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Digitalization in Sensory Science: Survey Results

October 2023

Setting the Scene

Survey Objective

- **Determine attitudes and current positioning of companies and individuals working in the sensory science field towards digital technologies.**

Approach

- **Survey request to participate circulated to ESN community, LinkedIn and other ESN social media+ contacts of the workshop team and members of Society of Sensory Professionals.**
- **Survey designed by the Pangborn Digital Workshop Team (Appendix) and John Castura at Compusense who administered it.**
- **181 complete responses received by end of August 2023.**

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Key Messages

- ***Positive mindset*** **– recognising the value of adopting digital technologies and learning the skills to deliver the benefits.**
- ***Traditional skills important*** **– sensory scientist should still be 'expert' in sensory science and develop at least 'intermediate' skills in digital technologies.**
- ***Comment*** **– digital technologies could come from other 'experts' in statistics and the data sciences who develop 'basic to intermediate' skills in sensory science.**
- ***Sensory education*** **– need to equip future sensory scientist for the digital world and the value it can bring.**
- ***Cost a barrier and an opportunity*** **– upfront investment is needed (financial outlay), but over time cost savings though efficiencies and more focussed insights.**
- ***Soft skills*** **– teamwork, communication and storytelling skills should not be forgotten.**

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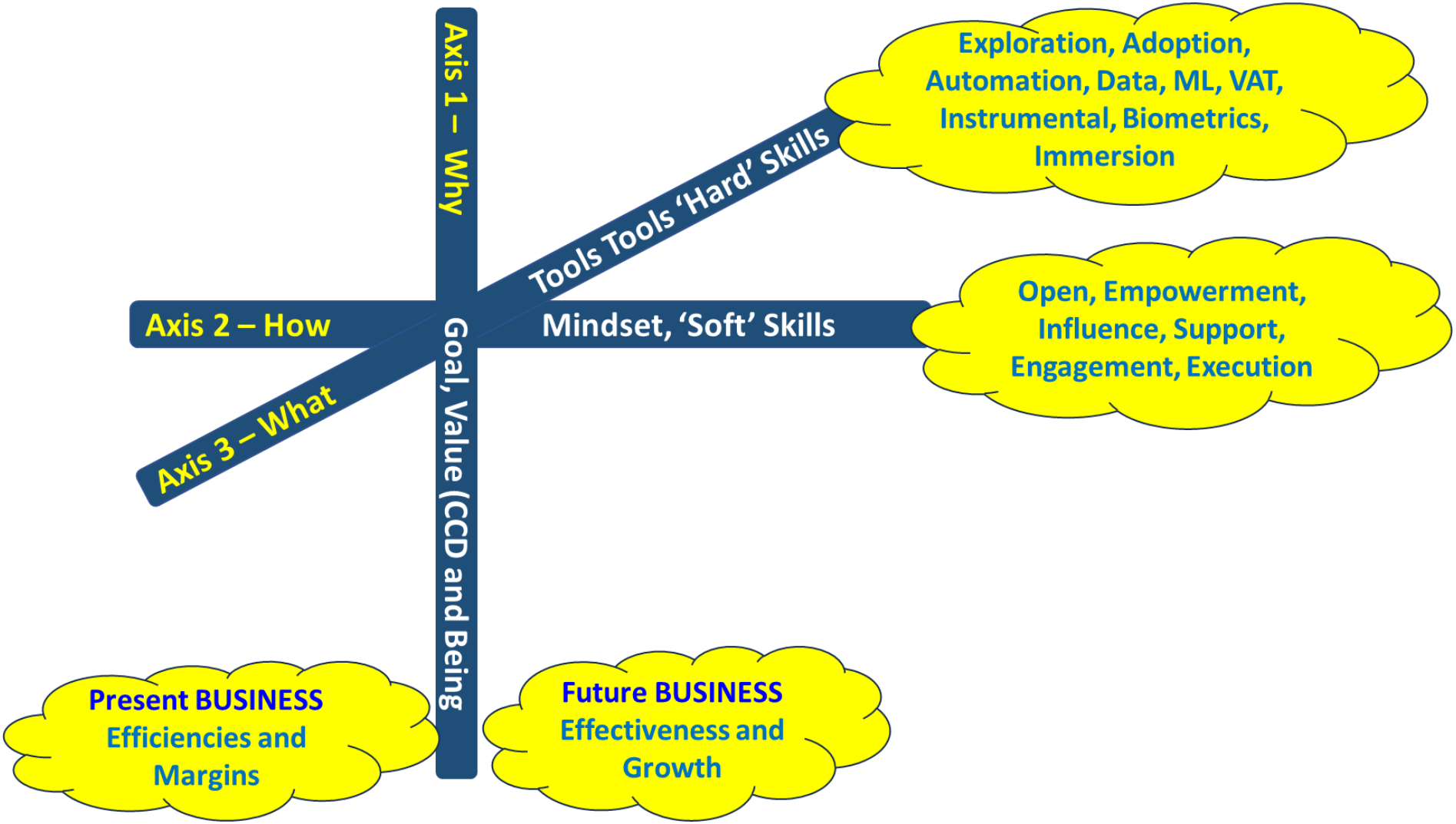
Key Themes – 3 Underlying Axes Identified



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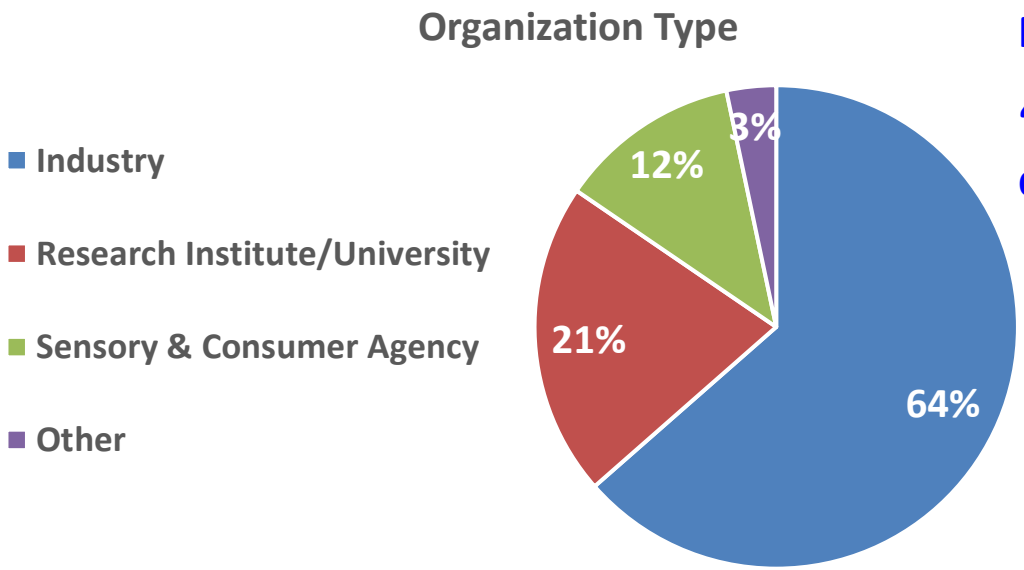
Who Responded: Organization Type and Region

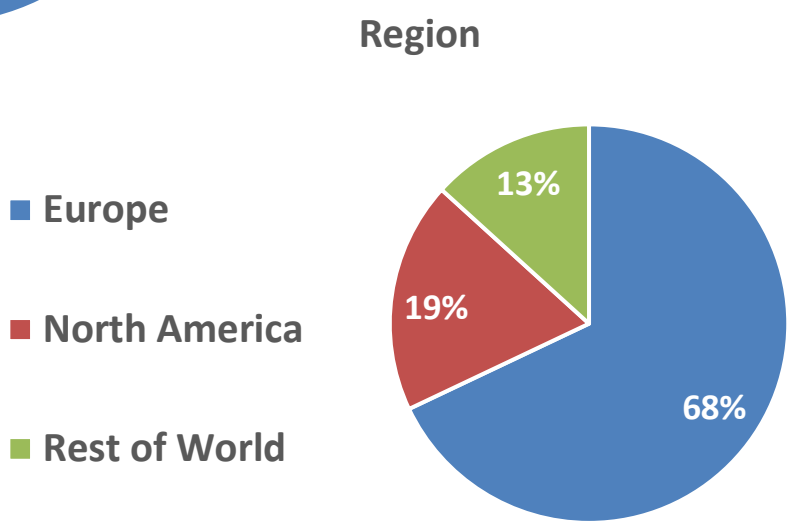


Majority from Industry.

