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STRATEGIC GUIDE FOR GERMANY

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Partners:

Omagh Enterprise Company, United Kingdom

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Leitrim County Council, Ireland

Zetis GmbH, Germany

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1.0 Introduction

Smart Data, Smart Region (SDSR) has a clear objective: to improve the ability of entrepreneurship VET policy makers and practitioners to understand, teach and implement smart data within their institutions and to use smart data to adapt and optimise entrepreneurship development strategies at regional level.

SDSR can be described as a lighthouse project, introducing the topic to the VET sector as a whole and integrating it to entrepreneurship education in a very practical way to reveal the scale of what can be achieved.

"Data can be used to help understand more comprehensively what is happening in the region, why it is happening, and most importantly, what needs to happen next" (Arlene Foster, Department for Enterprise Minister).

Data skills improve the entrepreneurial mind-set and employability of students in all fields and Smart Data improves our understanding of social and economic trends, enabling VET providers to tailor their service and entrepreneurship support to specific opportunities at regional level, producing better outcomes for their trainees and economic development. However, the VET sector is being held back by its own skills deficit because:

1. There is currently no reliable source of training to help todays teachers/trainers acquire the knowledge and skills they need to help teach smart data effectively.
2. VET managers and wider stakeholders are unaware of how smart data can be applied to improve decision making about what to teach, to whom and how to enhance employment and entrepreneurship.
3. In most institutions, data is used to evaluate outcomes (after), rather than being used predictively to plan interventions (before).

Given that expertise in education strategies for smart data skills are still emerging, we believe that joining forces with European partners we will be able to leverage a much greater understanding of the practical applications of smart data for VET entrepreneurship education than could be achieved on our own.

To the best of our knowledge, this is the first project that has addressed the data analysis skills as a necessary component of contemporary VET curricula and policy making. In doing so the project recognises that many entrepreneurship education institutions see big data emerging as an important trend, but lack the ability to understand its full relevance and application to their daily work.

Our open education resource will be highly innovative, delivering the knowledge, skills and networks they need, and doing so in a practical cost effective manner.
SDSR also compliments the existing work on the expansion of entrepreneurship education. It recognises that entrepreneurship requires both a mind set and a set of practical skills and locates data analysis as a key skill within the larger framework.

SDSR recognises that data analysis can be applied to unlock innovation and value creation both in traditional sphere of start-up entrepreneurs. There is a need for an integrated, cross sector approach to improving the teaching and use of smart data skills in VET for entrepreneurship.

Smart Data skills is an entirely new concept to most VET teachers and trainers and they need a constant flow of knowledge, tools, motivation and inspiration to integrate it effectively into their work. The same is true for VET policy makers and wider stakeholders. New skills and working practices will not be achieved overnight and they require gradual awareness raising and access to the right professional support.

The project will generate fresh new ways of creating awareness about the role of smart data and teaching its use in very practical ways and will be the first of its kind in the world.

The remainder of the documents sets out how we will deliver the project in Northern Ireland and includes relevant background information on Northern Ireland, proposed consultations with stakeholders, surveys, our findings and recommendations for going forward.

2.0   Desk Review

2.1   Profile of Germany

Population

Germany is the largest country in the European Union (357,114 km²) with 80.7 million residents[1]. Despite its large population, Germany has relatively few large cities with just 4 cities over 1 million inhabitants. The capital of Germany is Berlin where almost 3.5 million residents live. There are more relatively 'small' large cities: 82 cities with a population of more than 100,000 people[2]. Germany has a population density of about 227 inhabitants per square kilometre. 49.2% Of the population is men and the median age is 46.8 years. Life expectancy is about 81,5 years.[3]

Education

In Germany the responsibility of for the education system lies primarily with the states (*Länder*), while the federal government plays a minor role. The vocational school in Germany is called *Berufsschule* and has a mix of theory and practice: Students are expected to come to school twice a week and the other days are spent working at a company (an apprenticeship).

Since the end of World War II the number of young people entering a university has more than tripled, but still more people are going to e.g. vocational schools. This can be explained with the dual education system with its strong emphasis on apprenticeships and vocational schools. Many jobs which do require an academic degree in other countries (such as nursing) require completed vocational training instead in Germany.

In 2015 Germany was ranked 15th by the OECD Programme for International Student Assessment (PISA), a shared position with the United Kingdom and the Netherlands[4]. With a score of 509 the education system belongs to the 27 countries which score higher than the OECD average. PISA examines what students know in science, reading and mathematics, but also what the students can do with what they know. In this study were 72 countries and economies studied, including the 35 OECD countries and 37 partner countries and economies.

2.2   Needs and Opportunities for Data Research in Germany

Projections indicate a revenue of over 50 billion Euros in 2017 from big data solutions[5]. Therefore the government is supporting various initiatives with tens of millions Euros in this field. For example, the Federal Ministry for Economic Affairs and Energy has created a technology program ("Smart Data – Data Innovations") to promote 13 flagship projects that are developing innovative smart data services for

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[1] http://worldpopulationreview.com/countries/germany-population/
[2] http://worldpopulationreview.com/countries/germany-population/
[3] http://worldpopulationreview.com/countries/germany-population/
[4] http://www.keepeek.com/Digital-Asset-Management/oecd/education/pisa-2015-results-volume-i_9789264266490-en#page21
[5] http://www.digitale-technologien.de/DT/Navigation/EN/Foerderprogramme/Smart_Data/smart_data.html

industry, mobility, energy and health. With this program the government wants to encourage the wide usage of smart big data technologies as early as possible. The goal is to open up the future market for smart data technologies in Germany. The government wants to enable SMEs to benefit from the smart data technologies. "Smart Data – Data Innovations" is just one example of the support measures of the government. Both the Federal Ministry of Education and Research as well as the Federal Ministry for Economic Affairs and Energy are supporting technology development with tens of million Euros. As can be seen in graph 1, the government is also supporting for example "Management and Analysis of Large Bulk of Data" with 20.6 million Euros. For this project and also for the earlier mentioned "Smart Data – Smart Innovations" also accompanying research is financially supported by the earlier mentioned two federal ministries.

