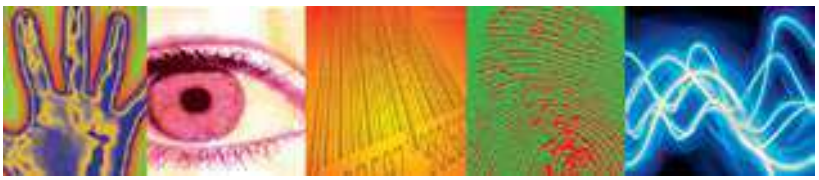

Biometrics Institute Industry Survey 2021

BIOMETRICS INSTITUTE INDUSTRY SURVEY 2021
(July 2021)

INTRODUCTION

ABOUT THE BIOMETRICS INSTITUTE

The Biometrics Institute is the independent and impartial international membership organisation for biometric users and other interested parties. It was established in 2001 to promote the responsible and ethical use of biometrics and has offices in London and Sydney.

With nearly a thousand members from 220 membership organisations spread across 30 countries, it represents a global and diverse multi-stakeholder community. This includes banks, airlines, government agencies, biometric experts, privacy experts, suppliers, and academics.

The Biometrics Institute connects the global biometrics community. It shares knowledge with its members and key stakeholders and most importantly, develops good-practices, governance frameworks and thought leadership for the responsible and ethical use of biometrics.

AIMS OF THIS SURVEY

In its twelfth year, this annual survey provides an insight into trends and developments in the biometrics industry over the last year as well as looking to the future. The results of the Industry Survey also provide insights into industry attitudes on several key issues and reveal the ongoing impact of the COVID 19 pandemic.

CIRCULATION OF THE SURVEY

This survey was circulated by email to over 7000 individuals across the world in June 2021: members of the Biometrics Institute, other key stakeholders and industry and media contacts.

THE SAMPLE

This year, 371 industry professionals responded to the survey. Of those, just over half (55%) were members of the Biometrics Institute. There was a good response from across our global network.

Just under half (43%) of the respondents were from a supplier organisation, with the remainder predominantly biometric users such as government organisations, banks, and airlines (36%). The remaining 20% represented universities (8%) and other organisations such as regulators and international or European organisations.

Nearly three quarters of respondents were male, reflecting the profile of our members and attendees at our events, and the sample was older than the general population.

SUMMARY OF RESULTS

CONTEXT

As usual we updated the questionnaire to reflect industry trends. Some answer options were changed, new questions added, and the attitude statements were overhauled to measure more of the current issues in the biometrics world and the impact of the current COVID-19 pandemic.

Given the sample sizes, we are again able to confidently conduct subgroup analysis by broad region and by organisation category.

The full report, which follows this summary for members, looks at the differences between these subgroups in detail.

SIGNIFICANT DEVELOPMENTS – PAST YEAR

In which area has there been the most significant development in the use of biometrics in the last 12 months?

As was the case for the first time last year, digital identity topped the list, increasing from 14% mention in 2020 to 33% this year. This was followed by border control/security (12%), national identity (8%) and artificial intelligence and healthcare which were both cited by 7%.

SIGNIFICANT DEVELOPMENTS – ANTICIPATED

Unlike previous years where there have been diverse perceptions as to the area where there is expected to be the most significant development in the use of biometrics over the next five years this year digital identity dominated.

- Digital identity (30%)
- Artificial intelligence (13%)
- Border control/security (10%)
- Consumer biometrics (9%)
- National identity (9%)

Face remained the biometric thought most likely to see an increase in use over the next few years followed as last year by multimodal and contactless finger/vein.

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46%	17%	9%	7%	6%
Face	Multimodal	Contactless finger/vein	Behavioural	Iris and vein

There was increased mention of behavioural biometrics in response to this question and they also featured more when respondents were asked which other biometrics might be on the increase.

When asked in which area or areas biometrics should not have been implemented two thirds mentioned at least one area. The top mentions were:

- Social media & political use – 37%
- School administration – 26%
- Birth registration – 24%
- Ancestry (DNA) testing* – 14%
- Commercial use* – 13%
- Consumer biometrics* – 13%
- Surveillance systems* – 11%

*New or renamed for 2021

MARKET RESTRAINTS

As seen over the last few years, the factor considered to be restraining the market to the greatest extent remained privacy/data protection concerns which were still cited by nearly two thirds of these industry professionals (65%). Lack of trust (a newly introduced option) was selected by around half, legislation and governance (44%), misinformation about biometrics (38%) and data sharing concerns (33%).

LEGISLATION AND CONTROLS

Against a continuing background of debate in the industry on this issue, we again asked respondents whether the legislation covering the use of biometrics is strict enough in their own country. In this context, opinions were almost equally divided:

- Legislation is strict enough –45%
- Legislation is not strict enough – 42%
- Not sure – 13%

As last year, those in Europe were the most likely to feel there is already sufficient legislation in place with those in regions other than ANZ, Europe and the Americas more likely to feel the legislation wasn't strict enough on balance.

When specifically asked in which areas legislation wasn't strict enough, policing/law enforcement, commercial uses, and social media and political use topped the list, all selected by around 60%.

Respondents were presented with a series of attitude statements and asked to what extent they agreed or disagreed with each using a five-point scale. Confirming the earlier market restraints findings, just under 70% of these industry professionals agreed that privacy concerns are holding back the market for biometrics. This was a marginally lower proportion than last year.

Reflecting the response seen for the last two years, over half still agree that there are too many instances of biometric use where informed consent hasn't been properly obtained.

As last year, there remained mixed opinions as to whether the biometrics community can be trusted to be ethical with individuals' data.

- Biometrics community can be trusted – 34%
- Biometrics community cannot be trusted – 31%
- Not sure/don't know– 36%

In comparison to last year, a higher proportion agreed that the use of biometrics is growing too rapidly for existing controls to be effective.

- Use of biometrics growing too rapidly – 48%
- Use of biometrics isn't growing too rapidly – 33%
- Unsure – 20%

On balance, the industry marginally disagreed with the statement that stricter regulation of the biometrics industry will stifle innovation and investment

- Stricter regulation will stifle innovation and investment – 36%
- Stricter regulation will not stifle innovation and investment – 41%
- Unsure – 23%

There was strong agreement (79%) with the premise that any biometric implementation must have human rights at front of mind and also with the principle that there should be no conviction, denial of service or presumption of wrongdoing solely on the basis of an automated system without human decision making ('a human in the loop'). Just under three quarters (74%) agreed with this statement.

Regarding the very public debate on whether a ban or moratorium on police use of face recognition is what we need right now, only around one in ten agreed with a convincing 64% disagreeing.

TESTING AND TECHNOLOGY

There has been a lot of discussion around testing in the industry over the last year and this section of the survey looked at some key attitudes in this area. We released The Three Laws of Biometrics in October 2020 as a prompt to remember the fundamentals of using biometric technology responsibly and ethically.

A high 86% agreed that standardised biometric testing is crucial to the industry's future, with minimal disagreement that this was the case. An even higher proportion (94%) believed that testing is essential to understand an algorithm's performance and how risks are managed.

Opinion was polarised as to whether biometrics are now more vulnerable to spoofing attacks than ever before – approximately a third thought this to be the case, a further third disagreed, and the remainder were uncertain.

Similarly in the highly debated area of demographic differentials, opinion was also polarised: 36% agreed that the issue of demographic differentials in face recognition is overstated but this was counterbalanced by 28% who disagreed, with the remainder uncertain.

PUBLIC PERCEPTIONS

When asked which aspects of biometrics they thought concerned the public the most, linked databases leading to mass surveillance and misidentification topped the list, each selected by around 70%.

Demographic differentials/ bias, watchlists and use in social media also featured strongly. Only 2% thought there was nothing that concerned the public.

As last year there was overwhelming agreement (90%) that properly educating the public about the benefits of biometrics is crucial for the future of the industry.

Two thirds of these industry professionals also agreed that organisations' lack of transparency about their use of biometrics is the cause of the lack of public trust with only 12% disagreeing with this view.

Interestingly, on balance, these industry professionals agreed that the public has less trust in government use of biometrics than in commercial use with 50% agreeing with this view and only just over a quarter disagreeing. Even those in government expressed a similar pattern of response overall.

DIGITAL IDENTITY

Given the interest in digital identity and expectations for its future growth, a section specifically exploring this topic was added to this year's survey.

Virtually all these industry professionals (90+%) agreed that biometrics will be the key enabler for anchoring digital identity and that there will continue to be significant growth in mobile remote identity verification systems and remote onboarding technology.

When specifically asked about their organisation's timescale for exploring interoperability, over half confirmed that this was already underway with others mainly indicating this would take place in the next two years.

Mainstream consumer adoption of self-sovereignty was thought likely take place further into the future with very few feeling it had already occurred and most of those with a view on this anticipating at least two years from now.

On balance, consumer perceptions of biometrics were thought to impact positively on digital identity adoption with 63% holding this view vs a third believing they had a negative impact.

THE IMPACT OF COVID-19

> At the time of this research much of the world was still in some form of lockdown due to a global pandemic. We decided to include some questions relating to the impact of COVID-19 on the implementation and use of biometrics over the last 18 months.

Last year the majority (60%) had believed that COVID-19 would change the way in which biometrics were used and implemented.

When asked an open-ended question as to the ways in which the use would change, most responses referred to the likely move to contactless/touchless modalities and increased demand for remote usage. Linking of biometrics with health data and the need for face recognition technology to be developed to deal with the use of masks were also mentioned.

This year there was majority agreement (63%) that the pandemic has accelerated the adoption of biometric solutions, with three quarters thinking that new solutions using new technology will be critical for managing this and future pandemics.

In the health area, most (60%) also thought that biometrics should be used internationally to provide the necessary identification assurance for vaccine certificates with few (14%) actively disagreeing with this view. There were polarised views as to whether health protection will be more important than privacy protection over the next few years – 39% agreed, 32% disagreed and the remainder were unsure.

Finally, six out of ten believed mask-aware face recognition capabilities are now crucial for security and crowd management.

WHAT NEXT?

The survey provides a snapshot of current thinking as we navigate unknown waters. It reflects the industry's view of many of the concerns currently being raised in the media around ethics and facial recognition technology, especially in policing and data protection.

It is important to remember that the survey covers relatively general questions without the context that is often required to make an informed decision about the responsible and ethical use of biometrics.

Over the past year we have been discussing many of last year's survey findings in our own, and also external events, to raise awareness and to bring about a balanced discussion on key industry trends, challenges and opportunities.

This year new questions on vaccine certificates and the use of biometrics; the importance of testing and the risk of spoofing; as well on those on digital identity were included in the *Industry Survey*. These will be explored further in our upcoming member discussions commencing with the annual Biometrics Institute Congress to be held online in October 2021.

Questions around legislation and bans for biometrics, and in particular face recognition, showed similar results to last year and this will be an important area for the Institute to continue engaging with key-decision makers and regulators. Our *Should we ban Facial Recognition Viewpoint Paper* is certainly a document that should be revisited.

The issue of demographic differentials in face recognition is another important topic and the view of this year's respondents shows that there are still questions to be answered about how important an issue this is and whether the issues are overstated. We released the *NIST top 10 Takeaways -*

Demographic Differentials Paper in September 2020 which outlines in more simple terms the NIST findings on this issue and we therefore clearly must continue discussing this subject.