'Other' includes software and data services providers.

Over 50% of responses came from 4 countries:

Country	Count (%)
USA	32 (18%)
UK	26 (14%)
France	24 (13%)
Netherlands	17 (9%)



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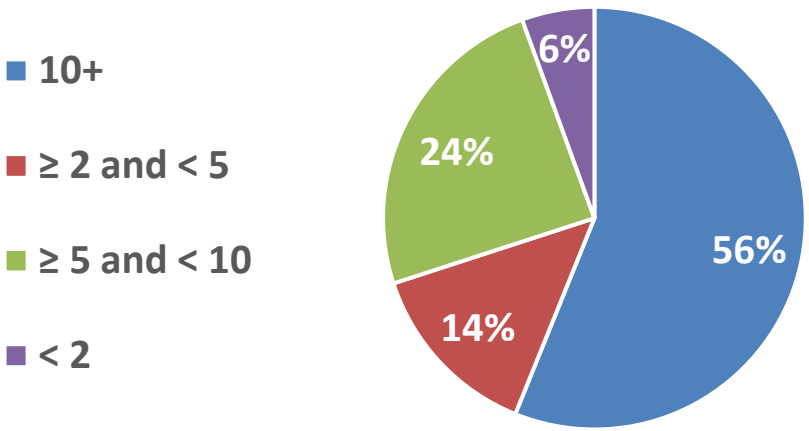
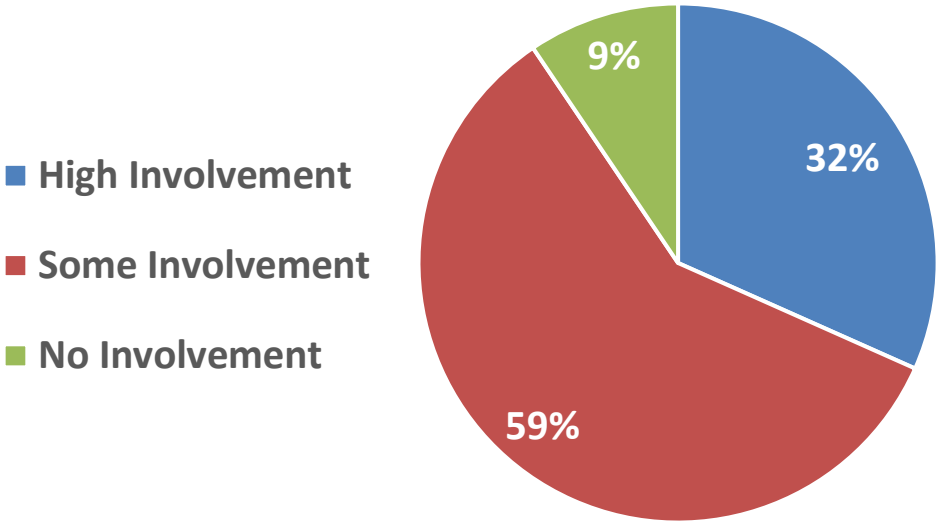
Who Responded: Years Experience & Involvement

Years Experience in Sensory and Consumer Sciences



Over half of respondents have more than 10 years experience in the sensory and consumer sciences.

Involvement in Digital Technologies Decisions



Most respondents have some or high involvement in making decisions regarding digital technology in their organization.

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Years Experience and Involvement

Experience/ Involvement	High Involvement	Some Involvement	No Involvement	Total
10+ years	41%	50%	9%	100%
< 10 years	20%	70%	10%	100%
Total	32%	59%	9%	100%

- Statistically significant association (p=0.01) between experience and involvement in digital technology adoption.
- 41% of more experienced respondents had high involvement with digital implementation v 20% of less experienced respondents.
- Over 90% of all respondents had some involvement (possible response bias…).

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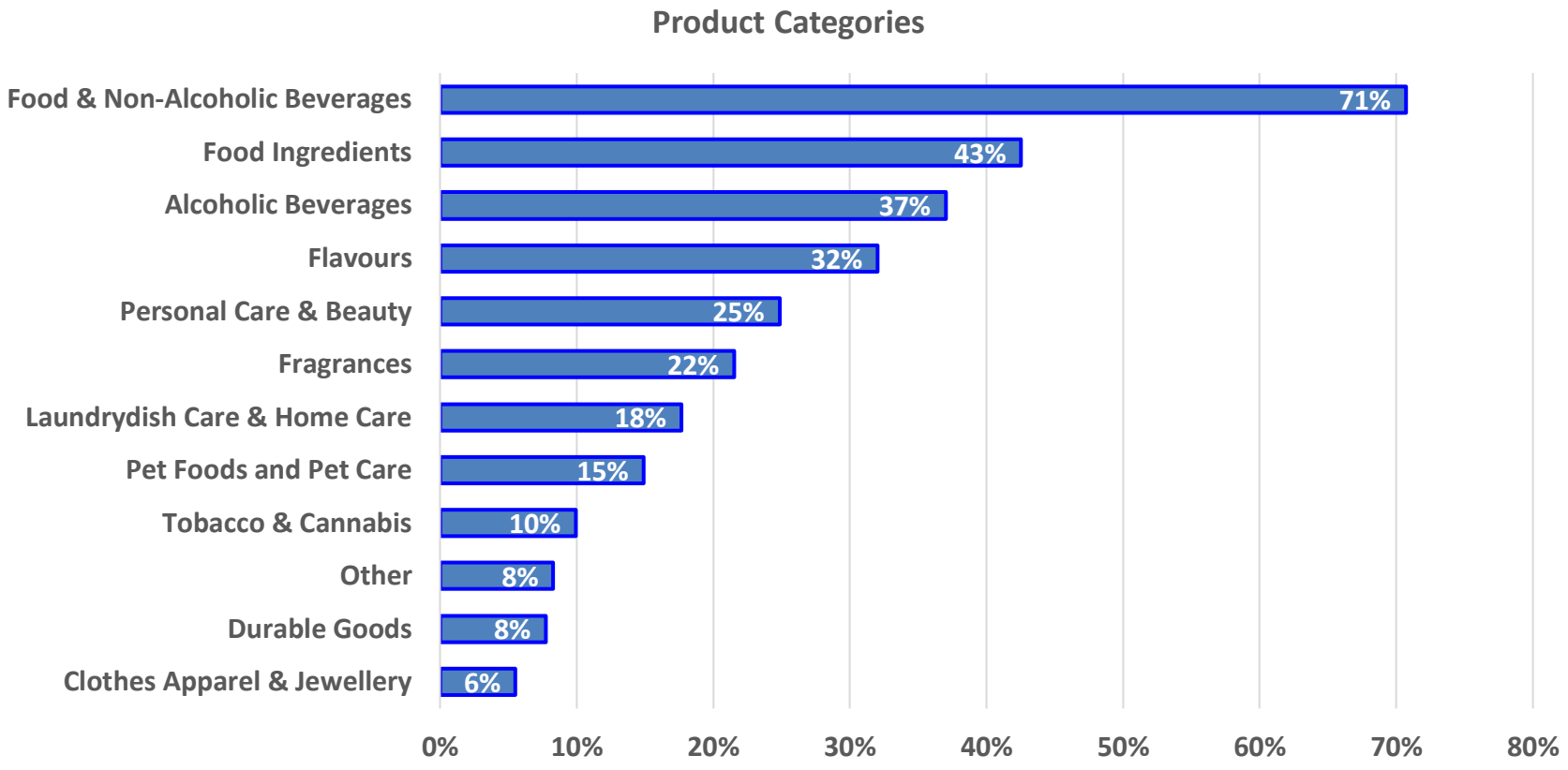
Who Responded: Product Categories