Generally said, Germany is lagging behind on the provision of open government data. Therefore, in 2013 a central open data platform[6] is opened which links the platforms of the Federal Government, the Länder and the municipalities and gives users access to the data in the hands of the public administration[7]. Germany has implemented the Act on the Re-use of Information in 2006. The aim of this Directive is to ensure possibilities to re-use public-sector data. The PSI Directive was revised in 2013 in the light of new developments in technology, and the German Act was updated correctly in July 2015. One of the changes is that there is a basic right to re-use public data. Further to this, the fees for the re-use of data were restricted to the costs of reproduction, provision and transfer. Whilst the revision of the Act sends positive signals to German firms, critics do not believe that changes go far enough. For example, an IT business association feels that the rules on the prohibition of exclusive agreements grant existing agreements too long a transitional period up to 2043. Also, the exemptions from the prohibition are not clearly defined and thus weaken the rules.[8] Germany should continue its effort to foster open data, in order to enable start-ups, SMEs as well as large firms, to benefit from structured and non-discriminatory access to public-sector data.

In Germany the most common type of technology used by companies as part of big data solutions are standard relational database technologies (78% of the 252 respondents say they use these technologies). However, these technologies are not able to deal with large quantities of data. Technologies especially developed to deal with large quantities of data are not widely used (e.g. NoSQL or Hadoop ecosystem): less than 25% per cent of the respondents use these type of technologies.

Other popular tools are standard tools for business intelligence (BI, 61%) and data integration (55%). With regards to plans on technologies as part of big data solutions, companies are most planning to introduce solutions for data mining and

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[6] https://www.govdata.de/
[7] http://www.digitale-technologien.de/DT/Redaktion/DE/Downloads/Publikation/smart_data_business_models.pdf;jsessionid=AFD7D5880D0C230FBD732A3F6CCED999?__blob=publicationFile&v=5
[8] http://www.digitale-technologien.de/DT/Redaktion/DE/Downloads/Publikation/smart_data_business_models.pdf?__blob=publicationFile&v=5

predictive analysis (40%), followed by the Hadoop ecosystem (38%) and systems for explorative analysis and analytical databases (both 37%). For an overview, see figure 1.

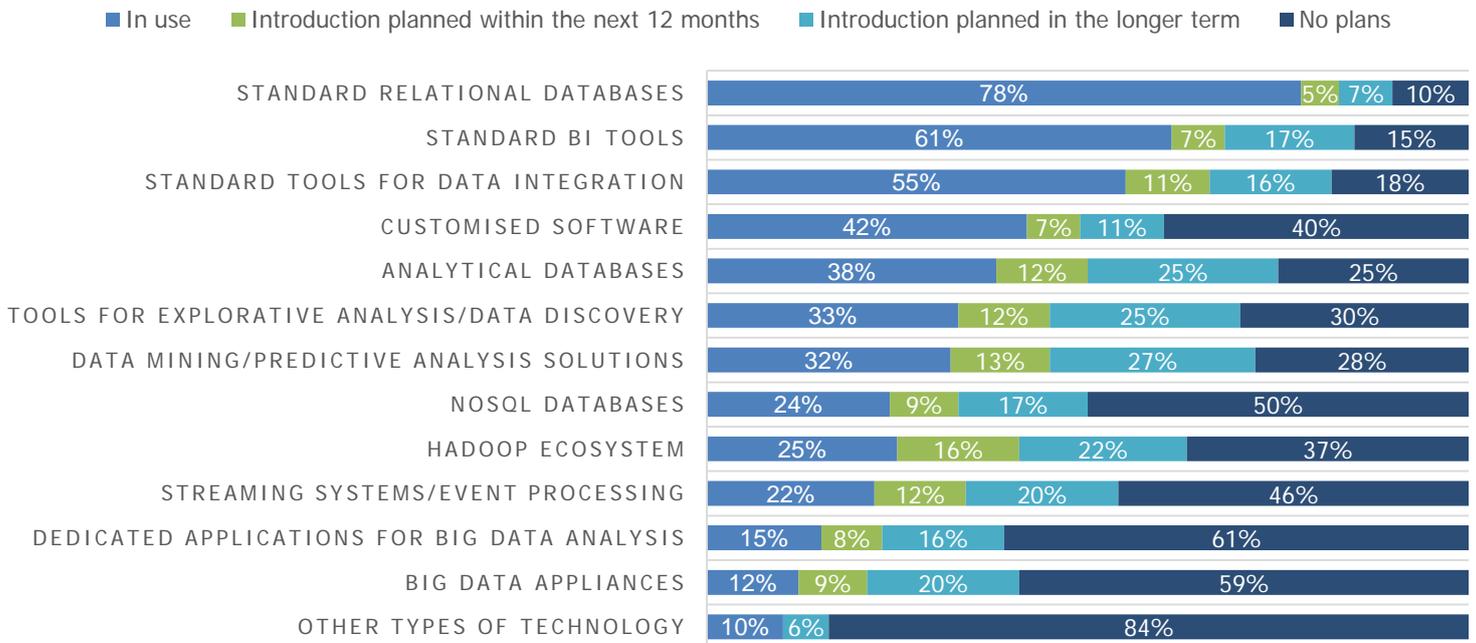## TYPES OF TECHNOLOGY FOR BIG DATA USED OR PLANNED TO USE IN COMPANY/ORGANISATION

■ In use ■ Introduction planned within the next 12 months ■ Introduction planned in the longer term ■ No plans

	In use	Introduction planned within the next 12 months	Introduction planned in the longer term	No plans
STANDARD RELATIONAL DATABASES	78%	5%	7%	10%
STANDARD BI TOOLS	61%	7%	17%	15%
STANDARD TOOLS FOR DATA INTEGRATION	55%	11%	16%	18%
CUSTOMISED SOFTWARE	42%	7%	11%	40%
ANALYTICAL DATABASES	38%	12%	25%	25%
TOOLS FOR EXPLORATIVE ANALYSIS/DATA DISCOVERY	33%	12%	25%	30%
DATA MINING/PREDICTIVE ANALYSIS SOLUTIONS	32%	13%	27%	28%
NOSQL DATABASES	24%	9%	17%	50%
HADOOP ECOSYSTEM	25%	16%	22%	37%
STREAMING SYSTEMS/EVENT PROCESSING	22%	12%	20%	46%
DEDICATED APPLICATIONS FOR BIG DATA ANALYSIS	15%	8%	16%	61%
BIG DATA APPLIANCES	12%	9%	20%	59%
OTHER TYPES OF TECHNOLOGY	10%		6%	84%

Figure 1. Types of technology for big data used or planned to use in company/organisation[9]

The strong use of standard BI technologies is reflected in the types of data used by the companies by the companies: 58% of the respondents use IT log data are used most commonly. Data from transaction systems is also commonly used (55 %) and is often combined with other types of data. There is major potential for harnessing data from social media: only 22% use this social media data. However, 47% are planning on using this data in the future.[10] For an overview, see figure 2.