Spoofing is certainly another important topic for the Institute and the survey shows mixed views on this issue. With biometrics as a key enabler for anchoring digital identity, this will be a very important conversation for us in the coming year. Our *Digital Onboarding and Biometrics Guiding Paper* was a first initiative to address good practices for biometrics and digital identity and this work will continue.

As privacy concerns continue to be seen as the main barrier to the adoption of biometrics and legislation; regulation; standards; and testing all struggle to keep pace with technology, the Institute has an important role to play in continuing to bring diverse stakeholders together to discuss these issues.

The survey highlights some areas where more work needs to be done in our industry, and we look forward to working with you – our members – to promote the responsible and ethical use of biometrics.

You are welcome to use the information from this survey with a reference to its source, *Biometrics Institute Industry Survey 2021.*

MAIN FINDINGS

SAMPLE PROFILE

A total of 371 industry professionals took part in the survey.

	%
Member	55
Non-member/don't know	45
ANZ	19
UK/Europe	45
Americas	23
Other	13
User: public sector	29
User: private sector	7
Supplier or consultant	43
Academic	8
Other (regulatory body, IGO)	12

The sample, as usual, was almost evenly split between Biometrics Institute members and non-members.

The broad geographical spread and organisation types represented by the respondents clearly reflects the global and multi stakeholder nature of the Biometrics Institute community. Most responses came from the UK/Europe (45%), the Americas (23%) and ANZ region (19%).

In terms of organisation type, suppliers were the again the largest contributors to the survey (43%) followed by public sector/government users and those from organisations such as regulatory bodies and IGOs. Private/commercial sector users (such as banks and airlines) and academics were also represented.

	%
Male	72
Female	26
Other	2
18 - 34	12
35 - 54	53
55+	35

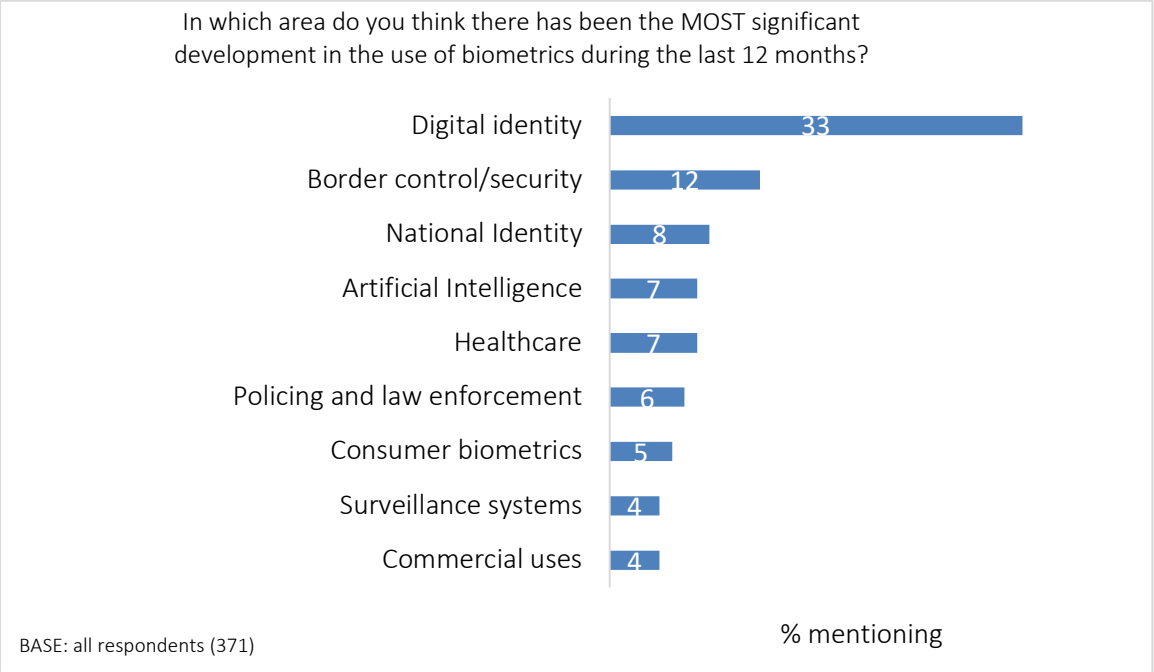
As seen over the last two years, around three quarters of the respondents were male and a quarter female.

The sample was again older than the adult population.

TRENDS: LOOKING BACK OVER THE LAST 12 MONTHS

Respondents were initially asked to select the one area (from a prompt list) where they thought there had been the most significant development in the use of biometrics over the last 12 months.

NB: This list has been slightly updated since last year.



In comparison to last year where no one area dominated, this year digital identity was selected by a third of these industry professionals as the area where there had been the most significant developments (vs 14% in 2020). Activity in this area had been predicted over the last two years.

This was followed by border control/security (12%, marginally up from 8% last year). Other areas attracting some mentions were:

- Artificial intelligence (7%)
- Healthcare (7%)
- Policing and law enforcement (6%)
- Consumer biometrics e.g., connected home, automotive (5%)
- Surveillance systems (4%)
- Commercial uses (4%)

No other area was selected by more than 3%.

The next few charts look in more detail at the response to this question amongst those in ANZ vs Europe vs North America and amongst suppliers vs users.

This table shows the areas in which the most significant development is thought to have taken place in the last year in each of the three key regions.

In which area do you think there has been the MOST significant development in the use of biometrics during the last 12 months?	TOTAL	Europe	ANZ	Americas	Other regions
BASE: all respondents	371	150	64	78	43[L]
	%	%	%	%	%
Digital identity	33	33	39	36	26
Border control/security	12	9	16	14	21
National identity (passports, voter identification)	8	8	11	4	7
Artificial intelligence	7	7	8	5	5
Healthcare	7	8	2	6	12
Policing and law enforcement	6	5	6	9	2
Consumer biometrics	5	7	5	5	2
Surveillance systems	4	5	2	3	5
Commercial uses	4	3	2	9	7
Enterprise biometrics	2	3	-	-	2
Call centres	1	1	2	1	-
Counterterrorism	1	1	-	1	2
Social media and political use	1	-	2	1	-
None	1	1	-	1	-
Other	1	2	2	1	-
Don't know	6	8	6	3	9

CAUTION: L = Low base

Higher percentage mentions

The pattern of responses to this question was more consistent than usually seen. Digital identity topped the list in all the regions analysed with border control/security consistently in second place.

There was more mention of border control/security in regions other than ANZ, Europe and the Americas, than in Europe, and of healthcare in comparison to ANZ.

The table overleaf compares the responses of the users and the suppliers on this question.

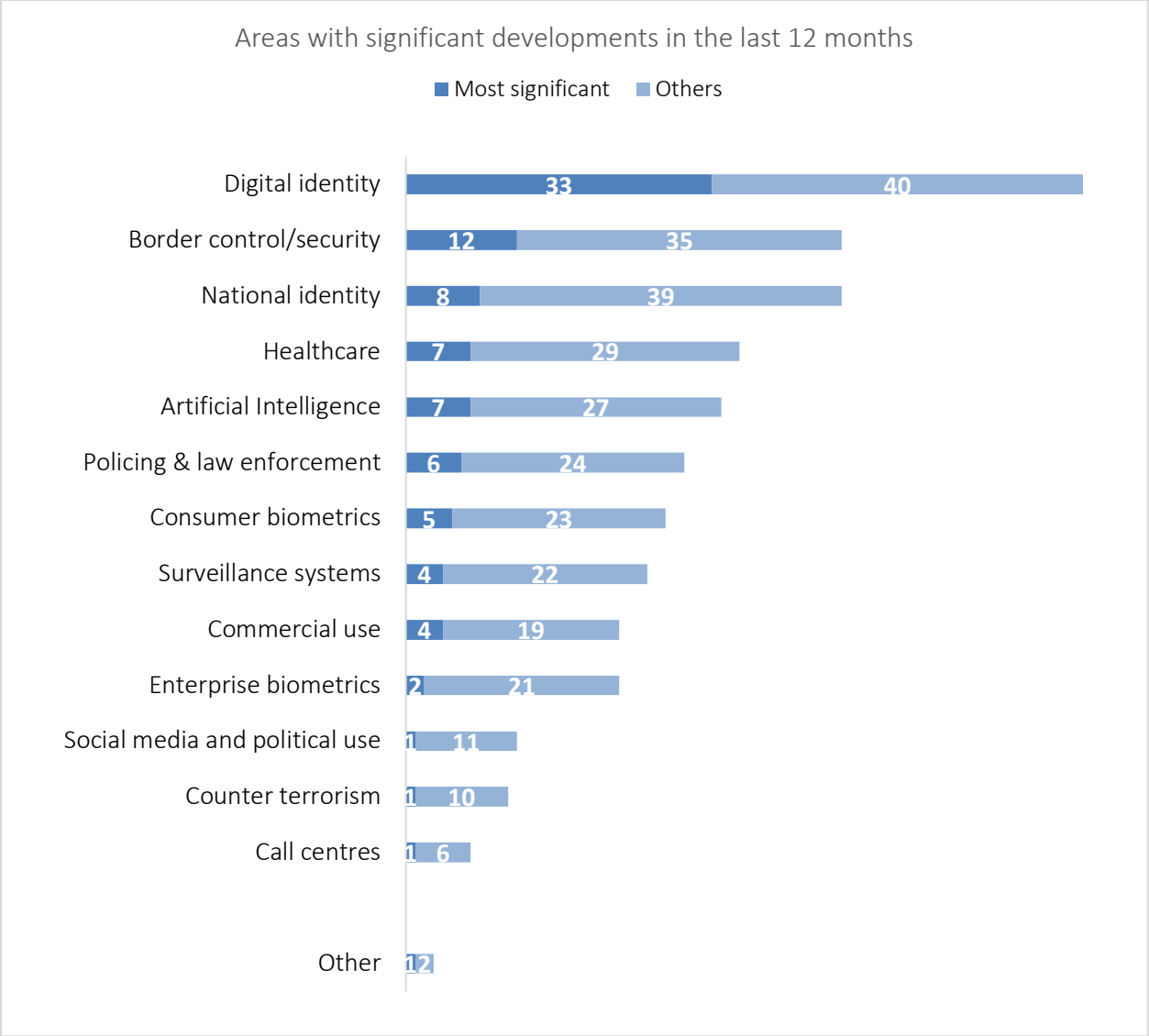
In which area do you think there has been the MOST significant development in the use of biometrics during the last 12 months?	TOTAL	Suppliers	Users	Other
BASE: all respondents	371	145	119	70
	%	%	%	%
Digital identity	33	39	34	21
Border control/security	12	11	16	13
National identity (passports, voter identification)	8	10	7	4
Artificial intelligence	7	7	6	7
Healthcare	7	6	7	9
Policing and law enforcement	6	5	5	9
Consumer biometrics	5	5	8	3
Surveillance systems	4	3	4	6
Commercial uses	4	5	3	6
Enterprise biometrics	2	2	1	1
Call centres	1	1	-	3
Counterterrorism	1	1	1	-
Social media and political use	1	1	-	-
None	1	1	-	3
Other	1	1	1	3
Don't know	6	3	8	13

Lower percentage mention

As last year, there was very little variation between the users and the suppliers in the response to this question.

