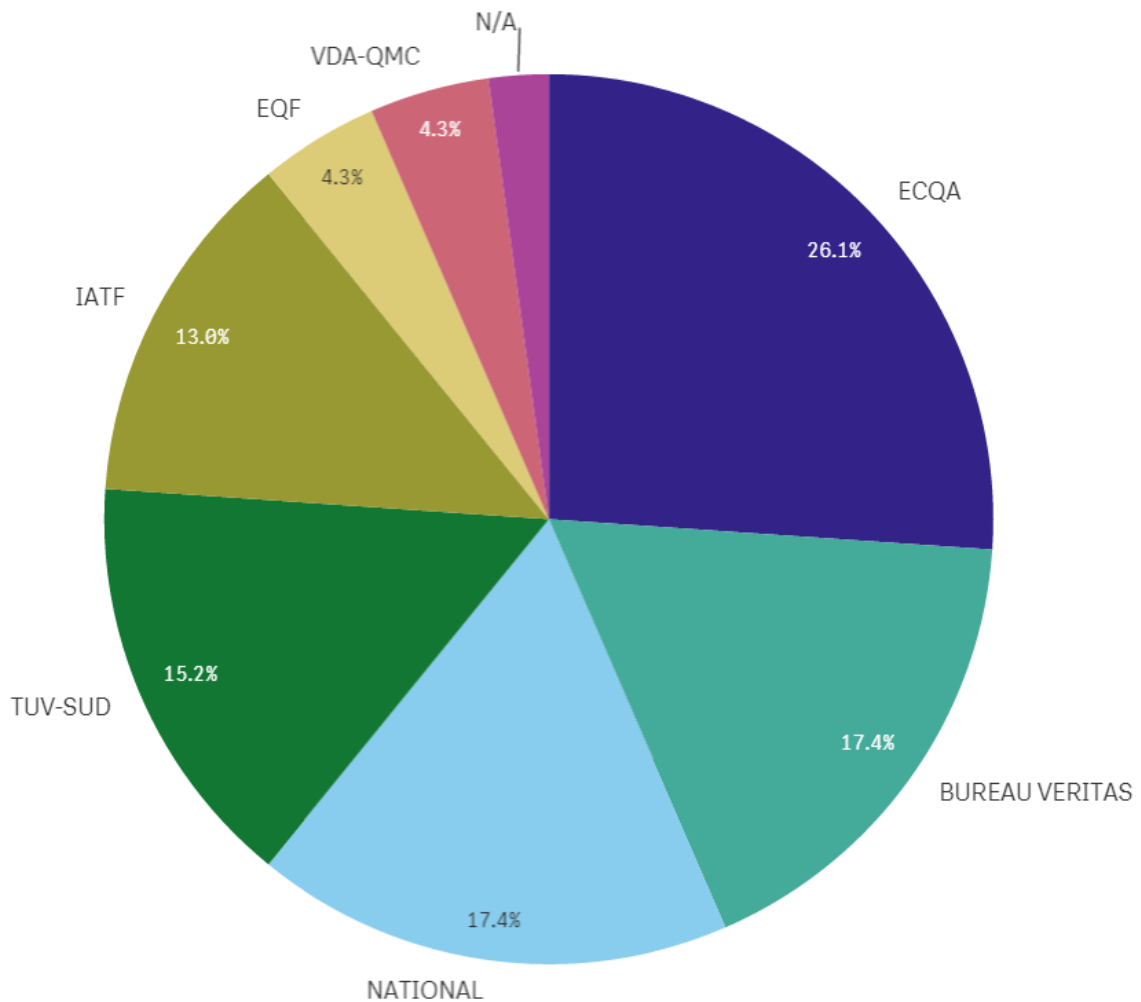


Figure 86: KPI 6.1 (Offer) Skill Recognition Standards – Overall sample

Figure 86 summarises overall results in relation to the importance of different Skill Recognition Standards to those organisations responding to the offer survey. “ECQA” accounts for more than 25 % of all recognised standard and qualification frameworks cited, followed by “BUREAU VERITAS” (17.4 %), and “NATIONALS” (17.4%); It should be noted that although “ECQA”, “BUREAU VERITAS”, “TUV-SUD” and “IATF” account for more than 70% of all skill recognition standards cited, “NATIONAL” standards are still considered important.