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[9] http://www.digitale-technologien.de/DT/Redaktion/DE/Downloads/Publikation/smartdata_Study:%20Smart-Data-Business.pdf;jsessionid=AFD7D5880D0C230FBD732A3F6CCED999?__blob=publicationFile&v=12
[10] http://www.digitale-technologien.de/DT/Redaktion/DE/Downloads/Publikation/smartdata_Study:%20Smart-Data-Business.pdf;jsessionid=AFD7D5880D0C230FBD732A3F6CCED999?__blob=publicationFile&v=12

TYPE OF DATA USED OR PLANNED TO USE FOR BIG DATA ANALYSES BY COMPANY/ORGANISATION
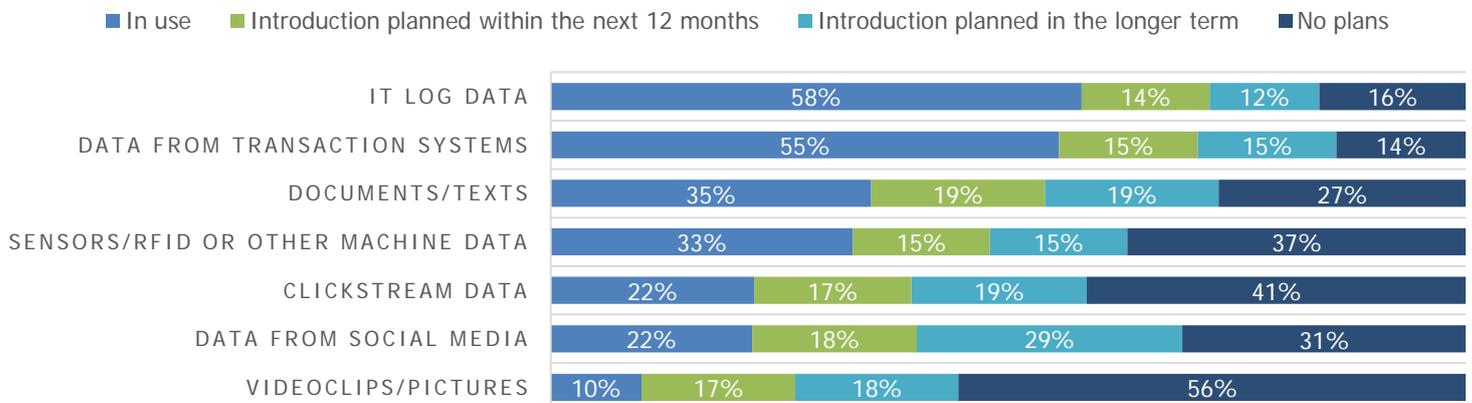
■ In use ■ Introduction planned within the next 12 months ■ Introduction planned in the longer term ■ No plans

Type	In use	Next 12 months	Longer term	No plans
IT LOG DATA	58%	14%	12%	16%
DATA FROM TRANSACTION SYSTEMS	55%	15%	15%	14%
DOCUMENTS/TEXTS	35%	19%	19%	27%
SENSORS/RFID OR OTHER MACHINE DATA	33%	15%	15%	37%
CLICKSTREAM DATA	22%	17%	19%	41%
DATA FROM SOCIAL MEDIA	22%	18%	29%	31%
VIDEOCLIPS/PICTURES	10%	17%	18%	56%

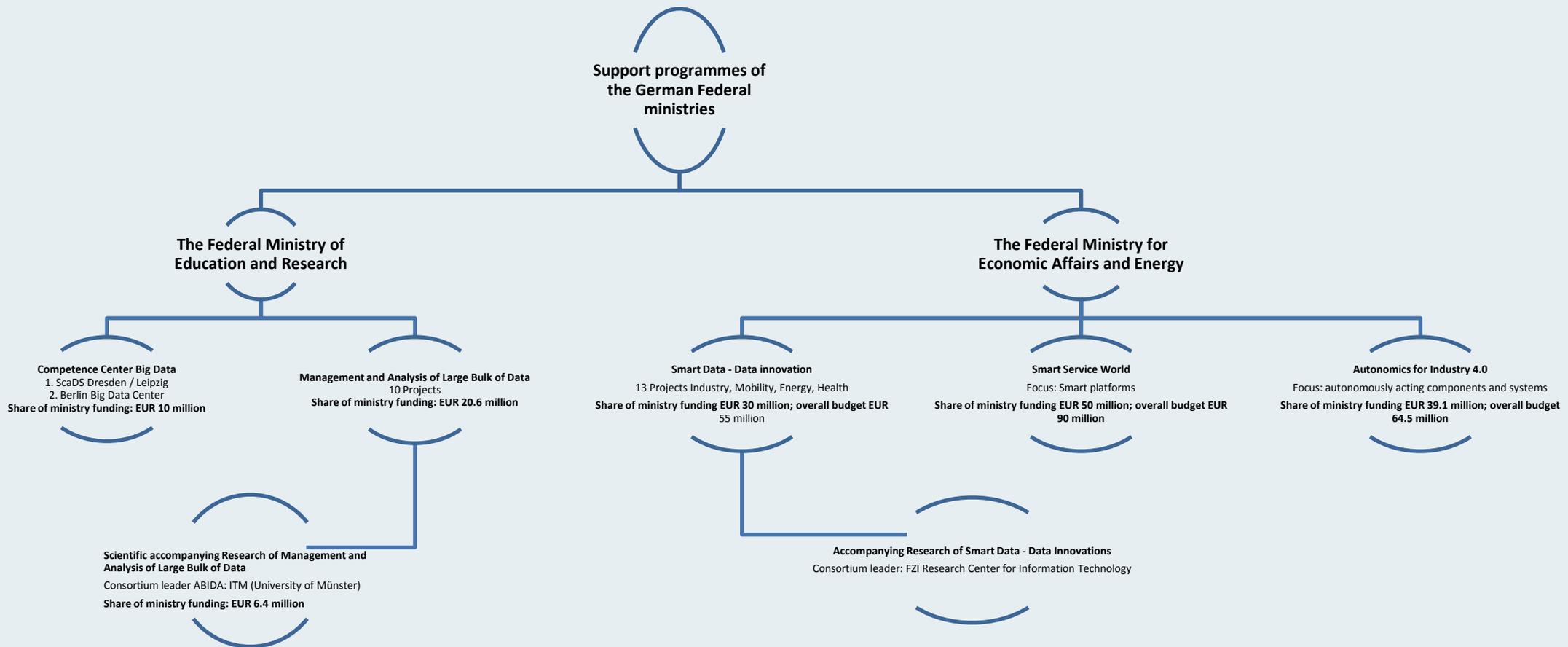*Figure 2. Type of data used or planned to use for big data analyses by company/organisation[11]*

