

HIGHER EDUCATION IN THE DIGITAL ERA

*The current state of transformation
around the world*

Trine Jensen



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around the world in the digital era

Technological advancements bring about new opportunities for improving the human condition, yet they also introduce new social challenges and the risk of creating divisions between those who have access to potential benefits and those who do not. The preconditions for leveraging the potential of technological developments are very different among and within countries, which implies that the rapid changes risk exacerbating rather than bridging digital divides. To counter this trend, the International Association of Universities (IAU) fosters collaboration among higher education institutions, as IAU believes that this is an essential component to bridge-building, facilitating leapfrogging and capacity building through mutual exchange with a common goal of leveraging the potential of technological advancements *for good* and rendering them accessible *to all*.

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This report presents the results of the Open Consultation carried out by the International Association of Universities (IAU) from 1 November 2018 to 1 April 2019. The aim of the consultation was to take stock of the current state of digital transformation in higher education around the world and to inform the development of a new IAU Policy Statement.

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FOREWORD

Technology in itself is merely a means to an end, yet technological developments are leading to fundamental changes in higher education and in society - and this at an unprecedented pace. This is why the International Association of Universities (IAU) has made 'technology in higher education' one of its key priorities in order to discuss, debate and bring to the attention of leaders of higher education and policy makers the issues at stake and the opportunities to be explored.

On one hand, technological developments are exciting and aspiring as they come with an untapped potential for exploring new opportunities for tackling challenges facing societies, opportunities in terms of teaching, learning and research. Yet, at the same time, the opportunities for exploring and leveraging the potential of technology are very different from one country to another and within countries, which means there is a great risk of exacerbating divides. This implies that our mission is twofold: we need to consider the opportunities to be explored and at the same time to advocate and raise awareness of the important global challenges and risks related to digital transformation in order to close gaps, avoid biases and ensure an inclusive, fair, ethical and human-centred approach to digitalization.

In this complex context, IAU stresses that 'there is no one size that fits all' to digital transformation in higher education and society. It is crucial to bring together views and experiences from different parts of the world and to discuss the values and principles that must underpin digital transformation at the global level. This is essential in order to build bridges and create mutual understanding of local as well as global challenges to determine the key values and principles that are pivotal in order to shape a meaningful, human-centred digital future for the common global good, regardless of where in the world we are physically based. This is precisely the aim of the new IAU Policy Statement that is currently being developed.

This report presents the results of the Open Consultation, conducted to monitor the current state of digital transformation in higher education from a global perspective and inform the drafting of the policy statement. IAU is pleased to present this first stock-taking exercise in the field, and to contribute to discussing the current state of transformation, the risk of inequalities, the ethical implications and how to jointly leverage the potential of technological developments **for a sustainable future**.

We hope you enjoy the wealth of information presented in this report. The aim is that it will fuel the much-needed debates on digital transformation in higher education and contribute to the IAU Policy statement. Together we can shape the digital future that we want for higher education to better serve its purpose and society as a whole.

Hilligje van't Land

Secretary General, International Association of Universities

Remus Pricopie

Rector, SNSPA, Romania & Chair of the IAU Working group on Technology in higher education



INTRODUCTION

This report presents the results of the Open Consultation carried out by the International Association of Universities (IAU) from 1 November 2018 to 1 April 2019. The aim of the consultation was to take stock of the current state of digital transformation in higher education around the world and to inform the development of a new IAU Policy Statement. It is structured around five main sections:

I) Context, methodology and sample

The first part sets the context, explains the rationale, method and outreach. It also introduces the data sample by region and by breakdown between public and private institutions. Finally, it presents the profile of responding institutions to provide a sound understanding of the sample to be considered when reviewing the results.

II) Assessing the external environment of higher education institutions (HEIs)

This section focuses on the national context in which higher education institutions (HEIs) are operating in order to assess to what extent HEIs are operating in an environment conducive to digital transformation. This section examines both the infrastructure and governance in terms of policies and higher education regulations.

III) Transformation at the institutional level

In the third part, the institutions are at the centre of the review of the current transformation taking place. The first part focuses on institutional governance.

This is followed by a section looking at changes as they relate to teaching and learning; it also examines the use of Open Educational Resources (OERs) and the current trends in terms of Open Science. Considering the public discourse and an increasing need for Lifelong Learning (LLL), there is a specific section dealing with this aspect. The section ends with a summary of what HEIs consider the key achievements and the major challenges in terms of digital transformation.

IV) Perceptions of the developments

The last part of the report presents respondents' perceptions and opinions of current and future developments as well as of commonly used assumptions and claims related to digital transformation in higher education and society.

V) Conclusions in relation to the Policy Statement

Finally, the conclusions include the key outcomes of the consultation and a reflection of how the results can be transformed into forming the principles of the IAU Policy Statement.

I. CONTEXT, METHODOLOGY AND SAMPLE

I.1 SETTING THE CONTEXT

Technology in higher education became a strategic priority for the International Association of Universities (IAU) as part of its Strategic Plan 2016-2020. IAU Members agreed that technological development has significant implications for the future development of higher education and society. The main objective set out in the plan was to develop a new policy statement building on, yet moving beyond, the principles laid out in 'Universities and Information and Communications Technologies (ICTs)' adopted in 2004. While many of the principles of the latter remain relevant, the context, opportunities and implications of technology in higher education and in society have drastically changed over the past decade and continue to change at a rapid pace.

To oversee the development of the Policy Statement, an Expert Advisory Group (EAG) was established composed of IAU Board members and experts from different parts of the world, bringing together a broad range of expertise both in higher education leadership as well as in specific areas of digital transformation[7]. To plan the work and to discuss the initial outline of the statement, the EAG met in Bucharest,

Romania in May 2018. The meeting was generously hosted by the National University of Political Studies and Public Administration (SNSPA). The EAG agreed the roadmap to the statement which included carrying out a consultation among higher education institutions (HEIs) around the world to take stock of the current level of transformation, and to gather information about their experiences and views on the future.

The Open Consultation was divided into two separate consultations: **i)** one targeting the leadership of HEIs (referred to in the report as 'leadership consultation' in the text and as 'C1' in the graphs) and **ii)** one open to all representatives in HEIs across the institution (referred to as the 'comprehensive consultation' in the text and 'C2' in the graphs). The purpose of having two separate consultations was based on the desire to reach out to the leadership of HEIs and to do so, it was important that the consultation was as succinct as possible. The comprehensive consultation included a more detailed set of questions, seeking more background information on respondents and their HEIs. While the first consultation specifically targeted the leadership of HEIs, the comprehensive consultation was open to all representatives from HEIs.



[1] The list of the Expert Advisory Group (EAG) members is available here : <https://iau-aiu.net/technology?onglet=1>

It was also decided that several representatives from the same institution could contribute to the consultation in order to collect information as many different sectors as possible within institutions that may be involved in activities or initiatives related to digital transformation. In most cases, institutions responded once or twice, but a number of institutions, particularly in the Middle East, responded more than twice.

The main objective of the consultation was to inform the development of the policy statement, but it is all the same interesting to present the results of this global consultation to generate awareness about the commonalities and differences that derive from the outcomes of the consultation. It is essential to keep in mind that the open consultation is composed of voluntary contributions of HEIs interested in and willing to take part in the consultation to shape the IAU policy statement.

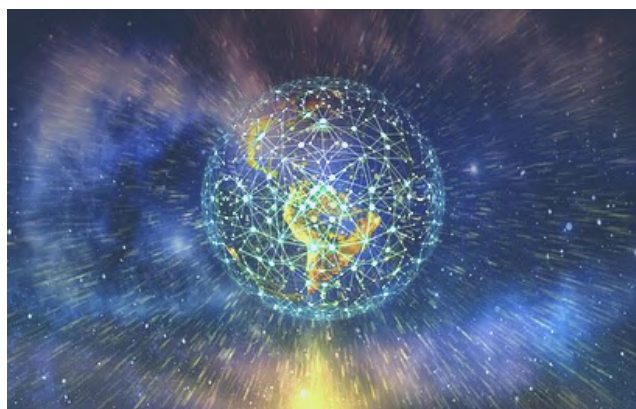
I.2 REACHING OUT TO THE HIGHER EDUCATION INSTITUTION COMMUNITY

The IAU World Higher Education Database (www.whed.net) constitutes the key source of information for reaching out to higher education institutions worldwide. The database includes information on more than **18,500** higher education institutions (HEIs) in **196** countries. For the launch of the Open Consultation in November 2018, **6,440** heads of institutions received an invitation to take part in the Open Consultation and **2,681** representatives from the international relations offices also received the invitation encouraging them to share it with relevant staff internally in the institution.

Beyond the individual invitations sent to **9,121** contacts, IAU invited its Member Organizations and its Affiliates to disseminate invitation to participate in the consultation through their networks; several heads of institutions also contributed to the outreach by sharing the consultation through their national networks and rectors conferences. IAU is grateful to its partners around the world who took part in disseminating the consultation, including among others UNESCO, the Commonwealth of Learning (COL), the European University Association (EUA), the Association of Universities of Latin America and the Caribbean (UDUAL), the Association of African Universities (AAU), the Conference of Rectors of Universities (CRUE), Spain and the Groningen Declaration Network (GDN). We also thank other partners who contributed to this effort without our awareness.

I.3 WHO RESPONDED TO THE OPEN CONSULTATION?

Taking into account the total number of replies to both consultations, IAU received **1,039** complete replies from **127** countries. The leadership consultation gathered **347** complete replies from **107** countries, and the comprehensive consultation gathered **692** replies from **106** countries.



I.3.1 BREAKDOWN BY REGION

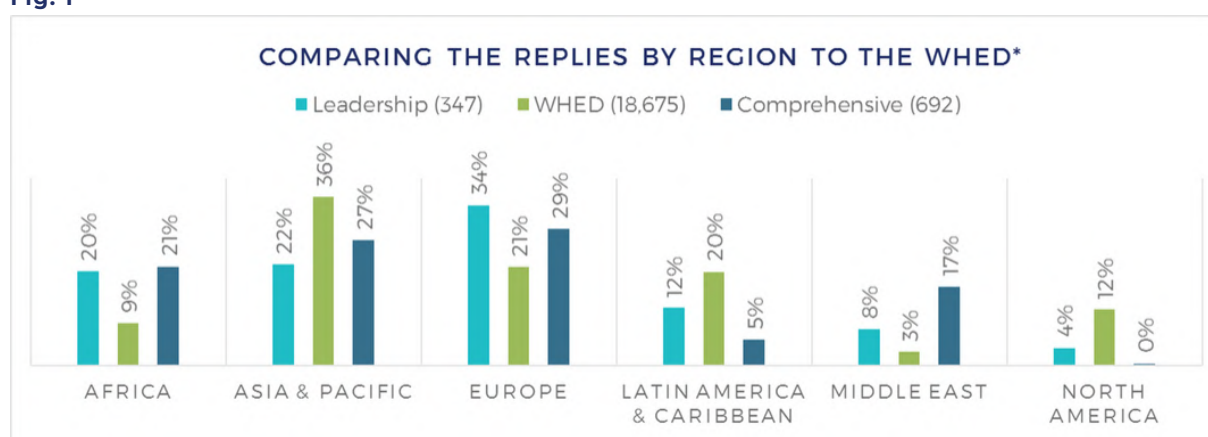
The distribution of replies by region is listed in the table below.

When comparing the regional breakdown of respondents against the number of institutions by region in the WHED (**Fig.1**), we see that Africa, Europe and the Middle East provided proportionately more replies when compared to the respective numbers of HEIs in the WHED. Asia & the Pacific is slightly lower and the participation of Latin America and the Caribbean (LAC) while North America is significantly lower than the number of HEIs in their respective regions. Due to the particularly low participation from North America, it has been excluded from the regional comparison throughout the analysis. However, the responses received from this region are included in the global dataset.

As the participation of LAC is more significant, it has been included in the regional breakdown of the data, but it is important to keep in mind that representation of LAC, particularly in the comprehensive consultation, is lower than the other regions. As mentioned, this consultation reflects the replies from respondents who participated in the voluntary contribution to shape the IAU policy statement. HEIs around the world received an invitation to take part, and all regions received an equal opportunity to contribute to the consultation. While we regret the low participation in LAC and North America, probably due to high level of national surveys on this topic, we were very pleased with the overall global involvement and the high response rate to the first survey by IAU in this field. IAU would like to thank all respondents for the time they invested and support they provided, which constitute an important contribution to the development of the policy statement.

	Africa	Asia & the Pacific	Europe	Latin America & Caribbean	Middle East	North America
Leadership consultation: 347	70	75	119	43	27	13
%	20%	22%	34%	12%	8%	4%
Comprehensive consultation: 692	146	186	202	38	117	3
%	21%	27%	29%	5%	17%	0%

Fig. 1



*The data from the IAU World Higher Education Database (WHED.net) were extracted on 13 March 2019

1.3.2 PROFILE OF RESPONDING INSTITUTIONS

The comprehensive consultation includes information on the profile of respondents and their institutions, which are presented in this section. However, as the leadership consultation was more succinct, in order to encourage a high response rate, it therefore did not contain these background questions.

1.3.2.1. BREAKDOWN BY PUBLIC AND PRIVATE HEIS

The higher education landscape continues to change. To assess the type of institutions that took part in the Open Consultation, we included a question to distinguish public, private not-for-profit and private for-profit (Fig.2). The global data shows that most responses came from public institutions (61%).

The regions with the most responses from public institutions are Europe (79%), Africa (69%) and Asia & the Pacific (54%), followed by LAC (50%). The Middle East is the only region where the majority of responses came from private institutions (62%). In Fig. 3, this breakdown is compared to the distribution of HEIs in the WHED. However, the data from the WHED do not distinguish between private not-for-profit and private for-profit. In the WHED, 43% of all HEIs are public, which shows that the Open Consultation has a high representation of public institutions.

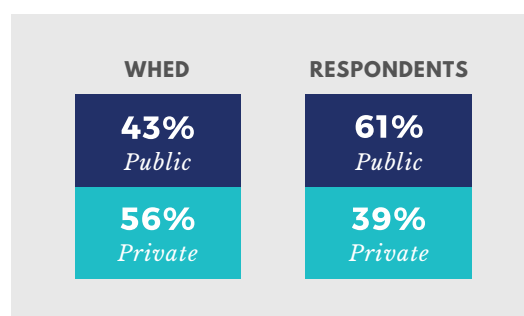


Fig. 2

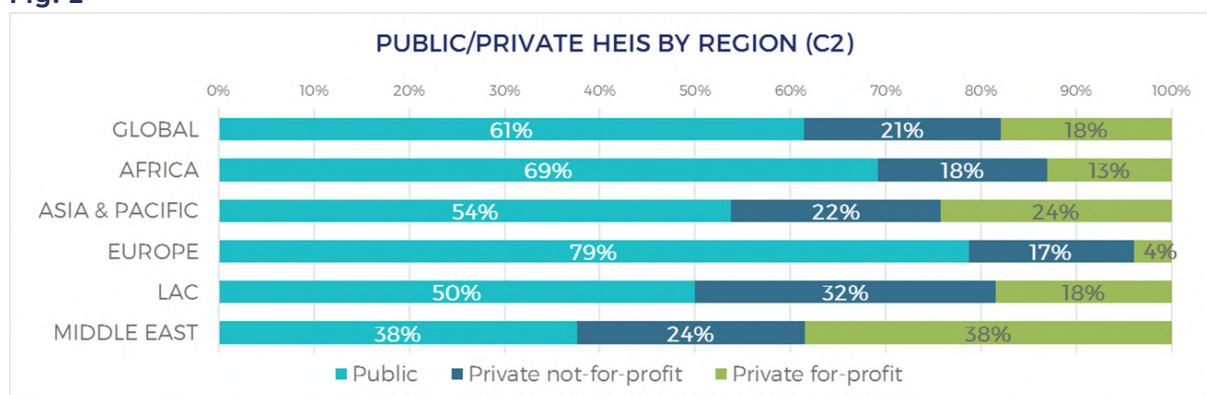
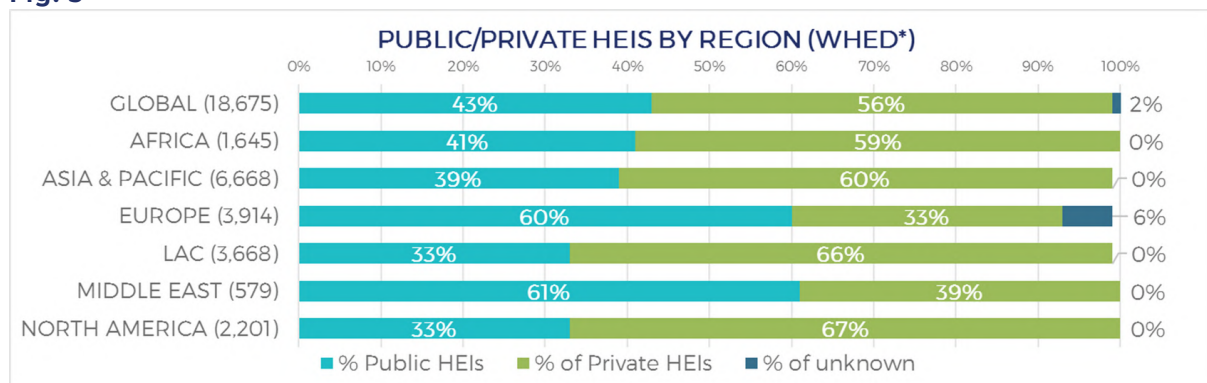


Fig. 3



* Based on data extracted from the IAU World Higher Education Database (www.whed.net) on 13 March 2019

1.3.2.2. SIZE AND FOCUS OF THE HEIS

Fig. 4 presents the size of responding institutions by student enrolment. The profile of the institutions (**Fig. 5**) shows that over 80% of the institutions focus on both teaching and research. Finally, **Fig. 6** lists the level of degrees awarded by the responding institutions where 89% are offering Bachelors degrees, 92% Masters degrees, and 69% PhD degrees.



Fig. 4

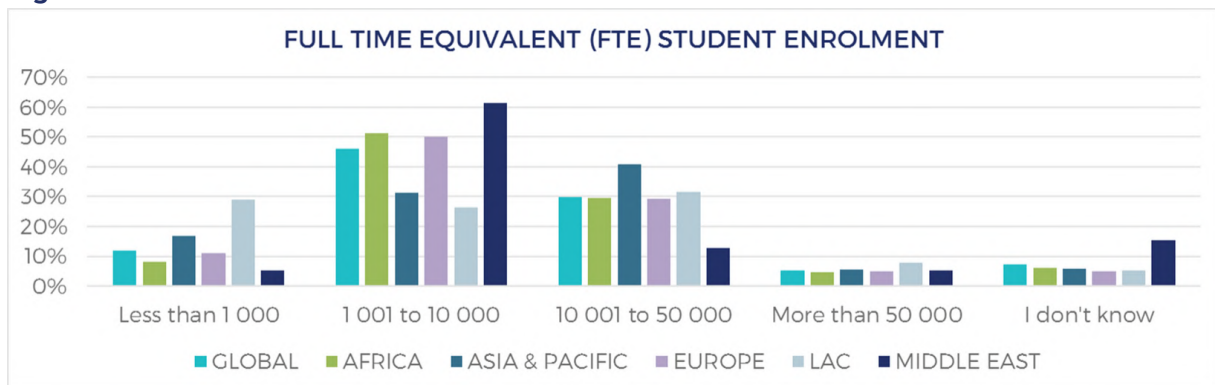


Fig. 5

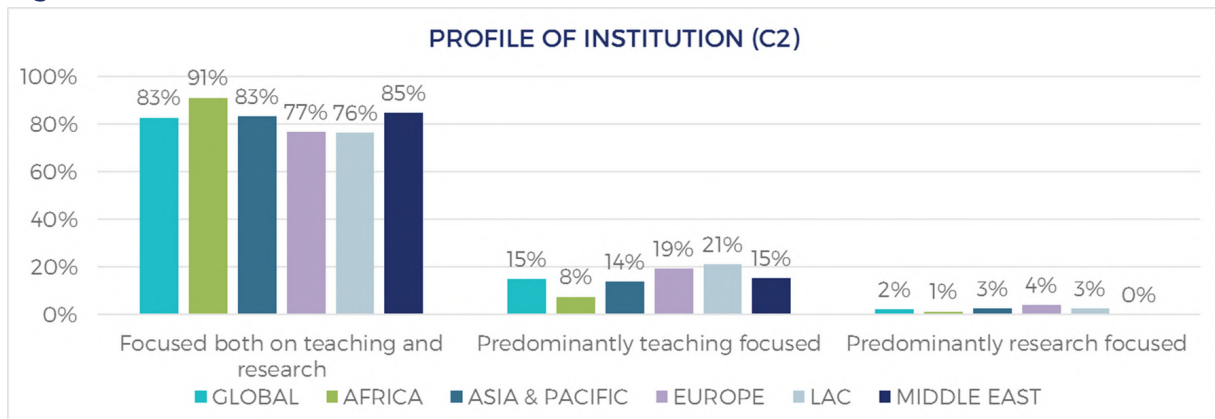
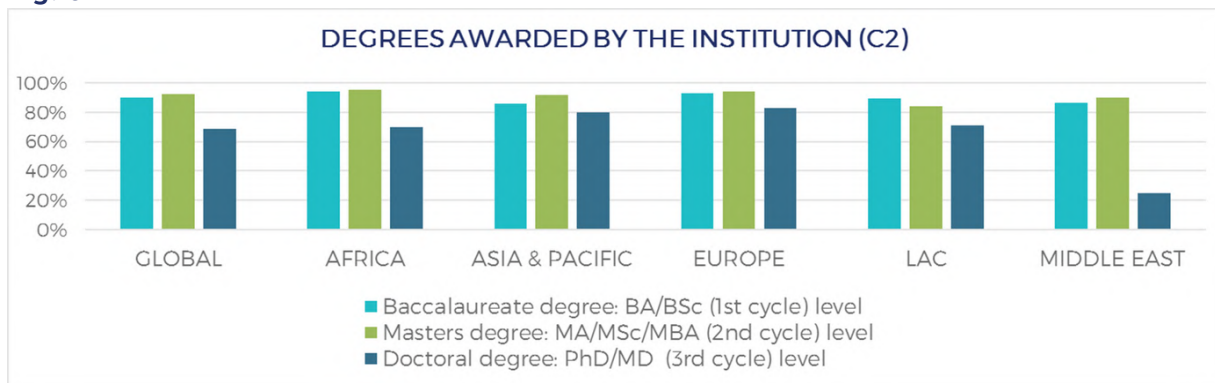


Fig. 6



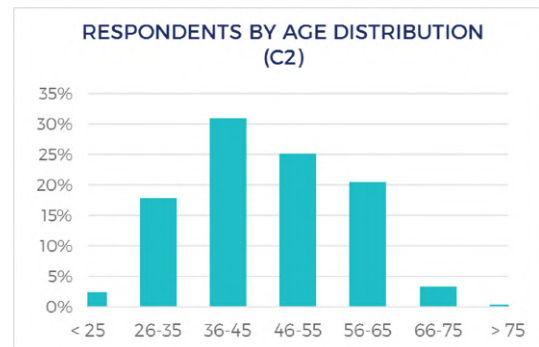
I.3.2 PROFILE OF RESPONDENTS

In both consultations, the respondents provided their title. The results are presented in **Fig. 7** for the leadership consultation and in **Fig. 8** for the comprehensive consultation. As expected, most respondents to the leadership consultation (39%) are at the highest level of leadership, but another important share comes from other senior positions within the HEIs. For the comprehensive consultation, most respondents are faculty, heads of departments and staff. It also includes contributions from senior leadership, although less important in the overall score. It was a challenge to have the two consultations taking place simultaneously and to ensure that invitations reached the right audience. In spite of the difficulty, overall we are very pleased with the participation results. In the comprehensive consultation, respondents also shared their gender and age (relatively few did not reply to these optional questions). We were pleased to note that 32% of them were women.