Other: Clinical Nutrition, Data. Education, Food Packaging. Healthcare, Horticulture, Nutritional Products (Specialty), OTC Medicines

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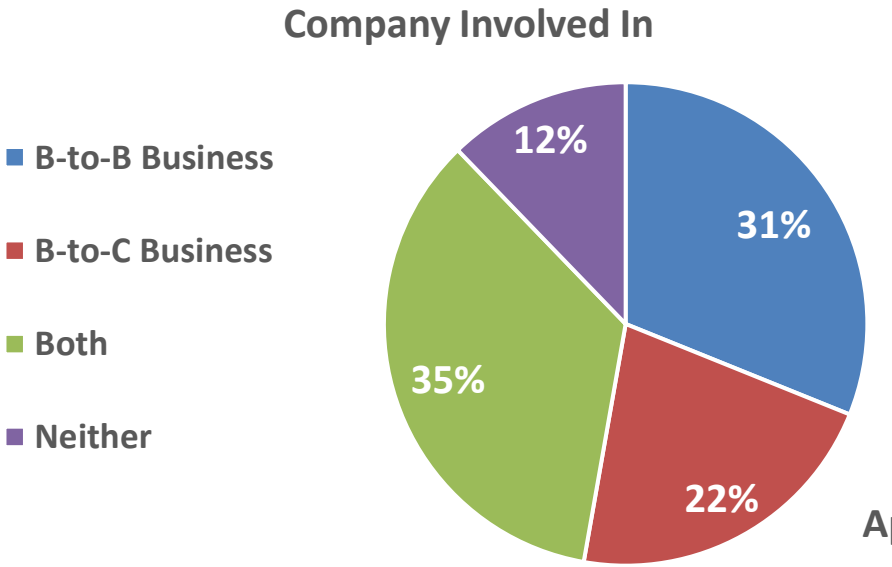
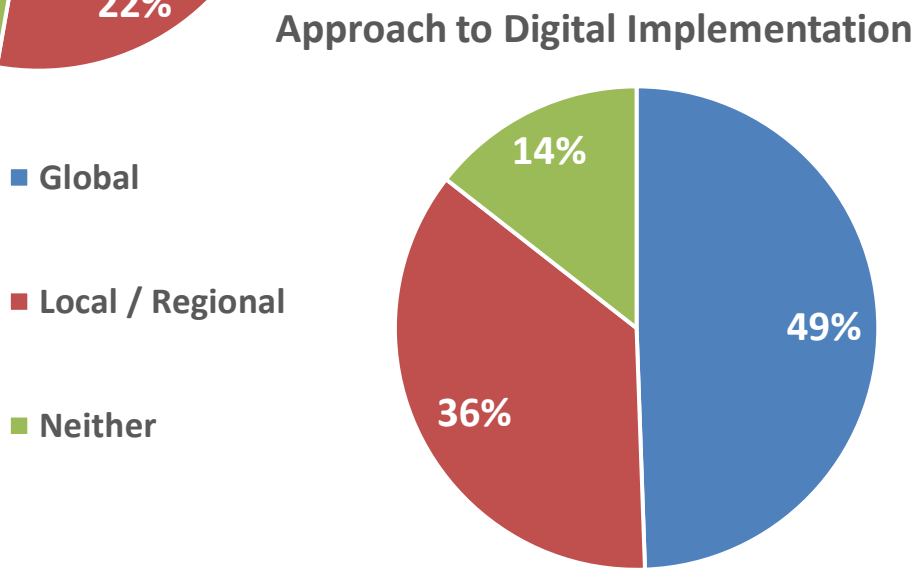
Who Responded: Company Type and Approach



There is a spread across those involved with B-to-B, B-to-C and both B-to-B and B-to-C.



Around half of organizations take a global approach to implanting digital technologies.

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Company Type and Approach to Digital

Company Involved / Digital Implementation	Global	Local / Regional	Neither	Total
B-to-B Business	49%	39%	12%	100%
B-to-C Business	59%	33%	8%	100%
Both	54%	37%	10%	100%
Neither	23%	32%	45%	100%
Total	50%	36%	14%	100%

- **Statistically significant association between company activity and digital implementation ($p = 0.001$).**
- **B-to-C companies more likely to be working globally to implement digital technologies.**
- **Non-commercial organizations were more likely to have no global strategy.**

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What Does Digital Sensory Mean to You

Question: What 3 words best describe what does digital sensory mean to you?

'data' and 'efficiency' are most associated with digital sensory.

Text processing using SAS JMP® software
Word stems extracted

What 3 Words

Question: What 3 words best describe what does digital sensory mean to you?

Stem Word	Count	Percent
data	39	6%
effici·	30	5%
technolog·	21	3%
artificial intelligence	19	3%
online	16	3%
agil·	13	2%
analysis	13	2%
digit·	13	2%
fast	12	2%
future	12	2%
innov·	12	2%
sensori·	12	2%
predict·	11	2%
speed	10	2%
time	10	2%
autom·	9	1%
big data	9	1%
data collect·	8	1%
results	8	1%
tool·	8	1%

- 128-word stems in total (word stems indicated by -)
- 95 occurred <5 times
- *Note*: Some respondents used sentences rather than single words so total number of words Example: "Getting data in real time and having it digitally captured and recorded"

- For all organizations 'Data' was the most frequently used word at 6% of total words used.
- 'Efficiency' was rated second highest in Industry.
- 'Technology' was rated second highest in Research Institutes.

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Elaboration of Digital Sensory – Sample Responses

Question: Please elaborate on what digital sensory means to you.

Id	Response
7	Big Data
17	Conducting sensory studies via digital means.
19	To me digital sensory mainly relates to how we gather and interpret panelist data. It's important that programming is accessible to both the panel leader and also the panelists. This helps with speed when running panels, as often we run multiple in a day and it's important that there are minimal issues that can delay timings. Speed also relates to how the program can interpret results. We have recently started using EyeQuestion and this has saved us so much time as it analyses the results for us e.g., average, level of significance and also presents them into user friendly graphs. Finally, future is important as we need to stay on top of any up-and-coming trends in the future. Digital sensory is constantly evolving and I am sure in the future there will be even more exciting ways to digitally run a sensory panel and also analyze / interpret / report results.
23	My department is involved in many projects driven by our Digital team, in fragrances, color cosmetics and skin care. It spans from understanding and improving consumer journey on e-commerce websites, to recommend products based on a series of criteria either collected digitally or directly from the consumers.
43	Able to investigate new measures once inaccessible with traditional methods. Increased participant engagement.
46	I guess it is about how we maximise our sensory testing with digital tools that we could leverage.
50	NLP= natural language processing for consumer and product insights, data analysis and modelling of product and consumer spaces is part of digital sensory to me.
60	Something to keep on top of to stay current with the field.
63	Less resource to get similar data quality.
68	Using data from multiple sources to leverage insight, follow trends and have string et infos on our consumers
74	We can learn so much more using digital data analytics and techniques.
84	It enables faster and more advanced approach to sensory testing.