Research shows that a main challenge for SMEs who want to use big data applications is to gain specialist and technical expertise. No less than 22 per cent of respondents indicate that they are investing in training their existing staff and 17 per cent states they are investing in additional jobs. This shows how crucial specialist knowledge is when it comes to using new technologies. To generate additional revenue from big data, you need high skilled personnel[12].

Concluding, in the research just 3 per cent of the respondents indicated that data does not play a large role in their company. On the other hand, just 15 per cent has indicated that big data initiatives formed a core part of company processes and 24 per cent of respondents are currently piloting a big data initiative. The results of that research are in line with earlier research by BARC (2015)[13]: the corresponding figures in 2013/2014 were 12 and 18 per cent.

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[11] http://www.digitale-technologien.de/DT/Redaktion/DE/Downloads/Publikation/smartdata_Study:%20Smart-Data-Business.pdf;jsessionid=AFD7D5880D0C230FBD732A3F6CCED999?__blob=publicationFile&v=12
[12] http://www.digitale-technologien.de/DT/Redaktion/DE/Downloads/Publikation/smartdata_Study:%20Smart-Data-Business.pdf;jsessionid=AFD7D5880D0C230FBD732A3F6CCED999?__blob=publicationFile&v=12
[13] http://barc-research.com/wp-content/uploads/2015/07/BARC_Big_Data_Use_Cases_EN_2015.pdf

Support programmes of the German Federal ministries

The Federal Ministry of Education and Research

The Federal Ministry for Economic Affairs and Energy

Competence Center Big Data
1. ScaDS Dresden / Leipzig
2. Berlin Big Data Center
Share of ministry funding: EUR 10 million

Management and Analysis of Large Bulk of Data
10 Projects
Share of ministry funding: EUR 20.6 million

Smart Data - Data innovation

13 Projects Industry, Mobility, Energy, Health
Share of ministry funding EUR 30 million; overall budget EUR 55 million

Smart Service World

Focus: Smart platforms
Share of ministry funding EUR 50 million; overall budget EUR 90 million

Autonomics for Industry 4.0

Focus: autonomously acting components and systems
Share of ministry funding EUR 39.1 million; overall budget 64.5 million

Scientific accompanying Research of Management and Analysis of Large Bulk of Data

Consortium leader ABIDA: ITM (University of Münster)

Share of ministry funding: EUR 6.4 million

Accompanying Research of Smart Data - Data Innovations

Consortium leader: FZI Research Center for Information Technology

Graph 1 : Support programmes of the German Federal Ministries[14]

2.3   A Focus on our Region of Kaiserslautern

The region of Kaiserslautern is located in the cross-border biosphere reserve Palatinate Forest-North Vosges. Residents and guests will find a large potential of relaxation and numerous opportunities of outdoor activities. In this environment, a successful technology site has developed: The number of settlements of companies and facilities for research and technology increases steadily.

Technologies of tomorrow can be found in the region Kaiserslautern everywhere - in labs just as in the practical application. The city of Kaiserslautern is with almost 100,000 residents the smallest large city in Germany and the main center for the 500,000 inhabitants of West Palatinate. The county with more than 100,000 inhabitants not only provides high quality tourist services, but also numerous commercial and industrial areas with plenty of space for small and medium sized businesses that produce trend-setting technologies in different industries.

In the region of Kaiserslautern live and work members from more than 140 nations, including about 50,000 Americans. Thus, the Western Palatinate houses the largest U.S. military community outside the United States.

Kaiserslautern is a young, dynamic and cosmopolitan city: 19,200 students from 80 nations receive a high-quality, future-oriented training at the Technical University of Kaiserslautern and the technical oriented University of applied sciences. The University consolidates its leading position always anew by excellent rankings in various university rankings.

The gross domestic product in Kaiserslautern city is €51,060 and of the county of Kaiserslautern even €54,127[15].

The universities are the main driver for the development of Kaiserslautern: Start-ups, company settlements, meetings with international participants and the establishment of research institutes of the highest level cause so many synergies that the achievements are reached faster. All local companies of all industries benefit from a smooth, tailored information and technology transfer.

About the motorway network the economy region Kaiserslautern is easily accessible from all directions: The A6 connects Kaiserslautern with the Rhine-Neckar, the Saarland and France; the A63 leads to the Rhine-Main area; the A62 establishes the connection across Trier / Luxembourg with the North Sea ports. Several regional and international airports are reachable within a reasonable travel time, including in about an hour's drive of one of the world's largest airport in Frankfurt am Main - also easily reachable by ICE. [16]

In the region of Kaiserslautern 87,350 companies are located of which a little over 25,000 are registered at the Chamber of Commerce. The most popular legal forms are the private company (almost 17.000 *GmbH*), limited partnership (around 3300 *KG*) and the self-employed without personnel (around 2100 *Einzelfirmen*).

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[15] https://www3.kaiserslautern.de/wfk-kl/media/pdf/Fakten%20aus%20Broschuere.pdf
[16] WFK Wirtschaftsförderungsgesellschaft Stadt und Landkreis Kaiserslautern mbH, „Wirtschaftsstandort", Kaiserslautern 2014

Of these 25,000 registered companies most of them are active in services (around 7,000). Other popular sectors are production (over 4800) and retail (over 4800).