As technology has the reputation of being a male-dominated field, it is encouraging to see that around a third of the replies came from women. The age distribution is available in **Fig. 9**.



Fig. 9



The next section assesses to what extent the national environment in which the HEIs are operating is conducive to digital transformation.

Fig. 7

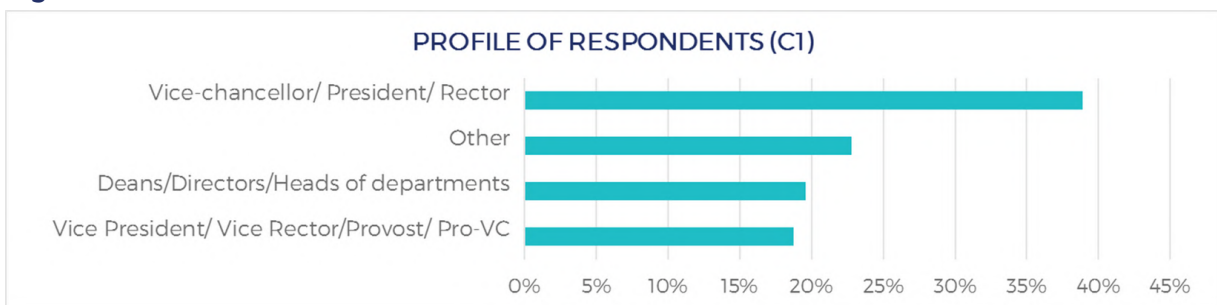
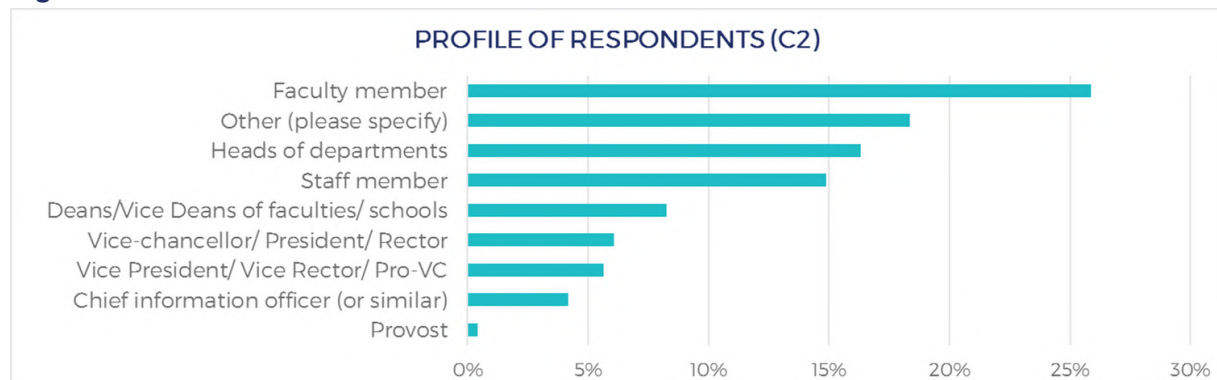


Fig. 8




II. EXTERNAL ENVIRONMENT

II.1 RELEVANCE OF NATIONAL HIGHER EDUCATION POLICIES, REGULATIONS AND SYSTEMS


To understand digital transformation at the institutional level, it is important to assess to what extent HEIs find that the national regulatory framework for higher education is appropriate and conducive to transition in the digital era. In the leadership consultation, the respondents assessed the extent to which the national regulatory policies (Fig. 10) and financial frameworks (Fig. 11) are supportive at the institutional level.

There are some differences among regions, but at the global level, the results show a divide between 'Mostly supportive with some exceptions' policies (32%) and 'variably supportive and constraining' policies (36%).

Are regulatory frameworks conducive to digital transformation ?



Asia & the Pacific has the most positive assessment,



where Europe has the most negative one.

Most replies lie at the middle of the scale, with a slight preponderance towards the negative end. The remaining respondents are equally divided between 'Highly supportive' (16%) and 'Mostly unsupportive' (17%). When adding together the replies on the supportive side compared to the less supportive side, 48% considers the policies supportive and 52% unsupportive.

Fig. 10

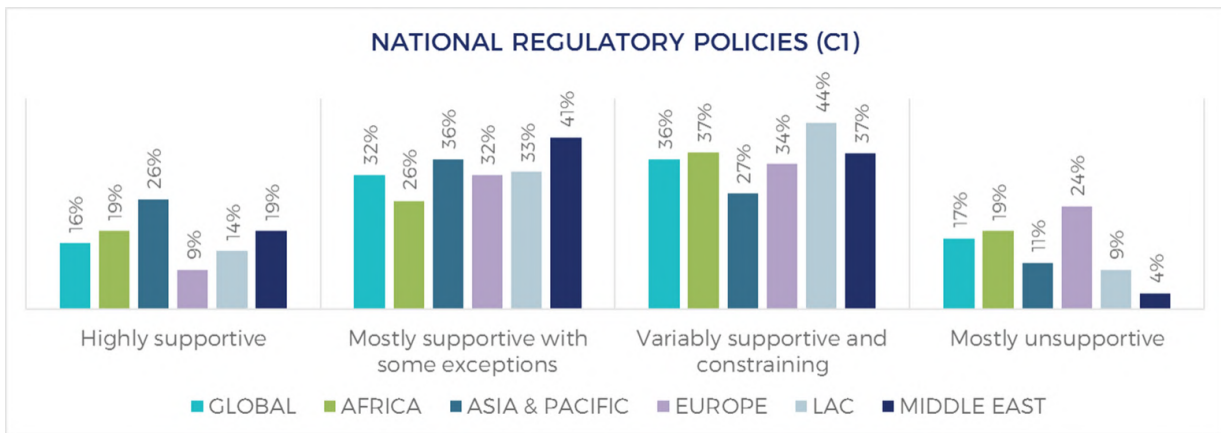
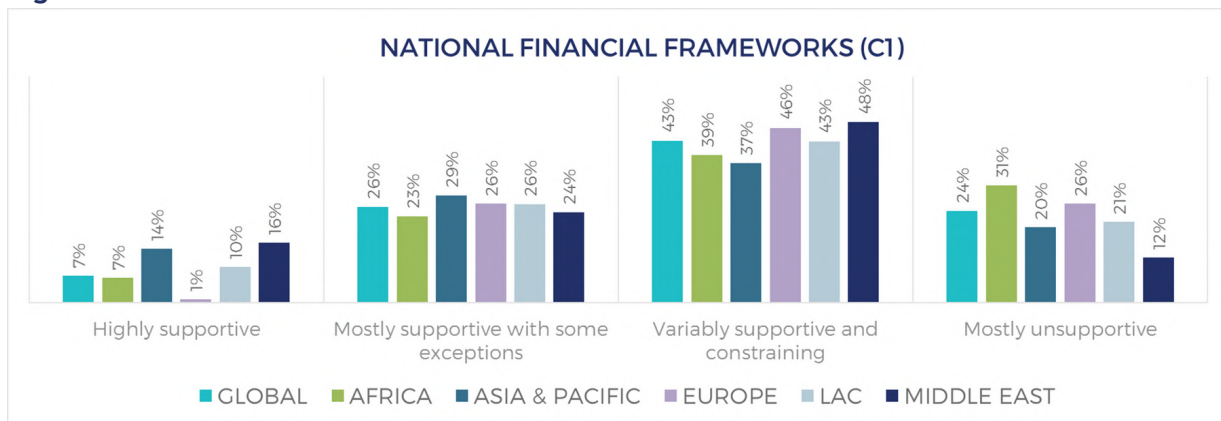


Fig. 11



Looking at this same breakdown by region, it shows that in Asia & the Pacific, HE policies are considered more supportive (62%) than other regions, followed by the Middle East (59%). The regions weighing higher on the negative side of the scale are Europe (58%), Africa (56%) and LAC (53%) where most respondents consider the policies less conducive to digital transformation.

Turning to the second part of the questions on the national financial frameworks for higher education, 'Variably supportive and constraining' (43%) has the highest score not only at the global level but across all regions. Here, 'Mostly unsupportive' (24%) also has a higher score than 'Highly supportive' (7%). Although respondents from Asia & Pacific are also more critical compared to the previous one, it remains the most positive region (14% 'Highly supportive' and 29% in 'Mostly supportive with some exceptions').



The financial frameworks are the least conducive to digital transformation. Besides, the accreditation system and the recognition and quality assurance systems are considered slightly less conducive to digital transformation compared to the rest.

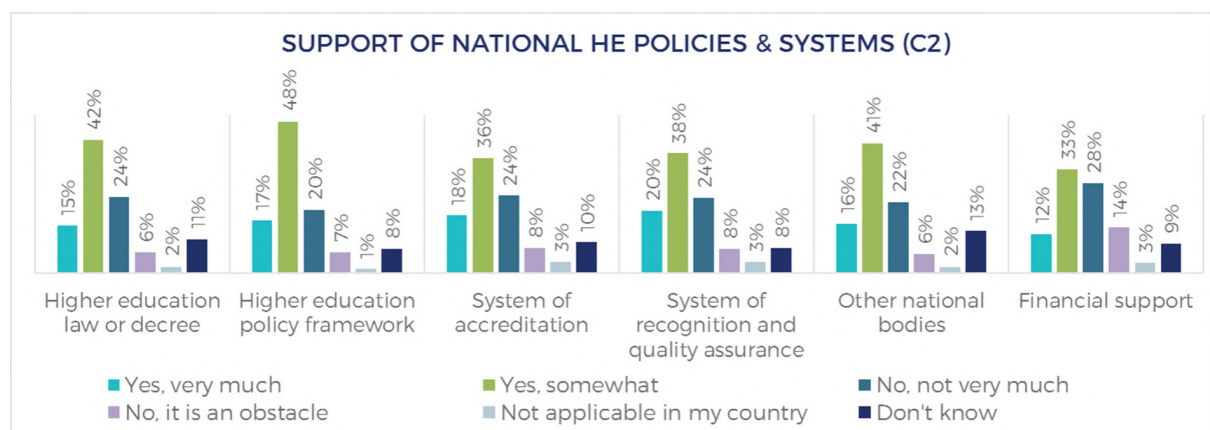


Adding up the scores of the responses on the positive and negative sides, we see the same trends as for the previous question on policies: Asia & the Pacific (43%) and Middle East (40%) are the most positive regarding the national financial framework. The less positive responses are from Europe (72%), Africa (70%), and LAC (64%), thus echoing replies to the previous question.

The comprehensive consultation sought a more detailed assessment of national higher education regulations (**Fig. 12**) with questions on the following: i) Higher education law or decree, ii) Higher education policy framework, iii) System of accreditation, iv) System of recognition and quality assurance, v) Other national bodies in charge of higher education and vi) Financial support. Besides the two positive and two critical replies proposed, two additional options were included ('Not applicable in my country' or 'Don't know') to take into account the differences in terms of higher education governance at the national level as well as the level of awareness of respondents.



Fig. 12



Looking at the results from the evaluation of the different policies and systems in place, it shows a rather consistent trend across the different regions where the category with the most replies is "Yes, somewhat" conducive to digital transformation in higher education. The percentage varies from 33 to 48% in this category, but in all cases, it is this reply that has scored the highest. 'No, not very much' has the second-highest score (ranging from 20 to 28%). The third most popular reply is 'Yes, very much' (12-20%) except for 'Financial Support' where 'No, it is an obstacle' gained a higher percentage.

Comparing the overall results among the different options, the respondents find that the 'financial frameworks and support' are the less conducive to digital transformation. Besides that, the 'System of Accreditation' and the 'System of Recognition and quality assurance' are considered slightly less conducive to digital transformation when compared to the rest.

Overall, there is a clear message from respondents that the current policies and regulation systems of higher education are 'somewhat' supportive. It is the general trend in replies given across these two sections. It was also clear from the different consultations that HEIs would like to see more supportive financial frameworks as an incentive to move towards more transformation. The respondents are not necessarily very critical of existing policies, but neither are they necessarily very positive. It is an area to monitor in more details in order to identify the key challenges and opportunities in the relationship between the national policies and regulations and the possibility of higher education institutions pursuing transformation and change in an increasingly digital world.



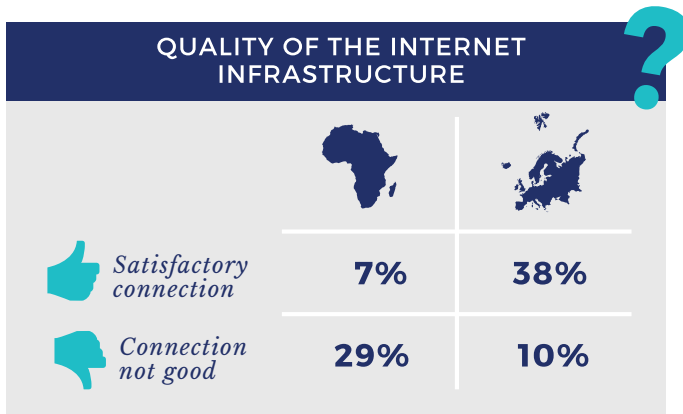
II.2 INTERNET INFRASTRUCTURE

While the response patterns were relatively similar in the previous section on national policies and systems, it is not the case here where the focus is on internet infrastructure and the consequences for HEIs. This is not a surprise, as it is in line with global data on internet penetration and use. The figures from International Telecommunication Union (ITU) in **Fig. 13** shows only 51% of the world's population is using the Internet. For developed countries, it is 81% of the population against 45% in for developing countries and when we examine Least Developed Countries (LDCs), only some 20% of the population - the opposite of developed countries.

Fig. 13 - Individuals using the Internet per 100 capita (2018)

Per ITU defined region		Developed vs. developing countries	
Africa	24,4	Developed	80,9
Arab States	54,7	Developing	45,3
Asia & Pacific	47,0	World	51,2
CIS	71,3	LDCs	19,5
Europe	79,6	Source: ITU (2019)[2]	
Americas	69,6		

[2] ITU 2019 <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (Accessed on 4/6/2019)

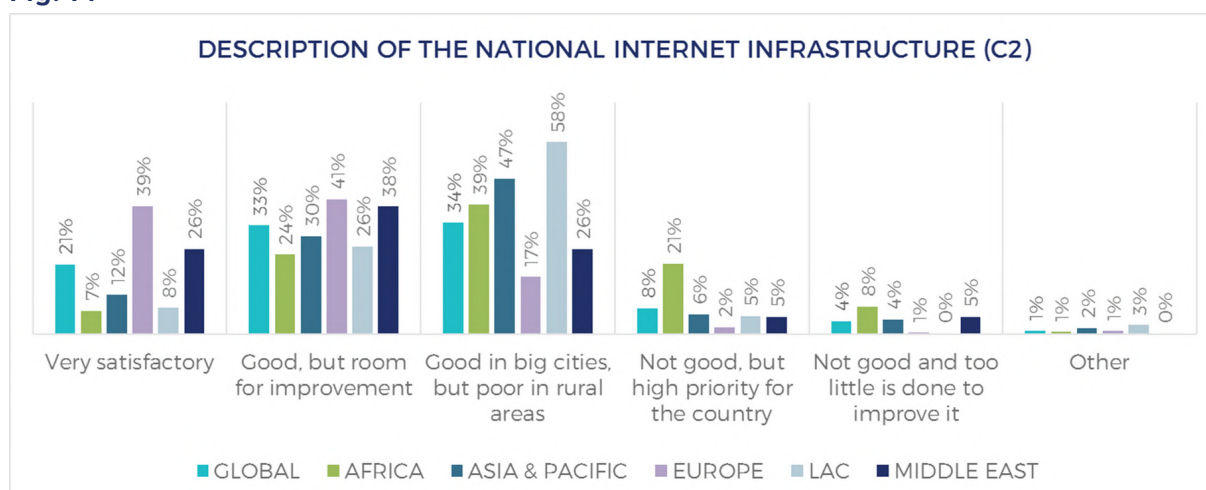


There is still a continuous need for investment in infrastructure and for awareness and solidarity among HEIs with access and those without to strengthen capacity building and facilitate leapfrogging when possible. This very simple graph (Fig. 14) shows extensive inequalities in internet access and therefore also in access to international networks and most importantly, in the access to knowledge and information. Is it possible to refer to 'knowledge society & economy' when half of the world population is excluded from the wealth of information available online? We want all countries to thrive, grow and improve the human condition. However, as for many other societal aspects, the preconditions needed to explore and leverage the potential of technology in higher education remains highly unequal and represents a major risk in terms of creating or exacerbating divides.

Although the higher education sector represents a segment of the population which is more likely to have access to the internet, there is still an important difference between Europe, where 38% describe the national infrastructure as 'very satisfactory' against only 7% in Africa. Particularly, LAC (58%), Asia & the Pacific (47%) and Africa (39%) indicate that the infrastructure is 'good in big cities, but poor in rural areas'. This confirms that the opportunities are far from the same in terms of digital transformation around the world and within many countries. It will not be possible to transform higher education and make use of the potential of technology where infrastructure and connectivity are not providing the essential conditions for tapping into this potential.

Unequal access to internet, implies unequal access to information, knowledge and international networks

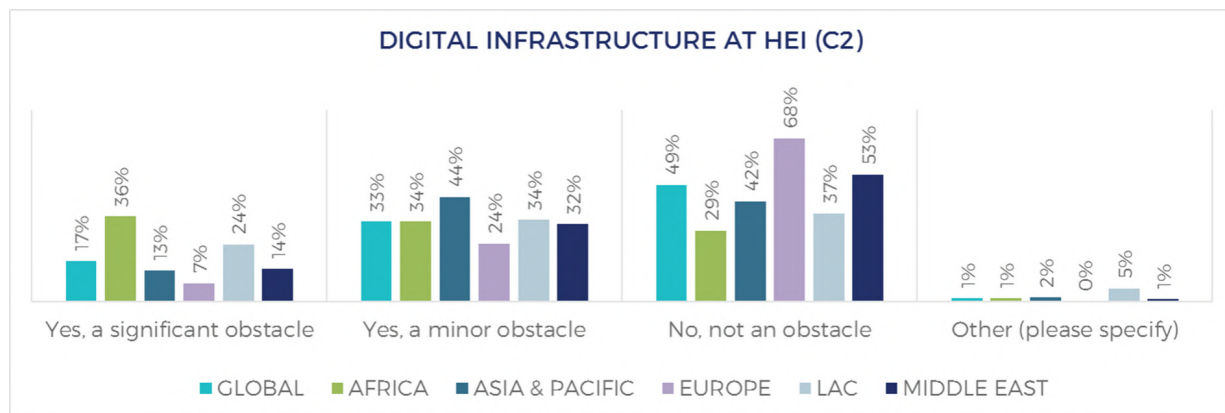
Fig. 14



Respondents were also asked to describe the internet infrastructure within the institution, which in the same manner illustrates the different working conditions of HEIs depending on where in the world they are situated. The same trend is visible in this chart showing that the largest divide is between Africa (36%) and Europe (7%) when looking at the answer category 'Yes, a significant obstacle'. In the same manner, the respondents who indicate that it is not an obstacle, Europe scores 68% against 29% in Africa.



Fig. 15



II.3 USAGE OF NATIONAL RESEARCH EDUCATION NETWORK (NREN)

As an alternative to the commercial Internet Service Providers (ISPs), the National Research Education Network (NREN) constitutes a different, independent network connection used in many countries specifically for education and research. Beyond the network, NREN can also provide different services to HEIs, and it is an important opportunity for global collaboration on education and research through access to databases and other research material[3].

In the comprehensive consultation, respondents assessed whether there is national support for NREN (Fig. 16) and whether NREN is used at the institution (Fig 17).

The results in Fig. 16 show that in most cases the respondents confirmed that there is 'Yes, somewhat' (55%) support for NREN at the national level and if 'Yes, very much' is added to the percentage it brings the global percentage to 71%. Only in LAC do replies differ from other regions where the respondents are more mixed (50%/50%) in terms of the support versus lack of support.

[3] https://www.casefornrens.org/Resources_and_Tools/Document_Library/Documents/What%20is%20an%20NREN.pdf

On the use of NREN at the institutional level (**Fig. 17**), it shows that while the highest score is 'yes' at the global level (42%) it is worth mentioning that Africa has the highest score of usage (49%). An important number of respondents do not know whether their university is using an NREN network (33%). It means that while the consultation provides some indication that most of the institutions are using NREN, it also shows that faculty and staff across the institution are not aware of this and it may be useful to raise awareness about the potential that NREN can bring to the education and research community.

The purpose of this section was to present the different parameters to understanding the conditions for digital transformation at HEIs, taking into

account the national environment and the different factors that play a role in the governance of HEIs. While many of the replies were similar across regions in relation to national policies and regulations, the internet infrastructure remains the most unequal factor for the level of opportunity higher education institutions have around the world for pursuing the potential of emerging technologies.

NREN is one way of investing in educational and research infrastructure other than commercial internet providers, and also the means to facilitate the transfer of data and communication at high speed.

In the next section, the focus moves from the national to the institutional level.