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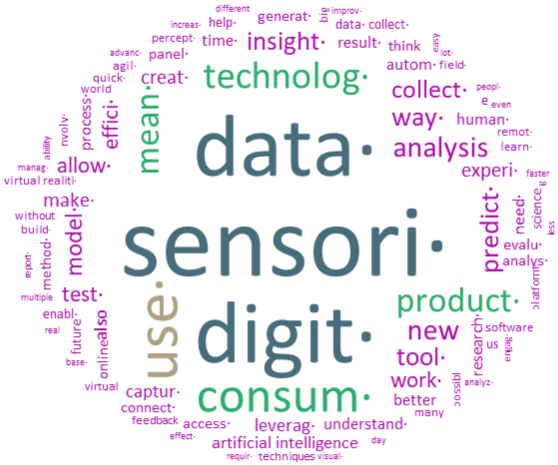
Elaboration of Digital Sensory by Organization Type

Question: Please elaborate on what digital sensory means to you

Term	All	Industry	Research	Sensory
sensori·	78	48	15	13
data·	67	49	11	5
digit·	67	41	15	8
use·	46	26	12	6
consum·	37	23	9	5
technolog·	27	15	8	3
mean·	25	16	4	4
product·	25	15	5	4
analysis	20	15	1	4
new	20	15	3	2
predict·	19	14	4	1
way·	19	10	5	4
insight·	18	14	2	1
tool·	18	12	4	2
collect·	17	12	3	1
model·	16	12	3	1
allow·	15	7	4	3
effici·	15	11	2	0
test·	15	10	3	1
work·	15	8	4	1
creat·	13	9	2	1
experi·	13	6	4	3
make·	13	9	3	1
captur·	12	7	2	3
leverag·	12	11	1	0
artificial intelligence	11	8	1	2

Data = count of number of times word stem used



words stems count>10

Text processing using SAS JMP® software
Word stems and phrases extracted

Elaboration of Digital Sensory by Organization Type

Question: Please elaborate on what digital sensory means to you

Term	All	Industry	Research	Sensory
sensori·	5%	4%	5%	7%
data·	4%	4%	4%	3%
digit·	4%	4%	5%	4%
use·	3%	2%	4%	3%
consum·	2%	2%	3%	3%
technolog·	2%	1%	3%	2%
mean·	2%	1%	1%	2%
product·	2%	1%	2%	2%
Analysis	1%	1%	0%	2%
New	1%	1%	1%	1%
predict·	1%	1%	1%	1%
way·	1%	1%	2%	2%
insight·	1%	1%	1%	1%
tool·	1%	1%	1%	1%
collect·	1%	1%	1%	1%
model·	1%	1%	1%	1%
allow·	1%	1%	1%	2%
effici·	1%	1%	1%	0%
test·	1%	1%	1%	1%
work·	1%	1%	1%	1%
creat·	1%	1%	1%	1%
experi·	1%	1%	1%	2%
make·	1%	1%	1%	1%
captur·	1%	1%	1%	2%
leverag·	1%	1%	0%	0%
artificial intelligence	1%	1%	0%	1%
need-	1%	1%	0%	1%

- **Comparison of rankings of % occurrence by region or organisation type shows no difference in pattern.**
- **However, allowing people to elaborate gives a different hierarchy of terms compared to the 3-word request.**
- **Efficiency which ranked 2nd in the 3-word list is 18th in this list after mining the elaborated comments.**
- **Here the emphasis is on data and data analysis.**

% of total words used

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Digital Mindset

Question: Thinking about your digital mindset, which of the following statements best describe you?

N	%	Response
167	92%	I believe I can learn digital technology skills, and I believe that they would add value to my role or my organization.
5	3%	I believe I can learn digital technology skills, but I do not believe they would add value to my role or my organization.
9	5%	I believe that digital technologies would add value to my role or my organization, but I do not believe I can learn the required skills.
0	0%	I do not believe that digital technology would add value to my role, or my organization and I do not believe I can learn the required skills.

- **95% of respondents believe they can Learn and Add Value.**
- **They are rising to the challenge.**

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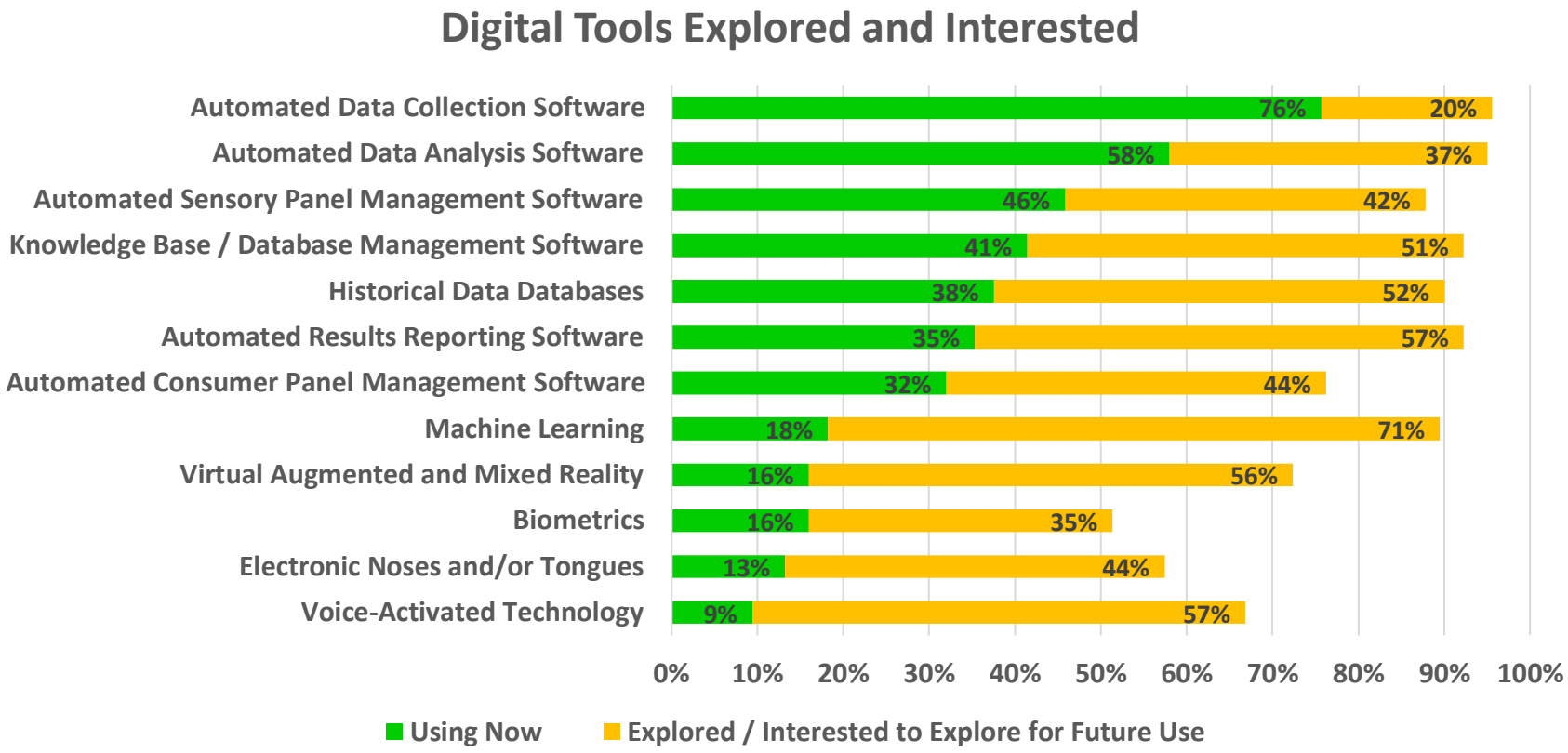
Which Digital Tools?

Question: Which of the following digital tools do you use in your Organisation or have explored?