¹³ <https://www.tuvsud.com/en>

¹⁴ <https://vda-qmc.de/en/>

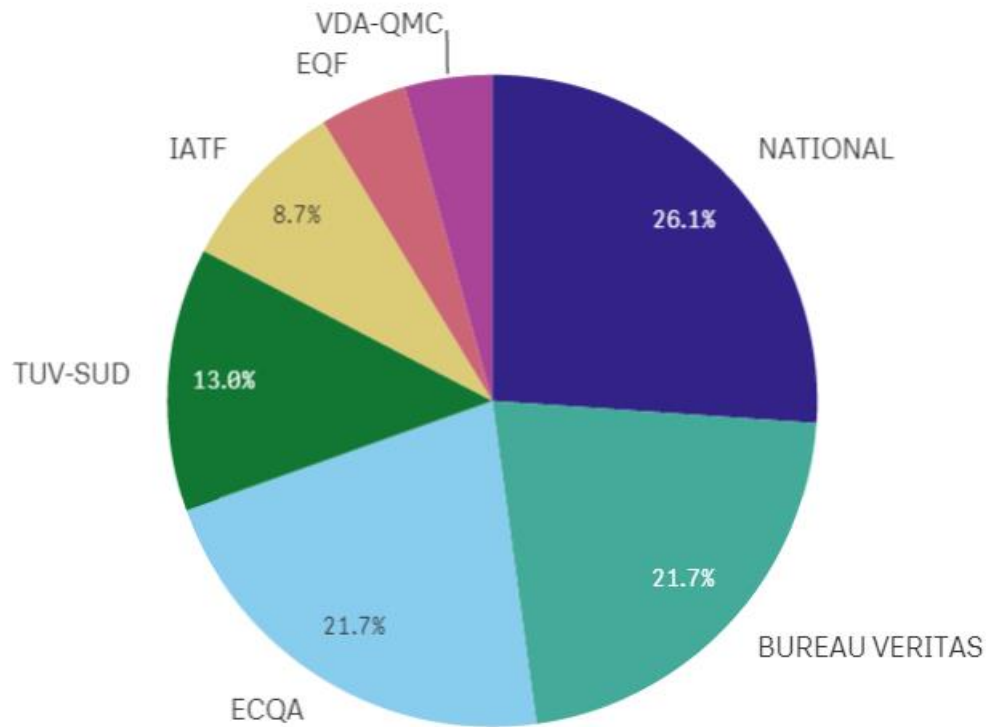


Figure 87: KPI 6.1 (Offer) Skill Recognition Standards – VET sample

Perceptions of the importance of different skill recognition standards from the perspective of VET providers is set out in Figure 91. It is important to note that for these stakeholders the relevant “NATIONAL” standard is ranked first (26.1%) in terms of importance, followed by “BUREAU VERITAS” (21.7%) and “ECQA” (21.7%). This underlines the utilisation of national standards within the EU VET system.

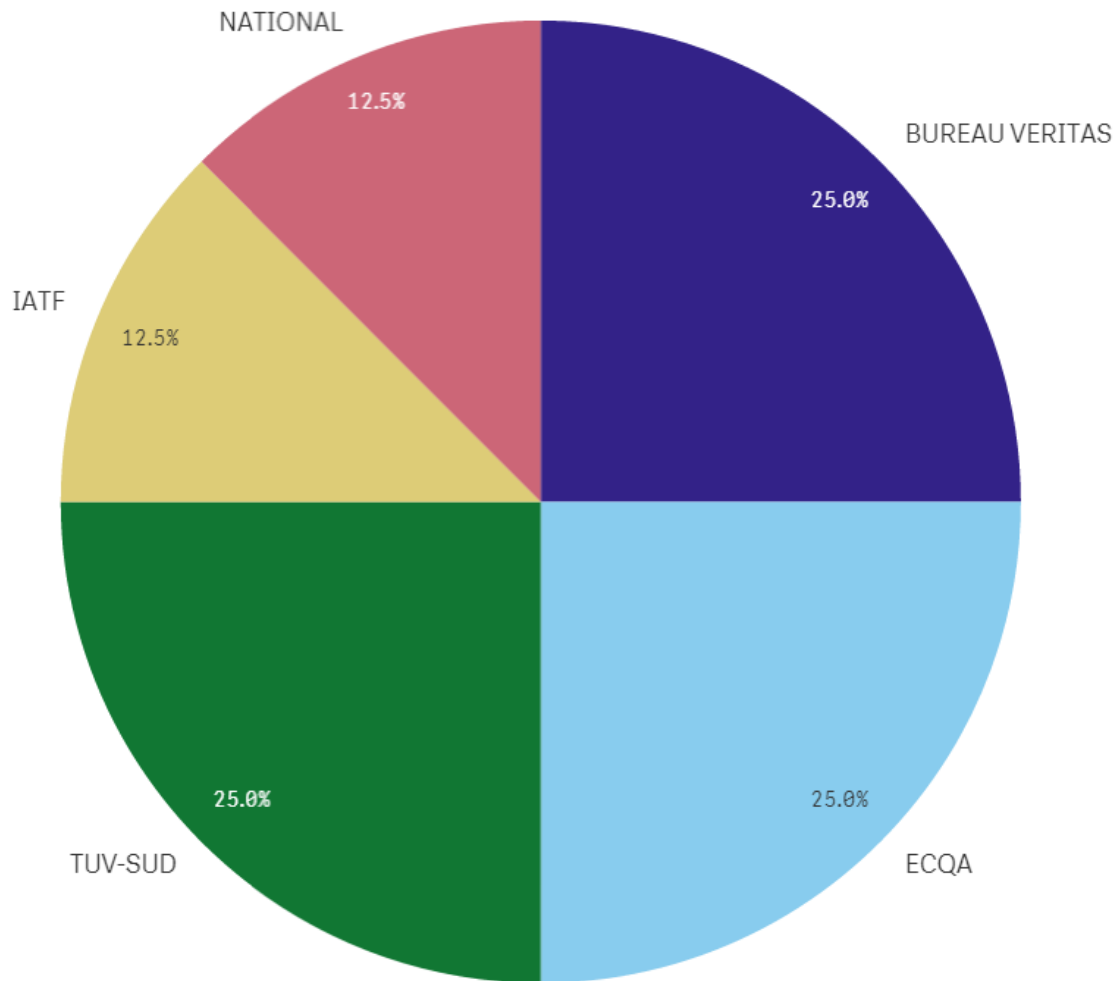


Figure 88: KPI 6.1 (Offer) Skill Recognition Standards – INSTITUTE sample

Figure 87 sets out the perceptions of the importance of different skill recognition standards from the perspective of Institutes. “ECQA”, “BUREAU VERITAS” and “TUV-SUD” each account for a quarter (25%) of all skill recognition standards cited with “IATF” and “NATIONAL” skill recognition standards (each 12.5 %) accounting for the remainder. However, it should be noted that the total number of responses from Institutes is relatively low and therefore not statistically significant. However, “NATIONAL” standards appear less important for this group of stakeholders with “BUREAU VERITAS”, “ECQA” and “TUV-SUD” the most used and recognised.