Fig. 16

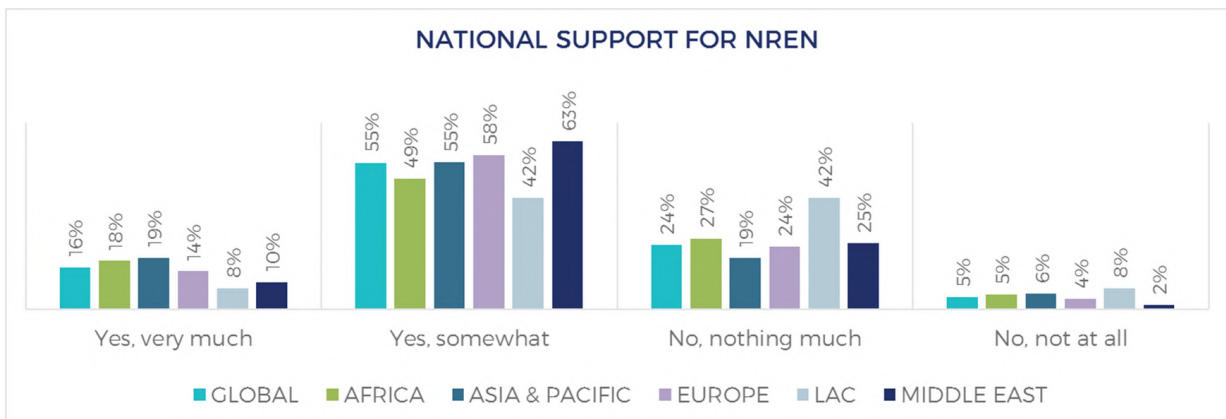
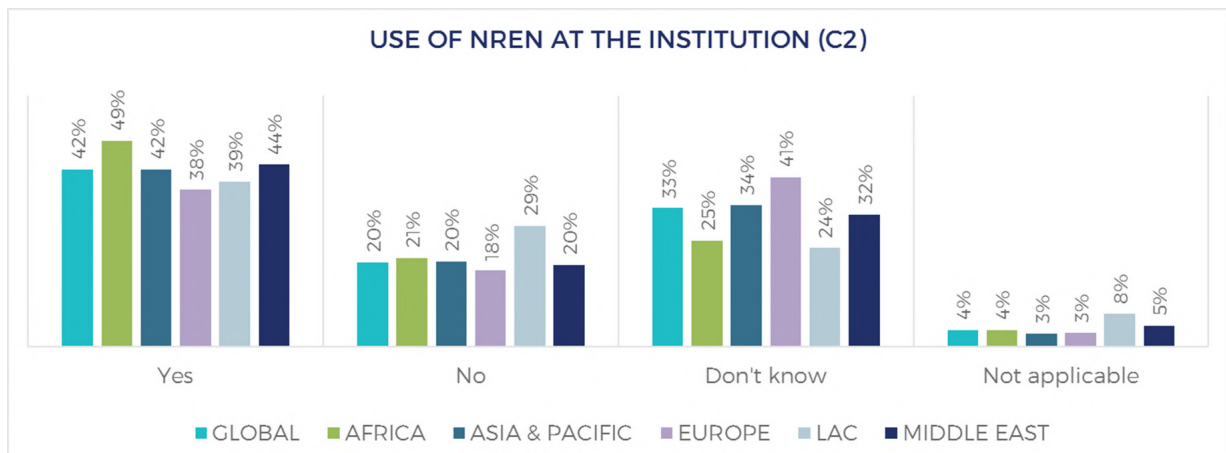


Fig. 17



III. TRANSFORMATION AT THE INSTITUTIONAL LEVEL

This section examines several aspects within the HEIs in order to assess the level of digital transformation within these various facets. The section is divided into different parts looking first at changes from perspective of the overall institutional governance, followed by the use of technology in teaching and learning. The third part reviews the progress made towards the use of Open Educational Resources (OERs), Open Science and the availability of digital knowledge infrastructures such as an online library. A specific part on Lifelong learning has been included in response to the current societal discourse on the need for continual training, re-skilling and upskilling of citizens to assess to what extent lifelong learning is affecting higher education. The last part presents the key achievements and obstacles related to digital transformation according to the HEIs.



III.1 TRANSFORMATION IN HIGHER EDUCATION GOVERNANCE

III.1.1 THE COMMITMENT TO AND THE NATURE OF CHANGE

It aimed at assessing to what extent leaders in higher education consider digital transformation as a priority (Fig. 18). Unsurprisingly, most respondents consider it a 'high priority' (68%) or 'medium priority' (29%) and only very few consider it a 'low priority' (3%) or 'not a priority' (1%).

In the comprehensive consultation, respondents were not asked to assess whether digital transformation is considered a priority but rather the commitment of leadership towards digital transformation and the use of new technologies within the institution (Fig. 19). The results confirm that 72% of respondents find that there is a commitment from the leadership at the global level. Particularly in Africa (77%) which is above average, but less so in LAC (61%) which is below the global average. In spite of the differences, there is an overall trend where leadership considers 'digital transformation' an important priority and respondents confirm that in the majority of HEIs, there is strong leadership commitment to pursuing digital transformation.

Fig. 18

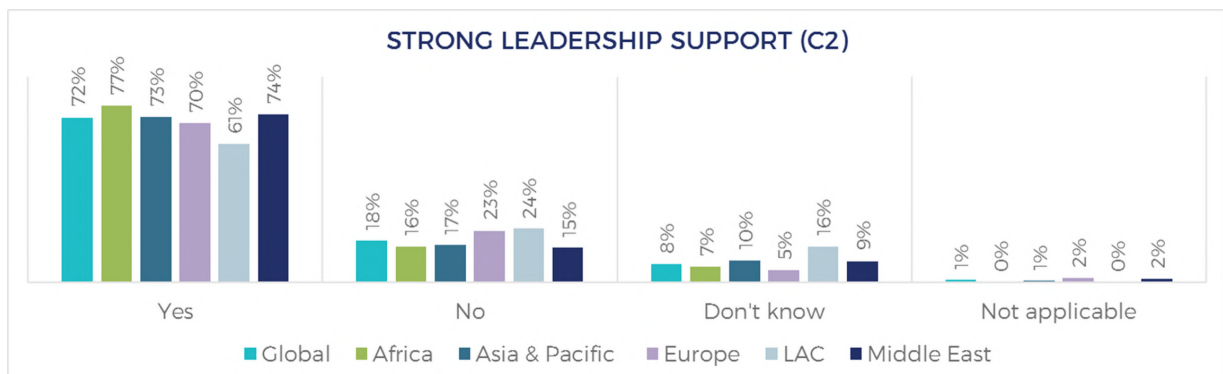
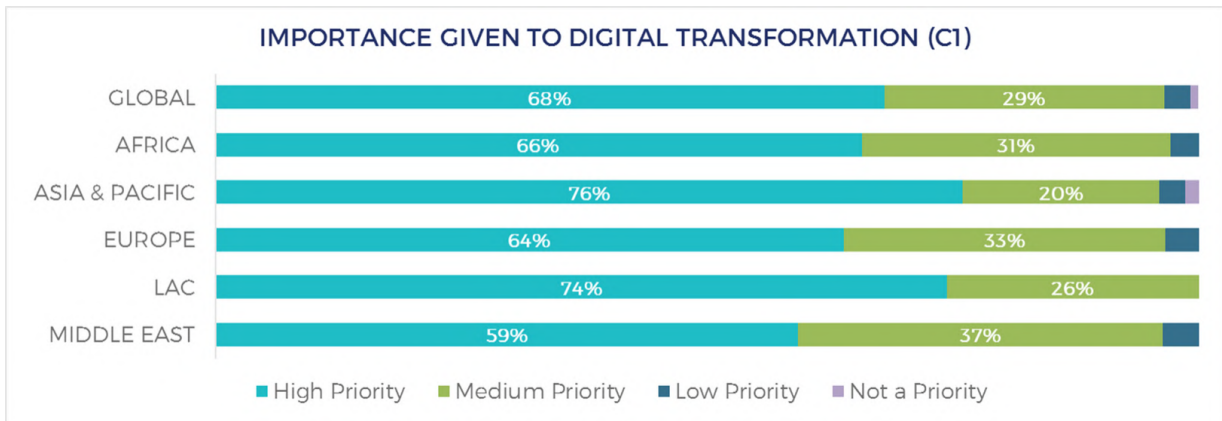


Fig. 19



To understand how digital transformation translates into action, respondents were asked to assess whether it is mainly being pushed top-down by the leadership and through an institutional-wide strategy or whether it is mainly developing as bottom-up, building on different opportunities and experiences across the different faculties or administration (**Fig. 20**).

As expected, the responses to this question are rather divided with, globally, a slight majority in the 'bottom-up approach' (41% top-down/ 56% bottom-up). When we consider the regional breakdown, in the Middle East (70%) the result is more marked, where the trend is towards a 'bottom-up approach with multiple initiatives taking place within the different faculties'. This trend is also somewhat reflected in Africa (63%). However, at the global level, it is a mixture of both approaches. This was also expressed in several comments relating to the question, explaining that there is no strategy in place but that it is being developed, while others confirmed that it is a combination of both and some refer to a digital roadmap or strategy in place to support the institutional transformation.

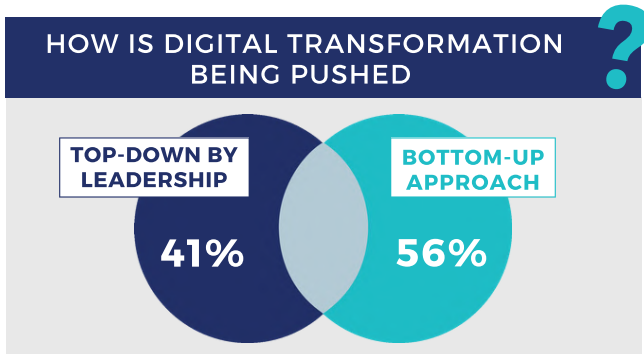
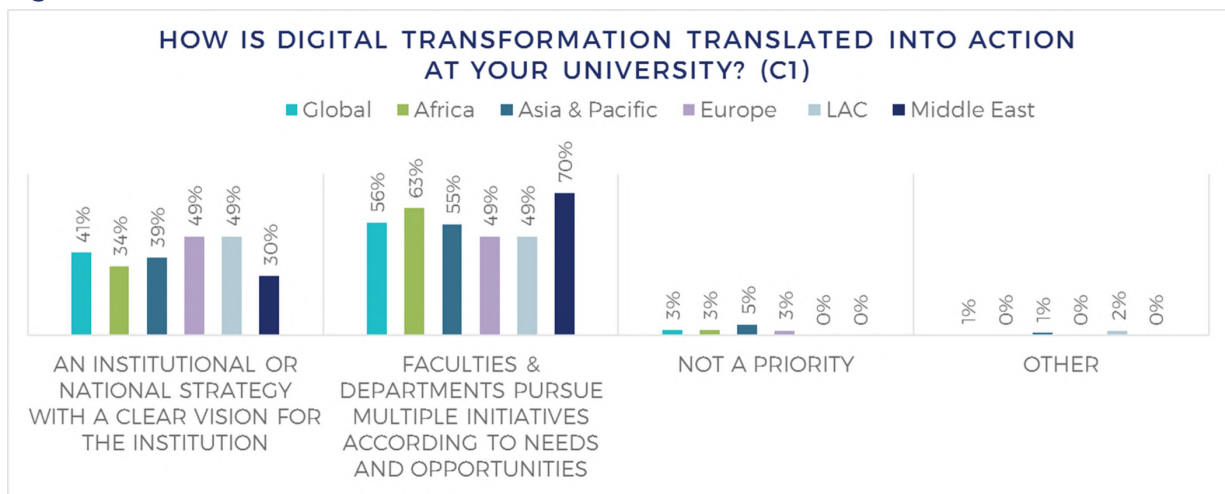


Fig. 20



To assess perceptions of digital transformation in HEIs, the respondents to the leadership consultation were asked whether initiatives undertaken at their institutions are mainly 'to do the same things, but with the help of technology' or 'to do things differently, with the help of technology'. An additional option was added: 'We are planning to do things differently, but are limited because of funding or other demands' (**Fig. 21**). In terms of global average, the highest score (43%) is showing that things are being done differently so it is not only a matter of doing the same things supported by technology, while 38% explained that they are planning to do things differently but are held back by a lack of resources. Finally, 18% stated that the transformation is mostly about doing the same things but with the help of technology. Only 1% indicated that 'No new initiatives are taking place'.

This first series of questions were to assess the understanding of digital transformation in higher education. The next series of topics relate to the overall governance of the institution in order to examine how digital transformation translates into action through a different set of measures.



Digital transformation is being integrated in the institutional strategic plan in most HEIs around the world.



III.1.2 FROM COMMITMENT TO ACTION

III.1.2.1. STRATEGIC PLANNING

80% of respondents confirmed that the institution has an institution-wide strategic plan, while 11% 'do not know' and the remaining 9% explained that the institution does not have a strategic plan. In the subsequent question, the respondents were asked whether the use of new technologies is part of the institutional strategic plan (**Fig. 22**), to which 75% confirmed that it is the case without big differences among regions. 9% specify that this is not part of the institutional strategic plan. In this category, Europe (13%) and the Middle East (12%) are above the global average. 13% 'don't know' and in this category, LAC are particularly above the global average (18%). Despite the differences, this provides a clear sign that digital transformation is being integrated as part of the institutional strategic plan in most HEIs around the world.

Fig. 21

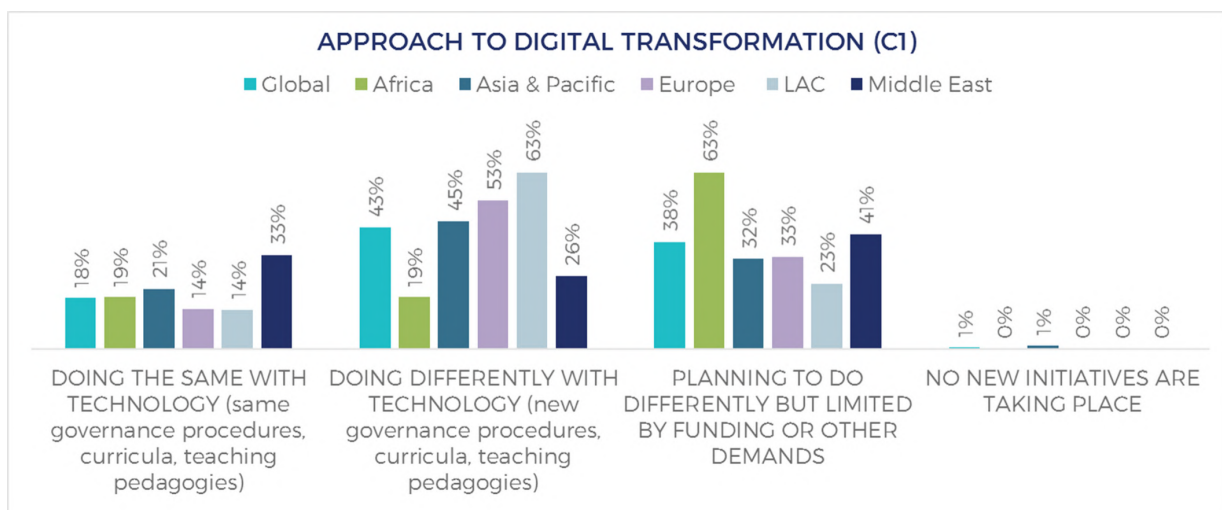
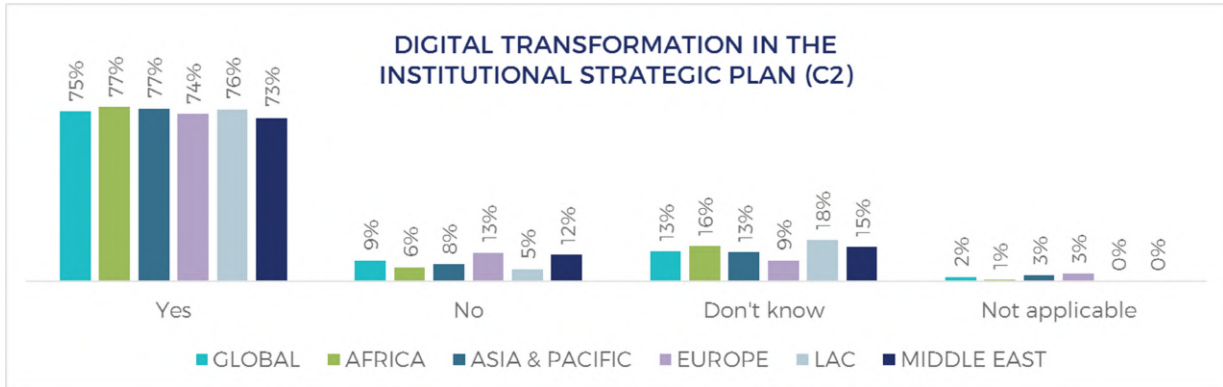


Fig. 22



III.1.2.2 BUDGETARY COMMITMENTS

In the leadership consultation, the respondents were asked to indicate approximately how much of the overall institutional budget is allocated for digital transformation (**Fig. 23**). In the comprehensive consultation (**Fig. 24**), the question was more open and respondents had to indicate whether the institution had a budget allocation to support digital transformation.

Again, most respondents (55%), confirm that there is a budget supporting digital transformation, 25% do not know and 18% indicate that there is no budget available.

The results of the leadership consultation show that budget is mostly assessed between 0-9% (35%), and then between 10-19% (29%). Thereafter, the number of replies decline as the percentage of the budget ranges increase.

Fig. 23

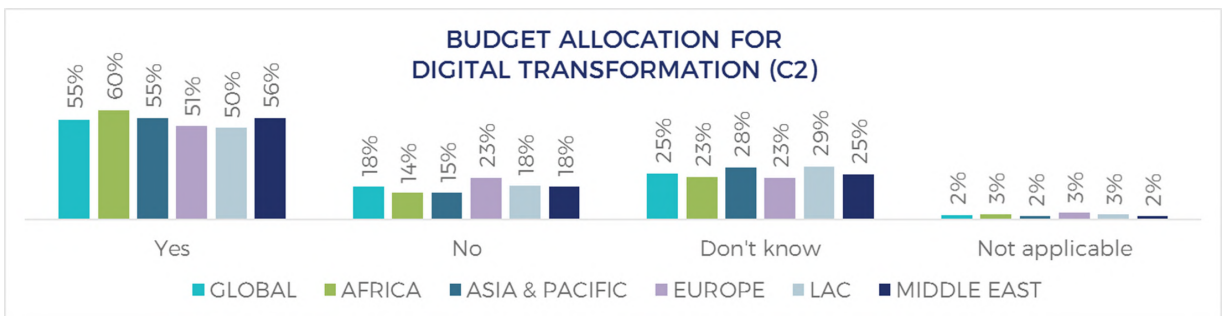
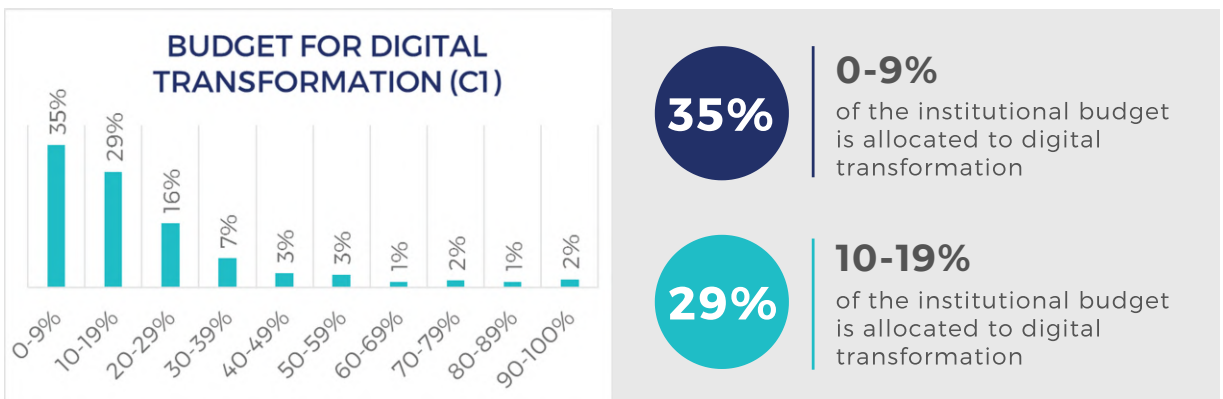


Fig. 24



III.1.2.3 MANAGERIAL COMMITMENT

With no significant differences among regions, the institutions confirm that in most cases (73%), there is a person or an organizational unit in charge of digital transformation (**Fig. 25**). In contrast, 19% of HEIs do not have someone or a unit in charge. Africa (21%) is the only region slightly above the global average. In the leadership consultation (**Fig. 26**), the results are slightly more positive with overall 83% positive replies, among which 60% 'Yes' and 23% 'Yes, several'. Similarly to the comprehensive consultation, 17% explain that they do not have senior leadership in charge of this area.

Fig. 26

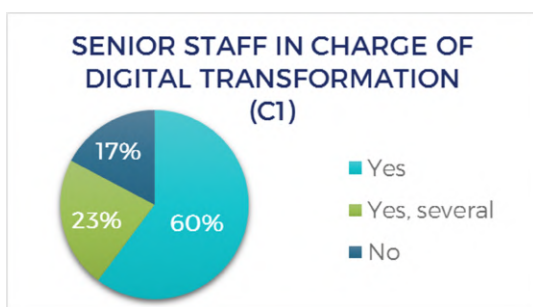


Fig. 25

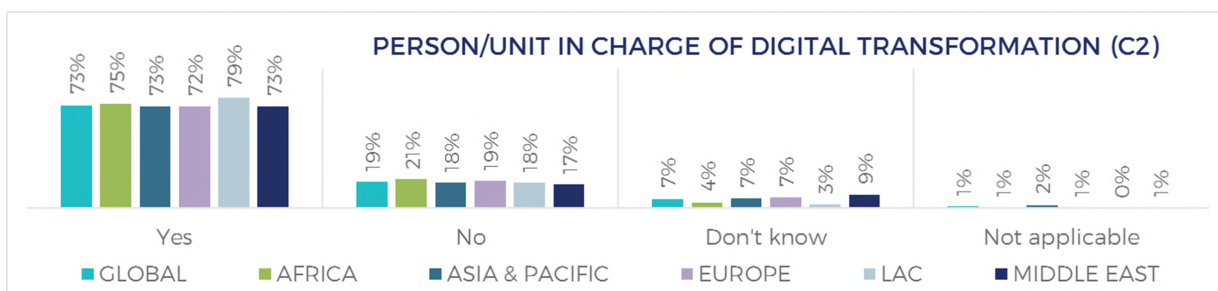
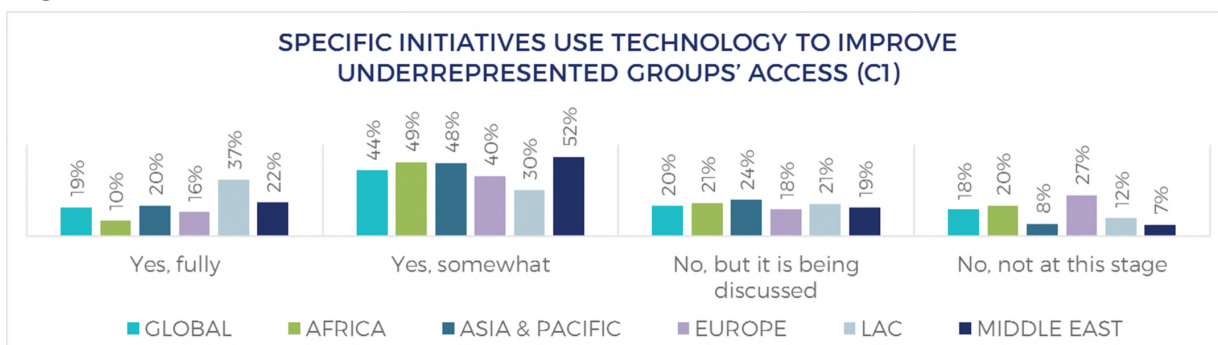


Fig. 27



III.1.2.4. COMMITMENT TO WIDENING ACCESS TO HIGHER EDUCATION

Technology offer new opportunities of outreach to students, both in terms of distance access and means to facilitate learning for, among others, people with disabilities. In this respect, the leadership consultation included a question to assess whether universities are undertaking initiatives to improve access to higher education for under-represented groups (**Fig. 27**). Most of the respondents confirm that this is the case: 'Yes, somewhat' (44%) and 'Yes, fully' (19%); 20% indicate that it is not the case currently, but it is being discussed. The remaining 18% represent the category where no initiatives are currently taking place. In particular, LAC are above average in the category 'Yes, fully' (37%) whereas Europe is above average in the category 'No, not at this stage' (27%). While most replies are on the positive side, it still leaves 38% on the negative side, which is a clear sign that there is room for improvement to explore the technological opportunities to improve access to higher education of under-represented groups.