- **Most widely used digital tools are for data management and analysis.**
- **At least 50% of respondents are using or considering using the digital tools listed.**

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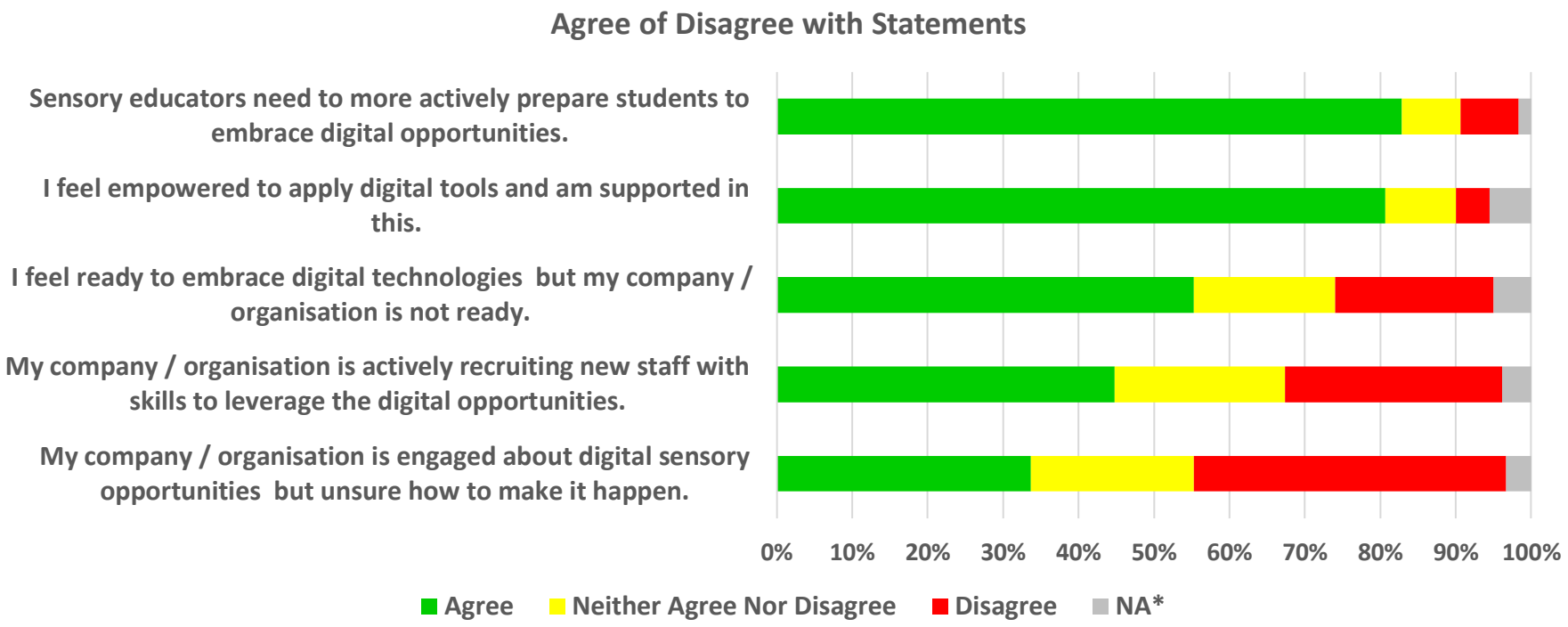
Digital In My Organization

Question: For each of the following statements indicate how much you agree or disagree with them in the context of your current organisation



Broadly respondents are positive about their organisation's approach to digital technologies.

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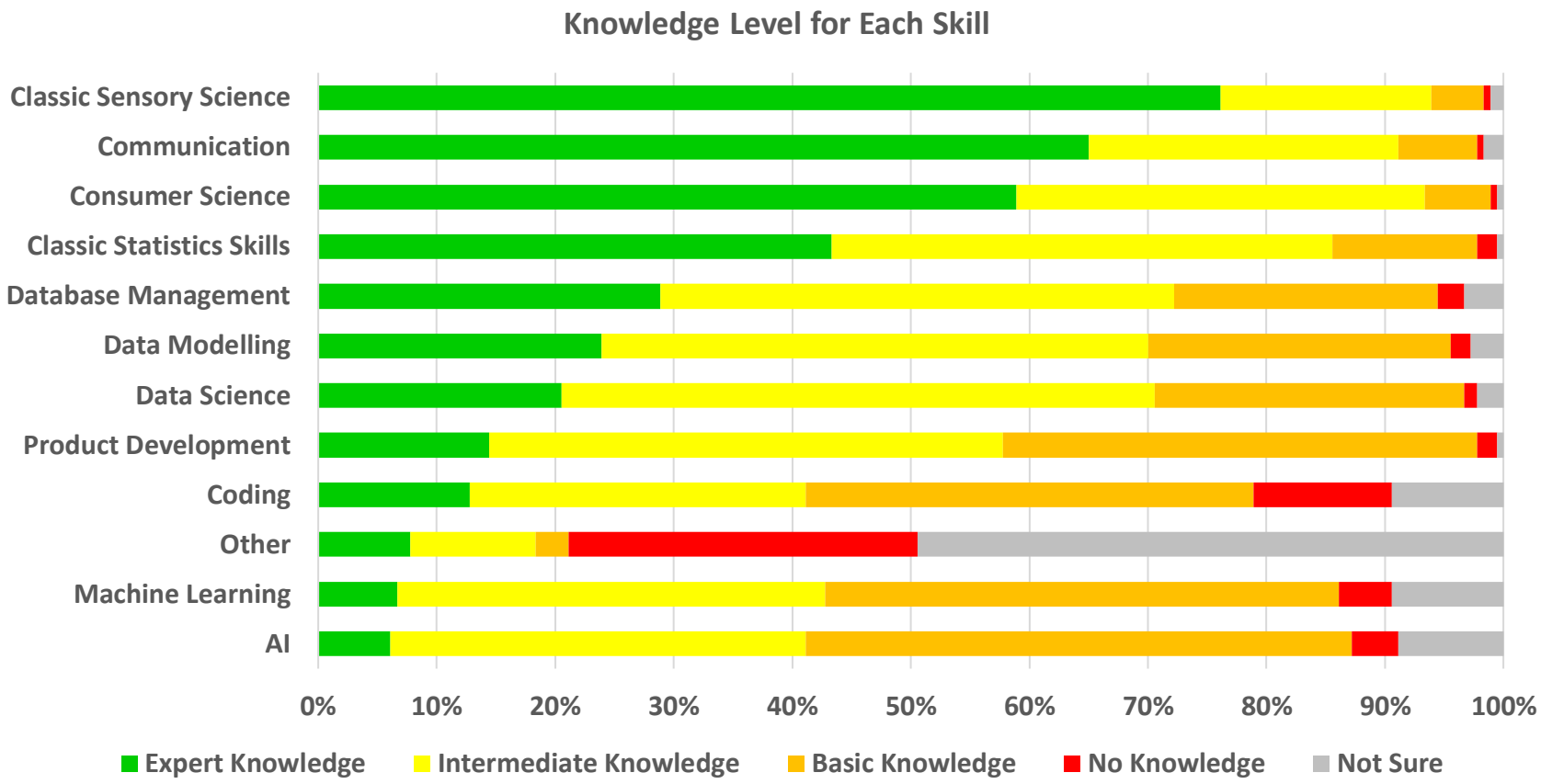
Digital Skills

Question: Which of the following skills should future sensory scientists have and at what level?



Communication is an important skill along with the expected traditional skills.

Machine Learning, Coding and AI considered the skills where less knowledge/expertise required.