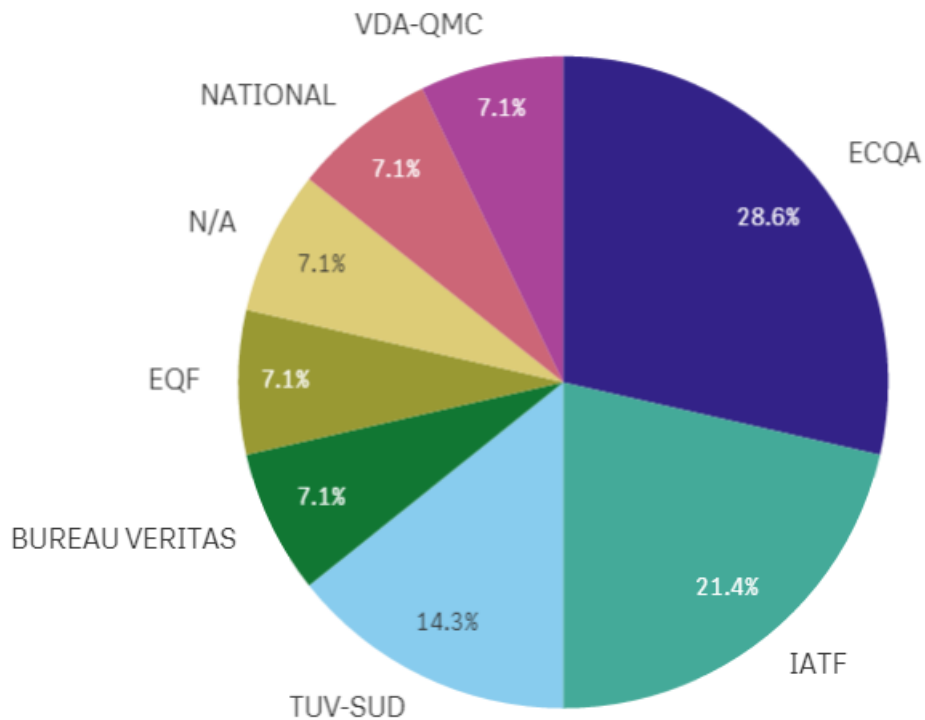


Figure 89: KPI 6.1 (Offer) Skill Recognition Standards – PRIVATE COMPANY sample

Perceptions of the importance of skill recognition standards from the perspective of private companies is set out in Figure 89. For this group of stakeholders “ECQA” is the most recognised skill standard accounting for 28.6 % of responses, followed by “IATF” (21.4 %) and “TUV-SUD” (14.3 %). Of note is that “BUREAU VERITAS” is somewhat less important by comparison with the position for all stakeholders, accounting for only 7.1 % of responses.

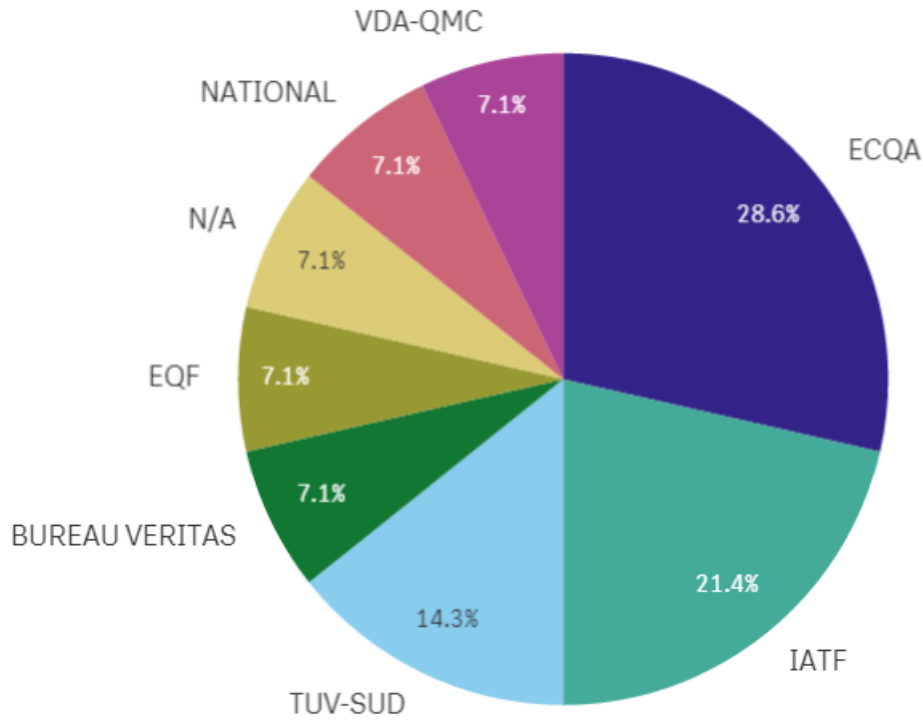


Figure 90: KPI 6.1 (Offer) Skill Recognition Standards – UMBRELLA ORG. sample

Figure 90 sets out perceptions of the importance of skill recognition standards from the perspective of “Umbrella Organisations.” For this group “ECQA” is by far the most frequently recognised skill standard at 28,5 %, followed by “IATF” (21,4%). This is followed by “TUV-SUD” and “BUREAU VERITAS” at 14,3% and 7,1% respectively.