III.1.2.5 CAPACITY-BUILDING

Both consultations sought to assess to what extent capacity-building and training opportunities are available to support faculty and staff in gaining new skills and becoming familiar with new technologies and new opportunities. In both consultations, there is a clear reply across regions that training opportunities are indeed available. The respondents to the leadership consultation were a little more optimistic (**Fig. 28**: 87%) compared to the comprehensive consultation (**Fig. 29**: 73%). So while most staff can enjoy capacity-building opportunities, somewhere between 13-27% do not have access to these opportunities or might not know that such opportunities exist. Considering the results of those without access to training opportunities (19% in the comprehensive consultation), the regional responses are more or less the same, with Africa (21%) only slightly

above and the Middle East (17%) slightly below. In the leadership consultation, however, there is more regional variation in the replies. When we look at the sum of the two 'no' options, 13% indicate that no training opportunities exist and both Europe (18%) and Africa (17%) are above the global average. LAC (98%) is the region with the highest percentage of institutions with access to training opportunities when considering both 'yes' categories, but even in the 'Yes, fully' category, the region has a much higher percentage (56%) than the other regions where Africa comes in second (36%).



Fig. 28

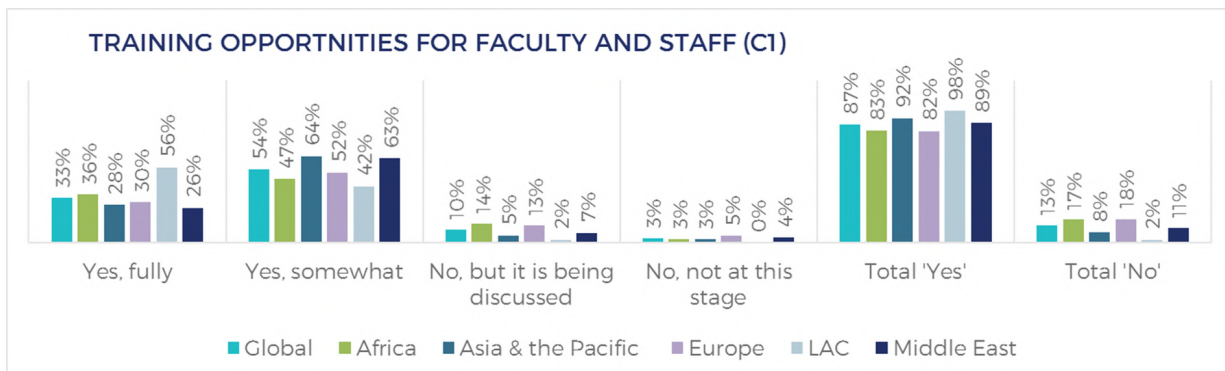
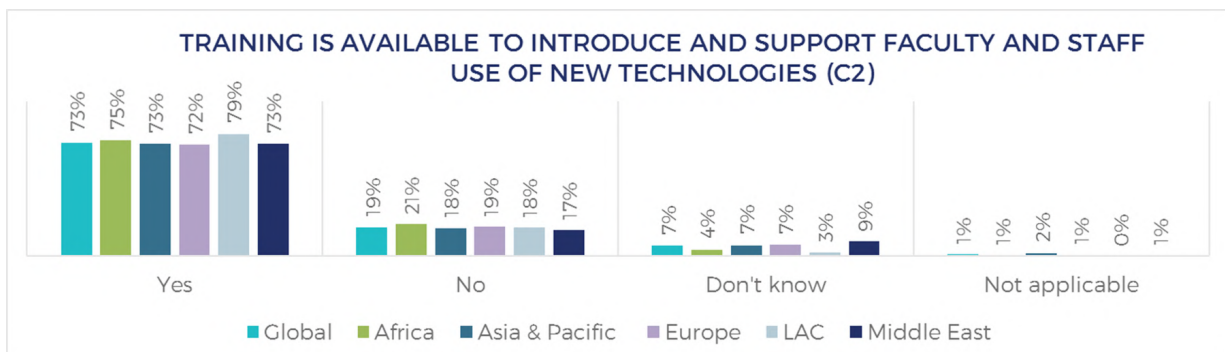


Fig. 29



III.2 ONLINE GOVERNANCE OF STUDENT DATA AND LEARNING PROCESSES

III.2.1 ONLINE STUDENT ENROLMENT

At the global level, 63% indicate that the enrolment process and student data is fully managed online, followed by 30% indicating that it is managed partially online (Yes, somewhat) (Fig. 30). Europe (72%) and Middle East (70%) are both above the global average in terms of fully managing the application process online and Africa (53%) and LAC (58%) are below the average in this category. When combining the results of the two negative reply options ('No, but it is being discussed' and 'No, not at this stage'), Africa (10%) and Asia & the Pacific (10%) are above the global average of 7% for these categories. After 30 years with the world-wide-web, this is one area where the majority of universities across the different regions have either started or fully transitioned to online management of enrolment and student data. Yet, 7% are still managing this process fully offline, which means that if this was 7% of the number of institutions in the World Higher Education Database (WHED), it represents around 1,300 institutions worldwide.

III.2.2 USE OF LEARNING MANAGEMENT SYSTEMS (LMS)

The use of Learning Management Systems (LMS) was assessed in both consultations (Fig. 31 and 32). Overall, the replies are similar, although the use of LMS is slightly higher in the leadership consultation (35% versus 30% for the category 'Yes, fully'). Overall, the trend is similar between 73-77% of respondents are using LMS (either fully or somewhat) and between 24-27% are not using LMS or not aware of it. Some are, however, exploring LMS more extensively than others. In terms of the regions, the trends are similar in both consultation except for LAC where the leadership indicate that 47% that it is 'fully used' and 28% 'somewhat used' whereas in the comprehensive consultation the trend is the opposite with 16% expressing that it is 'fully used' against 53% 'somewhat used'. So in this region, there are divergent views on to what extent LMS is being used but less so when considering the 'yes' categories jointly. Different respondents from different countries within the region might also explain the difference between the two consultations. Finally, Europe has a high score of 'don't know' (19%) in the comprehensive consultation.

Fig. 30

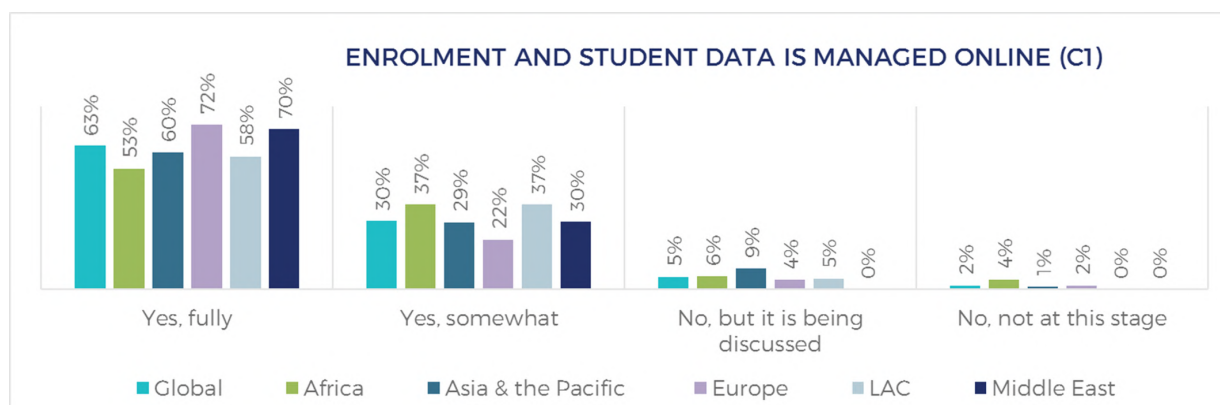


Fig. 31

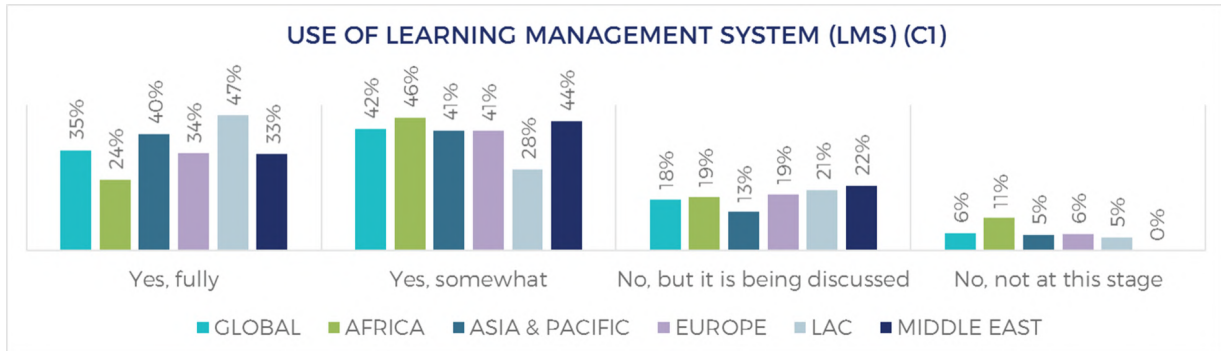
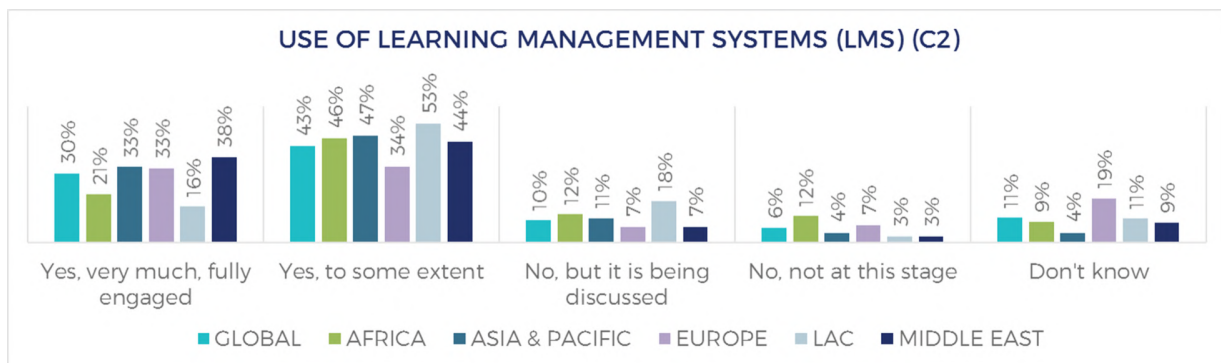


Fig. 32



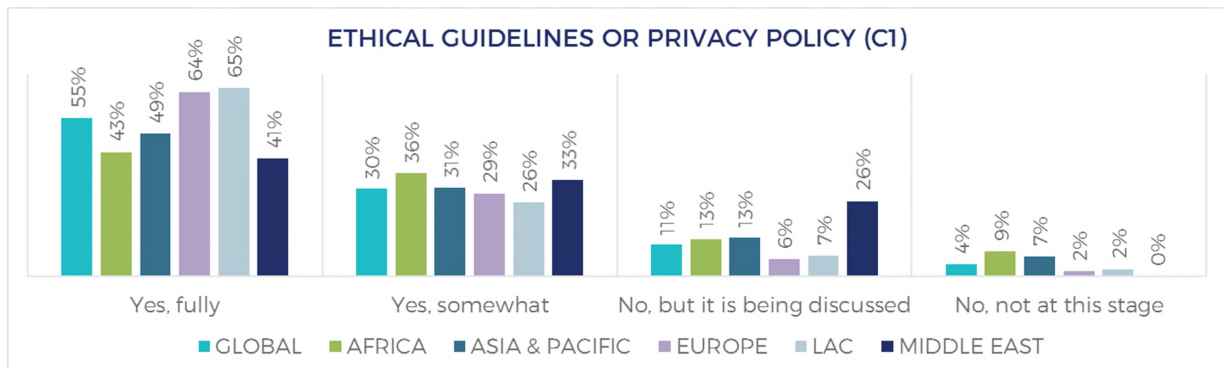
III.2.3 POLICIES ON DATA MANAGEMENT

Online management of data generates new possibilities for exploring, tracking and using the data related to students throughout their enrolment and of the alumni of the institution. It enables new forms of communication with students, online learning spaces and fora, online communication with professors and teachers. These new opportunities bring about new ethical questions about management and transparency in the use of data, data security and the right to data privacy. The consultation, therefore, aimed to assess to what extent universities have data privacy policies in place or ethical guidelines. In the leadership consultation, both dimensions were grouped into one question on whether the university has ethical guidelines or a privacy policy in place dealing with the use of data and information: 55% responded 'yes, fully'



and 30% 'yes, somewhat' (**Fig. 33**). However, when considering the replies by region, the data shows that LAC (65%) and Europe (64%) are more advanced in this area. The Middle East (41%), Africa (43%) and Asia & the Pacific (49%) have the lowest score in this category and although they are slightly higher than the global average (30%) in the 'yes, somewhat' category, these three regions remain the ones with the highest rate of 'no' answers namely 26% for the Middle East, 22% for Africa, and 20% for Asia & the Pacific - when combining the sum of the two 'no' categories of answers.

Fig. 33



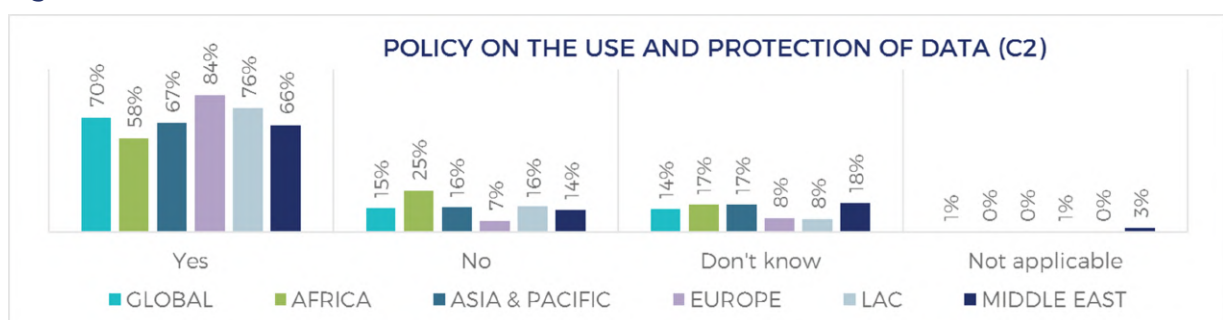
The questions were framed somewhat differently in the comprehensive consultation where it was broken down into two questions, one specifically on the Data Protection Policy (**Fig. 34**) and one on Ethical Guidelines (**Fig. 35**). The global average on the availability of a Data Protection Policy is higher (70%) than the leadership consultation, but the trends within the regions remain similar, with Europe (84%) and LAC (76%) in the top responses Africa (58%), Middle East (66%) and Asia & the Pacific (67%) below the average.



Technology is merely a means to an end, the essential question is therefore how we make use of and apply technology. This is intrinsically linked to a series of ethical questions that must be a priority for higher education to consider.



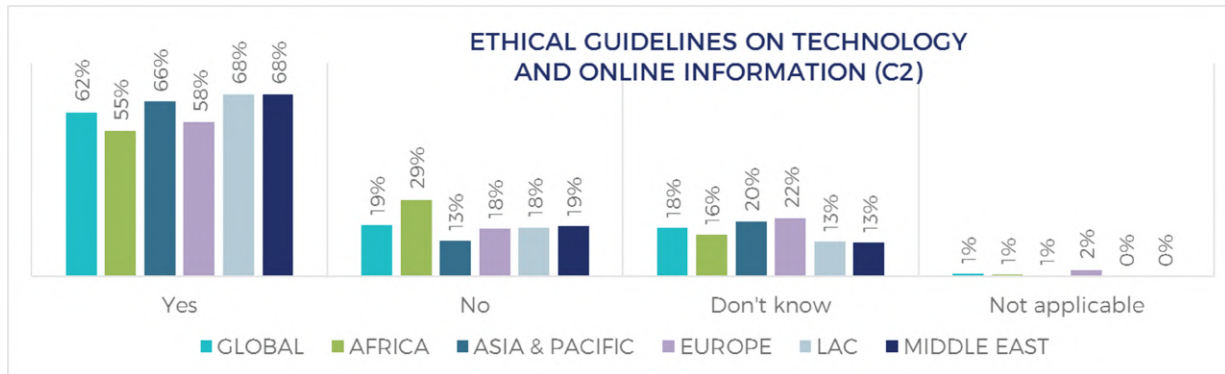
Fig. 34



The second question on ethical guidelines was to assess to what extent HEIs are discussing, and determining policy on what is ethical in terms of the use of data (**Fig. 35**). This part can be relevant from different angles, both from the perspective of the institution and how student data is used, and in the relationship with the students and their digital or online behaviour (plagiarism,

dissemination of knowledge, recording lectures etc.). This question has a slightly lower global average (62%) and there is less discrepancy among regions. However, it is worthwhile to note that LAC (68%) and the Middle East (68%) are beyond the global average along with Asia & the Pacific (66%); divergence of terminology in different parts of the world might explain this difference.

Fig. 35



III.3 TRANSFORMATION IN TEACHING AND LEARNING

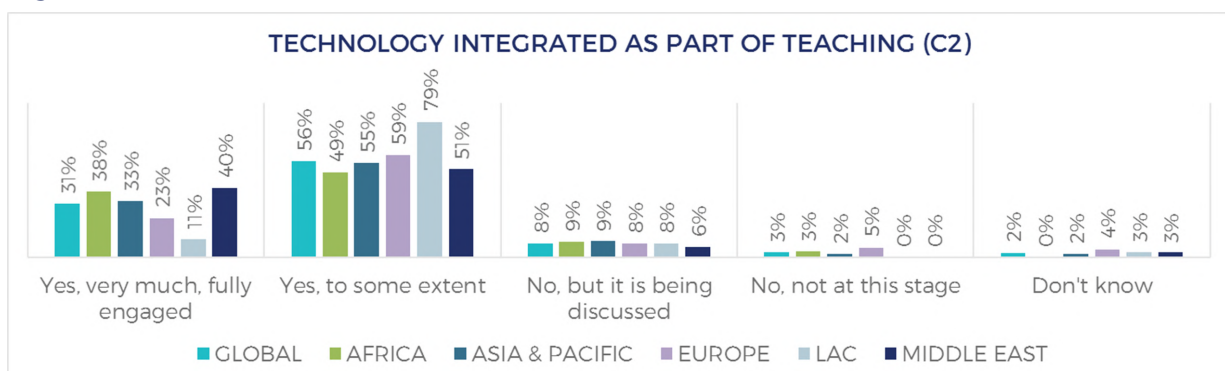
After considering transformation that concerns the global governance of the HEIs, this section will look into the changes specifically related to teaching and learning.

III.3.1 TECHNOLOGY IN TEACHING AND THE USE OF NEW TEACHING MODALITIES

From a general perspective, respondents assessed whether technology is being increasingly integrated as part of teaching (**Fig. 36**). Most respondents expressed that 'yes, to some extent' (56%) and 31% indicated 'yes, very much'. Some 8% replied 'No, but it is being discussed' and only a few selected 'No, not at this stage' (3%).

From a general perspective, respondents assessed whether technology is being used in teaching. While the regional breakdown of the responses on the 'no' side of the scale is similar, there are some regional differences between the categories ('Yes, very much' and 'Yes, to some extent'). For LAC, only 11% of the respondents answered 'yes, very much', against 79% who responded 'yes, to some extent'. Europe is also below the global average in the category 'Yes, very much' (23%) but above average in 'Yes, to some extent' (59%). When considering both of the 'yes' categories together it is very clear that the technology is increasingly being used in teaching, but most respondents are in the category 'Yes, to some extent'. This can be a sign of a potential to integrate it more fully, or maybe that it is important that technology is only used somewhat in teaching.

Fig. 36



In the leadership consultation, the respondents assessed to what extent they use teaching modes such as a flipped classroom, blended learning and online learning (Fig. 37). Twenty-seven percent stated 'Yes, fully' and 52% indicate 'Yes, somewhat'. These results are in line with the trends from the previous question. There is a general tendency towards more integration of technology through new teaching and learning modes, yet the potential is, maybe not yet, being fully explored in most HEIs. In terms of the regional breakdown, LAC has the highest score in 'yes, fully' (49%) and below the average in 'yes, somewhat' (37%). Europe is slightly below the average in 'yes fully' (24%), but more importantly beyond average in the category 'yes, somewhat' (60%). However, when considering the sum of the 'yes' categories both LAC (86%) and Europe (84%) are at the same level, it is the degree of the 'yes' that is significantly different. Finally, Middle East (22%/7%) and particularly Africa (29%/9%) are the two regions above the global average (16%/5%) in both of the 'no' categories. So although the previous question showed that respondents in Africa indicated that technology is increasingly being integrated into teaching, it is not necessarily in the form of the different teaching modes highlighted in this question.

The comprehensive consultation included three questions where the respondents were asked to express in percentages to what extent their institution offers courses fully online; hybrid and blended courses and thirdly courses supported by online resources (Fig. 38).

It is very clear that very few of the responding institutions offer courses available fully online. As the first 10% range attracted 59% of responses, it was decided to break the range down into three categories: 0% (with 32% of replies), 1 to 4% (14% of replies) and 5 to 9% (13% of replies). Then we see the curve gradually declining the higher the percentage becomes, except for the last range of 90-100% (2%) where a few open universities, providing all courses fully online, lead to a slight increase at the end. However, it is very clear that moving towards teaching provided fully online is not a major priority.