Digital Skills – Other

Skills	N
Statistical Analysis, Data Interpretation & Visualisation	25
Team Building/People skills	22
Business Acumen	21
Scientific Skills	21
Project Management	14
Soft Skills	13
Storytelling	12
Marketing	6
Product/Market/Consumer Knowledge	5
Broader Expertise	3
Common Sense	3
Communication Skills	3
Collaboration with other departments	2
Mental Agility	2
Study Design	2
Teaching	2
Computing/software	2
Autonomy	1
Report writing	1

- **Non-technical skills such as team building were mentioned under 'other'.**

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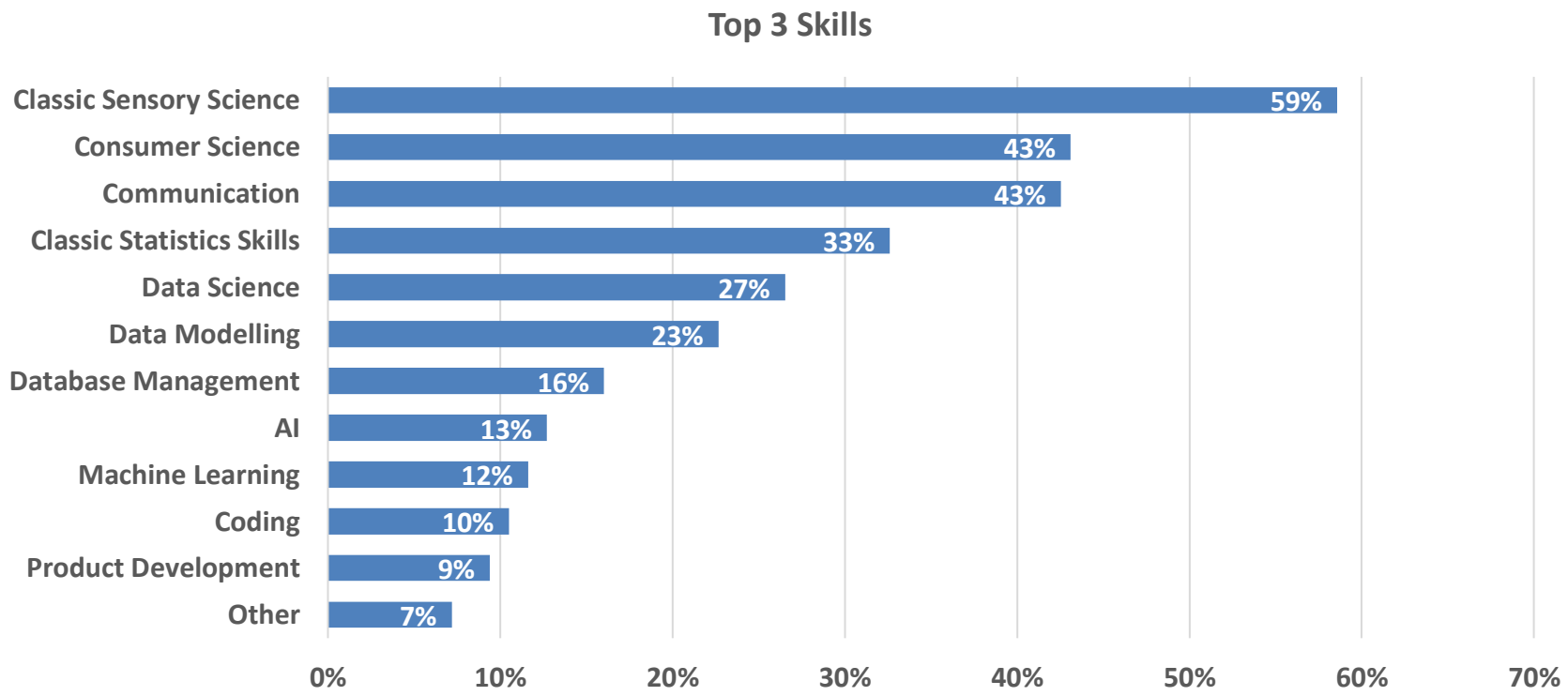
Top 3 Must Have Skills

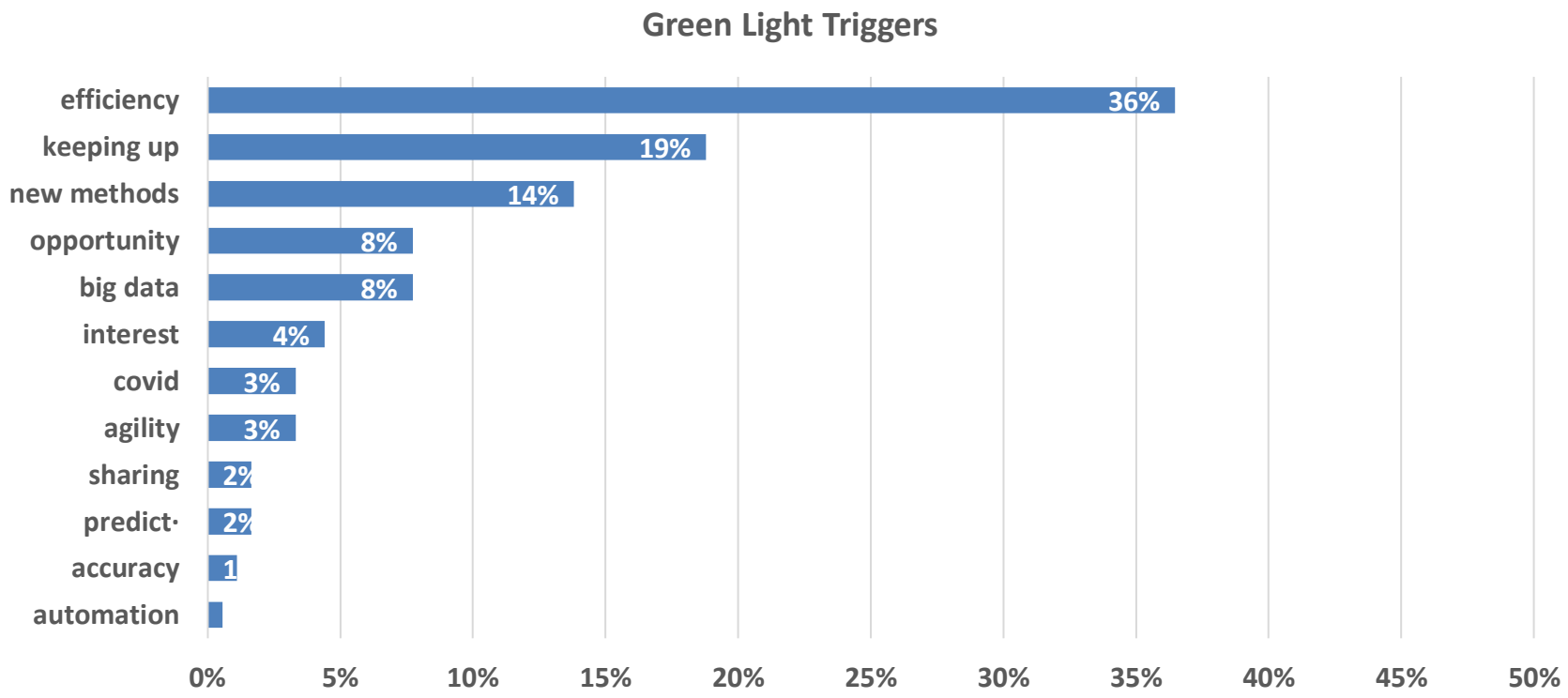
Question: Thinking about this list of 11 specified skills, what are the top 3 'must have' skills for the future?



Top 'must have' skills were traditional sensory, consumer science and statistical skills together with communication skills

Green Light

Question: What triggered you (and your Organisation) to become more digital (green light)?



Efficiency stated as most frequent trigger, followed by 'keeping up'.