4.6 RECRUITMENT FOR THE AUTOMOTIVE SECTOR METHODS

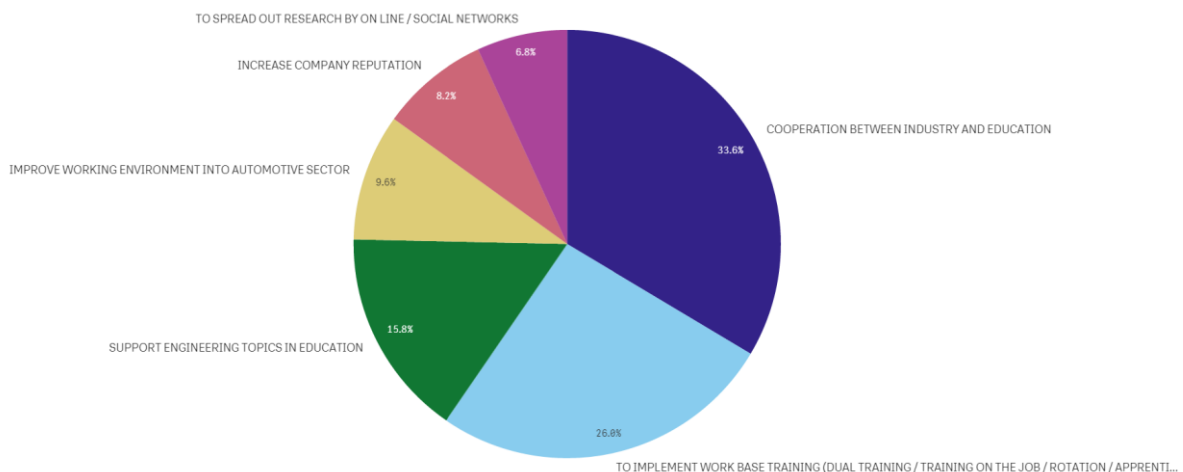


Figure 91: KPI 7.3 (Offer) RECRUITMENT AND ATTRACTIVENESS: METHODS – Overall sample

Figure 91 focuses on overall key performance indicators related to “RECRUITMENT AND ATTRACTIVENESS METHODS” in relation to the automotive industry, in particular, perceptions of the most effective recruitment methods to recruit workers required. Cooperation between the automotive industry and the relevant education stakeholders for this domain is considered of primary importance, the most frequently cited response at 33.6%. This is followed by implementation of work base training (26.0%), underlining the importance of training on the job, dual training and other interventions. Further priorities identified include support for engineering topics in education, ranked third at 15.8%. By contrast, the improvement of the work environment only accounts for 9.6% of responses, with company image and reputation (8.2%) and research dissemination (6.8%), the least cited methods.

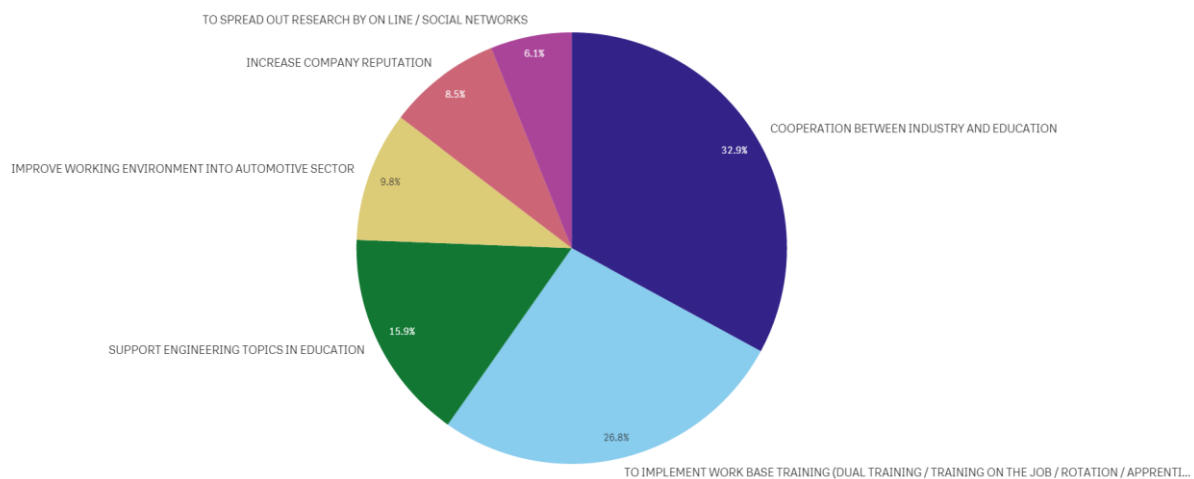


Figure 92: KPI 7.3 (Offer) RECRUITMENT AND ATTRACTIVENESS: METHODS – VET sample

Figure 92 outlines the responses of vocational education and training centres with regard to RECRUITMENT AND ATTRACTIVENESS METHODS. Once again, the most frequently cited method is cooperation between the automotive industry and education stakeholders (32.9%), with work based training ranked second, at 26.8%. A further method identified as important by VET centres is the support for engineering topics in education, ranked third at 15.9%. Only 9.8% of responses identified improving the work environment in the automotive sector. As is the case with all respondents, increasing company reputation and communication of research through social media are identified the least frequently, at 8.5% and 6.1% of responses respectively.