Academics and those working for other organisations such as NGOs and international bodies were more likely to have difficulty answering this question and were least likely to mention digital identity, albeit it was still their top mention.

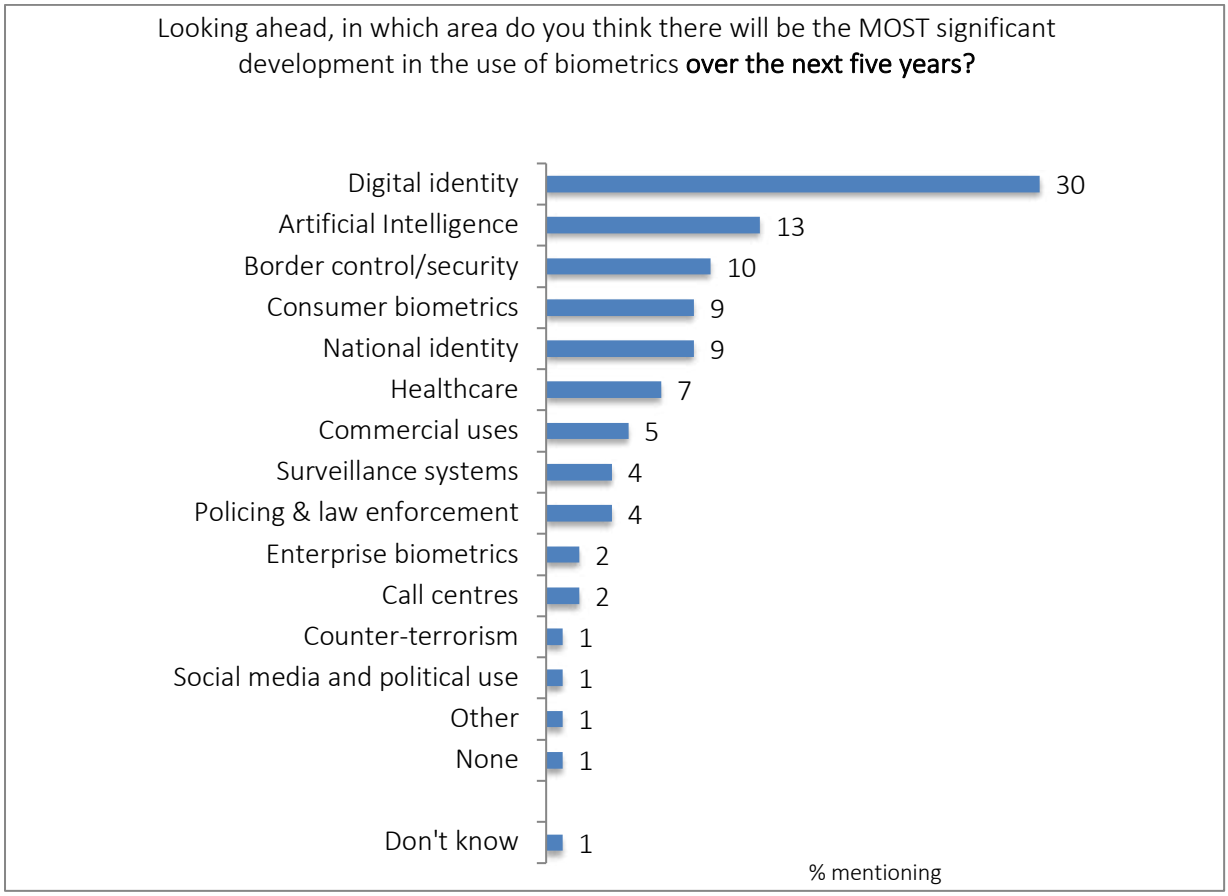
Participants were then asked which other developments, if any, they felt were significant during the last 12 months. The chart below shows all those mentioning any aspect, either as the most significant development or as another significant development over the last year.



In this broader analysis, digital identity continued to dominate the areas thought to have shown significant developments over the last 12 months with nearly three quarters selecting it. Interestingly, national identity (such as passports and voter identification) overtook border control/security in terms of total mentions, but the latter also continued to feature strongly. Both were selected by over 40%.

TRENDS: LOOKING FORWARD TO THE NEXT FIVE YEARS

This question asked respondents to select the development they expected to be the most significant over the next five years and then which others might also be significant. The next table looks at the development expected to be most significant with respondents asked to only provide one answer.



Digital identity is expected to be a key area for the use of biometrics, not just now but over the next five years – up to 30% mention from 17% last year.

As last year this was followed by artificial intelligence (13%), and then border control/security (10%).

The next few charts look in more detail at the response to this question amongst within region and amongst suppliers vs users.

The next table shows the areas in which the most significant development is thought likely to take place in the next five years in each of the four analysed regions.

Looking ahead, in which area do you think there will be the MOST significant development in the use of biometrics over the next five years?	TOTAL	Europe	ANZ	Americas	Other regions
BASE: all respondents	371	150	64	78	43[L]
	%	%	%	%	%
Digital identity	30	30	44	31	16
Artificial intelligence	13	17	5	14	12
Border control/security	10	12	6	5	16
National identity	9	9	8	15	5
Consumer biometrics	9	7	13	13	7
Healthcare	7	5	5	3	16
Commercial uses	5	5	5	4	5
Surveillance systems	4	5	-	3	7
Policing and law enforcement	4	2	13	3	2
Call centres	2	2	-	1	2
Enterprise biometrics	2	1	-	5	2
Social media & political use	1	2	-	1	2
Counterterrorism	1	1	-	2	5
Other	1	1	-	3	-
None	1	1	-	-	-
Don't know	1	1	2	-	2

CAUTION: L = Low base

Higher percentage mentions Lower percentage mentions

The overall pattern of responses was broadly similar across the regions in terms of the main areas expected to show significant developments over the next five years but there was some variation.

Those in ANZ were even more likely to mention digital identity than the other regions and less likely to mention artificial intelligence. They also mentioned policing and law enforcement to a greater extent.

Those in the 'other' regions (Asia, Africa, and the Middle East), mentioned healthcare to the greatest extent.

The table below compares the responses of the users, suppliers and other sectors on this question.

Looking ahead, in which area do you think there will be the MOST significant development in the use of biometrics over the next five years?	TOTAL	Suppliers	Users	Others
BASE: all respondents	371	145	119	70
	%	%	%	%
Digital identity	30	37	29	20
Artificial intelligence	13	10	13	20
Border control/security	10	10	10	9
Consumer biometrics	9	9	8	13
National identity	9	10	13	4
Healthcare	7	6	6	6
Commercial uses	5	6	4	1
Surveillance systems	4	2	4	6
Policing and law enforcement	4	4	4	4
Enterprise biometrics	2	2	2	1
Call centres	2	1	2	1
Counterterrorism	1	1	2	3
Social media and political use	1	1	2	3
Other	1	1	-	3
None	1	-	-	3
Don't know	1	-	2	3

Higher percentage mentions Lower percentage mentions

The supplier community were especially likely to focus on digital identity as a development area for biometrics over the next five years, with those from the 'other' category least likely to do so. This group on the other hand were a bit more focussed on artificial intelligence than the users and suppliers.

Respondents were also asked in which other areas they expected significant developments in the use of biometrics in the next five years. The table overleaf combines these additional mentions with the area where the most significant development in the use of biometrics was expected.

Significant developments in next five years	Most significant development	Other significant developments	All mentions
BASE: all respondents (371)	%	%	%
Digital identity	30	46	76
National identity	9	46	55
Border control/security	10	45	55
Healthcare	7	38	45
Artificial intelligence	13	31	44
Consumer biometrics	9	35	44
Policing & law enforcement	4	36	40
Commercial uses	5	27	32
Surveillance systems	4	28	32
Enterprise biometrics	2	27	29
Counterterrorism	1	20	21
Social media & political use	1	16	17

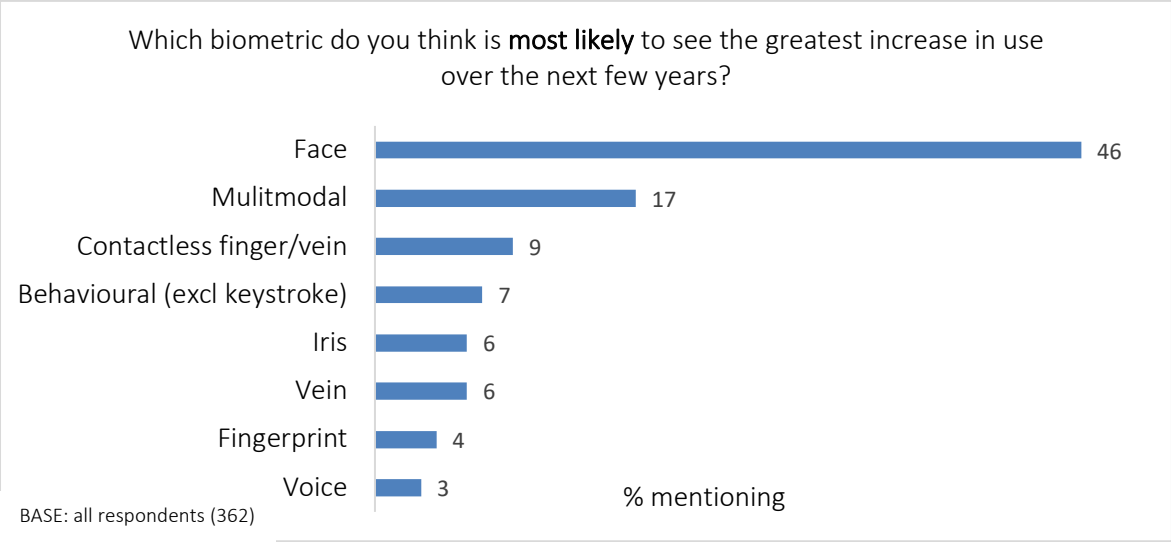
Call centres	2	8	10
Other	1	1	2
None/no others	1	1	2
Don't know	1	1	2

When the additional, secondary expected developments were added in, digital identity remained at the top of the table. However, all national identity, border control/security and healthcare usurped artificial intelligence, moving it into fifth place.

All these areas were felt likely to show significant developments over the next five years by at least 40% of these industry professionals, with digital identity selected by three quarters of them.

MODALITIES

Respondents were asked which biometric from a prompt list they felt would be most likely to be on the increase over the next few years and which others might also be on the increase. The table below shows those modalities with the highest level of mentions.



The response to this question was very similar to last year. Continuing the pattern seen over the last few years, face was still the biometric expected most likely to dominate and was selected by just under half of these industry professionals (marginally down from 51% last year). Also reflecting last year's findings, this was followed by multimodal at 17% and contactless finger/vein at 9%. Behavioural biometrics (7%), iris (6%), vein (6%) fingerprint (4%) and voice (3%) followed.

The table below compares the response to this question within each of the regions analysed.