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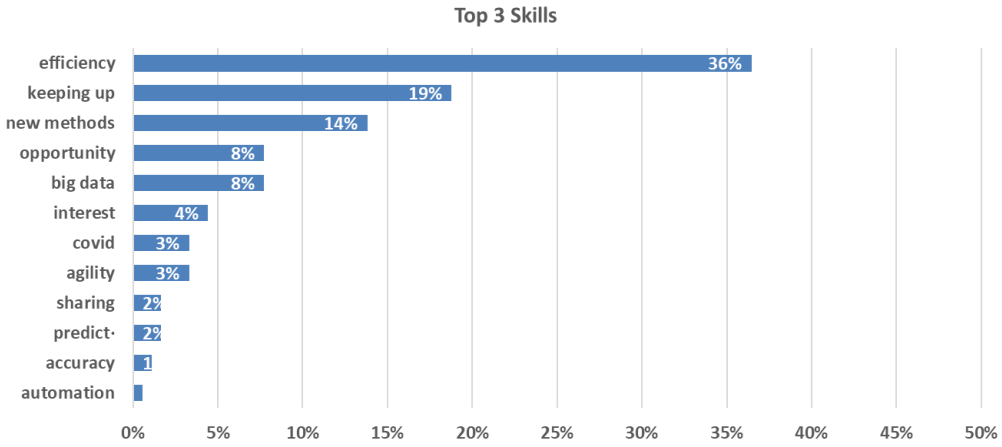
Green Light

Question: What triggered you (and your Organisation) to become more digital (green light)?



Comparison of coded responses v CHAT GPT (thanks to Dr Thierry Worch)

- ***Save time, money, and access new data types.***
- ***Streamline processes, reduce manual work, and improve efficiency.***
- ***Embrace digital tools for sensory research and stay updated with technology.***
- ***Connect and analyze data for better insights and predictive modeling.***
- ***Meet consumer demand, stay competitive, and innovate in product development.***
- ***Adapt to changing times, including the impact of COVID-19.***
- ***Improve data collection, analysis, and reporting for efficiency and accuracy.***
- ***Future-proof the business and leverage historical data.***
- ***Increase agility, speed, and productivity.***
- ***Stay relevant, keep up with industry trends, and prepare for the future.***

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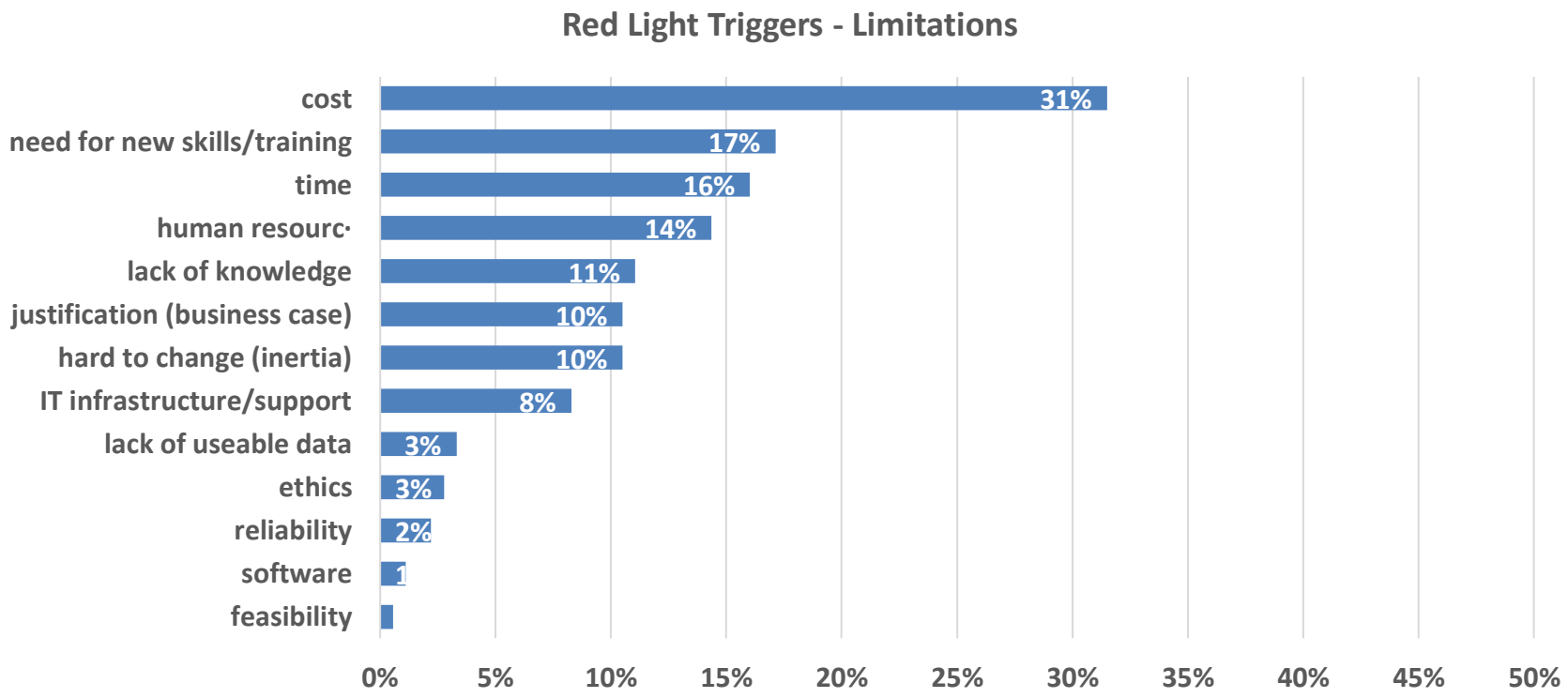
Red Light

Question: What are the limitations that you (or your Organisation) faced to be more digital (red light)?



Cost is by far the greatest limitation.

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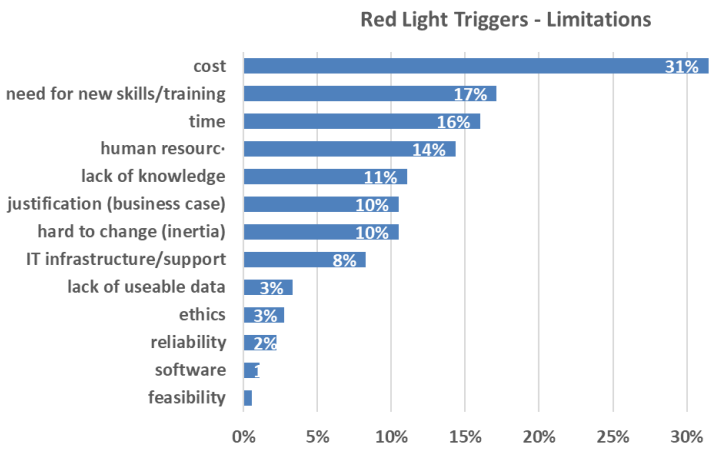
Red Light

Question: What are the limitations that you (or your Organisation) faced to be more digital (red light)?



Comparison of coded responses v CHAT GPT (thanks to Dr Thierry Worch)

- ***Limited resources, including time, budget, and expertise.***
- ***Resistance to change and lack of understanding of benefits.***
- ***Cost and investment required for new technologies.***
- ***Challenges in data management and analysis.***
- ***Lack of IT infrastructure and support.***
- ***Skill gaps and training needs in digital technologies.***
- ***Privacy, security, and confidentiality concerns.***
- ***Integration challenges and compatibility issues.***
- ***Limited awareness and knowledge of available options.***
- ***Difficulty in justifying the need for digital technology.***
- ***Insufficient access to necessary data and infrastructure.***
- ***Limited availability and high costs of suitable solutions.***
- ***Challenges in acquiring necessary knowledge and skills.***
- ***Balancing competing priorities and limited time.***
- ***Resistance to change and reliance on traditional methods.***
- ***Challenges in training and upskilling staff.***
- ***Concerns about confidentiality and data privacy.***
- ***Limited resources and budget constraints.***
- ***Organizational size and bureaucracy hindering progress.***
- ***Lack of internet access in certain locations.***
- ***Limited financial resources and accessibility to digital tools.***
- ***Concerns about risk and trying something new.***
- ***Lack of expertise and skills in AI and data science.***
- ***Challenges in standardizing and structuring data.***
- ***Limited knowledge and understanding of digital tools.***