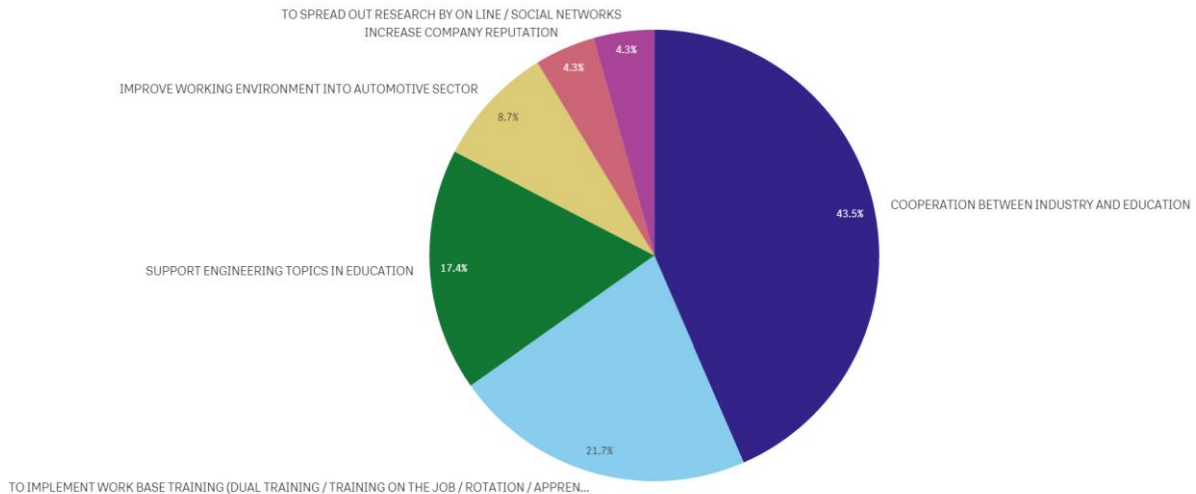


Figure 93: KPI 7.3 (Offer) RECRUITMENT AND ATTRACTIVENESS: METHODS – INSTITUTE sample

Figure 93 outlines the responses of Institutes with regard to RECRUITMENT AND ATTRACTIVENESS METHODS. The most frequently cited methods were cooperation between the automotive industry and education (43.5%). This is followed by implementation of work-based training, ranked second at 21.7%. Support for engineering topics in education is ranked third at 17.4%, a method identified as somewhat more important by Institutes than is the case with the VET centres. Improving the work environment in the automotive sector is considered somewhat less important (8.7%), together with social media dissemination and company reputation strategies, both at 4.3%.

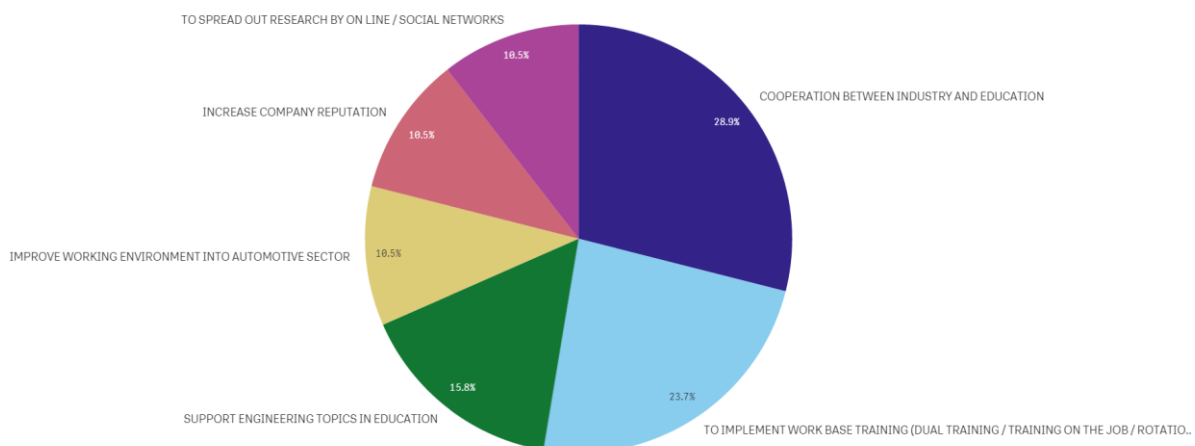


Figure 94: KPI 7.3 (Offer) RECRUITMENT AND ATTRACTIVENESS: METHODS – PRIVATE COMPANY sample

In relation to private companies (See Figure 94), the most important recruitment methods are identified as cooperation between the automotive industry and education (28.9%) and implementation of work based training (23.7%). Supporting engineering topics in education is ranked third, at 15.8% of responses. By contrast with other stakeholders, private companies attach more

importance to company reputation and the use of social media for material dissemination than is the case with VET centres and institutes (both at 10.5%), together with improvements to the work environment.