Which biometric do you think is most likely to see the greatest increase in use over the next few years?	TOTAL	Europe	ANZ	Americas	Other regions
BASE: all respondents	362	150	64	78	43[L]
	%	%	%	%	%
Face	46	47	52	47	44
Multimodal	17	18	19	17	16
Contactless finger/vein	9	12	3	5	12
Behavioural (excl keystroke)	7	9	3	4	2
Iris	6	4	8	6	7
Vein	6	1	9	10	2
Fingerprint	4	3	-	4	9
Voice	3	4	3	1	-
Retina	1	1	2	1	2
Signature	1	-	-	-	5
Gait	1	-	2	-	-
Hand	*	-	-	1	-
Heart rate	*	1	-	-	-
Keystroke	*	1	-	-	-
Other	1	-	-	3	-

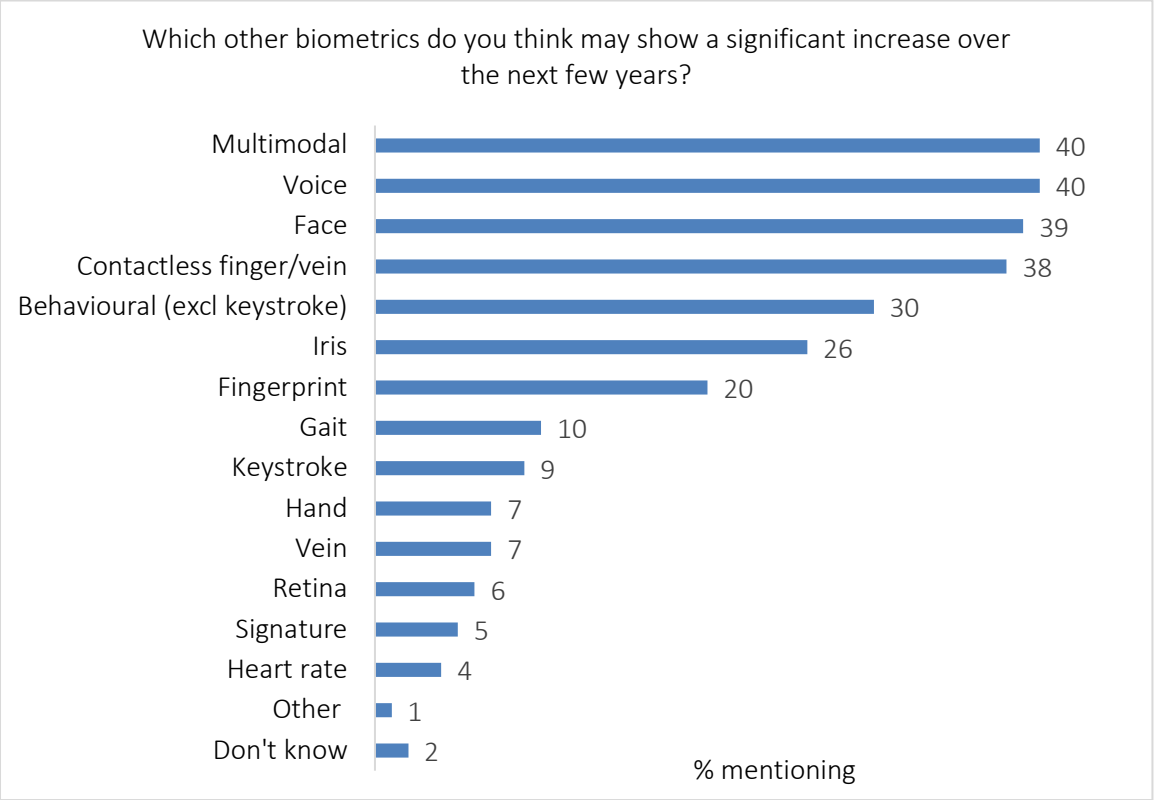
CAUTION: L = Low base

Higher percentage mentions

The pattern of response was very similar across all regions with face dominating in all of them, followed by multimodal.

The only noticeable variation was more selection of contactless fingerprint/vein in Europe and 'Other' regions and of vein in isolation in ANZ and the Americas.

Respondents were then asked which other biometrics they thought may show a significant increase over the next few years.



When asked which other biometrics may on the increase, multimodal (40%), voice (40%) and face (39%) and contactless finger/vein (38%) topped the list.

Behavioural biometrics showed a noticeable rise to 30% mention, with iris (26%) and fingerprint (20%) both mentioned at similar levels to last year.

The table below shows the summation of both these questions for the total sample (i.e. the % mentioning a modality either as the most likely to be on the increase or as a secondary answer) and compares it to the last couple of years.

Modalities expected to be on the increase over the next five years – most likely plus others	2018	2019	2020	**2021**
BASE: all respondents	288	432	326	**362**
	%	%	%	**%**
Face	90	97	89	**85**
Multimodal	58	61	58	**57**
Contactless finger/vein	n/a	n/a	50	**47**
Iris	47	39	30	**32**
Voice	45	45	40	**43**

Fingerprint	41	40	25	**24**
Behavioural biometric (excl keystroke)	27	23	24	**37**
Vein	17	13	8	**13**
Retina	16	17	11	**7**
Keystroke	12	12	9	**9**
Gait	9	10	13	**10**
Hand	8	8	7	**7**
Heartrate	7	5	9	**4**
Signature	7	5	8	**6**
Other	4	5	5	**2**

Higher percentage mention than in 2020

In this analysis mention of the face biometric remained almost universal, as seen over the last few years.

Mention of all other biometrics was very similar to last year, with behavioural biometrics (excluding keystroke which was listed separately) the only one to show a notable increase, mainly as a secondary mention.

The table below compares the total mentions within each region.

Modalities expected to be on the increase over the next five years – most likely plus others	TOTAL	Europe	ANZ	Americas	Other regions
BASE: all respondents	**362**	150	64	78	43[L]
	%	%	%	%	%
Face	**85**	84	83	87	95
Multimodal	**57**	54	67	57	56
Contactless finger/vein	**47**	52	29	49	53
Voice	**43**	42	48	39	40
Behavioural biometric (excl keystroke)	**37**	44	29	33	18
Iris	**32**	28	31	29	49
Fingerprint	**24**	26	18	21	37
Vein	**13**	8	12	15	16
Gait	**10**	10	11	8	12
Keystroke	**9**	10	6	9	7
Retina	**7**	7	8	4	9
Hand	**7**	6	5	6	12
Signature	**6**	5	2	4	17
Heart rate	**4**	3	3	3	9
Other	**2**	1	-	7	2

CAUTION: L = Low base

Higher percentage mention Lower percentage mention

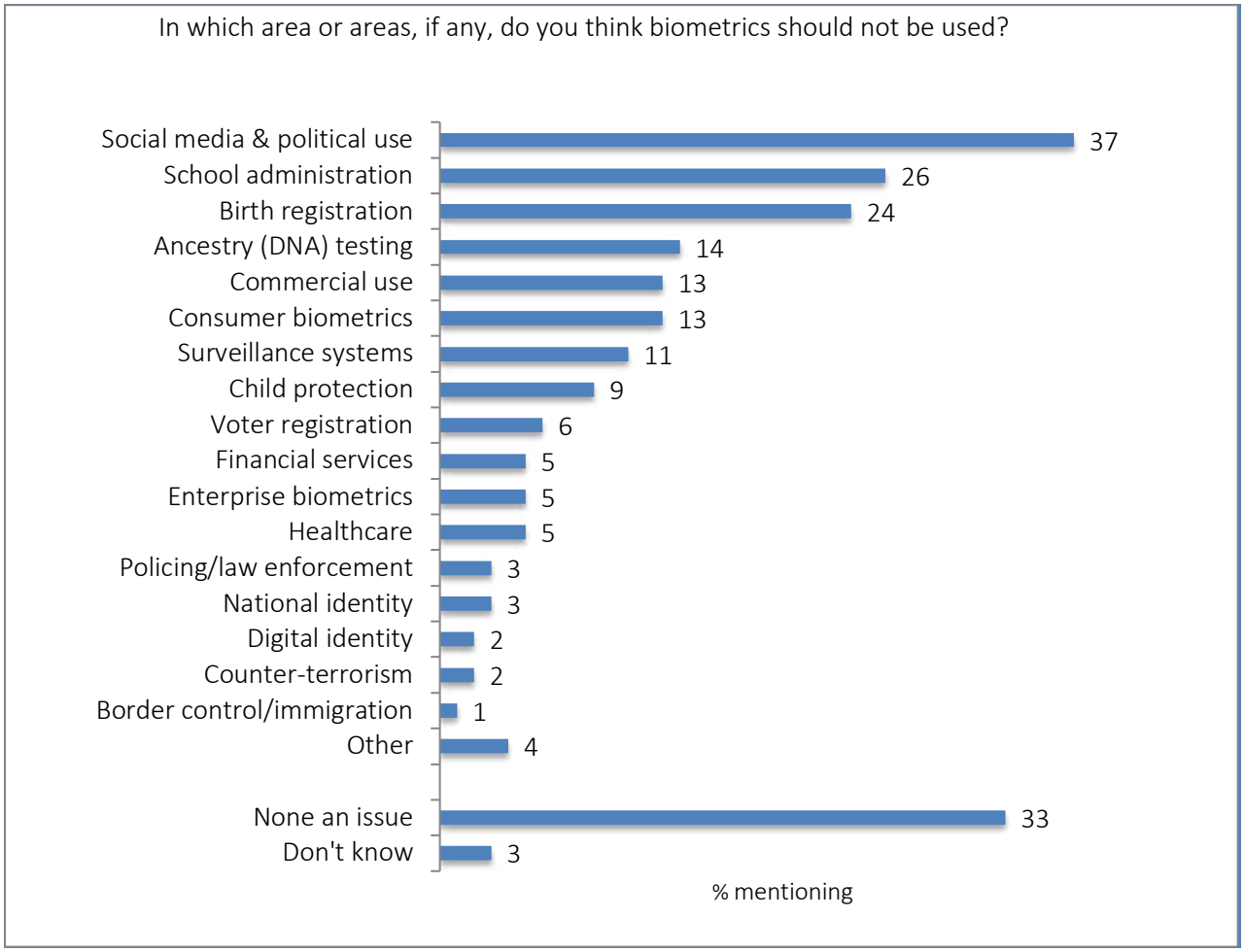
Face dominated in all the analysed regions. Multimodal also featured highly but particularly so in the ANZ region. As last year those in ANZ were least likely to mention contactless finger/vein as a modality likely to see a significant increase in use over the next few years.

As mentioned earlier there was an increase in mention of behavioural biometrics this year, especially in Europe.

Those in regions other than Europe, ANZ and the Americas (NB low base) had greater expectations for iris, fingerprint, hand, and signature biometrics than those elsewhere.

USE AREAS

Respondents were asked which areas from a prompt list where they felt biometrics should not be used.



As last year, only around a third felt that all implementations were acceptable.

On average, these professionals mentioned two unacceptable uses. The top three remained the same as last year and were led by social media and political use (37%) and school administration (26%) - both to a similar degree to 2020. These were followed by birth registration (24%). The newly introduced option, ancestry (DNA) testing, was next at 14%, alongside commercial use and consumer biometrics (both selected by 13%) and surveillance at 11%.

No other use case was mentioned by more than 10% and it is noticeable that very few were critical of the use of biometrics in large scale public ways such as for policing, counterterrorism, border control and national identity.

The next table again looks at the main responses (over 4% mention overall) within the analysed regions.