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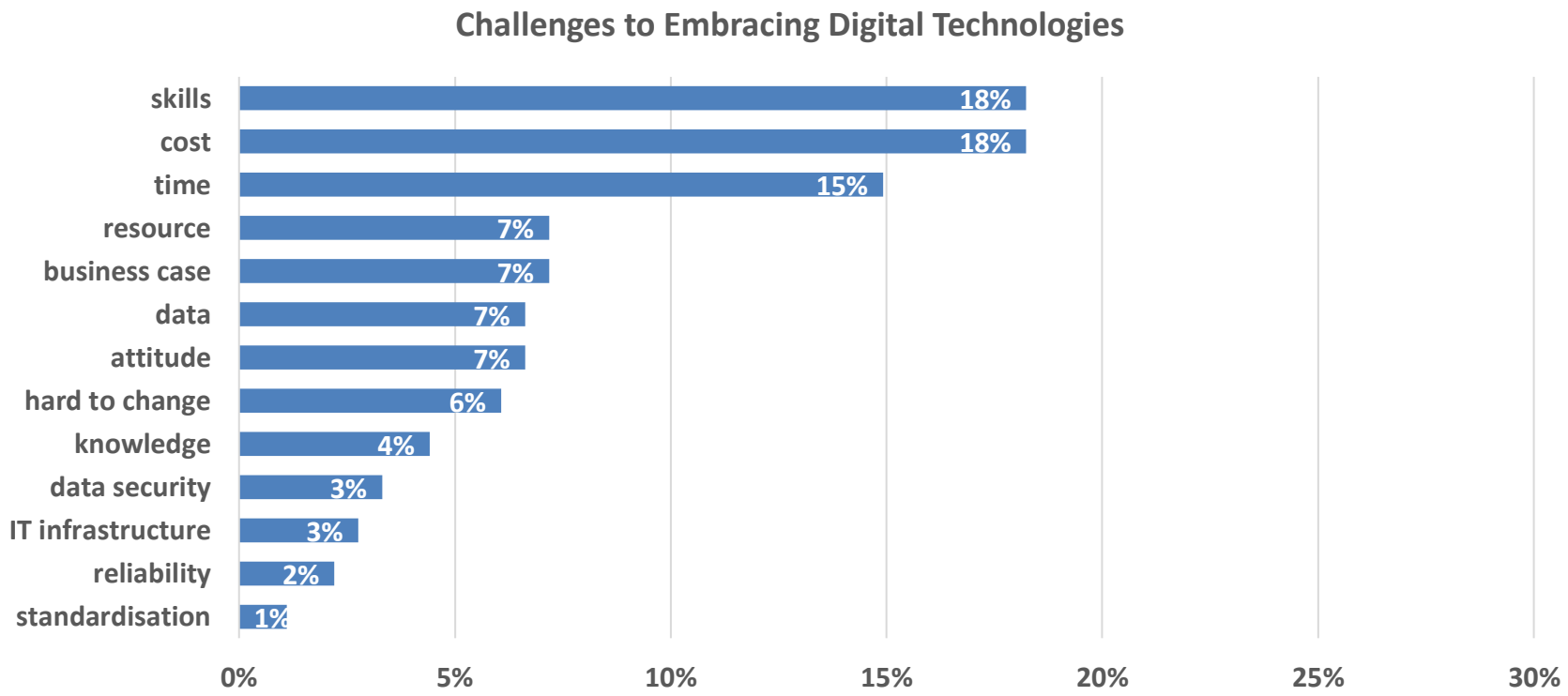
Challenges

Question: What do you see as the single biggest Challenge to fully embracing digital technologies in your Organization?



Cost, skills and time are seen as by far the greatest challenge.

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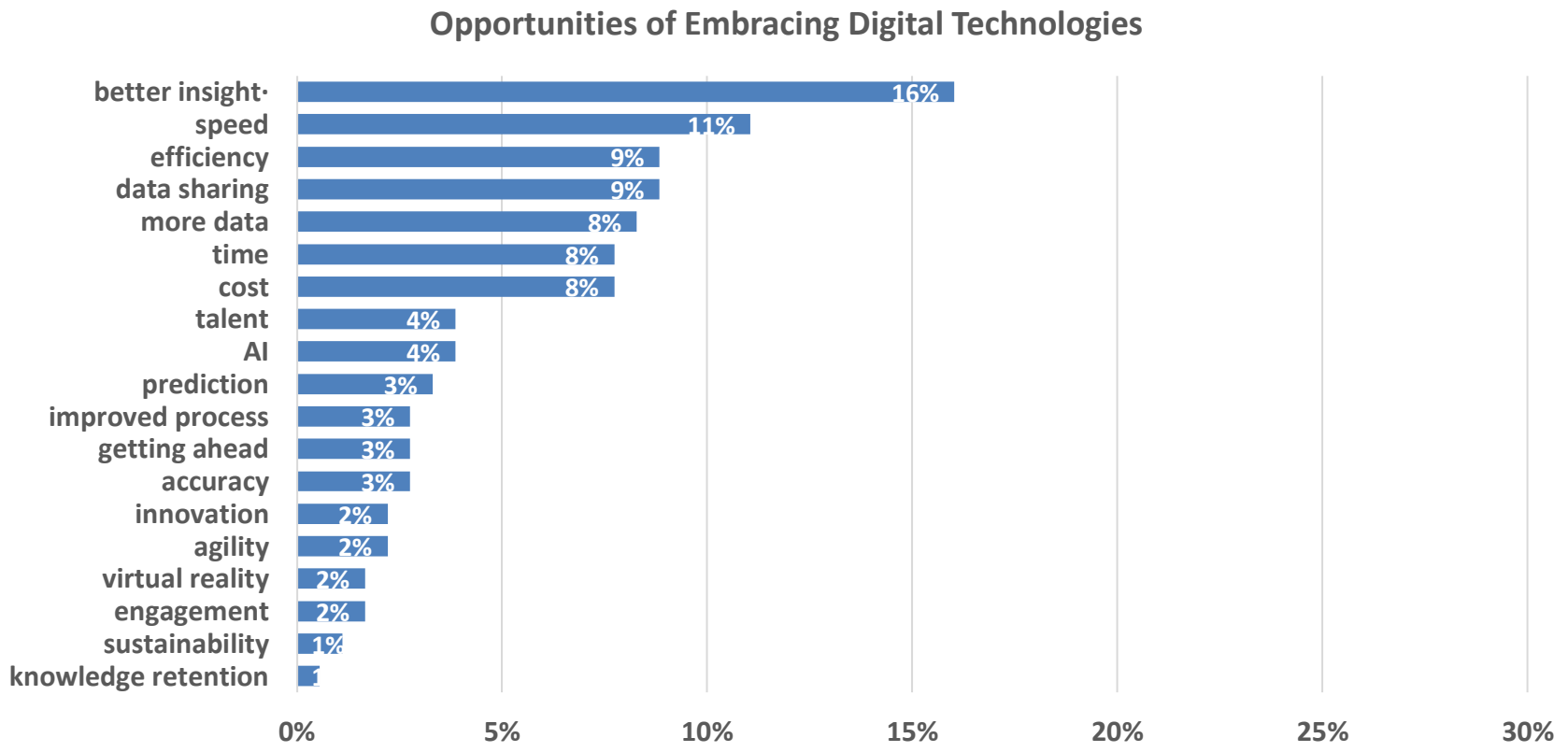
Opportunities

Question: What do you see as the single biggest Opportunity to fully embracing digital technologies in your Organization?



Better Insights, speed , efficiency and data are seen as the greatest opportunities. Cost as an opportunity is likely to be cost savings rather than the challenge to adopt.

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Appendix: Pangborn 2023 Workshop Team

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