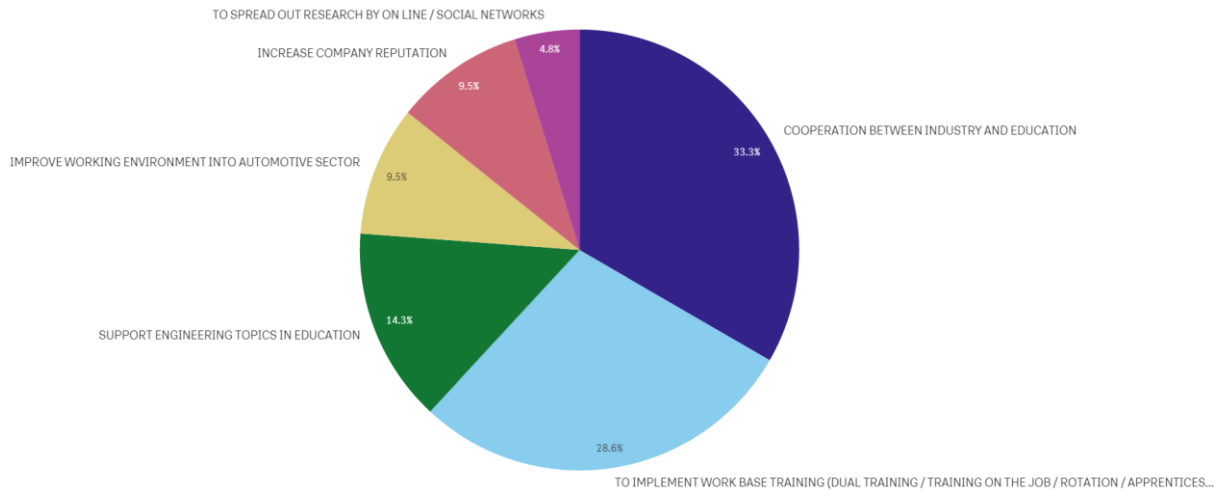
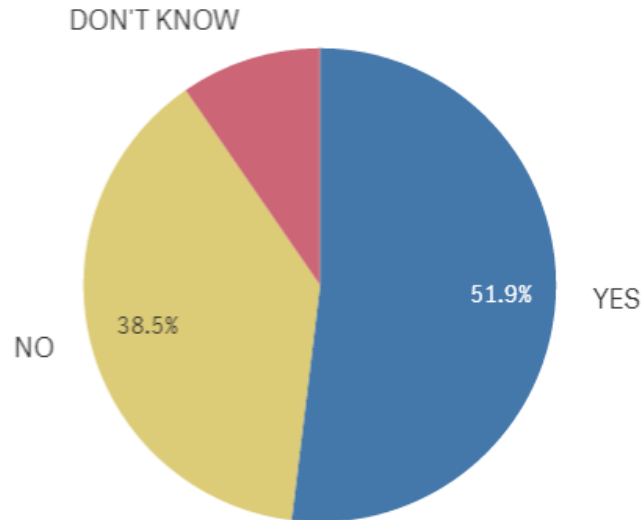


Figure 95: KPI 7.3 (Offer) RECRUITMENT AND ATTRACTIVENESS: METHODS – UMBRELLA ORG. sample

Figure 95 indicates that the perceptions of Umbrella organisations in relation to RECRUITMENT AND ATTRACTIVENESS METHODS are similar to VET centres, ranking – once again – the cooperation between industry and education at 33.3%, and work based training at 28.6%. Support for engineering is ranked third at 14.3%. Increased company reputation is, (as is the cases with private companies), identified as equally important as improvements to the working environment in the automotive sector, both at 9.5%. Finally, online dissemination of research through social media, once again, remained the lowest priority for the umbrella organisations (4.8%).

4.7 APPRENTICESHIP METHODS

Do you currently offer any courses for Apprentices within the Automotive sector?



At what EQF levels is Apprenticeship provision covering the automotive sector offered?

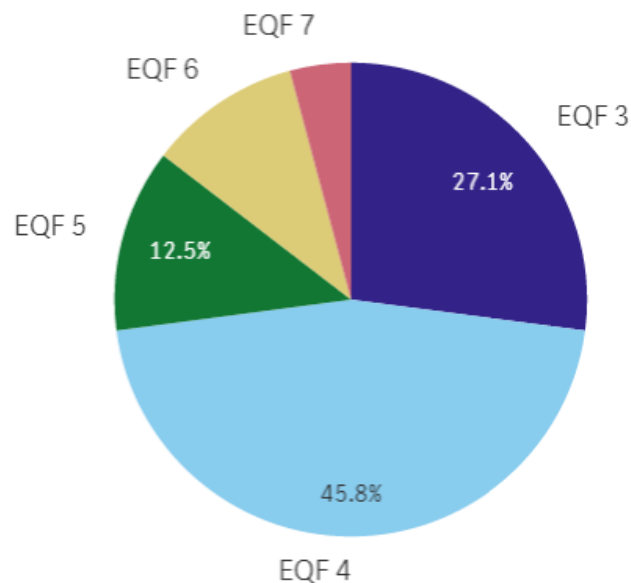
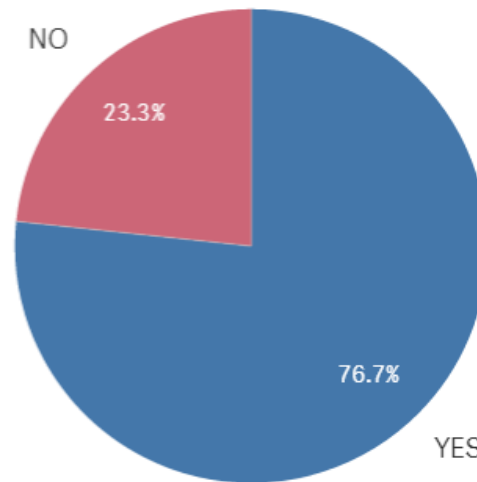


Figure 96: KPI 5.6 (Offer) APPRENTICESHIP AND EQF LEVEL– Overall sample

Just over half of all respondents to the survey indicated that they currently offer courses for Apprentices within the Automotive sector. Looking at the apprenticeship offer in more detail, almost half of these organisations offer this provision at EQF level 3 (Accounting for 27% of all responses to this question), more than 8 in 10 at level 4 (Accounting for 46% of all responses) 22% at level 5, 19% at level 6 and 7% at level 7. Provision at EQF level 5 or above accounts for 17% of all responses.

Do you currently offer any courses for Apprentices within the Automotive sector?



At what EQF levels is Apprenticeship provision covering the automotive sector offered?