In which area or areas, if any, do you think biometrics should **not** have been implemented?	TOTAL	Europe	ANZ	Americas	Other regions
BASE: all respondents	348	150	64	78	43L
	%	%	%	%	%
Social media and political use	37	33	42	35	42
School administration	26	31	33	15	19
Birth registration	24	23	23	19	28
Ancestry (DNA) testing	14	14	20	10	7
Commercial use	13	15	22	4	14
Consumer biometrics	13	13	13	8	16
Surveillance systems	11	10	11	15	12
Child protection	9	9	3	10	16
Voter registration	6	7	3	5	7
Financial services	5	6	13	-	2
Enterprise biometrics	5	6	9	-	-
Healthcare	5	5	6	3	5
None/ all acceptable	33	33	31	36	33
AVERAGE NO OF MENTIONS	2.1	2.2	2.5	1.8	2.2

CAUTION: L = low base

Higher percentage mention Lower percentage mention

Those in the Americas appeared to be less concerned about school administration and the commercial use of biometrics than their European and ANZ counterparts. Those in ANZ and Europe on the other hand, were a little more rejecting of use for school administration, financial services, and enterprise than the other regions with child protection use more of a concern in regions other than ANZ, Europe and the Americas.

Overall, those in ANZ mentioned a greater number of unacceptable use cases on average whilst those in the Americas were a little more accepting.

The table below compares the responses of users (government and private sector), suppliers and other industry professionals.

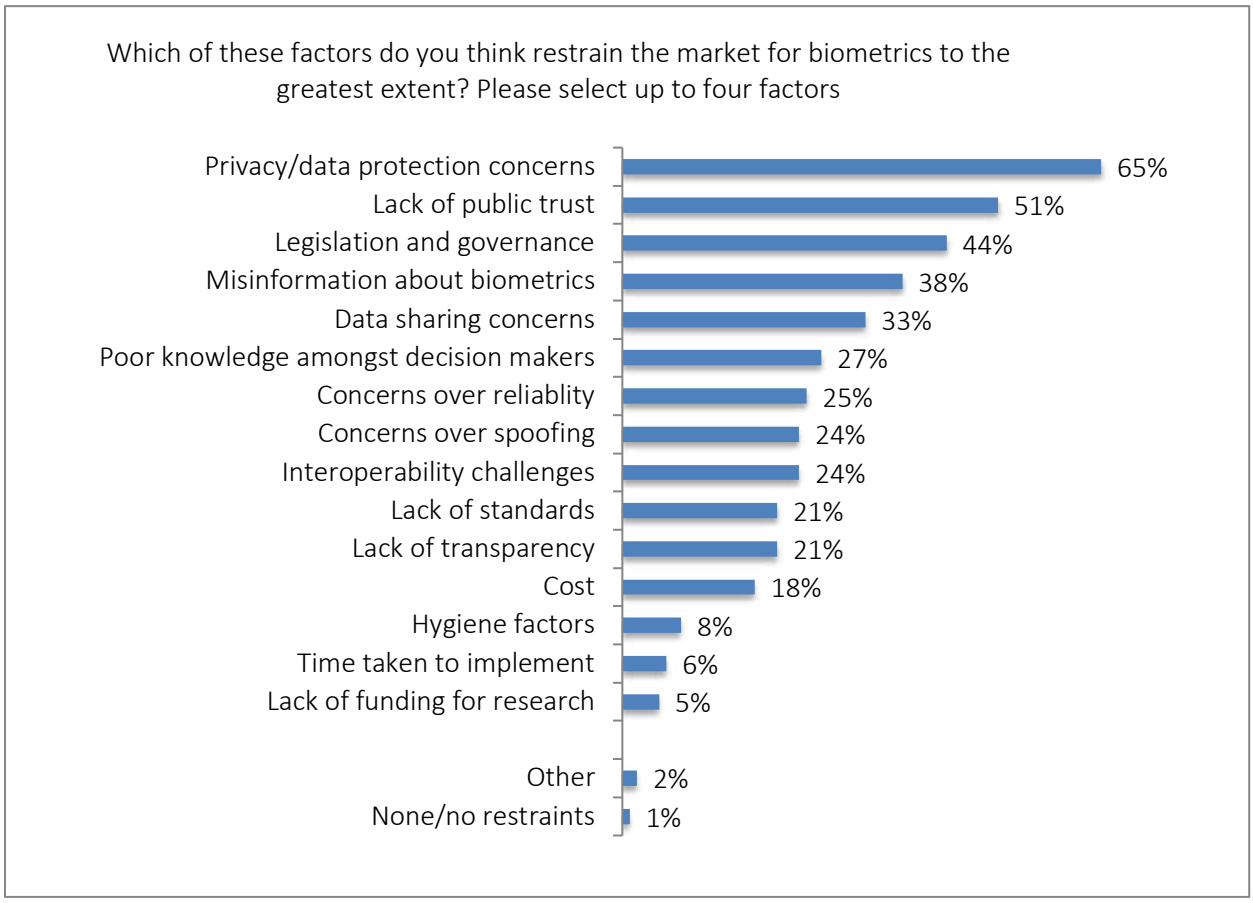
In which area or areas, if any, do you think biometrics should **not** have been implemented?	TOTAL	Suppliers	Users	Others
BASE: all respondents	326	92	145	70
	%	%	%	%
Social media and political use	37	35	37	39
School administration	26	23	29	29
Birth registration	24	19	27	24
Ancestry (DNA) testing	14	15	12	13
Commercial use	13	9	17	16
Consumer biometrics	13	9	13	16
Surveillance systems	11	10	10	17
Child protection	9	9	8	9
Voter registration	6	3	7	9
Financial services	5	3	8	7
Enterprise biometrics	5	1	7	7
Healthcare	5	1	8	6
None/all acceptable	33	37	31	31
AVERAGE NO OF MENTIONS	2.1	1.9	2.3	2.6

Higher percentage mention Lower percentage mention

The supplier community were generally less concerned about implementations, mentioning fewer unacceptable use cases overall.

MARKET RESTRAINTS

Respondents were encouraged to select **up to four factors** from a prompt list which they felt restrained the market for biometrics to the greatest extent. The list of answer options was slightly amended for this year's survey.



As seen over the last few years, privacy/data protection concerns topped the list with around two thirds again selecting it as a factor which restrained the market. The newly included lack of public trust took second position, selected by just over half (51%) of these industry professionals and was followed by legislation and governance (44%, up from 30% for last year's legislation and regulation), misinformation about biometrics (38%) and data-sharing concerns (33%). The latter two factors, and especially poor knowledge of biometrics amongst decision makers (27%) were selected by fewer than in previous years.

Several other restraints were mentioned by a fifth or more of the sample and, yet again, only 1% felt there were no restraints.

The next table looks at the perceived restraints amongst users vs suppliers vs other industry professionals.

Which of these factors do you think restrain the market for biometrics to the greatest extent? Please select up to four factors	TOTAL	Suppliers	Users	Others
BASE: all respondents	360	145	119	70
	%	%	%	%
Privacy/data protection concerns	**65**	66	68	63
Lack of public trust	**51**	54	56	40
Legislation and governance	**44**	39	50	40
Misinformation about biometrics	**38**	47	36	21
Data sharing concerns	**33**	28	38	33
Poor knowledge amongst decision makers	**27**	34	27	14
Concerns over reliability	**25**	24	27	26
Concerns over spoofing	**24**	28	22	20
Interoperability challenges	**24**	23	25	20
Lack of standards	**21**	21	23	16
Lack of transparency	**21**	17	21	24
Cost	**18**	19	18	11
Hygiene factors	**8**	9	8	9
Time taken to implement	**6**	6	6	3
Lack of funding for research	**5**	3	5	9
Other	**2**	-	-	11
None/no restraints	**1**	-	-	1

Lower percentage mentions Higher percentage mentions

As seen over the last few years, all these subgroups cited privacy/data protection concerns as the main market restraint.

The pattern of responses was very similar for the user and supplier groups. The professionals working in other roles in the industry were less likely to mention a lack of public trust, misinformation, and poor knowledge amongst decision makers.

It is also interesting to compare the perceptions of the key market restraints by region.

Which of these factors do you think restrain the market for biometrics to the greatest extent? Please select up to four factors	TOTAL	Europe	ANZ	Americas	Other regions
BASE: all respondents	360	150	64	78	43[L]
	%	%	%	%	%
Privacy/data protection concerns	**65**	65	63	73	60
Lack of public trust	**51**	45	69	56	42
Legislation and governance	**44**	41	52	45	37
Misinformation about biometrics	**38**	35	39	46	30
Data sharing concerns	**33**	37	33	24	30
Poor knowledge amongst decision makers	**27**	25	36	29	16
Concerns over reliability	**25**	27	28	22	21
Concerns over spoofing	**24**	24	19	26	30
Interoperability challenges	**24**	27	22	21	19
Lack of standards	**21**	23	17	24	12
Lack of transparency	**21**	21	20	21	14
Cost	**18**	15	19	12	28
Hygiene factors	**8**	9	3	5	19
Time taken to implement	**6**	5	3	6	9
Lack of funding for research	**5**	3	8	1	12
Other	**2**	3	-	3	2
None/no restraints	**1**	1	-	-	-

CAUTION: L = Low base

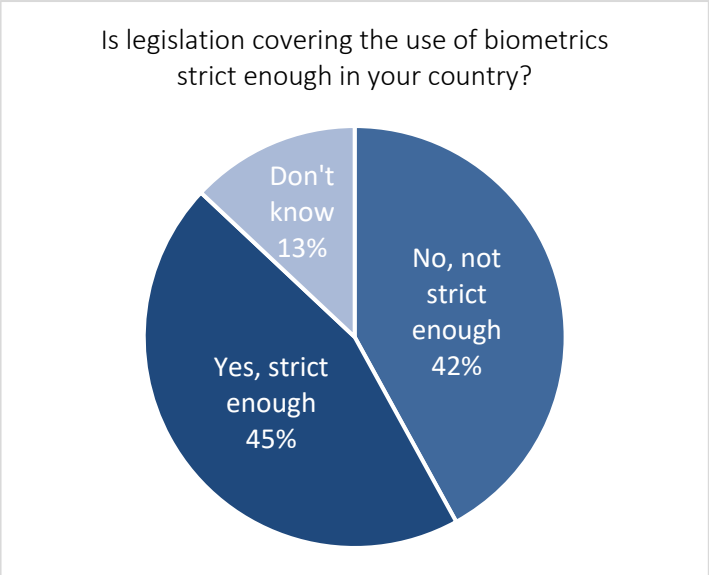
Higher percentage mentions Lower percentage mentions

Privacy/data protection concerns topped the list of key perceived restraints in most regions but in ANZ, lack of public trust was felt to me more of a restraint. Although still a little way down the list, those in ANZ were also more likely than the other regions to mention poor knowledge amongst decision makers.

Those in regions outside of ANZ, Europe and the Americas were more likely to mention cost, hygiene factors and a lack of funding for research than the other regions, albeit at a lower level than some of the other more universally mentioned restraints.

LEGISLATION AND CONTROLS

A question asking whether the legislation covering the use of biometrics is strict enough was introduced two years ago against a backdrop of debate in the industry about the varying controls in place around the world. Last year it was updated to is the legislation covering the use of biometrics strict enough in your country?



This year less than half (45%) felt that legislation was strict enough in their country vs just over half (52%) last year. 42% had concerns that it wasn't strict enough, a significant increase on last year where around a third held this view

BASE: all respondents (360)

Analysis at a country level isn't possible but the next chart looks at the response to this question in different regions.