Fig. 37

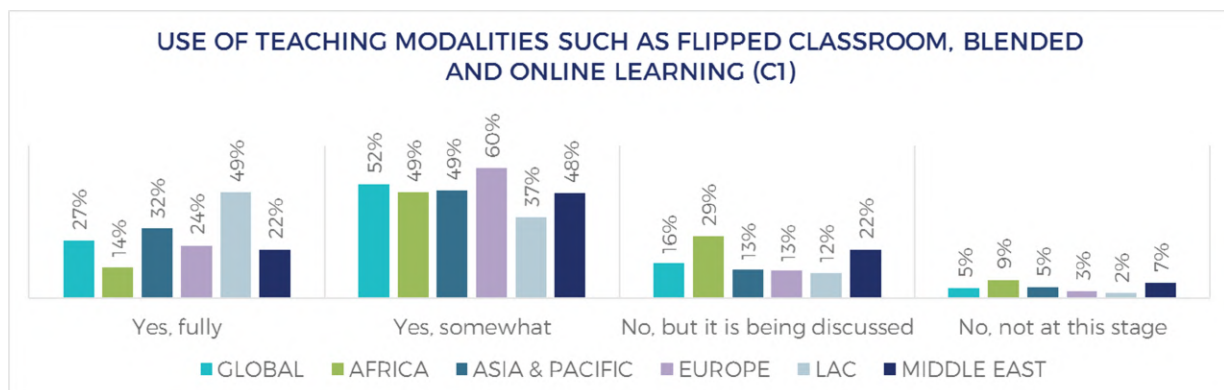
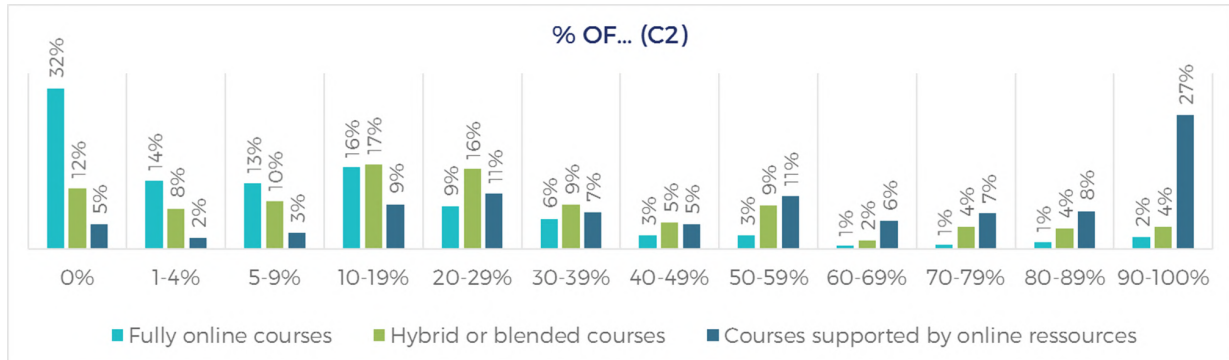


Fig. 38

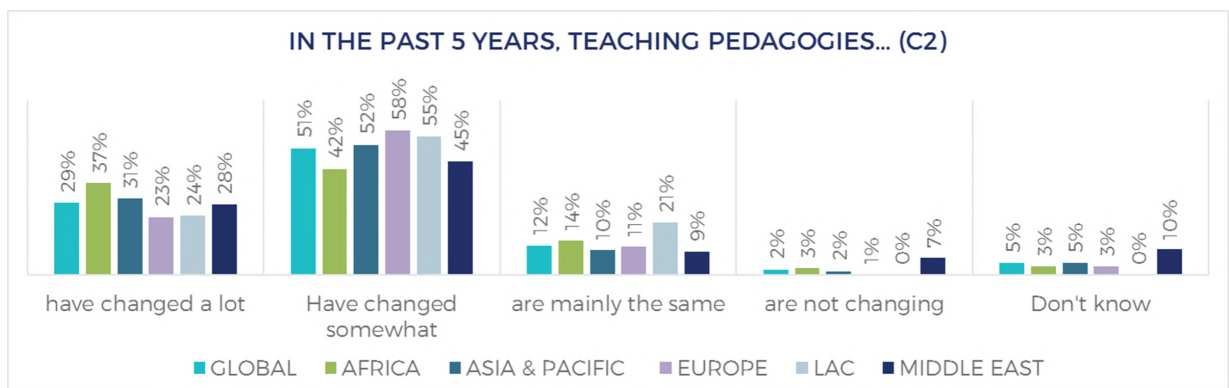


In terms of hybrid and blended learning, the responses are clearly divided across the scale. Twelve percent indicate that they do not use hybrid or blended learning. The majority of remaining replies (50%) are more or less evenly distributed within the spectrum of 1-30% with the remaining 38% being distributed across the rest of the scale (31-100%). Finally, in terms of use of online resources to support courses, the results show that these are more widely used. Here, the highest concentration of replies falls within the category 90-100% (27%) and only 5% state that they do not use online resources. Fully online courses remain predominantly the priority of open universities and a few on-site universities whereas hybrid and blended learning are finding a steadier role in universities and finally, it seems to be much more mainstream to use online resources to support courses offered.

III.3.2 CHANGES IN TEACHING PEDAGOGIES, COMPETENCIES AND ASSESSMENTS

Considering the change in teaching pedagogies, most respondents (51%) indicate that in the past 5 years, teaching pedagogies 'have changed somewhat', and 29% express that they 'have changed a lot' (Fig. 39). This leaves very few respondents that find that the teaching pedagogies remain mainly the same (12%) or that they are not changing (2%). Overall, regional trends are similar; however, Africa (37%) is above the global average in the category where pedagogies 'have changed a lot'. LAC (21%) is above average saying that teaching pedagogies 'are mainly the same'. Finally, the Middle East is above average saying that the pedagogies 'are not changing' (7%) as well as in the category saying that they do not know (10%).

Fig. 39

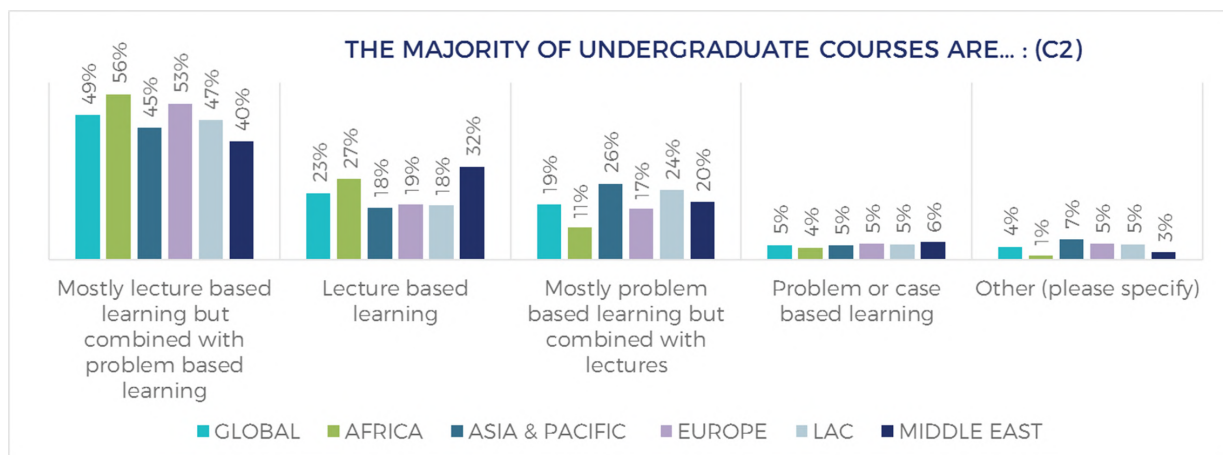


Although it is complicated to measure the change in teaching pedagogies and approaches at a general level due to differing traditions based on different fields of study, a question assessed whether lectures continue to be the dominant form of teaching in higher education. One possibility of technology is to disseminate information from one to many. It was a challenge to find a suitable wording to easily capture the alternative to lecture-based learning, but 'problem-based-learning' was used as it implies a more active engagement on the part of the students in the learning process rather than a more passive approach where information is 'transmitted' from the lecturer to the student through a lecture (Fig. 40).

Africa (27%) coming above average in the category 'Lecture-based learning'. Africa (56%) and Europe (53%) are above average in the category, 'Mostly lecture-based learning but combined with problem-based learning'. This means that lecture-based learning continues to be a dominant teaching mode, although it is also combined with problem-based learning.



Fig. 40



This question shows that 49% of undergraduate courses are delivered by 'Mostly lecture-based learning, but combined with problem-based learning'. In second place is 'Lecture-based learning' (23%). 19% chose 'Mostly project-based learning, but combined with lectures' and finally, 5% selected 'Problem or case-based learning'.

The regional breakdown shows that Asia & the Pacific (26%), LAC (24%) are above average in the category 'Mostly problem-based learning, but combined with lectures' with Middle East (32%) and

Technology is changing society and societies around the world depend more and more on digital technologies. This transformation has an impact on the skills and competencies required of citizens to take part in society and in the labour market. Within this context, respondents to the leadership consultation were asked to assess whether the university has reconsidered the skills and competencies required of students within the past 3 years (Fig. 41).

In terms of the global average, 82% indicate 'yes' where 35% of replies are 'yes, fully' and 47% are 'yes, somewhat'. Thirteen percent responded 'no, but it is being discussed' with 5% saying 'no, not at this stage'.

Replies from Asia & the Pacific and Europe more or less follow the global trend; Africa also, to a certain extent, but with a slightly lower rate in the 'yes, fully' reply (31%) and a slightly higher rate (50%) in the 'yes, somewhat' reply. LAC and the Middle East both stand out when compared to the global average - LAC as its share of replies to 'yes, fully' is much higher (56%) and its replies are lower than the global average in both 'no' categories.

The Middle East stands out by a much lower-than-average reply in the 'yes, fully' category (22%) and its much higher-than-average reply in the 'no, but it is being discussed' category (26%).

The same question was asked for 'learning outcome assessments' (Fig. 42) and in this case the share of 'Yes, fully' is higher (42%) whereas yes, somewhat (42%) slightly lower than in the previous question. The overall trend in terms of replies are the same across the regions, however Africa particularly stands out in terms of fewer replies in the 'yes' categories (33% and 34% respectively) and it has likewise a higher share of the 'no' replies - 17% in 'no, but it is being discussed' (against 10% in the global average) and 16% in the category 'No, not at this stage' (against 7% in the global average). Europe (91% in total) and LAC (86% in total) have a higher share of the 'yes' replies and likewise a lower share in the 'no' categories. The Middle East continues to have a higher share in the category 'No, but it is being discussed' (15%).

Fig. 41

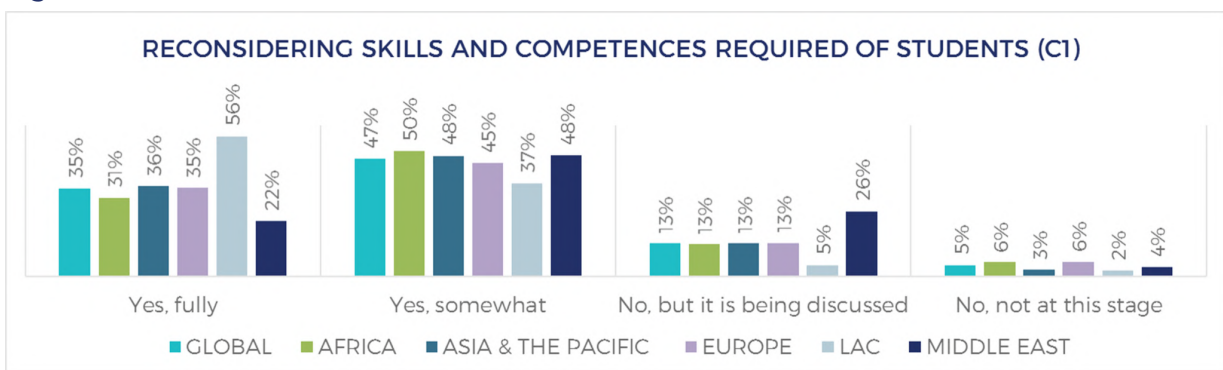
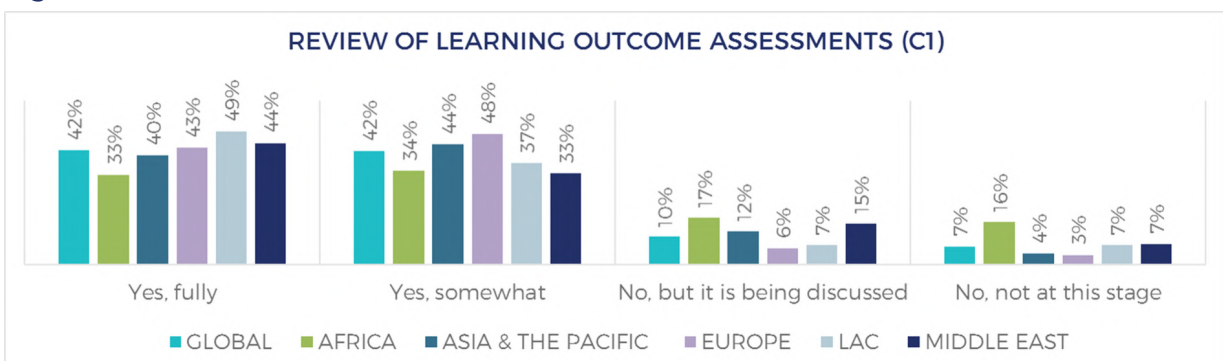


Fig. 42



Digital literacy is increasingly a skill that is required for students in terms of both their participation in society, the labour market and most importantly for gaining access to information and knowledge to aid them make informed decisions about their lives. With this in mind, the comprehensive consultation included two questions about digital literacy: the first question was to assess to what extent digital literacy is a priority at the national level (Fig. 43) and the second question whether it is a transversal learning outcome at the institutional level (Fig. 44).

In terms of national support, respondents mostly replied 'yes, somewhat' (53%) with 26% saying 'no, nothing much' followed by 17% indicating 'yes, very much'. LAC (42% in total) and Africa (38% in total) stand out by having a higher share of the respondents in the 'no' categories compared to the global average.

Turning to the question about whether digital literacy is a transversal learning outcome for students (Fig. 43), 47%

expressed 'yes, to some extent', 22% 'yes, very much engaged', 14% 'no, but it is being discussed' and 10% 'No, not at this time'. Finally, 7% 'did not know'. In terms of the regional breakdown, the Middle East has a particularly higher share of 'yes, very much engaged' (32%) although the total sum of the 'yes' replies remains only slightly higher than the global average. LAC are, on the other hand, above the average in the 'yes, to some extent' (55%) and significantly lower in the 'yes, very much engaged' (11%). Finally, Europe is below the global average in both yes categories (18%/39%) and 5% above average in 'no, not at this stage' and 'don't know'.

While the overall trend is similar across regions, this series of answers show that digital literacy is being considered 'to some extent' as a transversal learning outcome for nearly 50% of respondents at the global level. The leadership consultation equally shows that most of the respondents have reconsidered skills, competencies and the learning outcome assessments within the past three years.

Fig. 43

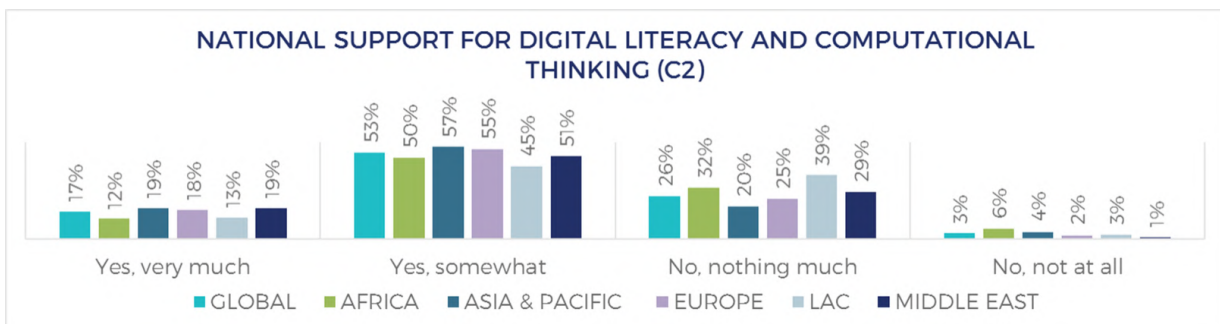
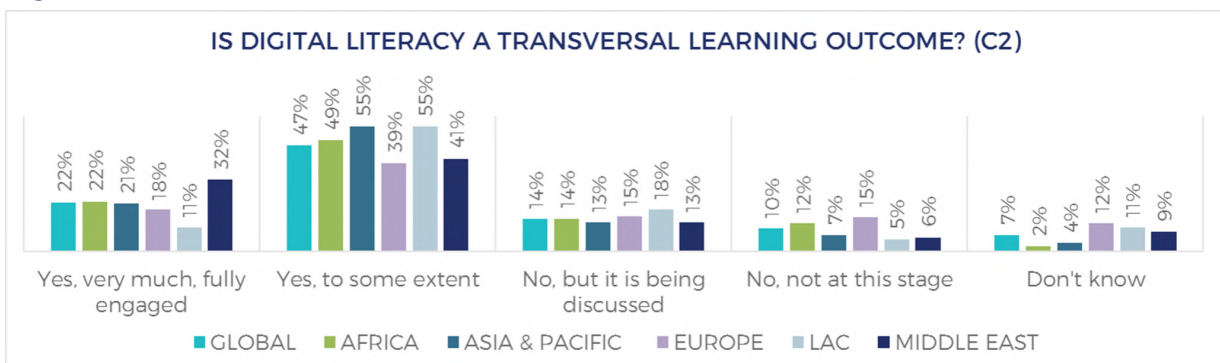


Fig. 44



III.4 OPEN EDUCATIONAL RESOURCES (OERS) & OPEN SCIENCE

III.4.1 CREATION, USE AND INFRASTRUCTURE FOR OPEN EDUCATIONAL RESOURCES (OERS)

In the comprehensive consultation, questions were included around national support for Open Educational Resources (Fig. 45) as well as national initiatives for an online bibliography or library for online content (Fig. 46). Most respondents selected 'yes, somewhat' (53%), 25% indicated 'No, nothing much'. The regions are quite aligned in the responses although Asia & the Pacific are slightly higher in the category 'Yes, very much' (22%) compared to the global average (16%). Africa (34%) is slightly higher than the average (25%) in terms of those indicating 'No, nothing much' in terms of national initiatives in support of OERs.

In the assessment of national initiatives to support an online bibliography or library for online content (Fig. 46), most responses are likewise in the category 'yes, somewhat' (55%), but in this case followed by 23% in 'yes, very much' so adding the two positive categories, the trend is slightly more positive, when assessing the national support of an online bibliography or library for online content.

In terms of the regional breakdown, Europe appears to express the strongest support (32% and 55% in the two 'yes' categories). For LAC, it seems to be a divided issue within the region as the responses are somewhat evenly distributed among the three categories ('yes, very much' (32%), 'yes, somewhat' (37%) and 'no, nothing much' (26%).

Concerning the creation and use of Open Education Resources (OERs) at the institutional level, the leadership consultation covered both dimensions in one question (Fig. 47).

Fig. 45

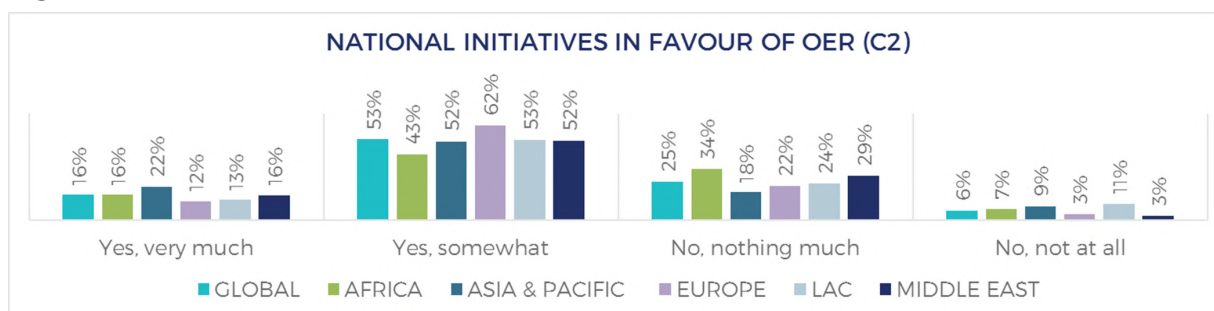
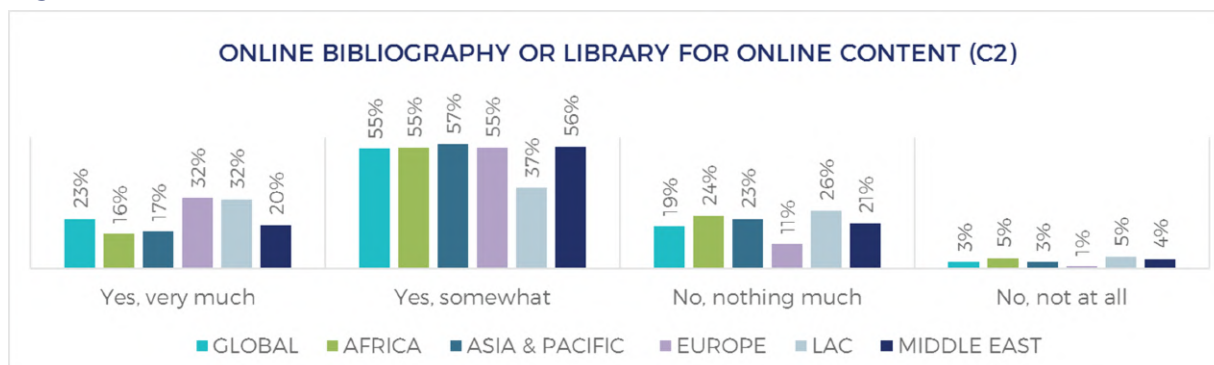


Fig. 46



In line with the previous questions on OER, the leadership consultation shows that 52% of HEIs 'somewhat' create and use OER, 19% 'fully' and 17% are not currently 'but it is being discussed' and finally 12% are not creating and making use of OERs at this stage. LAC is again very divided across categories and Africa has the lowest score in 'Yes, fully' (9%) and the highest in the 'no' categories (in total 37%). Asia & the Pacific (78%), Middle East (74%), and Europe (69%) are the regions mostly advanced in using and creating OERs (when combining the two 'yes' categories).

In the comprehensive consultation (Fig. 48) included one question in relation to the use of OER and one question in relation to the creation, while there were only 'yes' or 'no' answers; it also

included the option of 'don't know' and 'not applicable' as this question was one among many where the same series of replies were made available.