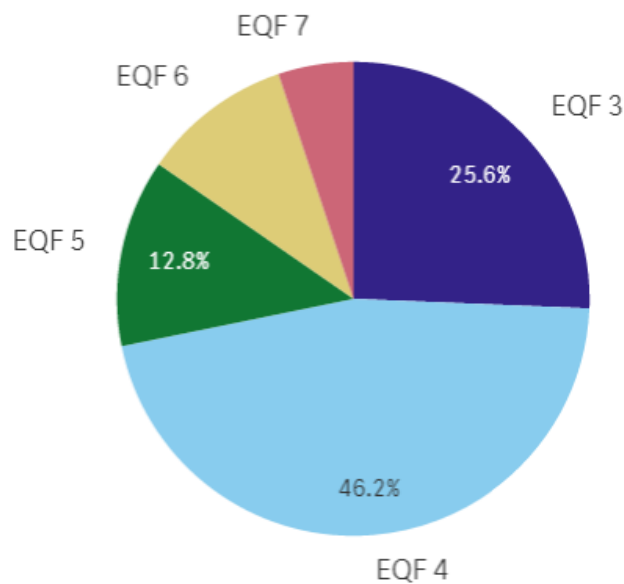


Figure 97: KPI 5.6 (Offer) APPRENTICESHIP AND EQF LEVEL – VET sample

Just over three quarters (77%) of all VET organisations responding to the survey indicated that they currently offer courses for Apprentices within the Automotive sector. EQF level 3 provision accounts for just over a quarter of all responses, almost half (46% of all responses) is accounted for by level 4 provision and 18% of all responses are accounted for by EQF level 5 or above provision.

Do you currently offer any courses for Apprentices within the Automotive sector?

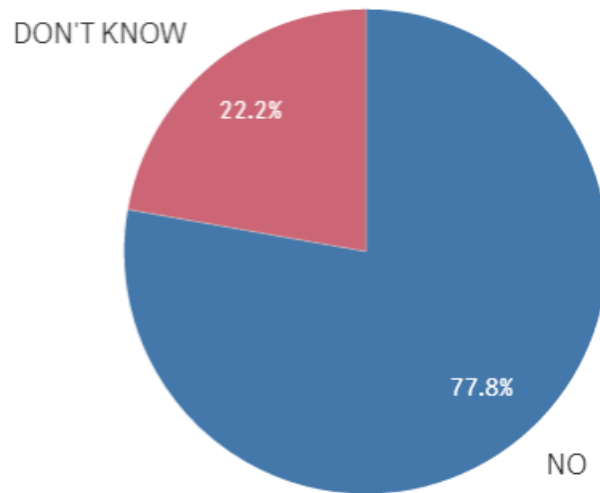
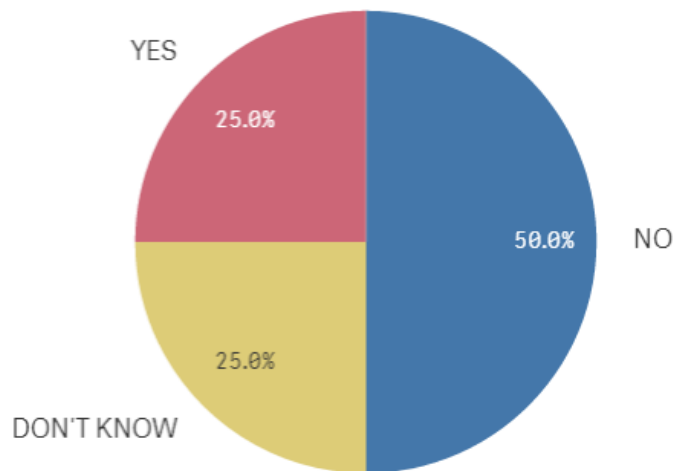


Figure 98: Figure 158: KPI 5.6 (Offer) APPRENTICESHIP AND EQF LEVEL – INSTITUTE sample

No Institutes responding to the survey indicated that they currently offer courses for Apprentices within the Automotive sector – (78% indicated this was the case and 22% didn't know).

Do you currently offer any courses for Apprentices within the Automotive sector?



At what EQF levels is Apprenticeship provision covering the automotive sector offered?

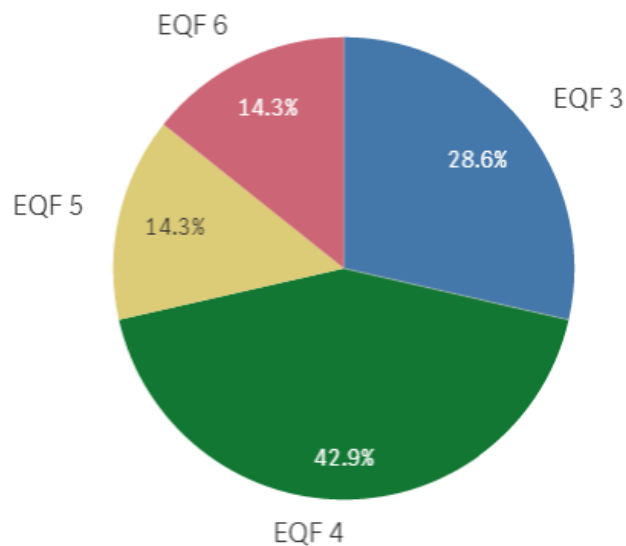
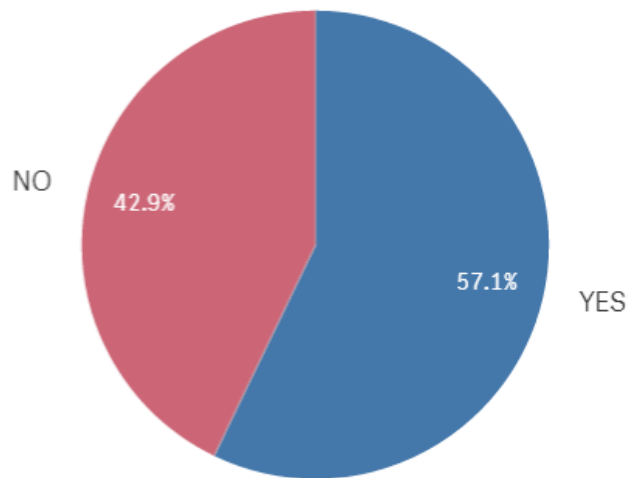