One of the centers of the German Research Center for Artificial Intelligence (DFKI) is located in Kaiserslautern (other offices are located in Saarbrücken, Bremen and Berlin). DFKI is the leading German research institute in the field of innovative software technology. In the international scientific community, DFKI ranks among the most recognized "Centers of Excellence" and currently is the largest research center worldwide in the area of AI and its application in terms of number of employees and the volume of external funds[17]. Examples of projects carried out in the research departments, research groups and living labs of DFKI are Smart Data & Knowledge Services[18], Intelligent Analytics for Massive Data[19] and Intelligent Networks[20].

In the region Kaiserslautern multiple events are organised around big data, digitalization, use of data, and the added value of using big/smart data. An example is 'ZIRP at 8', where you can gain insights into the aspects of digitalization that are important to your company. 8 Times a meeting is organised at the beginning of the working day (8 AM) and during breakfast you can exchange knowledge with businesses, politics and science stakeholders. For example the first of these meetings was organized in BIC Kaiserslautern and was about the added value of data usage, i.e. how digitalization will change the company[21]. Another example of an event in the region was the congress "Digital Transformation in the economy of Rhineland-Palatinate" earlier this year in Mainz.

3.0   Consultations with Key Local Individuals and Organisations

To gain insight in the current needs and opportunities but also in for example policies regarding big data and smart data, it has been decided to interview key local individuals and organisations. These key individuals and organisations include people from the local government, further education colleges, data analysts and economic development officers. To gain insight in the attitudes of the local government, we have interviewed mr. Hess from the Chamber of Commerce. We have also interviewed Dr. Domhardt who is a teacher at a university, representing the further education colleges. Thirdly we have interviewed Dr. Kurpjuweit (software developer) since he has knowledge about how data analysts see needs and opportunities in the region with regards to big and smart data. Last, but not least, Dr. Pongratz has been interviewed since he is an economic developer.

The questions in the interview included topics such as the use of data, the potential of data for SMEs and educational sectors, and also how the respondents see the role of data analysis for future entrepreneurs.

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[17] https://www.dfki.de/web?set_language=en&cl=en
[18] https://www.dfki.de/web/research/sds
[19] https://www.dfki.de/web/research/iam
[20] https://www.dfki.de/web/research/in
[21] http://www.zirp.de/inhalt/veranstaltungsreihe-zirp-um-8-%E2%80%93-big-data

3.1   Local Government

To include the opportunities and needs the local government sees regarding big and smart data, we have interviewed Bernd Hess from the Chamber of Commerce. In his opinion data can be used to develop better products and services and he sees the increasing prevalence of data impacting our working lives. Mr. Hess thinks the integration and education of smart data skills can be improved by offering in-depth training courses.

Mr. Hess is not sure whether the ability to analyse data will be a key entrepreneurial skill in the future. He thinks the importance of this skill is different for industries, sectors an even varying per company. Some entrepreneurs are interested in data analysis, but some are not. Probably everyone agrees that data analysis is useful and has added value, but not everyone is happy to do this analysis themselves. Therefore, Mr. Hess thinks it is necessary to gain the insights from data analysis, but it is less important whether the entrepreneur is doing this analysis themselves or outsource this job to an employee or an external expert.

Mr. Hess is not aware of any current strategies in the region to implement potential opportunities of using data for the region, so here is much to gain.

3.2   FE Colleges

Dr. Domhardt is teacher at the university. He is fully aware of how data can be used to make better decisions. He and his colleagues use big data nearly every day.

In his opinion the integration and education of smart data skills can be improved, especially at the university where he teaches. Dr. Domhardt states that this is especially important because he feels that the ability to analyse data will be a key entrepreneurial skill in the future. Gathering, processing, linking up and protecting data will increasingly become core capabilities that enable companies to be successful. This skill is not just important when you want to be self-employed, but it will be also a very important skill within employment. Nowadays employees need more entrepreneurial attitudes than years ago. Therefore, it would be a very beneficial to include education on data analysis on further education.

3.3   Data Analyst

Dr. Kurpjuweit is a software developer and data analysis is one of his regular activities. He sees many chances in using smart data for better decisions. According to dr. Kurpjuweit especially the IT companies can benefit from data analysis and smart data. Dr. Kurpjuweit also sees the increasing prevalence of "data" in our lives. He agrees that data is becoming more and more important in our modern society. Nowadays (almost) everyone has high-end smartphones and uses social media more than you probably would want. In an increasing number of products all kinds of sensors are inserted which can record a large number of parameters: cars, washing machines, fitness wristbands, you name it. Just in recent years the need to collate and process these new volumes of data has developed.

Dr. Kurpjuweit sees that companies require more and more specific data analysis skills. Therefore, he argues that analysing skills should be part of our education. In

his opinion, the awareness of the potential data gives to SMEs and the educational sectors is limited to certain sectors. For example, the IT sector is more aware of the opportunities data provides, but other sectors less.

Dr. Kurpjuweit uses a nice formula to explain how big data becomes smart data:

Big data + Quality + Data Security + Application = Smart data

Merely a large database is useless. You need high quality data, you need to be able to protect your data and make it ready for application. Only when you are capable of turning big data into applicable data which you can analyse and/or visualise, you will gain smart data. The focus of smart data is to deploy the big data intelligently, to extract information for analysis and utilise the commercial and social potential of these data.

3.4   Economic Development Officers

Recently we have interviewed Dr. Pongratz since he has a central role in economic development. He states to be fully aware of all the options dealing with smart data in terms of predictive decisions. He also sees that their companies are able to develop better products when they are performing data analyses. If a company is to thrive in today's economy, it must know how to handle data in the right way. Intelligent data analysis provides companies with a tremendous opportunity to better understand and streamline their business processes. Moreover, big data also serves as a catalyst for new business models – especially in the German and European digital sector.

Dr. Pongratz uses smart data to predict the economic future of the region. A lot of data is recorded about economic factors since a long time. Therefore, they are able to extract predictions from these data.

Dr. Pongratz agrees that the education and integration of SME businesses can be improved. He thinks that when students are taught data analysis skills when they are at school, it contributes positively to the employability of the students. He thinks that the ability to analyse data will be a key skill in the future, just like programming. Not just for entrepreneurs, but also in employment. For example, in the medical scenes: medical professionals can draw upon big data to provide improved treatment for health concerns such as cancer. Therefore it is important to prepare students for this kind of tasks during their education.