However, the results in this case are interesting from two perspectives: they show that the HEIs use (63%) more than they create (43%) OERs (Fig. 49). However, in this consultation, the regional result differs from the leadership consultation as Europe is the region using the least OERs (57%) and for the creation, Africa (38%) and Europe (39%) are more or less at the same level of contributing the less to the creation of OERs. It is also worthwhile to note that an important share of respondents did not know whether the institution uses (19%) or creates (26%) OERs. LAC has the highest score in both the use (71%) and the creation of OERs (55%).

Fig. 47

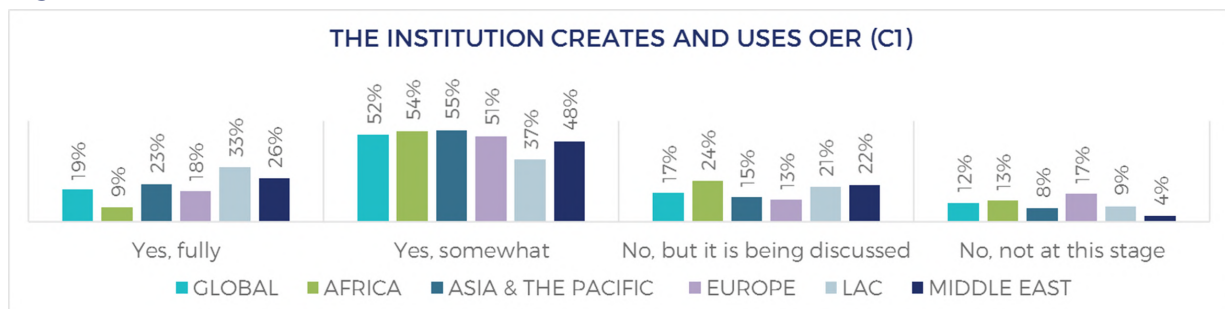


Fig. 48

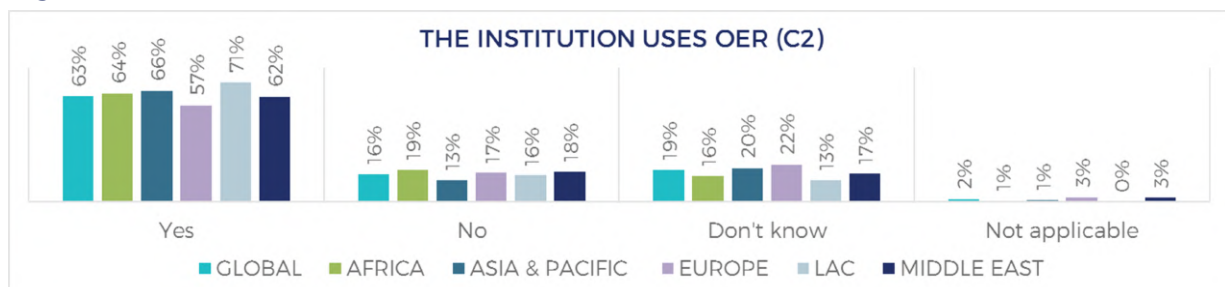
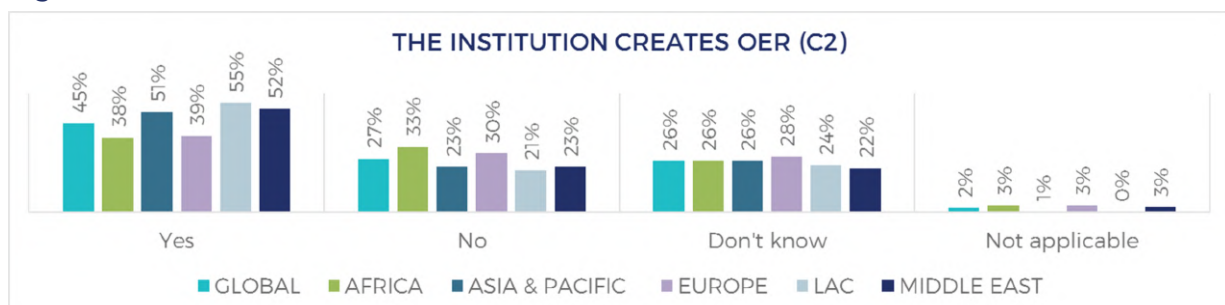


Fig. 49



III.4.2 OPEN SCIENCE

In terms of research and the availability of research results, both consultations included questions around Open Science, that is scholarly research that is freely and openly accessible.

In the comprehensive consultation, besides assessing whether the university was fostering initiatives for Open Science, it also assessed whether there are initiatives supporting Open Science at the national level (**Fig. 50**). To this question, 52% of the respondents expressed that there are 'somewhat' initiatives at the national level to support Open Science. 17% indicate 'yes, very much' and on the no-side, 26% indicate 'no, nothing much' or 'no, not at all' (5%). Although it is still in an initial phase, it is clear from the question that this is on the agenda around the world. The breakdown by region is very similar to the global trend, only Africa 10% and LAC (8%) are slightly higher in the 'no, not at all' category and Europe is slightly higher in both of the 'Yes, categories' (18%/56%).

Turning from the support at the national level to whether the institution fosters transformation toward open science (**Fig. 51**), in the comprehensive consultation 54% indicate 'yes' against 20% 'no'; 24% do not know and 3% indicates 'not applicable'. As the question was grouped with other questions in the survey, the response categories differed slightly from one consultation to the other. In the leadership consultation (**Fig. 52**), there were four different degrees to which the institution fosters transformation towards open science. Here 22% said 'yes, fully and 45% 'yes, somewhat, high in total (67%) makes it slightly higher than the comprehensive consultation. The fact that a high level of respondents did not know (26%) in the comprehensive consultation might explain this difference. Looking at the level of 'no' replies in the leadership consultation, it shows that 22% reply 'No, but that it is being discussed' and 12% 'no, not at this stage.

Fig. 50

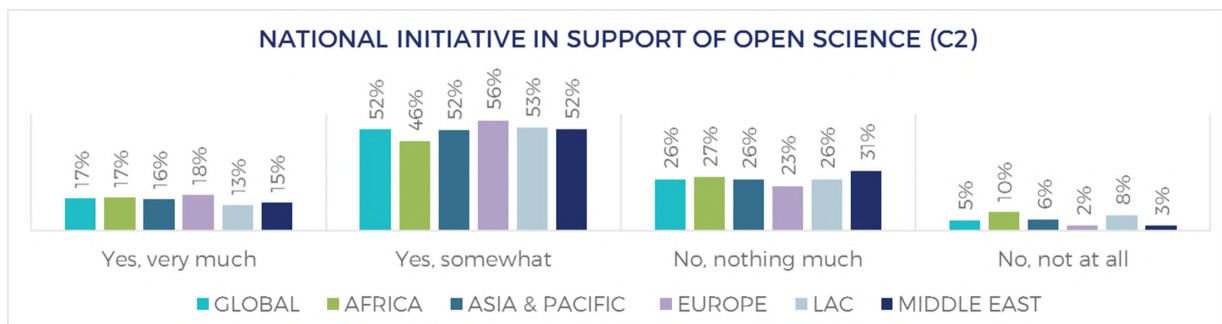


Fig. 51

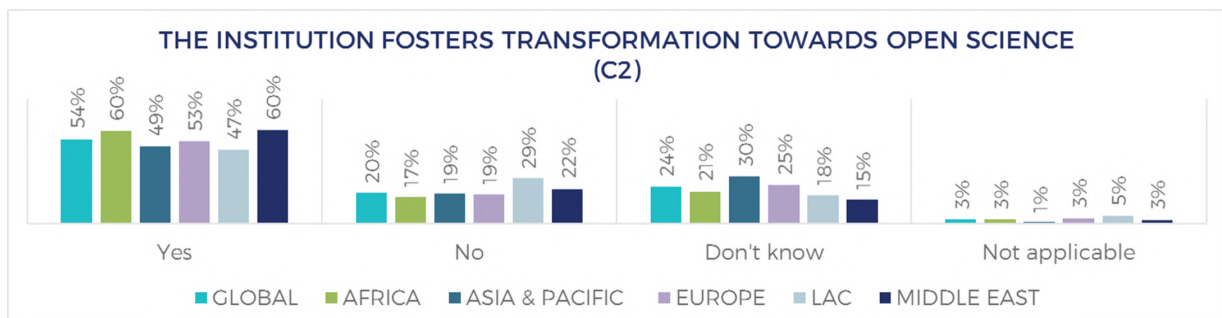
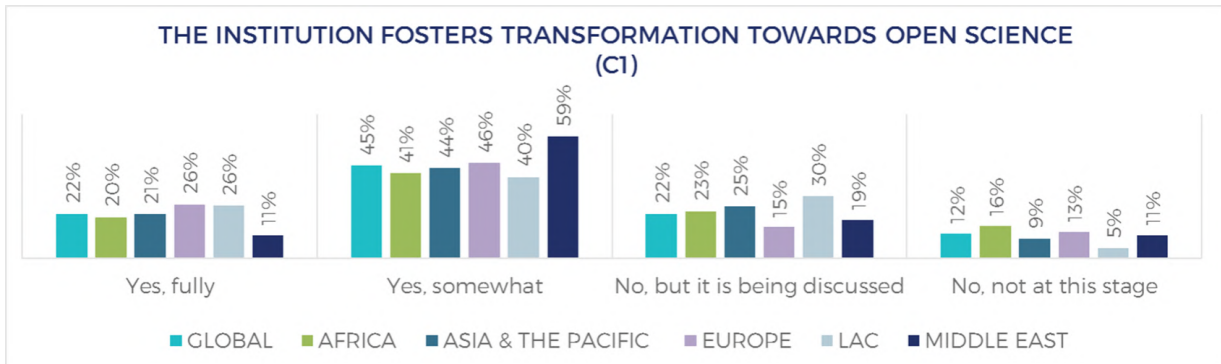


Fig. 52



III.5 LIFELONG LEARNING (LLL)

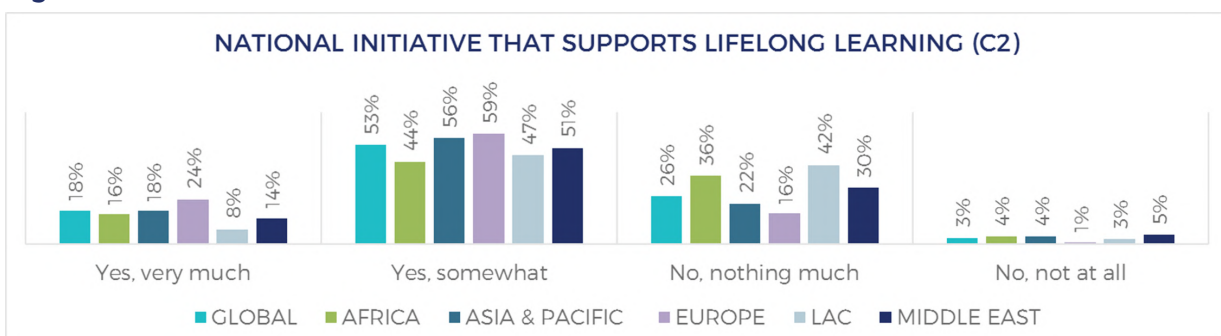
It is a publicly common discourse that technology is changing the jobs of the future and that there will be an increasing need for re-skilling or upskilling throughout life to adapt to a changing work environment. Considering this context, several questions were included in the comprehensive consultation in relation to lifelong learning to assess to what extent universities are impacted by these trends and to what extent they expect to be impacted in the years to come.

There is a general trend to consider lifelong learning at the national level but in its early or premature phase as it is mainly categorized by 'somewhat'. Considering the regional breakdown particularly LAC (42%) and Africa (36%) stand out with a higher score on the 'no, nothing much', followed by Middle East (30%) which is also above the average (26%) in this category. Europe (24%/59%) is slightly above average in the 'yes' categories, followed closely by Asia & the Pacific.

As for many other questions, respondents assessed whether they found that there were national initiatives in place in support of lifelong learning (Fig. 53). To this question, respondents primarily selected 'Yes, somewhat' (53%) or 'Yes, very much' (18%). On the other side, 26% indicated 'No, nothing much' and finally 3% 'no, not at all'.



Fig. 53



84% percent of HEIs welcome adult learners to their institutions (**Fig. 54**) and 55% have seen an increase in adult learners over the past 5 years (particularly in Africa (65%)) (**Fig. 55**) and 61% also expect the number to increase over the next 10 years (**Fig. 56**).

Finally, 53% indicate that they have a strategy in place already to accommodate an increase in the number of adult learners (**Fig. 57**). For the last two questions, it is noteworthy that 1 out of 4 indicated that they did not know.

Fig. 54

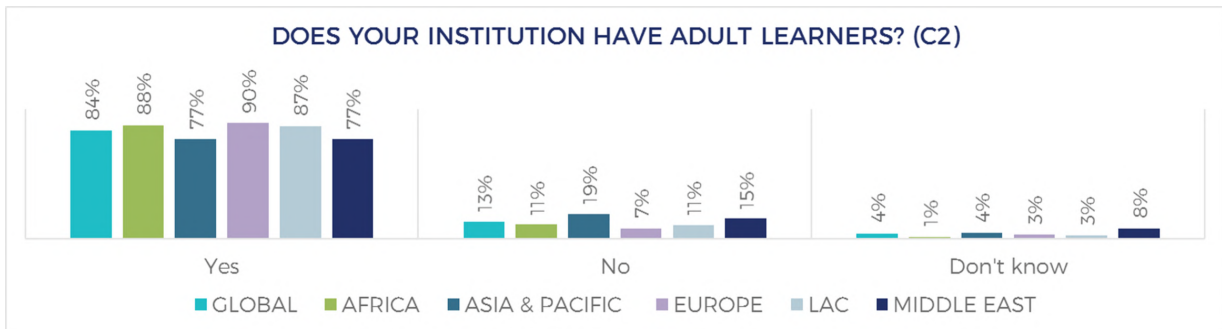


Fig. 55

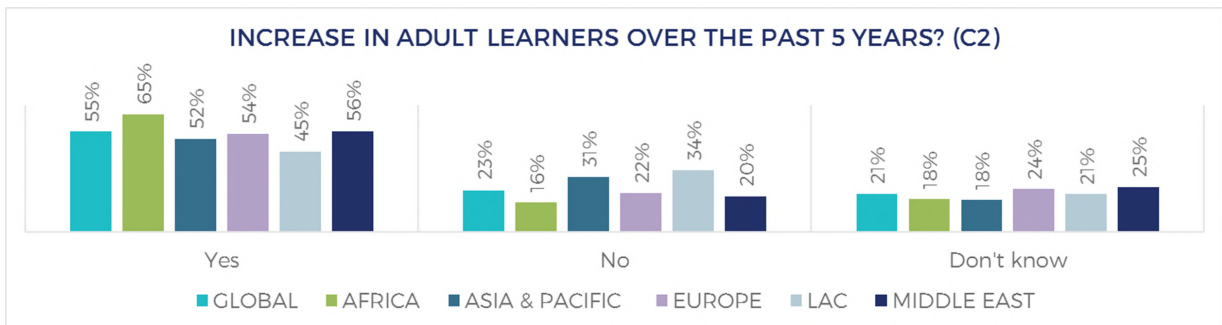


Fig. 56

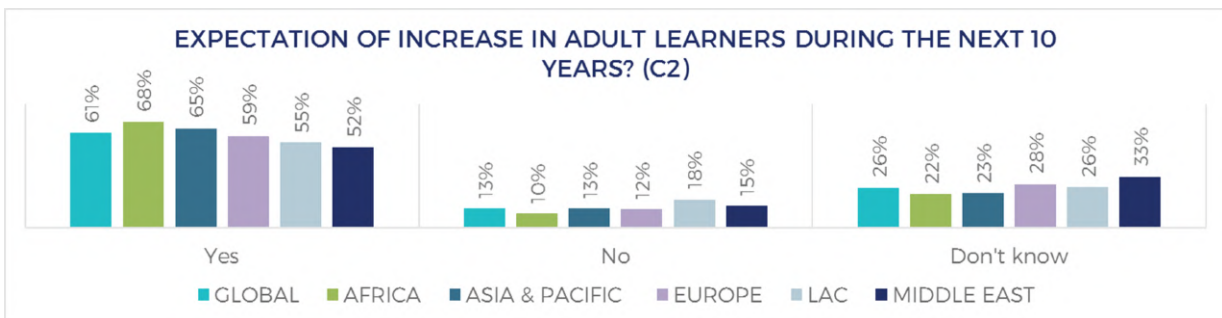
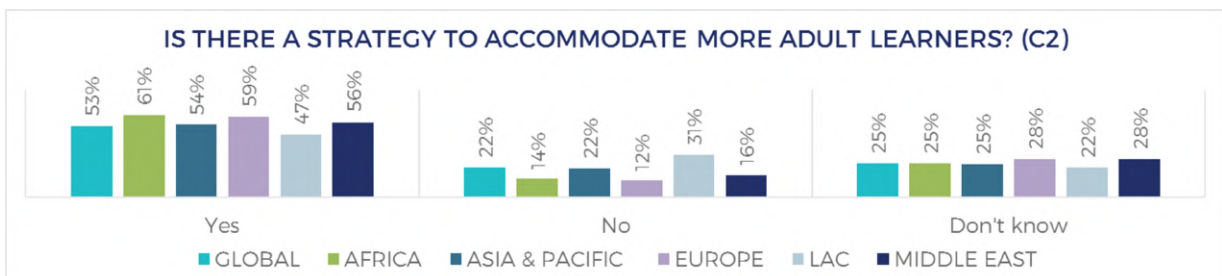


Fig. 57



III.6 OPPORTUNITIES AND CHALLENGES OF DIGITAL TRANSFORMATION IN HIGHER EDUCATION

III.6.1 WHO IS LEADING THE CHANGE AND WHAT ARE THE MAIN ACHIEVEMENTS ?

To assess from a general perspective, the main drivers behind digital transformation and the most common achievements as well as challenges, the respondents were asked to select the different categories that they found most relevant in answer to a series of questions (multiple replies were possible).

First, let us look at ‘who is pushing the digital agenda forward?’ This question was included in both consultations and in both the ‘Leadership’ category is the most important driver of digital transformation, followed by faculty.

Students have a higher score than staff in the leadership consultation (Fig. 58) and the other way around in the comprehensive consultation (Fig. 59). For these two categories, the share of responses is higher in Africa than in the other regions. For Europe, students are the second most important driver pushing the agenda forward, before faculty and staff. In the Middle East, ‘Faculty’ as a driver is as important as ‘Leadership’. In the comments of this section, several respondents refer to a specific unit or centre in charge of the digital transformation as the key driver of the university in terms of transformation.



Fig. 58

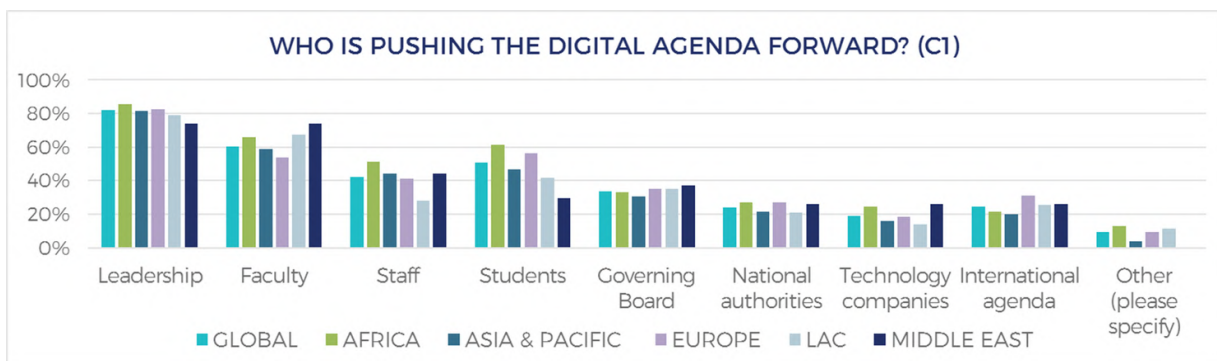
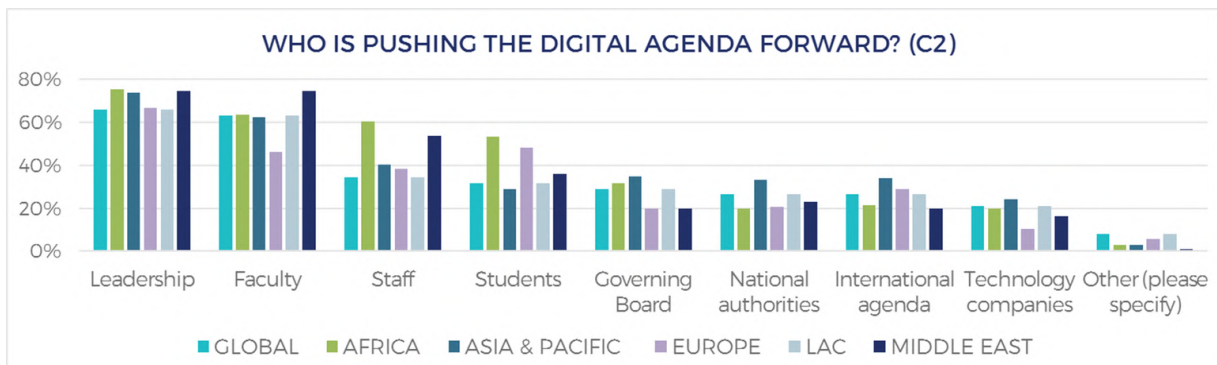


Fig. 59



In terms of the key achievements using new technologies (Fig. 60), the most frequently selected is 'improved governance of information followed' by 'new learning pedagogies to enhance the student experience'. Improved research through new networks shares the next place with improved access to scientific knowledge. There are some differences in terms of the regional breakdown in the replies. For example, in the Middle East and Africa, improved access to scientific knowledge is very important for both regions. LAC stands out in the category 'improved accessibility to HE through distance learning opportunities', which seems to be further explored in this region compared to the other regions.

The order of the different categories is similar in the comprehensive consultation (Fig. 61); however, there are fewer differences among the different achievements in this consultation (they vary from 73% to 53% in terms of the global average whereas in the leadership consultation they vary from 80% to 36% according to the different categories). The only difference in terms of the order is the category 'Improved access to scientific knowledge' which did not exist in the comprehensive consultation as it included a different category 'taking part in Open Science initiatives'. The first has a higher number of percentage and thus placement among the other categories compared to the latter.