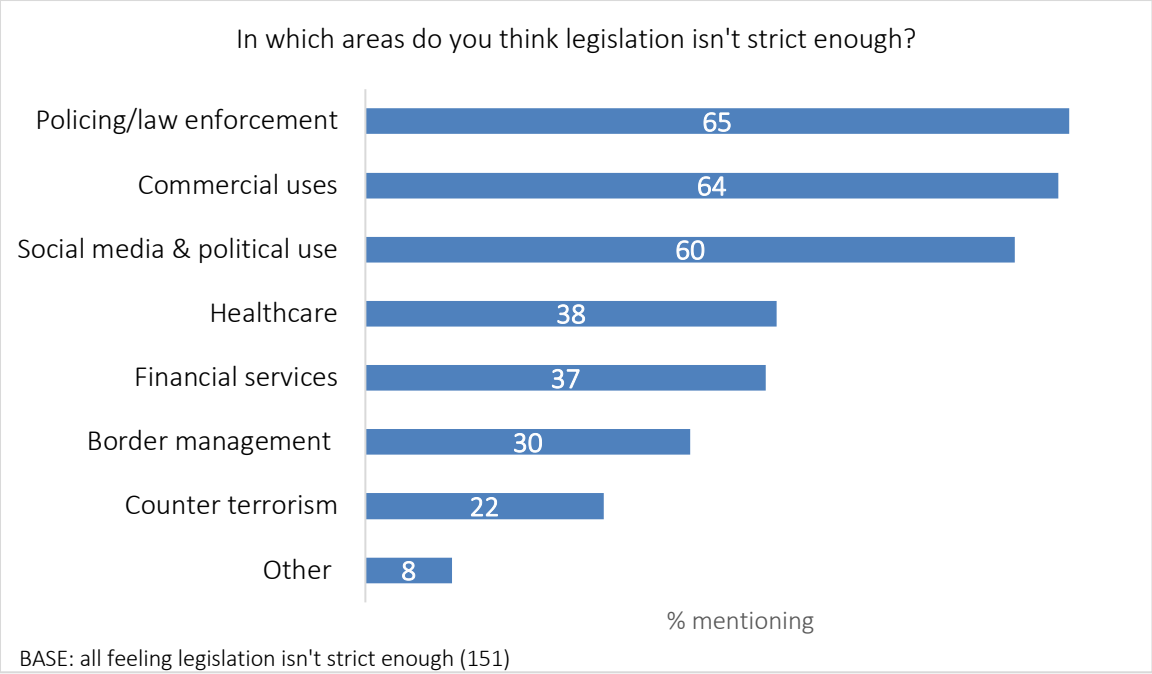
Is legislation covering the use of biometrics strict enough in your country?	TOTAL	ANZ	Europe	Americas	Other
BASE: all respondents	360	64	150	78	43[L]
	%	%	%	%	%
Yes, strict enough	45	44	56	36	30
No, not strict enough	42	47	31	49	60
Don't know	13	9	13	15	9

CAUTION: L = Low base

Higher percentage mentions Lower percentage mentions

As last year, those in Europe were the most likely to feel there is already sufficient legislation in place with those in ANZ, the Americas and in particular in regions outside of Europe, ANZ and the Americas more strongly believing that there isn't sufficient in their country.

Those believing that legislation covering the use of biometrics wasn't strict enough in their country were asked in which particular areas they thought this to be the case.



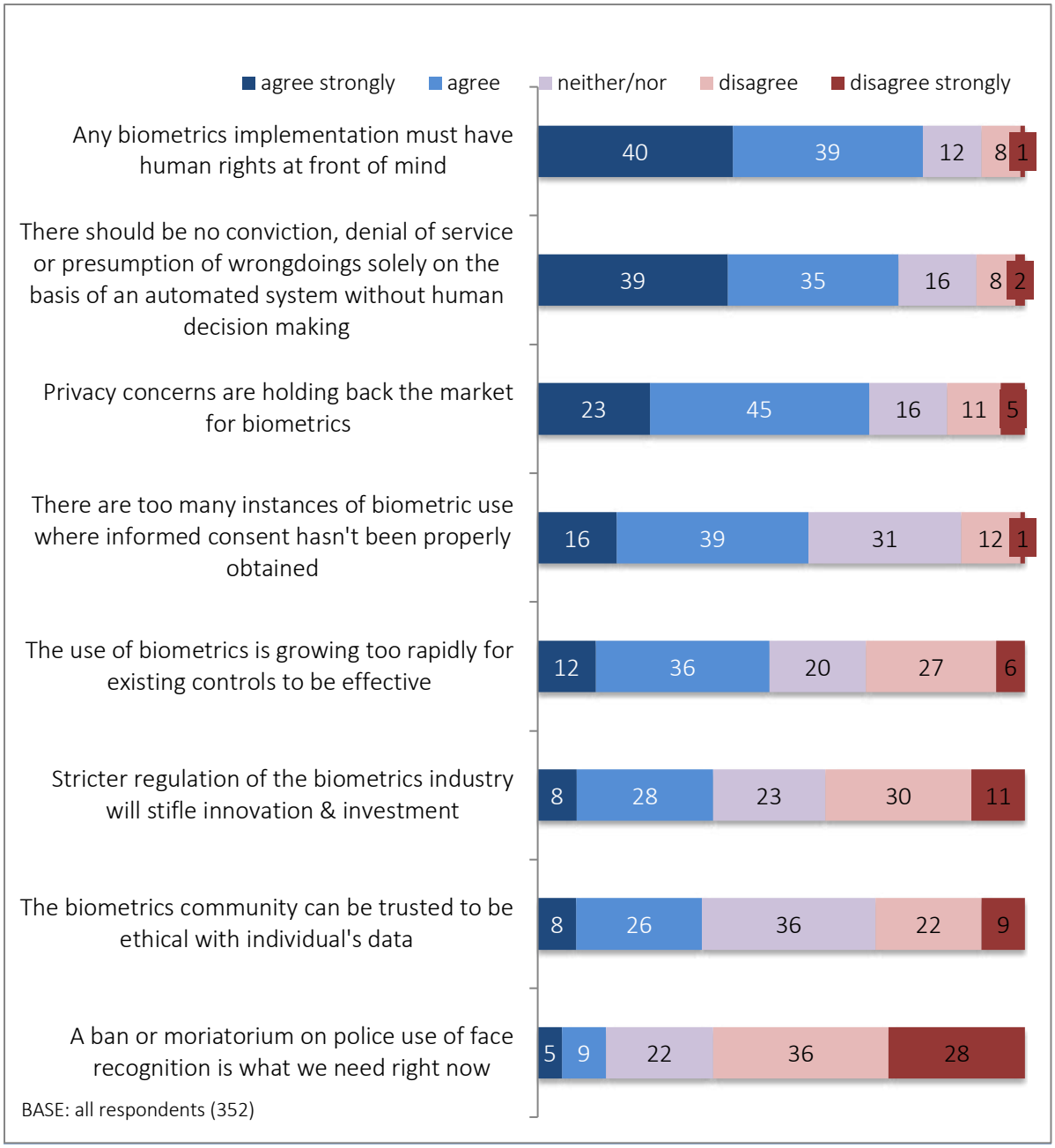
BASE: all feeling legislation isn't strict enough (151)

One average, those concerned about the lack of legislation mentioned between three and four areas. The three key uses of concern, all selected by around two thirds, were:

- Policing/law enforcement
- Commercial use and
- Social media and political use

At a lower but nonetheless significant level, healthcare, financial services, and border management were all cited by around a third.

To further understand this area, respondents were asked to what extent they agreed or disagreed with a series of statements relating to this topic, using a five-point scale agree disagree scale. Some of these statements had been included in previous Industry Surveys, others are new. The table below shows the responses and makes comparisons where appropriate.



It has been a widely held view over the last three years that privacy concerns are holding back the market for biometrics and the response was similar this year. 68% agreed that this was the case (down from 74% in 2020) and only 16% disagreed (vs 12%). Suppliers and those in the Americas were especially likely to agree with this position, whilst those users and those working in other roles were likely to disagree.

Over half of these industry professionals (55%) still believe that there are too many instances of biometric use where informed consent hasn't been properly obtained. This response was very consistent across the industry sectors and regions analysed.

After some perceived improvement last year, this year a higher 48% felt that the use of biometrics is growing too rapidly for existing controls to be effective with a lower 33% disagreeing. Reflecting Europeans higher level of comfort with existing legislation seen earlier, they were also more likely to disagree with this statement than those in other regions. Those working in the industry in roles other than suppliers or users of the technology on the other hand, were more likely to agree that growth was too rapid for existing controls to cope.

There is still uncertainty as to whether the biometrics community can be trusted to be ethical with individual's data with approximately a third believing they could be, 36% unsure either way and 31% feeling they couldn't be trusted. Views were consistent across the various subgroups analysed.

Respondents remain divided on the issue of whether stricter regulation of the biometrics industry will stifle innovation and investment with marginal disagreement with this statement on balance (41% disagreeing vs 36% agreeing (higher than in 2020)). Those in the ANZ region were significantly more likely to disagree with those in the 'Other' regions showing the highest levels of agreement.

This is clearly an issue which creates debate but given the general concerns expressed there does seem to be a perceived need for more controls and as seen earlier, existing legislation is still felt to be insufficient overall.

In addition to last year's statements in this area, three new ones were added.