4.0   Survey of 20 Trainers/Advisors in the Region

From the outset it was decided that the most effective way to gain a perspective of smart data was through a survey format. This was to determine their knowledge of data, how data can be used, are they aware of data possibilities, are there already strategies in place. We asked 20 business advisors in the region of Kaiserslautern to

"Rate your data skills". On the one hand, every respondent has filled out the closed questions, but on the other hand, merely 3 of 20 respondents have filled out the open question in the end.
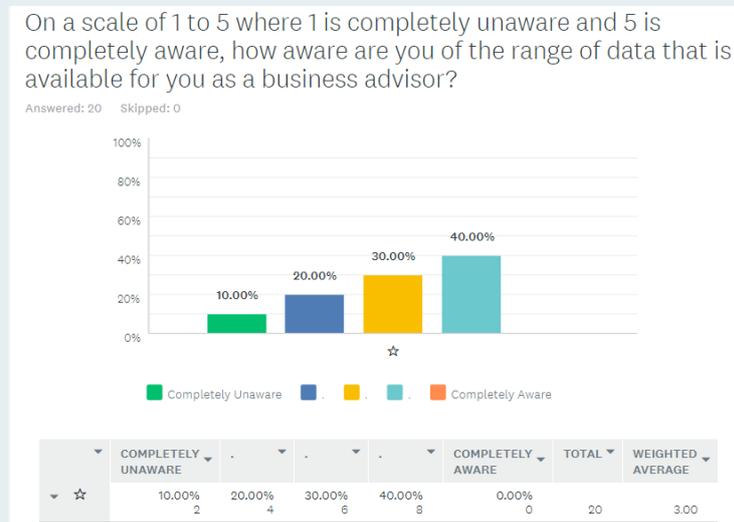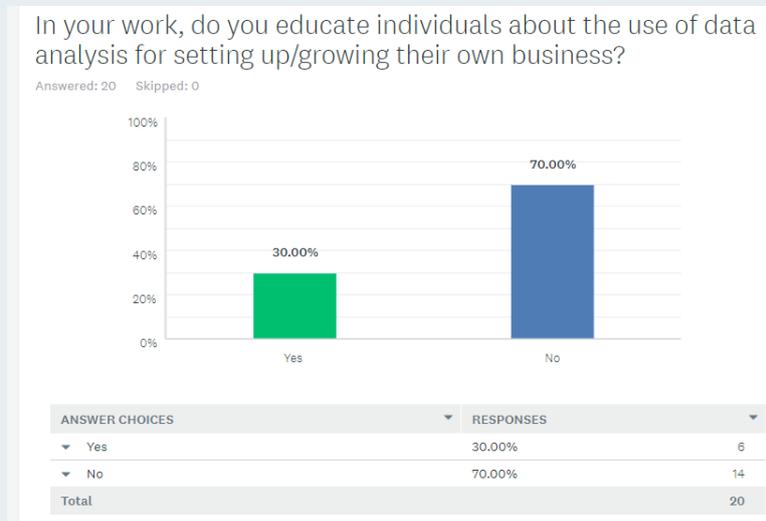

First of all, respondents were asked to rate their awareness of the range of data that is available for them as a business advisor. As can be seen in the graph above, the distribution of this awareness is spread. None of the respondents rated themselves as completely aware, but most of the respondents (40 per cent) have indicated that they are in some way aware of the range of data that is available. 30 Per cent chose for the neutral option and 30 per cent of the respondents have indicated that they are not highly aware of the availability of the range of data.
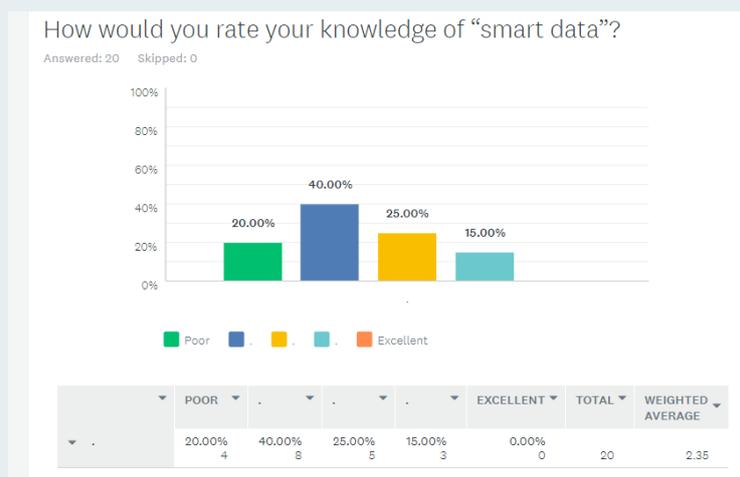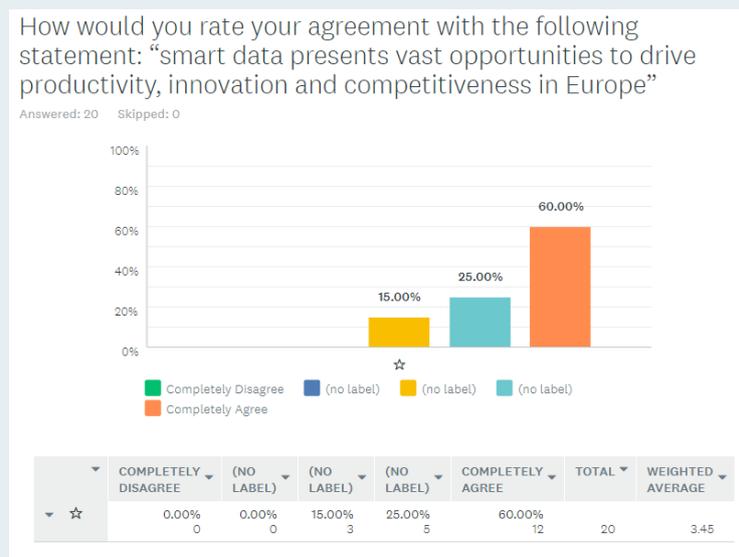

Secondly, respondents were asked to rate their knowledge of "smart data". The responses on this question were very interesting. A large proportion of the respondents indicated in the first question that they were in one way or the other familiar with the range of data available. However, they did not convincingly have

excellent or good knowledge on "smart data". Just 15 per cent chose for the good knowledge, 25 percent for the neutral option and a convincing majority (60 per cent) for not very good or even poor knowledge.