Fig. 60

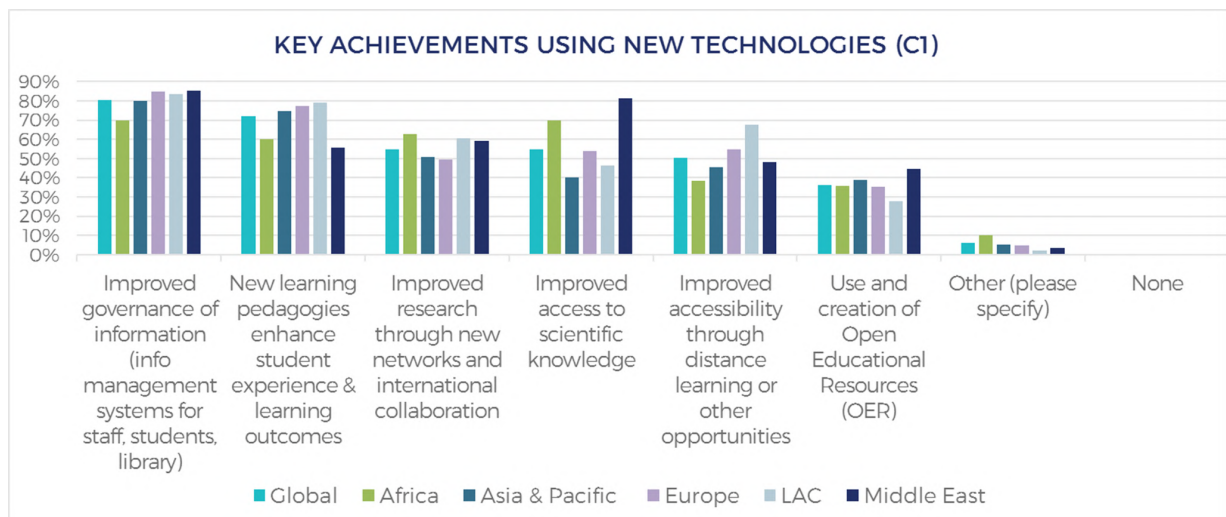
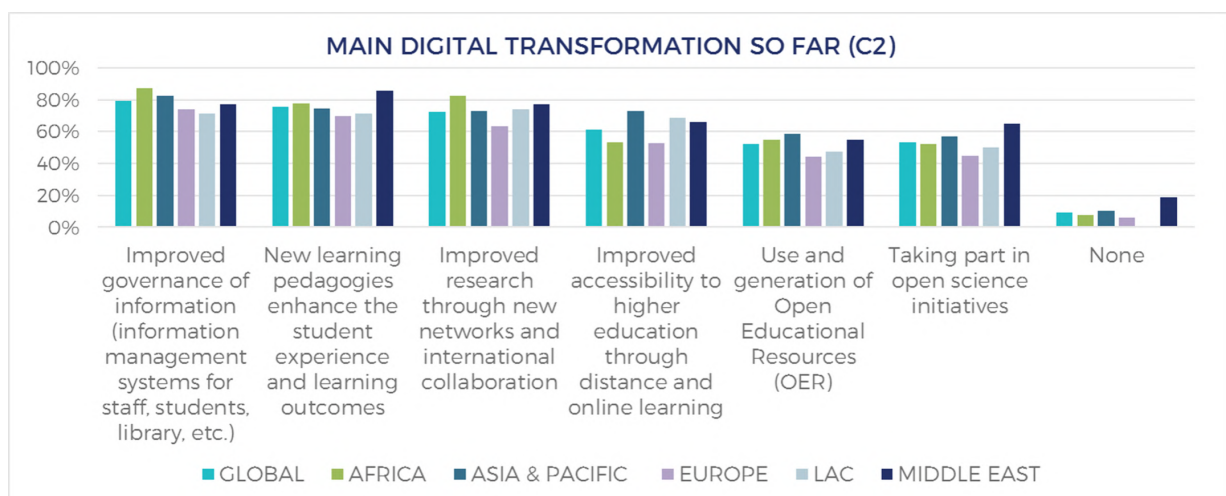


Fig. 61

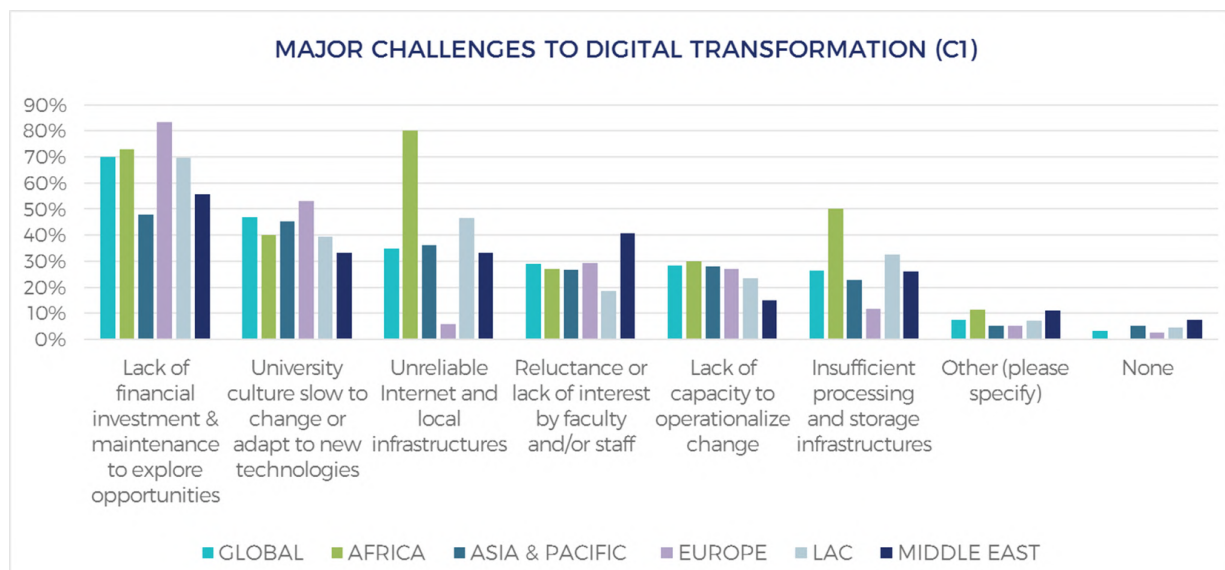


III.6.2 WHAT ARE THE KEY CHALLENGES TO DIGITAL TRANSFORMATION?

After having considered the main achievements, respondents assessed the main challenges at the institution to pursuing digital transformation at the institutional level. When looking at the global average of the leadership consultation (**Fig. 62**) 'financial investments' (70%) is the largest obstacle, in this case, Europe (83%) and Africa (73%) are above the global average. 'An organizational culture slow to change or adapt to new technologies' (47%) is the second most important obstacle, in which Europe continues to be above average (53%). In third position is 'unreliable internet and infrastructure' (35%) where Africa (80%) and Europe (6%) are extreme opposites in this category. It is the key obstacle for Africa compared to all others, and the least worrying concern in Europe, which exemplifies the different contexts to exploring the benefits of digital transformation for HEIs.



Fig. 62

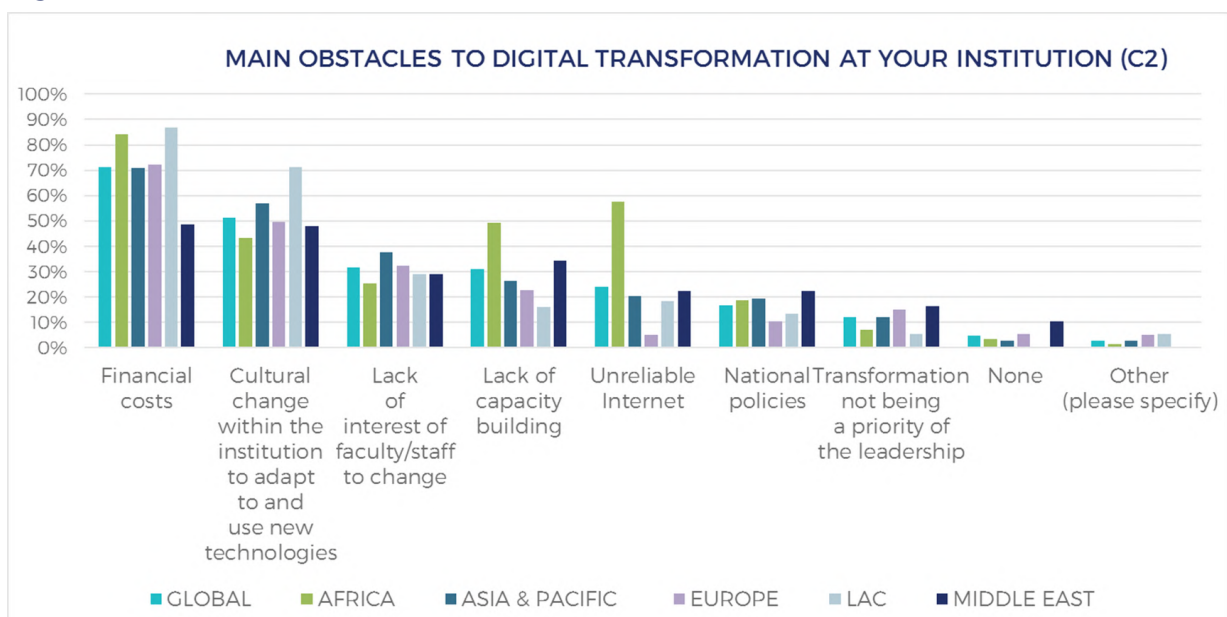




In the following category, 'Reluctance or lack of interest of staff' (29%), the Middle East (41%) is particularly higher than the global average.

Looking at the replies in the comprehensive consultation (**Fig. 63**), 'financial cost' (70%) is likewise the most important obstacle identified by the respondents. However, in this case, it is LAC (87%) and Africa (84%) that are above the global average. 'Cultural change' (51%) is equally the second most important obstacle in this consultation, and this is particularly underlined by LAC (71%). However, 'Lack of interest' (32%) and 'Lack of capacity building' (31%) come before 'Unreliable internet' (24%). While the regional breakdown in 'Lack of interest' is minor, Africa (49%) in particular and Middle East (34%) are higher than the global average when it comes to 'Lack of capacity building'. In terms of 'Unreliable internet, the trend is the same as in the leadership consultation, with Africa (58%) and Europe (5%) being opposites in this category.

Fig. 63



IV. PERCEPTIONS OF THE CURRENT TRANSFORMATION

Technological developments are not new - they have been taking place for a long time, but the pace at which technology is developing is unprecedented; at the same time technological developments are generating hope for the future in terms of providing new solutions for tackling problems of society. However, these developments can also be viewed as a source of insecurity for the future. We therefore included a series of questions aimed at collecting opinions of respondents related to higher education and technology, our intention being to get a sense of the mind-set of our colleagues devoting their careers to advancing higher education.

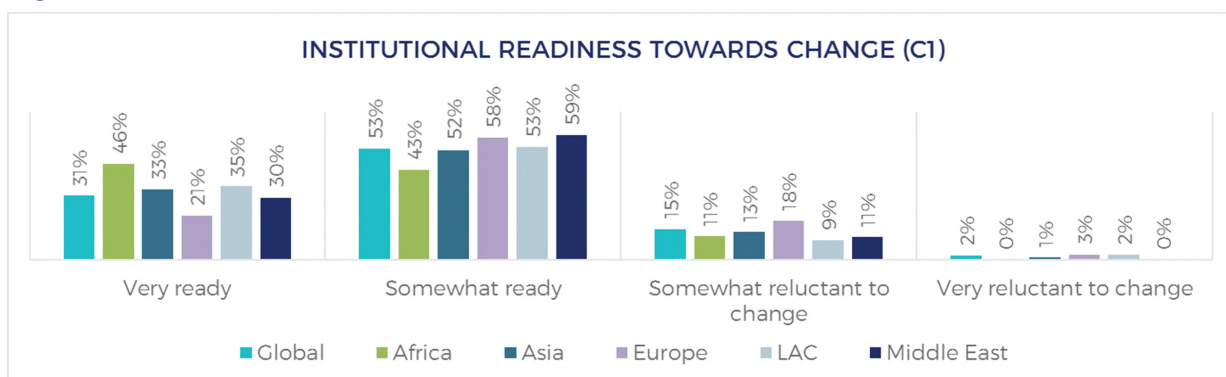


A third (31%) feels 'very ready' and 15% consider their institution is 'somewhat reluctant to change'. Luckily, only 2% consider their institutions as being 'very reluctant' to change. Particularly Africa (46%) is above average in the category 'very ready to change' and in contrast, Europe (21%) is below the average in this same category. Europe (18%/3%) is also the only region slightly above the global average (15%/3%) in the categories expressing reluctance to change. This general positive assessment of readiness for change within institutions is interesting when considering that the second most important obstacle to digital transformation was the 'organizational culture and readiness towards change'. This means that although there is a will, organizational culture remains an obstacle to introducing changes to an existing set of habits. This question was not part of the comprehensive consultation, and the results would potentially have been more critical than the leadership consultation, but this is merely speculation.

IV.1 READY FOR CHANGE?

The questions were built around a series of claims that are often referred to in the public discourse on digital transformation, or the fourth industrial revolution, as some refer to the phenomenon. However, first, it is a general assumption that integrating technology in higher education implies change and transformation, thus the respondents to the leadership consultation were asked to express to what extent they find their institution organizational culture is ready to change and innovate? (Fig. 64) The majority indicate that their institution is 'somewhat ready' to change (53%).

Fig. 64



The responses are more spread over the full scale in the following question although 51% agree that it is 'somewhat' difficult to leverage the potential of digital technologies (Fig. 65). Eighteen percent strongly agree that it is difficult whereas 10% strongly disagree and thus find that it is easy to leverage the potential. Finally, some 21% 'somewhat disagree' that it is difficult to leverage the potential. Although there are more divergent opinions on this question, the majority, however, find that it is challenging to leverage the potential of digital transformation and only one out of ten find that it is not the case.

Regarding digital transformation and the necessity for students to actively participate in society (Fig. 66), 61% strongly agree that it is crucial for preparing the student. 33% 'somewhat agree' and very few 'somewhat disagree' (5%) or strongly disagree (1%). Africa (77%) is above the global average (61%) in the category 'strongly agree'.

This is interesting in the light of it also being the continent with where infrastructure and access to the internet remains a major obstacle to pursuing digital transformation in society. However, in terms of the importance and willingness to change it come across strongly from the respondents in Africa. Asia & the Pacific (10%) and Europe (7%) are the regions above the global average indicating that the 'somewhat disagree'.



Respondents in Africa believe more strongly compared to the other regions that digital transformation is necessary and inevitable in preparing students to actively participate in society.



Fig. 65

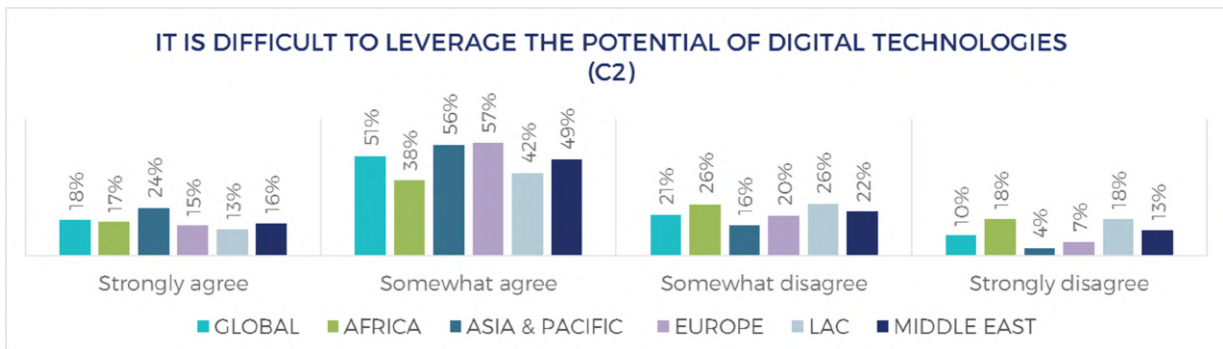
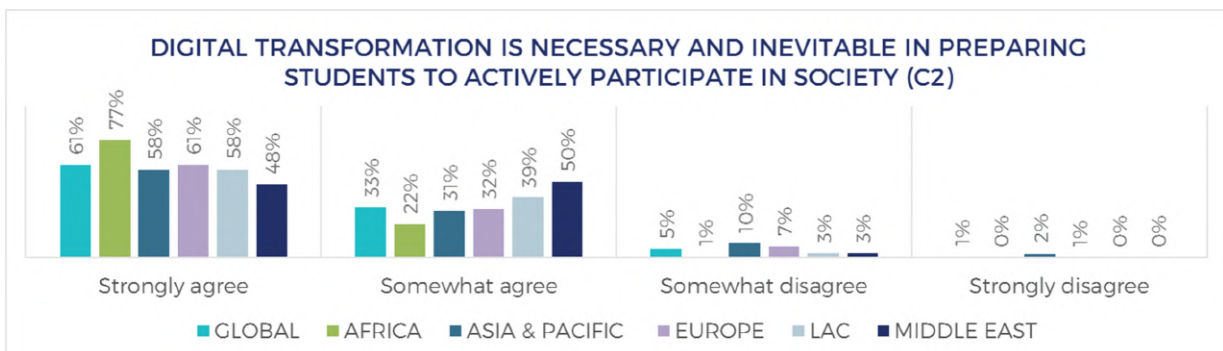


Fig. 66



After a question which saw consensus among replies across the regions, the next one generates a much more diverse set of responses, namely, to assess to what extent the impact of digital transformation on higher education is overestimated (Fig. 67). Even within the regions, the replies are divergent; however if we look at the global average, 32% 'somewhat agree' and another 32% 'somewhat disagree'. In the same manner, 17% 'strongly agree' and another 19% 'strongly disagree'. So what is clear in this case that there are divergent opinions around the world. When looking at the regional breakdown, it is Middle East (69%) and Asia & the Pacific particularly (61% in total) that agree with the statement that the impact of digital transformation in higher education is overestimated. On the other side of the spectrum, it is particularly LAC (63% in total), Europe (62% in total), and Africa (61%) that disagree with the statement. However, although some regions are slightly more in agreement or disagreement with the

statement, it remains a statement that evokes divergent opinions which also reflect very diverse opinions on the matter in society.

On a more positive note, the respondents agree that digital transformation carries the potential to improve the human condition (Fig. 68). Fifty-two percent strongly agree and 38% somewhat agree against only 8% somewhat disagreeing and 2% strongly disagreeing so although there are responses in all categories, a large majority of 90% agrees (to some extent) with the statement. When considering the regional breakdown, Africa is in particular above average in 'strongly agreeing' 75% and in total 98% agrees to some extent when considering both categories together. On the disagreeing side, it is Europe (13%) and LAC (11%) that are slightly above the average (8%) 'somewhat disagreeing' and expressing more caution in terms of the positive impact of digital transformation.

Fig. 67

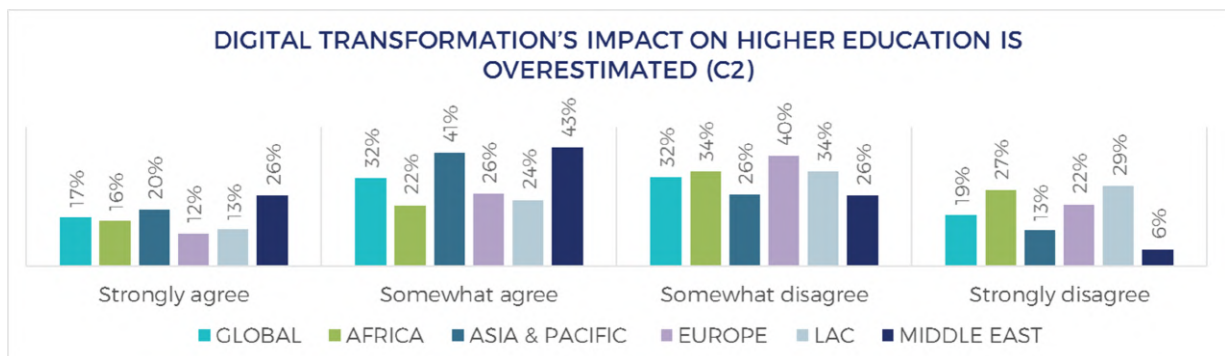
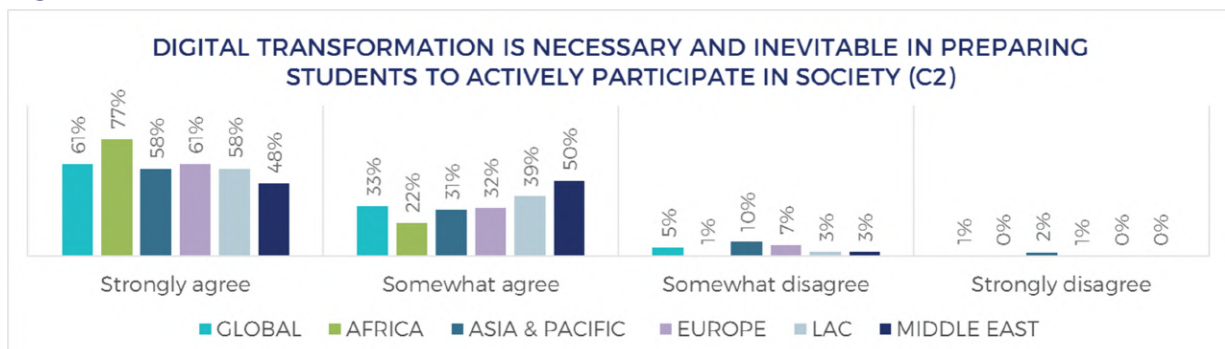


Fig. 68



The following statement focuses on the divide that digital transformation is potentially generating both among and within countries (Fig. 69). 27% 'strongly agree' that digital transformation exacerbates socioeconomic divides within and among countries and 42% 'somewhat agree', while 21% 'somewhat disagree' and 10% 'strongly disagree' with the statement. Thus although there is a majority who confirm that there is an important risk associated with new technologies, 31% disagree and believe, on the other hand, that new technologies can be seen as a potential opportunity for bridging divides.

Regarding the aim of bridging rather than generating divides, one aspect covered in the consultation was to what extent universities are pursuing initiatives to improve access to higher education (for under-represented groups of society) through the use of technology (Fig. 70). Although we saw that potential is not yet fully explored, in this case, 75% of the respondents

'strongly agree' and 23% 'somewhat agree' that this is one opportunity to be explored. Only 2% somewhat disagree. In particular, Africa (89%) is above average in the 'strongly agree' category and the Middle East is above average in 'somewhat agree' (32%). The same region is also slightly above average in the 'somewhat disagree' (5%) category.

The financial cost or investments required were identified as key obstacles in both consultations to digital transformation. Considering this trend, it is, however, interesting to note that 39% 'strongly agree' and 38% 'somewhat agree' that digital transformation and new technologies will lower the cost of higher education (Fig. 71). On the other side of the axis, 19% 'somewhat disagree' and 4% 'strongly disagree'. In terms of the regional breakdown, Africa (58%) is again above average in 'strongly agreeing' and Europe (32%) is above average in terms of 'somewhat disagreeing' and also 'strongly disagreeing' (7%).