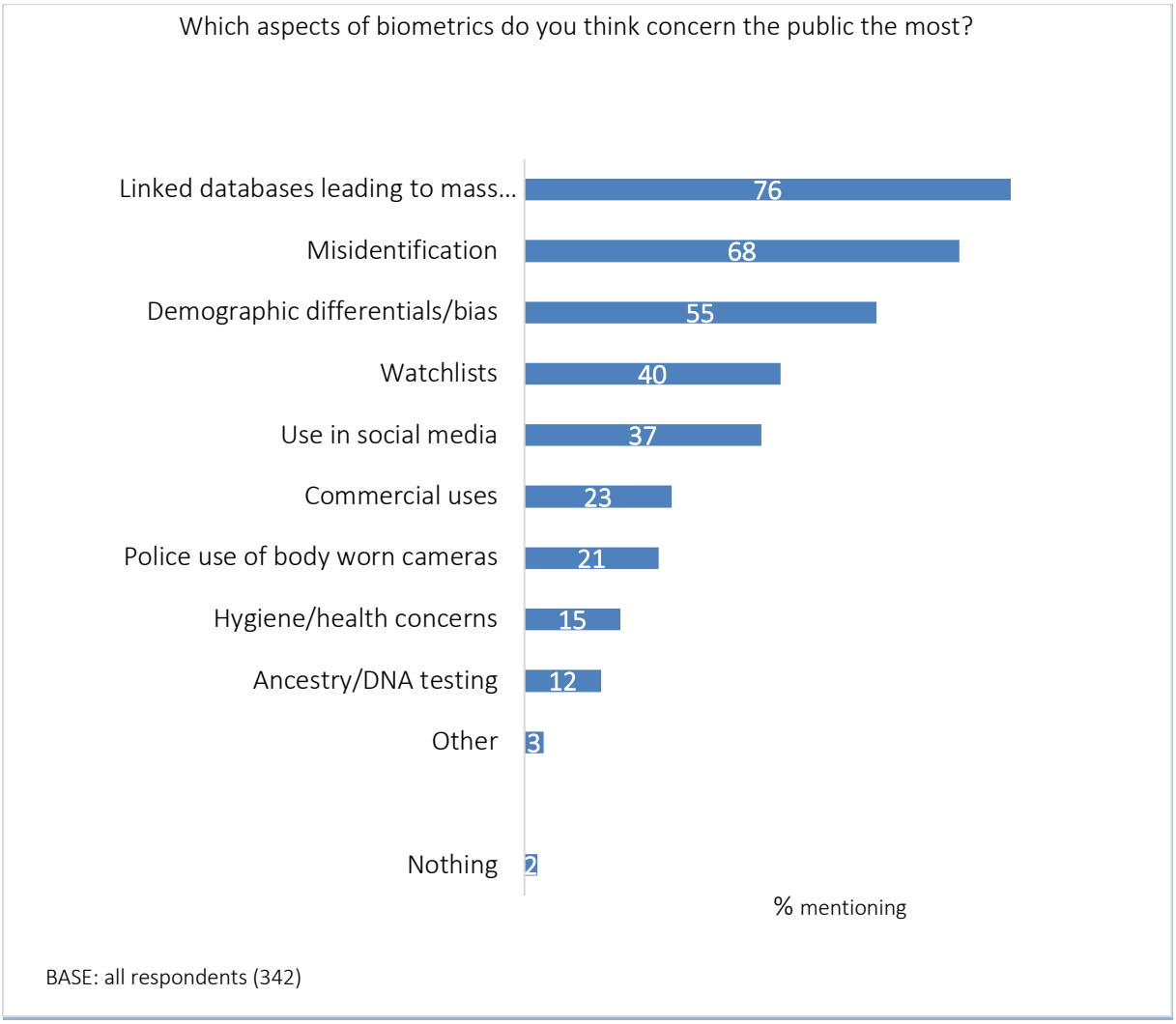
There was strong support across all groups that any biometrics implementation must have human rights at front of mind (79% agreement and only 9% disagreement overall).

There was also strong agreement (74%) that there should be no conviction, denial of service or presumption of wrongdoing solely based on an automated system without human decision-making. A 'human in the loop' is clearly seen as an important part of the process.

The final statement touched on an issue which has been the subject of fierce discussion and debate over the last few years. However, it was clear that only a small minority of these industry professionals (14%) felt that a ban or moratorium on police use of facial recognition is what we need right now with nearly two-thirds (64%) disagreeing with such action. Those in Europe and ANZ, and the user community (particularly those in government) were particularly against such a ban.

PUBLIC PERCEPTIONS

Last year in response to the increased discussion surrounding misinformation and public support for biometrics a question was asked relating to the aspects of biometrics which these industry professionals thought concerned the public the most. We included it again this year and also asked respondents to let us know to what extent they agreed or disagreed with a series of statements relating to the public's perception of biometrics.



As last year, the two main public concerns (from a prompt list) were believed to be linked databases leading to mass surveillance (76%) and misidentification (68%, up significantly from 50%), followed by demographic differentials/bias, ending up on a watchlist and use in social media.

Commercial uses and police use of body worn cameras were cited as public concerns by one in five and hygiene/health concerns and Ancestry/DNA testing by more than one in ten.

Very few (2%) thought the public had no concerns.

The next table looks at the perceived public concerns by region and by users vs suppliers vs other industry professionals.

Which aspects of biometrics do you think concern the public the most?	TOTAL	Europe	ANZ	Americas	Other
BASE: all respondents	326	150	64	78	43[L]
	%	%	%	%	%
Linked databases leading to mass surveillance	76	80	89	65	65
Misidentification	68	66	78	68	63
Demographic differentials/bias	55	55	56	59	47
Watchlists	40	41	42	44	33
Use in social media	37	37	34	38	40
Commercial use	23	22	22	21	30
Police use of body-worn cameras	21	20	17	26	21
Hygiene/health concerns	15	12	16	14	26
Ancestry (DNA) testing	12	7	16	14	19
Other	3	5	2	3	-
Nothing concerns the public	2	2	-	3	5
AVERAGE NO OF MENTIONS	3.3	3.5	3.7	3.5	3.5

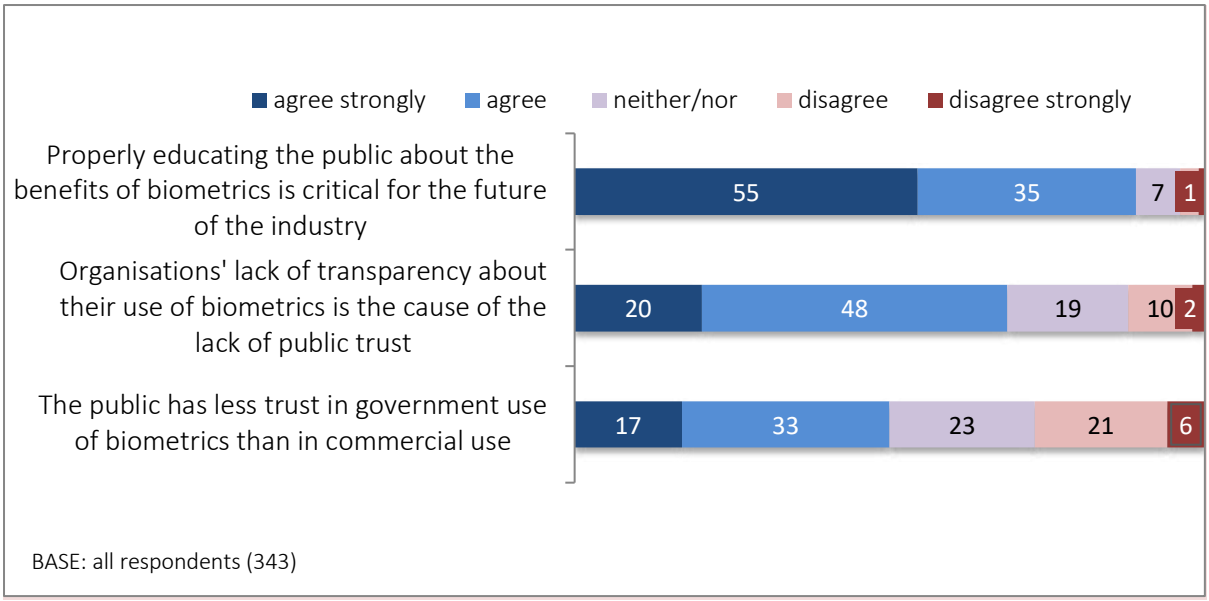
CAUTION: L = low base

Higher percentage mentions Lower percentage mentions

Linked databases leading to mass surveillance was the main perceived public concern in both Europe and ANZ, followed by misidentification at a lower level.

In the Americas and regions outside of Europe/ANZ/the Americas, misidentification was mentioned at a similar level to linked databases. In the 'other' regions, hygiene/health concerns were also mentioned at a higher level.

Respondents were then asked to what extent they agreed or disagreed with a series of statements relating to the public perception of biometrics, using a five-point scale agree/disagree scale.



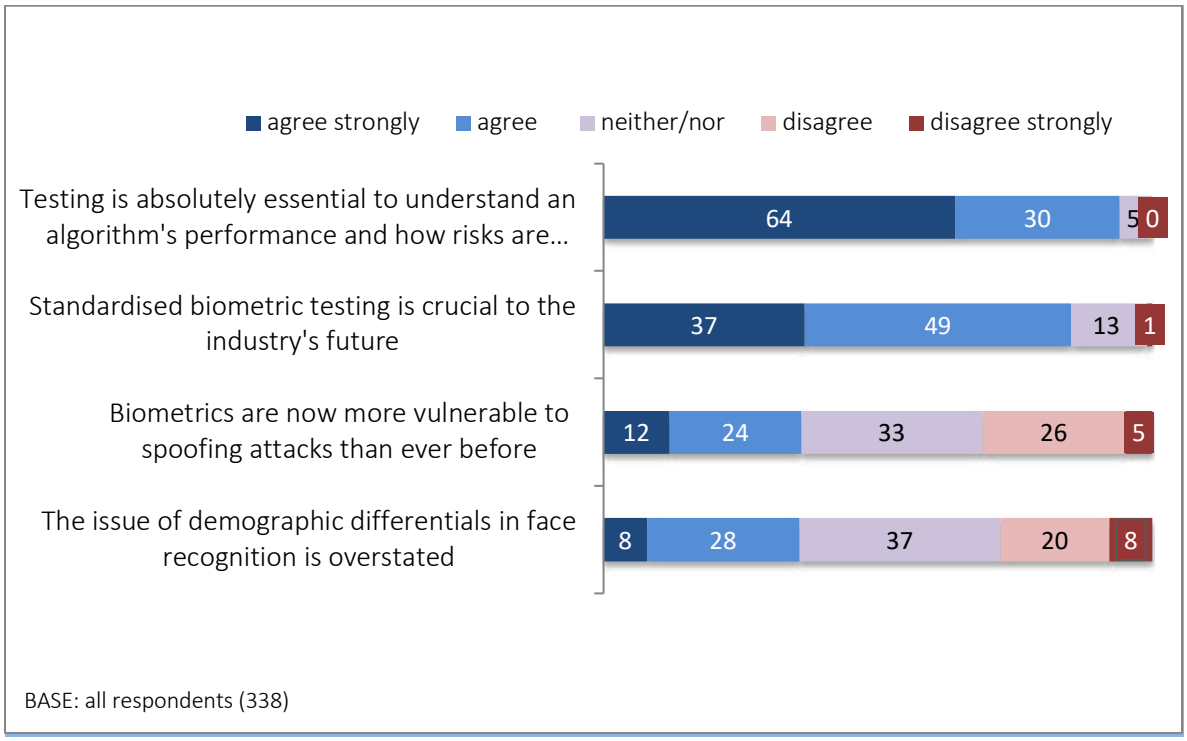
As in 2020, the statement, properly educating the public about the benefits of biometrics is critical for the future of the industry, prompted one of the highest levels of agreement overall (90%) with negligible disagreement. Those in ANZ were particularly likely to hold this view and there was also great consistency in the response of suppliers and the user community. This is clearly an area which the industry needs to work on together.

Two new statements were introduced in this area both of which attracted more agreement than disagreement. Over two-thirds felt that organisations' lack of transparency about their use of biometrics is the cause of the lack of public trust with only 12% disagreeing with this view. This was particularly strongly felt in regions other than ANZ, Europe or the Americas but was generally quite a widely held view.

On balance these industry professionals agreed that the public has less trust in government use of biometrics than in commercial use with 50% agreeing with this view and only just over a quarter (26%) disagreeing. Interestingly even those in government expressed a similar pattern of responses.

TESTING AND TECHNOLOGY

There has been a lot of discussion in the industry about testing over the last year, so some new statements were added to the one on standardised testing included in previous Industry surveys to gauge views. Respondents were again asked to what extent they agreed or disagreed with each one using a five-point scale.