In your work, do you educate individuals about the use of data analysis for setting up/growing their own business?

Answered: 20   Skipped: 0

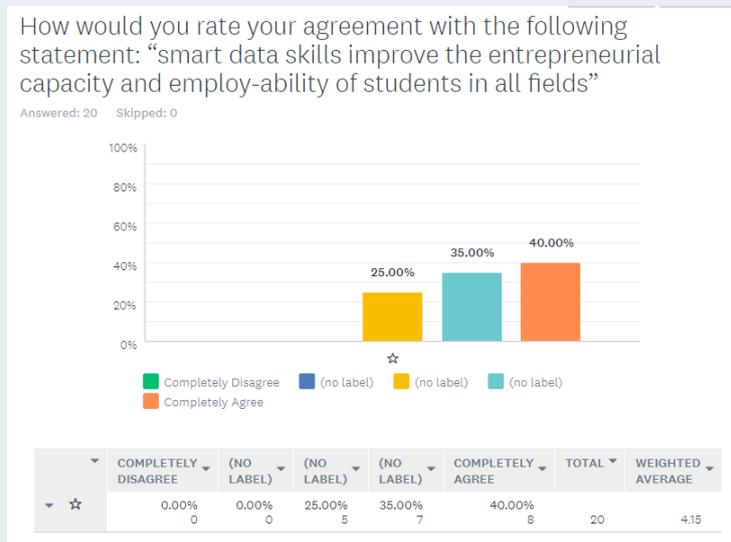| ANSWER CHOICES		RESPONSES	
▾	Yes	30.00%	6
▾	No	70.00%	14
Total			20

70 Percent of the interviewed business advisors do not educate individuals about the use of data analysis for setting up/growing their own business. This result is in line with the finding that most of the interviewed business advisors rate their knowledge on "smart data" not very high. It is very difficult to teach on a subject where you do not have excellent knowledge. We can conclude that there is much to gain on this area.

How would you rate your agreement with the following statement: "smart data presents vast opportunities to drive productivity, innovation and competitiveness in Europe"

Answered: 20   Skipped: 0

Legend: ■ Completely Disagree ■ (no label) ■ (no label) ■ (no label) ■ Completely Agree

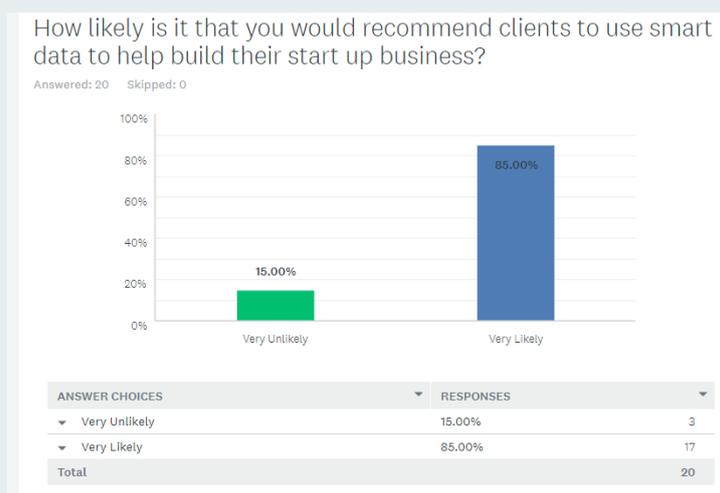|	COMPLETELY DISAGREE	(NO LABEL)	(NO LABEL)	(NO LABEL)	COMPLETELY AGREE	TOTAL	WEIGHTED AVERAGE
▾ ☆	0.00% 0	0.00% 0	15.00% 3	25.00% 5	60.00% 12	20	3.45

Only 15 per cent of the respondents chose a neutral option when they were asked if smart data offers vast opportunities to drive productivity, innovation and
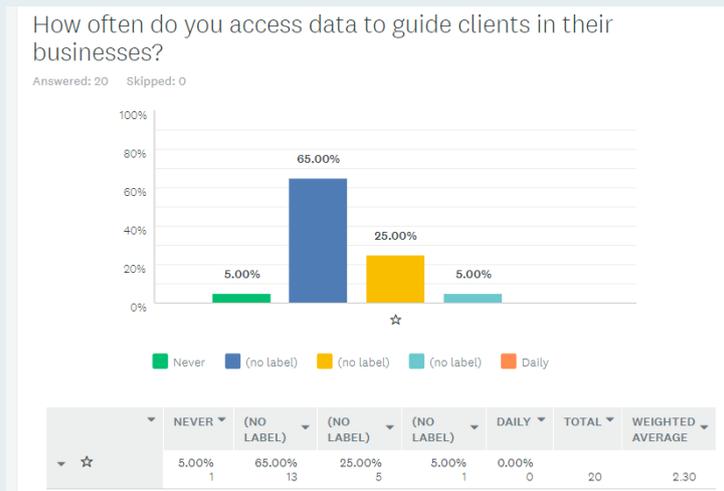
competitiveness in Europe. The majority completely agreed with this statement (60 per cent) and 25 per cent of the respondents agreed a little less than completely with this statement.

How would you rate your agreement with the following statement: "smart data skills improve the entrepreneurial capacity and employ-ability of students in all fields"

Answered: 20   Skipped: 0

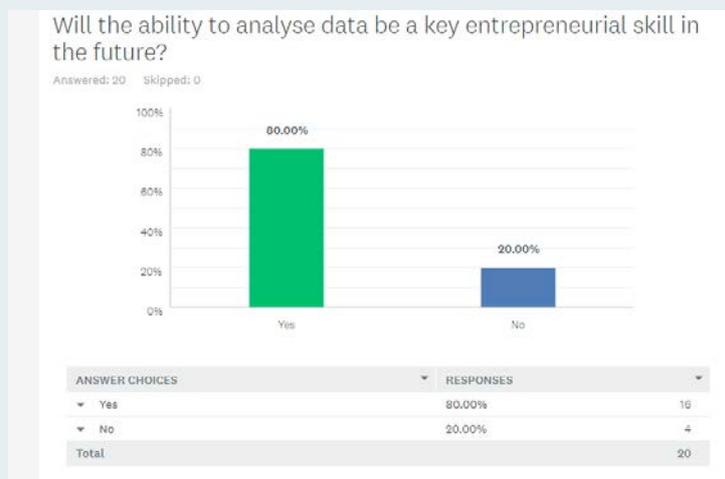|	COMPLETELY DISAGREE	(NO LABEL)	(NO LABEL)	(NO LABEL)	COMPLETELY AGREE	TOTAL	WEIGHTED AVERAGE
☆	0.00% 0	0.00% 0	25.00% 5	35.00% 7	40.00% 8	20	4.15

The respondents were also convinced that smart data skills contribute to the entrepreneurial capacity and employability of students in all fields. 40 Per cent of the respondents completely agreed with the statement, 35 per cent agreed a little less and 25 percent of the respondents chose for the neutral option.