Fig. 69

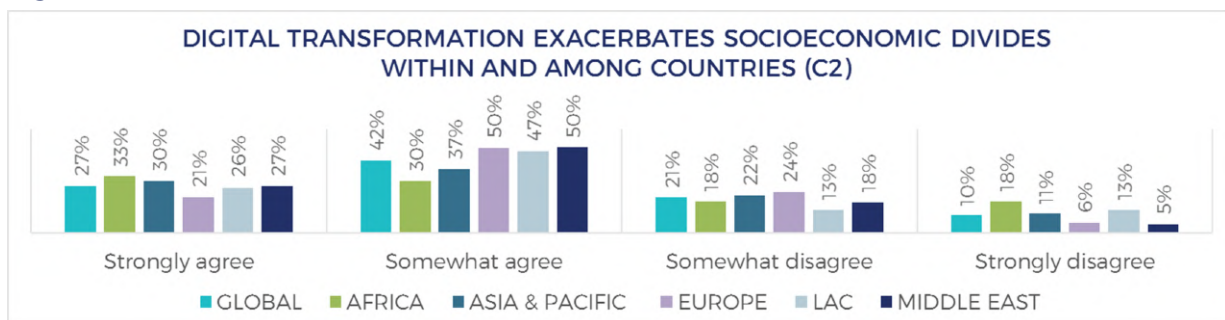
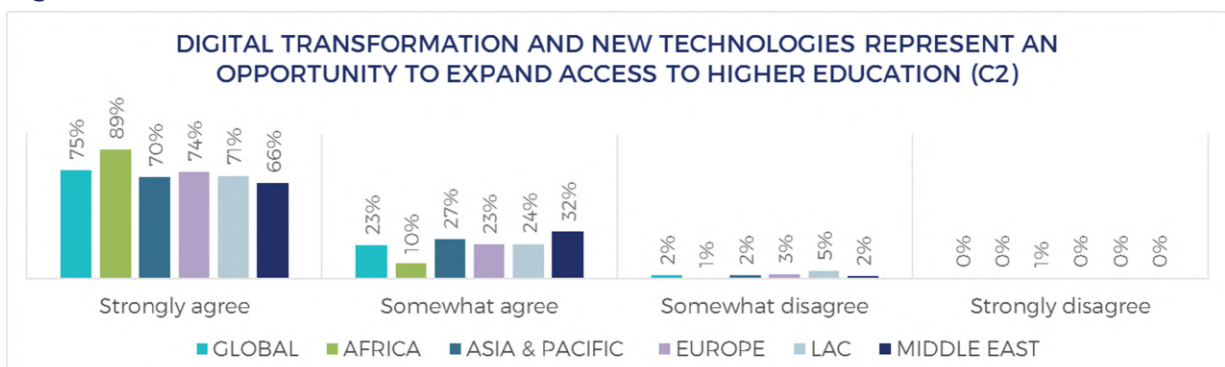


Fig. 70



In the latter category, LAC is above average with 11% against 4% of the global average. There is maybe some hope in this question expressed by Africa that technology will increase access to higher education by lowering the cost, but Europe as a continent does not have the same obstacles in terms of connectivity and is more cautious about assuming that it will imply a lower cost of higher education. It is a question of different perspectives but still, there is a majority of respondents who believe that technology is the means to lowering the cost of higher education.

However, when it comes to a more broad question about to what extent digital transformation and new technologies are essential for improving higher education (Fig. 72), most respondents 'strongly agree' (79%) and 20% 'somewhat agree'. Africa remains the most convinced region, with 97% of respondents strongly agreeing and none in the two 'disagreeing' options.

Along the same lines, the respondents to the leadership consultation were asked whether they believe that technological developments can enhance the quality of higher education and four choices were provided (Fig. 73). 17% of respondents indicated 'Yes, technological developments enhance the quality of higher education' with 17% replying 'Yes, in some areas but technology may be detrimental in other areas'. Five percent qualified technology as being a tool and the quality is the same with or without technology. Almost none (0.30%) chose the last category, which was that technology has a negative impact on the quality of higher education. The replies show a positive approach to the future of higher education and the overwhelming majority sees the potential of such tools to contribute to the quality of higher education. Africa (90%) and LAC (86%) are the most optimistic regions when it comes to this statement and Europe remains the most critical with 67% in the first and most positive category and also the region with the most replies in the category 'it is a tool and the quality is the same with or without technology' (10%).

Fig. 71

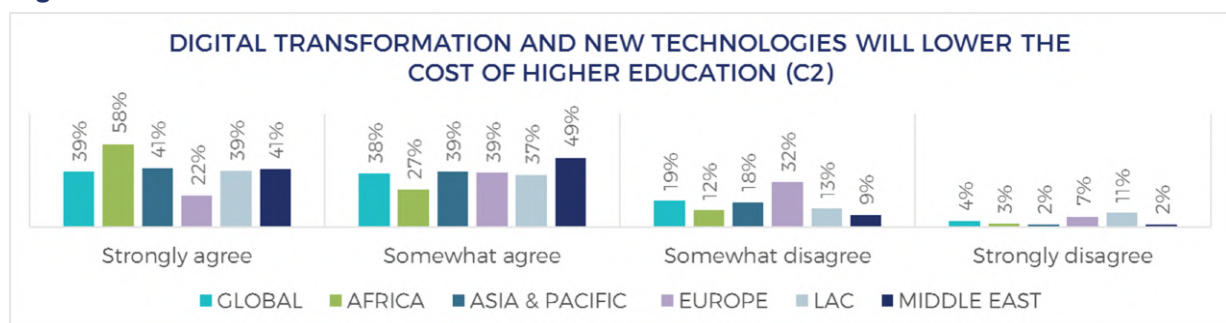


Fig. 72

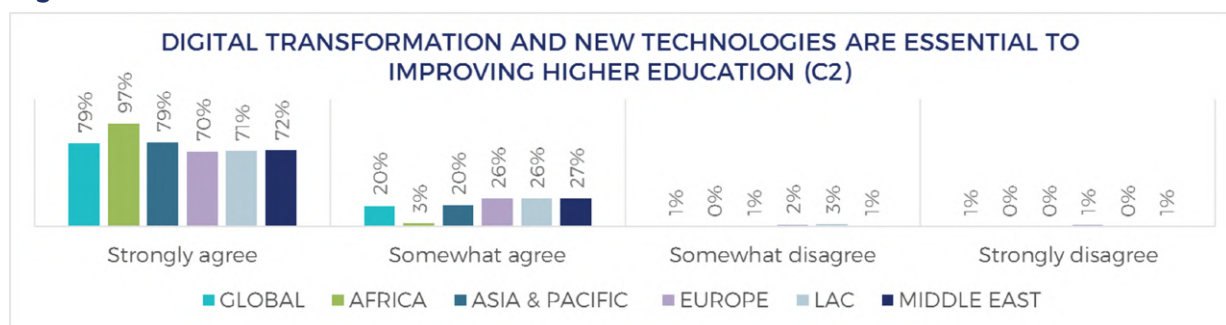
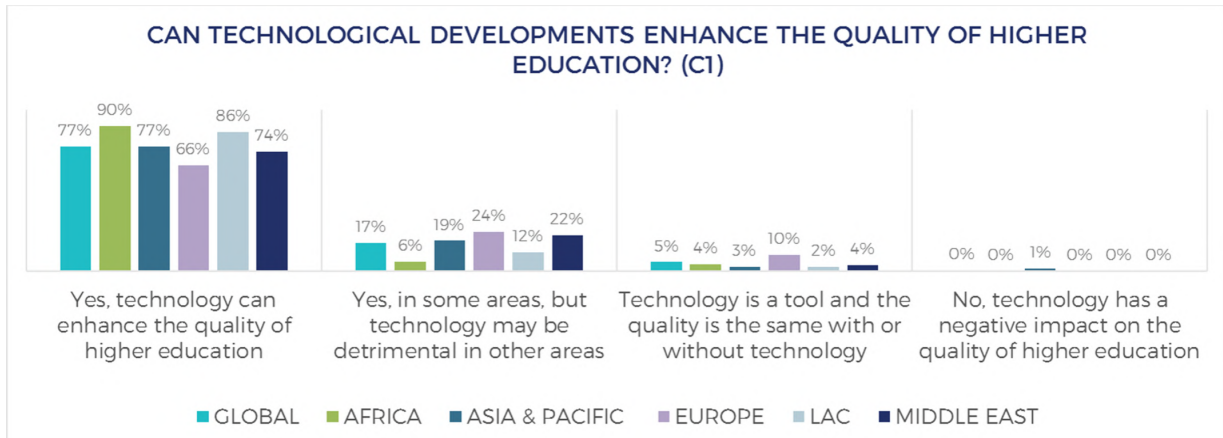


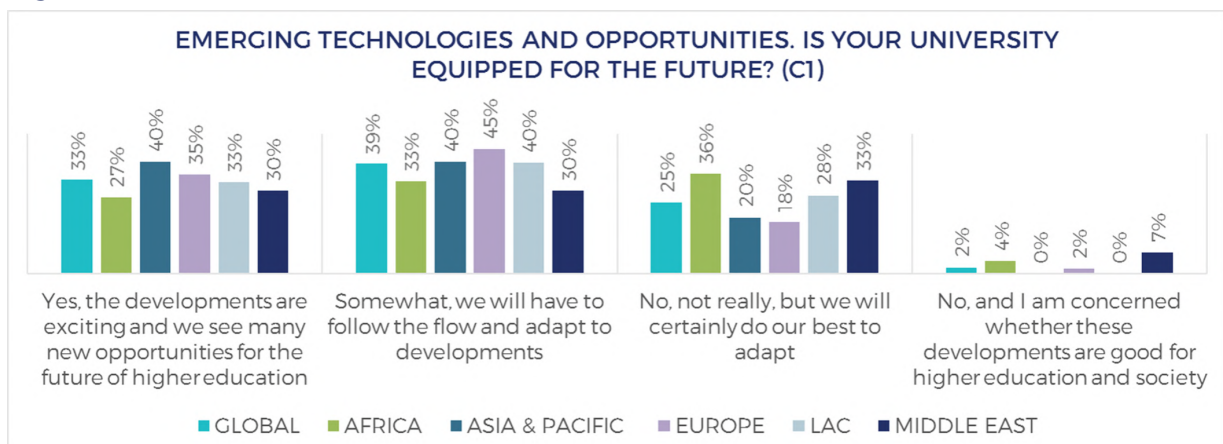
Fig. 73



In the leadership consultation, the final question looked towards the future, referring to relatively new and emerging technologies such as artificial intelligence, blockchain, big data, Internet of Things. The claim in the question is that these technologies are impacting society and whether the university is equipped for the future. (Fig. 74) This question triggered to some extent divergent replies as it saw 33% indicating 'Yes, the developments are exciting and we see many new opportunities for the future of higher education'. A slightly larger proportion of the respondents (39%) were more cautious in the reply saying 'somewhat ready, we will have to follow the flow and adapt to developments'. On the less positive side of the scale, 25% indicated

'No, not really, but we will do our best to adapt'. The final option 'No and I am concerned whether the developments are good for higher education and society' received only a score of 2%. So although the degree of readiness is diverse, only a very few believe that it will have a direct negative impact. One out of four, however, does not really feel equipped for the future and 39% only 'somewhat ready'. One out of three is excited about the changes, and will probably have to lead the way as first movers for new developments in terms of technology in higher education. Asia & the Pacific (40%/40%) and Europe (35%/45%) are the two regions that feel slightly more ready for change compared to the global average. Africa (36%/4%) and Middle East (33%/7%) are the regions that feel the less equipped for the future.

Fig. 74

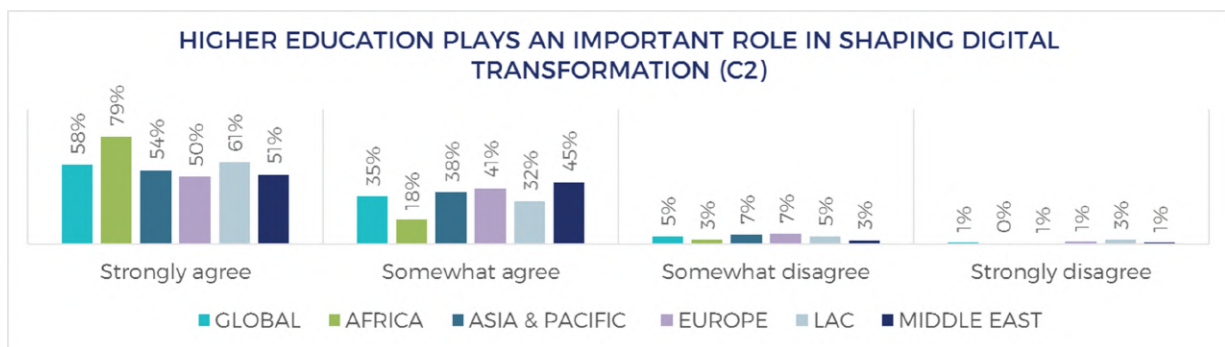


To end the report on a more positive note and likewise a more action-oriented note towards the future, the respondents in the comprehensive consultation were asked whether they believed that higher education plays an important role in shaping digital transformation (Fig. 75) to which 58% strongly agreed with the statement, 35% 'somewhat agree' and only a very few 'disagree' (5% somewhat disagree/ 1% strongly disagree). Africa (79%) is above average in terms of agreeing with the statement but otherwise, the main

difference among the regions is not whether they agree but rather the extent to which they agree. Only a very few disagree with this statement, and this is also very similar across all regions.

At IAU, we are very pleased with replies to the final question as we believe that higher education can play an important role in shaping the digital transformation *for good* through education and research, to propose solutions and advice in terms of the impact of digital transformation on higher education and society.

Fig. 75



CONCLUSION

There is 'no one size fits all' to digital transformation in higher education. Higher education institutions (HEIs) are different in nature, different in scope and operate in very different contexts. However, technological advancements have an impact throughout the world on the everyday lives of citizens, on how societies are developing, on the skills and competences required to take part in society; and most importantly, on how to access information and knowledge. Although the transformations are taking place in different ways, at different paces, and with different means and opportunities, one common factor to HEIs is that they are all confronted with the question of how to adapt and shape higher education in an increasingly digital world.

Technology in itself is merely a means to an end, and it is therefore essential to debate, question and inquire about 'the aim' of digital transformation, which ideally should be to advance and improve the quality and relevance of higher education. The purpose of the new IAU Policy Statement is to identify a set of principles and values that must underpin digital transformation in support of this overall aim at the same time considering the opportunities as well as the challenges. To define the principles and values of the new Policy Statement, it is important to understand the present state of transformation, to ensure a coherent linkage between the current state of higher education and the formulation of the principles and values taken up in the new Policy Statement.

Digital transformation is a shared priority among HEIs, regardless of where these institutions are located. The consultation affirms that a great majority of the respondents in the leadership consultation consider digital transformation a high priority (68%) for the institution.

The comprehensive consultation confirms that there is strong leadership support (72%) for transforming and making use of new technologies, however, although the consultation shows that it is an important priority accompanied by leadership support, it does not make the process of transforming less complex. The purpose of this conclusion is not to summarize the wealth of information available in the report, but to take a few trends underlined by the results and offer some reflections on their potential ramification and inclusion in the Policy Statement.

Higher education policies at the national level

The results of the consultation showed that in terms of national governance of higher education, the main barrier to digital transformation at the institutional level was the 'lack of national financial support' provided for higher education institutions to transform. Although there were some differences as to what extent national frameworks, policies and regulations were considered conducive to transformation, the 'national financial frameworks' were considered as the most important constraint in all regions. However, in Asia and the Pacific, the national higher education policies, regulations and systems were considered more conducive to transformation and in Europe less so when compared to the other regions. Beyond the national financial frameworks, accreditation systems and recognition and quality assurance were considered less conducive to transformations when compared to the other options. The consultation did not allow for investigating further the specific reasons behind the results, but

they can be considered an indicator of the type of policies that may need to be reviewed or adapted to better respond to certain innovations deriving from technological development and it would be interesting to further examine the tensions between national policies and regulations and digital transformation in higher education.

Financial investments

'Financial investments' were again outlined as the main barrier to digital transformation at the institutional level. It is furthermore interesting to note that Europe - one of the regions in the world with the highest internet penetration - is also the region with the highest percentage of replies indicating lack of financial investment as the key obstacle to pursuing digital transformation. This shows that it is not simply a matter of having the basic infrastructure in place and then being able to leverage the potential. Rather, the trend is that the more access you have to the basic infrastructure the more investment is required in order to further develop the potential of technology. If this trend holds true, it is a worrisome prospect for countries and regions that are still struggling to get the most basic infrastructure in place.

Technological versus human change

Technological developments are often accompanied by a series of contrasts. Contrast between the potential and the risks, appropriate use and misuse. One of the contrasts that stands out in the results is the difference between the pace of technological developments and the pace of changes in institutional cultures and thereby human behaviour; these were considered the second most important barrier to institutional transformation. The institutional culture is not changing at the same pace as technological developments.

Maybe that is a good thing - as it somewhat slows down the transformation, yet it also creates a dilemma for ensuring that higher education institutions are adapting to a changing context and remain relevant for the future. It is much easier to move a machine or a computer or to set it up for different tasks or different rhythms; it does not work in the same manner with humans (luckily). This however, means that one of the major obstacles to technological transformation is the human factor. This presupposes that to lead a successful transformation, the different stakeholders (whether faculty, staff, students) must be part of the process and take ownership of the process. There is a need for strong leadership support for the transformation, but those concerned by any changes must be involved in shaping the transformation; must take part in the reflection, conversations and the critical assessment in terms of opportunities and risks. It is also important to make room for failure as there is no guarantee when exploring innovations that they will all be successful. The leadership can provide a frame for motivating and mobilizing the institution, but it needs to be combined with capacity-building and flexibly to include innovations that are driven forward by the faculty and staff in relation to their different types of task and mission. Many HEIs indicated that they had created a specific unit within the institution that is tasked to test and drive digital transformation forward.



Inequalities

The open consultation also demonstrated existing inequalities in terms of access for exploring the potential of technology in higher education, for example, in case of internet infrastructure. This constitutes the major threat to future societies as it clearly illustrates the divides between those who have access and those who have not. This is of course initially a key priority to be dealt with at the national level, but the implications of these divides must also be considered at the global level in order to counteract the risk of increasing divides, and to generate collaboration that allows for leapfrogging and capacity building and other measures that can contribute to minimising divides. It is essential to ensure that new opportunities born out of new technological advancements do not lead to new or exacerbated inequalities.

While technology and access to the internet is merely a means to an end, the key underlying issue that poses a profound problem to the future of society is that this 'means' provides humans with access to data, information and knowledge. Knowledge is fundamental to the politics, economy, and culture of modern society and at the same time essential for the individual in order to take informed decisions about his or her life. So, although technology is only a means to an end, it is an essential means for accessing knowledge. When technology is not available equally to all, we refer to digital divides, but the main issue is rather the creation of "knowledge divides", resulting in different and unequal opportunities to act, take part in and develop society. Higher education institutions are at the heart of knowledge creation and dissemination; it is therefore only natural that higher education takes an active part in shaping a knowledge society.

Ethical dimensions

In terms of the key achievements at HEIs in terms of digital transformation, the first in line was online management of information and data. Most HEIs are, for example, managing student enrolment fully online compared to 30 years ago when this process was done on paper. This is a typical example of how some changes were carried out to do the same thing, but with the use of technology to improve the procedures and management of the information. However, increased digital data also implies new ways of analysing and making use of information, which leads to new ethical questions in terms of the right to data privacy, transparency in the use of the information and the need for elaborating a 'code of conduct' or data policy to ensure the stakeholders concerned are informed and aware about how the data collected is used, thus creating a trustworthy, transparent and safe environment for data management.

The ethical implications of new technological developments are manifold, complex and HEIs must strive to act as 'role models' in this field and pioneer positive and transparent use of online data. Ethical enquiry about technological developments is becoming increasingly important and must more than ever be included as part of curricula - maybe even as a transversal learning outcome, regardless of the field of study - to stimulate awareness and understanding of the implications of behaviour in the digital space. The ground for building ethical and responsible conduct when navigating or contributing to online space must already be laid in primary and secondary education, but higher education likewise has a role to play in educating and fostering responsible students in order to support and create norms and attitudes that support responsible conduct, not only in the physical world, but also in the online world.

Moving from the current state of transformation to the policy statement

The trends highlighted in this conclusion illustrate key challenges facing HEIs in current and ongoing transformation in the digital area and all these dimensions have therefore been included in the Policy Statement as a set of principles, norms and values to aspire to when pursuing the digital transformation. A draft version will be shared with IAU Members at the end of 2019 for comments and a final version will be submitted to the IAU 16th General Conference in November 2020 in Dublin, Ireland. Ultimately, the purpose of the Policy Statement is to set out principles and values that we - the higher education community - jointly support in our effort to shape an inclusive, ethical and purpose-based digital transformation.

While all HEIs are governed by their respective states and national policies, in a digital era, access to information goes beyond national boundaries, and therefore it is essential to have a global platform to exchange and to discuss how new technologies are transforming higher education, how to leverage its potential in higher education and how to build bridges between local and global contexts. This is the space of collaboration IAU is fostering - a global higher education community for exchange based on tolerance, mutual understanding and diversity - to discuss

the key issues at stake, share best practices and jointly to tackle challenges and find the means to develop best ways to explore opportunities.

It is time to revitalize and nurture the sense of shared responsibility and acknowledge that we live in one world, where we have to respond to the specific needs in local contexts, yet at the same time recognize that each context is intrinsically connected to the rest of the world. Let us use the unique position of higher education institutions in society to be at the forefront in terms of identifying and countering the risks related to technological developments and explore opportunities in order to create sound, sustainable, interconnected and human-centred societies where all citizens have equal access to knowledge, and thus the capacity to take informed decisions about their lives. The return on investment on this shared responsibility may be questioned, but it is simply a prerequisite for being part of a global puzzle and contributing to building a meaningful, stable and sustainable world where all citizens have an equal opportunity to pursue their potential. It may be difficult to quantify financially or tangibly, but it is a long-term investment in humanity, in society and a humble contribution to the mandate of UNESCO - ***building peace in the minds of men and women.***





IAU is a membership-led organisation with the purpose of advancing higher education and its important role in the development of our society. Founded in 1950 under the auspices of UNESCO, it is the leading global association of higher education institutions and organisations, comprising more than 650 Members in some 130 countries.

IAU serves as a global forum for leaders in higher education to reflect and rally around common priorities. It acts as the voice of higher education to UNESCO and other international organizations. The Association offers various services such as networking events, research, trainings and advisory services.

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