BASE: all respondents (338)

Over 90% of these industry professionals agreed that testing is absolutely essential to understand an algorithm's performance and how risks are managed, and as seen in previous years, a similarly high proportion (86%) agreed that standardised biometric testing is crucial to the industry's future.
These views were held across the various regions and by both suppliers and users of the technology indicating that testing is a very important area for the biometrics industry as a whole.

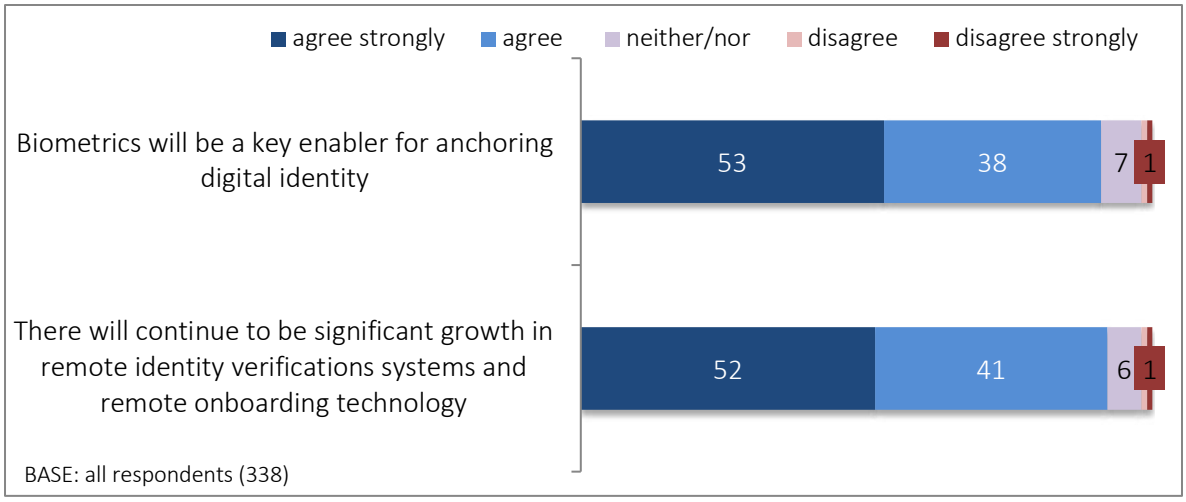
There was a more diverse range of opinions as to whether the issue of demographic differentials in face recognition is overstated – 36% agreed that this was the case whilst 28% disagreed. The remaining 37% weren't sure/didn't know. Those in Europe were less likely to agree that they are overstated, with those in the Americas tending to agree to a greater extent. This issue has clearly created a lot of debate and views are still polarised.

Similarly, there were mixed views as to whether biometrics are now more vulnerable to spoofing attacks than ever before – 36% thought they were, 31% disagreed and the remainder were unsure. Suppliers and those in the Americas were most likely to disagree. Regardless this is an area where the industry cannot afford to be complacent.

DIGITAL IDENTITY

As mentioned earlier, digital identity was the area in which there was thought likely to be the most significant development in biometrics over the next few years in last year's survey and this view has strengthened in this year's survey. This year 30% cited it as the area most likely to see significant development, with a further 46% mentioning it as a secondary area.

Owing to the interest in digital identity, we included more questions in this year's survey including two new attitude statements. Respondents were asked to what extent they agreed or disagreed with each one, using a five-point scale.



Just over 90% agreed that biometrics will be a key enabler for anchoring digital identity. Similarly, 93% felt that there will continue to be significant growth in remote identity verification systems and remote onboarding technology. This was a consistent response across the analysed subgroups.

Respondents were then asked about their organisation's timescale for exploring interoperability.

When do you envisage your organisation will be exploring interoperability?	TOTAL	Europe	ANZ	Americas	Other
BASE: all respondents	335	149	63	77	43[L]
	%	%	%	%	%
It already is	56	51	59	64	56
Within the next year	6	7	3	8	7
1 – 2 years	10	11	13	4	14
More than 2 years	8	7	13	6	7
Never	1	1	-	1	-
Not applicable	19	24	13	17	16

Higher percentage mentions

Around a fifth worked for organisations where the question wasn't applicable but over half (56%) claimed their organisations were already exploring interoperability. Those in the Americas appeared to be marginally ahead in this area.

These industry professionals were then asked about their expectation for the timing of mainstream consumer adoption of self-sovereign identity (giving control to the user).

When do you expect there will be mainstream consumer adoption of self-sovereign identity, that is giving control to the user	TOTAL	Europe	ANZ	Americas	Other
BASE: all respondents	337	150	64	78	43[L]
	%	%	%	%	%
It has already occurred	6	5	8	5	7
Within the next year	6	5	5	8	7
1 – 2 years	13	13	14	9	16
2 – 4 years	23	23	30	23	19
Longer	23	27	16	22	26
Never	5	3	6	8	5
Don't know	23	23	22	26	21

CAUTION: L = Low base

Higher percentage mentions

Around a quarter of the respondents didn't feel able to give an answer to this question. Amongst those who did, the majority thought it would happen at some point but not in a hurry. Nearly half (46%) thought it would be two years or more. Only 5% couldn't see it happening at all.

This pattern of response was very similar across the regions analysed with ANZ perhaps marginally more optimistic about the timescale.

Finally in this section, respondents were asked how they felt consumer perceptions of biometrics impacted on digital identity adoption.

In which of these ways do you think that consumer perceptions of biometrics impact on digital identity adoption?	TOTAL	Supplier	User	Other
BASE: all respondents	337	145	119	70
	%	%	%	%
Very positively (+5)	12	14	13	4
Somewhat or quite positively (+4)	51	58	51	39
No impact (+3)	8	6	8	11
Somewhat or quite negatively (+2)	30	26	29	41
Very negatively (+1)	3	1	3	4
AVERAGE SCORE	3.4	3.5	3.4	3.0

Higher percentage mentions Lower percentage mentions/average

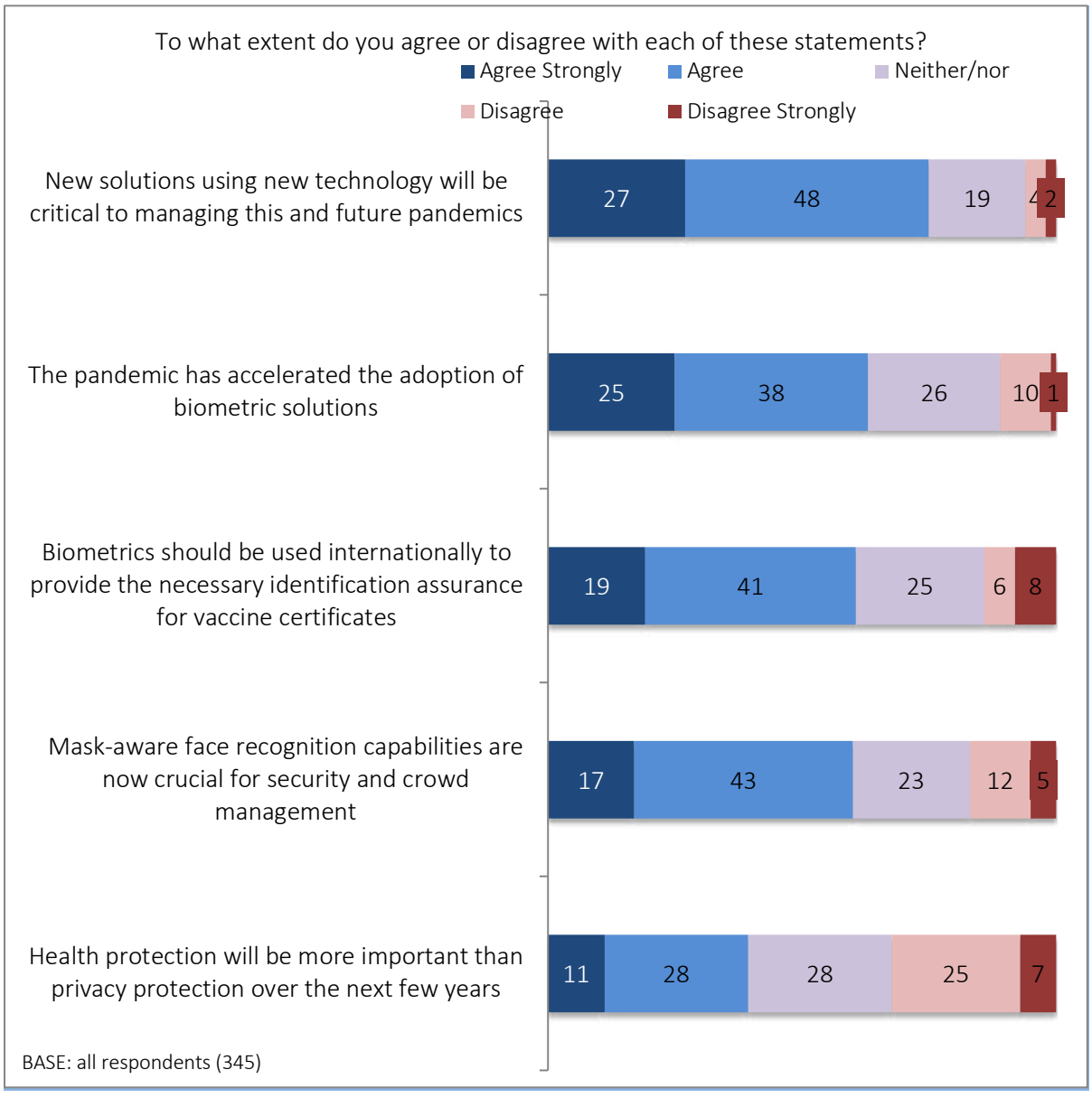
There was polarisation in the response to this question with under 10% feeling there was no impact, 63% thinking there was a positive impact and a third a negative one.

Whilst suppliers and users thought the impact was quite positive on balance, those in other organisations such as academics, regulatory organisations and IGO's were more evenly split.

THE IMPACT OF COVID-19

During the late winter/early spring of 2020 the global pandemic took hold. At the time of this survey, nearly eighteen months later, much of the world is still in some form of lockdown.

Respondents were asked to what extent they agreed or disagreed with several statements relating to the potential specific impacts of COVID-19 on the use of biometrics.



The majority (75%) agreed that new solutions using new technology will be critical to managing this and future pandemics and nearly two thirds (63%) felt that the pandemic has accelerated the adoption of biometric solutions. Perhaps unsurprisingly, suppliers were particularly likely to agree with the first statement whilst both users and suppliers showed relatively high levels of agreement with the second in comparison to those not working directly with the production or use of biometric technology.

Whilst overall, most (60%) also agreed that biometrics should be used internationally to provide the necessary identification assurance for vaccine certificates, the same 'Other' group were less convinced that this should be the case.

Sixty percent also agreed that mask-aware face recognition capabilities are now crucial for security and crowd management with particular agreement from regions other than Europe, ANZ and the Americas and notably more disagreement in Europe (25% vs 17% amongst the total sample).

There were more diverse opinions as to whether health protection will be more important than privacy protection over the next few years – with 39% agreeing with this premise, 32% disagreeing and the remaining 28% uncertain. Those in regions other than Europe, ANZ and the Americas were significantly more convinced that this would be the case.

Please feel free to share any of these findings with your clients or colleagues, referencing *Biometrics Industry Survey 2021.*

For any queries on these findings, please email nicky@biometricsinstitute.org