How likely is it that you would recommend clients to use smart data to help build their start up business?

Answered: 20   Skipped: 0

ANSWER CHOICES	RESPONSES	
Very Unlikely	15.00%	3
Very Likely	85.00%	17
Total		20

A convincing majority would recommend clients to use smart data to help build their start up business. No less than 85 per cent of the respondents indicated that it is very likely that they would recommend clients to use smart data to help build their start up business. The other 15 per cent thought this would be very unlikely.

How often do you access data to guide clients in their businesses?

Answered: 20   Skipped: 0

	NEVER	(NO LABEL)	(NO LABEL)	(NO LABEL)	DAILY	TOTAL	WEIGHTED AVERAGE
☆	5.00% 1	65.00% 13	25.00% 5	5.00% 1	0.00% 0	20	2.30

None of the business advisors are accessing data daily to guide clients in their businesses. 1 Respondent never accesses data to guide his/her clients, the majority (65 per cent) chose for the option which indicates the use of data slightly more than never. Also 25 per cent chose the middle option since they are accessing data a little more frequent and just 1 respondent indicated that he/she is accessing data on a regular basis to guide clients in their business, but not daily.

Will the ability to analyse data be a key entrepreneurial skill in the future?

Answered: 20   Skipped: 0

ANSWER CHOICES	RESPONSES	
Yes	80.00%	16
No	20.00%	4
Total		20

Only 4 of 20 respondents do not think the ability to analyse data will be a key entrepreneurial skills. The majority of the respondents, 80 per cent, believes agrees with the statement though: they believe that the ability to analyse data will be very important for entrepreneurs.

The second last question was whether they would avail from a training course about data for entrepreneurs and small businesses. All business advisors were interested in such a course and have indicated that they would avail from such a course.

Last but not least, we have asked if the respondent has any ideas on how to improve the use of data in their region. Unfortunately, just 3 respondents have filled this question out. The three answers have education in common: all three respondents have indicated the importance of education on the opportunities of

smart and big data and how to use these data. One respondent also stated that there is a need to raise awareness with regards to the topic of data.

5.0   Findings of Consultation Process and Questionnaire

The federal ministries of Economic Affairs & Energy and of Education & Research are supporting elaborated support programmes for technology development. A significant part of this subsidy is allocated to projects involving smart data and smart innovation. However, in none of these projects the integration or even cooperation of business and education has been addressed.
In the region a lot of research is dedicated to big data, smart data and knowledge services. These studies are dealing primarily with tools, models and innovative solutions. This research can provide indirect added value for entrepreneurs, e.g. in the form of tools that can be used to analyse data. We could not find projects aimed at supporting/encouraging the use of big and/or smart data.

The consultations with key local individuals and organisations show the potential of big and smart data: develop better products, services and make better decisions. All interviewees have mentioned these advantages of using big and smart data.
The key local individuals agree that data analysis skills are very important for a company, since data analysis provides valuable insights in business processes and so on. However, someone mentioned a cautious note: as long as you make sure you are informed about the insights from the data analysis, it might not be necessary to have in-depth knowledge on data analysis as the entrepreneur yourself. It might be possible to delegate these tasks within the company to an employee or outsource these tasks to an external party.

None of the interviewed men were aware of current strategies to implement the potential opportunities of using data in the region.

The business advisors who filled in our survey were in general pretty aware of the available data for them in their role as business advisor. Their knowledge of smart data is a bit more limited. On a scale of 1 – 5 where 1 is poor and 5 is excellent, 60% of the respondents rated their knowledge 1 or 2, 25% 3 and merely 15% a 4. No one rated his/her knowledge as excellent.

The mere part of the business advisors do not educate individuals about the use of data analysis for setting up and/or growing up their own business. Complementary, they reported that they access data very little when guiding clients in their business. This can be explained by the earlier mentioned limited knowledge of smart data. It makes sense that all business advisors have indicated that they would avail from a training course about data for entrepreneurs and small businesses. It can be expected that an increase in knowledge of data analysis will result in more education on data analysis by the business advisors.

The survey shows that the majority of the respondents see the potential of big data, data analysis and smart data: 85% Agrees that smart data presents vast opportunities to drive productivity, innovation and competitiveness in Europe and 75% that smart data skills improve the entrepreneurial capacity and employability of students in all fields. Also the majority of the respondents (85%) would recommend to use smart data to help build a start-up business and agrees that the ability to analyse data will be a key entrepreneurial skill in the future.

6.0   Conclusion and Recommendations

In the region of Kaiserslautern, just like in the rest of Germany, big data and smart data are becoming more and more important. Multiple projects are executed with regards to smart data and several are financially supported by the government.

Based on the results of the research, interviews and survey it can be said that there is much to gain in the area of educating data analysis skills. Especially the survey shows that the business advisors in the region of Kaiserslautern are aware of the available data for them as business advisors, but they do not use this data. This survey also shows that the knowledge about smart data is very limited of these business advisors, and therefore it makes sense that they do not educate individuals about smart data. However, the research, interviews and survey do show that smart data skills are becoming more important and will be key for entrepreneurs and entrepreneurial employees. Therefore, the business advisors did say they would avail from a training course on smart data for entrepreneurs and small businesses. With this knowledge they would be capable of educating individuals about smart data.

Therefore it is recommended to offer education on smart data skills. As well as key regional individuals, as well as the business advisors indicate that students and entrepreneurs will benefit from knowledge on these skills. Information on available data and the possibilities of data and data analysis can be very valuable. This process starts with teaching the teachers and business advisors on smart data, who can transfer the knowledge to students and entrepreneurs. These entrepreneurs can use this knowledge on their turn to improve their products and services and improve their decision-making.