Figure 99: KPI 5.6 (Offer) APPRENTICESHIP AND EQF LEVEL – PRIVATE COMPANY sample

A quarter of private companies responding to the survey indicated that they currently offer courses for Apprentices within the Automotive sector, with half indicating this was not the case and the remaining quarter didn't know. 29% of all responses from private companies offering this provision related to EQF level 3 provision, 43% related to level 4 provision, and 28% related to EQF level 5 or 6.

Do you currently offer any courses for Apprentices within the Automotive sector?



At what EQF levels is Apprenticeship provision covering the automotive sector offered?

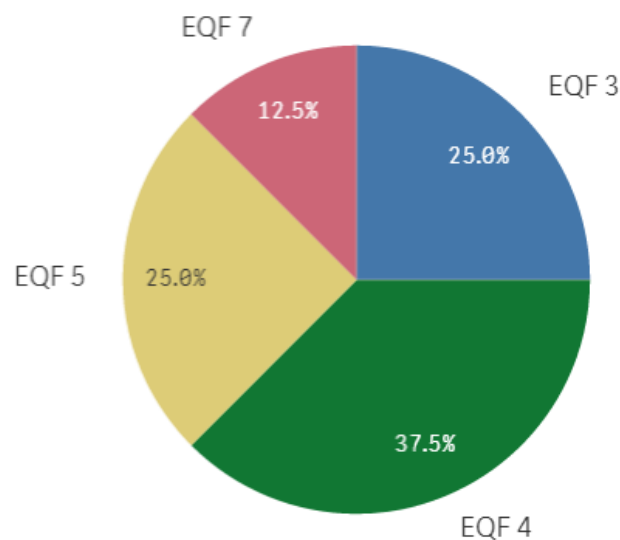


Figure 100: KPI 5.6 (Offer) APPRENTICESHIP AND EQF LEVEL– UMBRELLA ORG. sample

Nearly 6 in 10 (57%) of all Umbrella organisations responding to the survey indicated that they currently offer courses for Apprentices within the Automotive sector. A quarter of responses from these organisations offering this provision related to EQF level 3 provision, 38% related to level 4 provision, 25% to EQF level 5 and 13% to level 6.

APPENDIX

A RANKING OF TAUGHT SKILLS PER GRADUATES (PER YEAR)

SKILLS	% GRADUATES (per year)
CONTINUOUS IMPROVEMENT	9,45%
TECHNICAL KNOWLEDGE	9,43%
FOREIGN LANGUAGES	6,04%
COMMUNICATION	5,65%
LEARNABILITY	4,81%
TEAMWORK	4,59%
MATERIALS SCIENCES	4,20%
FUNCTIONAL SAFETY	3,88%
PROCESS ENGINEERING	3,82%
PRODUCT DEVELOPMENT	3,48%
ADAPTABILITY/FLEXIBILITY	3,15%
BEHAVIOURAL AGILITY	3,06%
MECHANICAL	2,96%
DIGITAL SKILLS	2,92%
CREATIVITY	2,81%
ELECTRICAL/ELECTRONIC	2,55%
PROBLEM SOLVING	1,95%
CRITICAL THINKING	1,93%
IOT & CLOUD	1,91%
ENTREPRENEURSHIP	1,89%
MAINTENANCE	1,76%
MECHATRONICS	1,15%
OPTIMIZE ACTIVITIES	1,08%
AFTER-SALES SERVICES	0,92%
DIGITAL NETWORKS	0,91%
ELECTRIC MOTORS	0,86%
AUTOMATION/ROBOTICS	0,85%
SUSTAINABILITY	0,70%
ELECTROCHEMICAL	0,67%
SOFTWARE DEVELOPMENT	0,61%
PROJECT MANAGEMENT	0,58%
PRODUCTION ORGANIZATION	0,57%
CHANGE MANAGEMENT	0,56%
MANAGEMENT & LEADERSHIP	0,54%
3D PRINTING	0,46%
CONNECTIVITY	0,45%
SYSTEM INTEGRATION	0,44%
ALTERNATIVE ICE POWERTRAINS	0,42%
ARTIFICIAL INTELLIGENCE	0,41%



SKILLS	% GRADUATES (per year)
RESILIENCE	0,41%
SYSTEM ARCHITECTURE	0,40%
NETWORKING	0,39%
PREDICTIVE MAINTENANCE	0,39%
SPECIFIC MANUF.ING PROCESSES	0,35%
BATTERIES	0,34%
DESIGN	0,32%
DRIVETRAIN	0,32%
ENERGY MANAGEMENT	0,31%
SALES	0,30%
BIG DATA/DATA ANALYTICS	0,27%
MOBILITY SERVICES	0,26%
AUTOMATED DRIVING	0,26%
POWER ELECTRONICS	0,25%
CYBERSECURITY	0,21%
TESTING/VALIDATION	0,21%
THERMAL MANAGEMENT	0,21%
INTERNAL LOGISTICS	0,09%
SIMULATION	0,09%
R&D&I	0,09%
MARKET ANALYSIS	0,05%
VIRTUAL PRDCT DEV. & TESTING	0,03%
DIGITAL TWINS	0,00%