2018 Mobile
Industry
Impact Report:
Sustainable
Development
Goals

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with over 350 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces industry-leading events such as Mobile World Congress, Mobile World Congress Shanghai, Mobile World Congress Americas and the Mobile 360 Series of conferences.

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Foreword

#betterfuture

Welcome to the 2018 Mobile Industry Impact Report

Since the first mobile networks launched nearly three decades ago, the mobile industry has connected billions of individuals around the world, providing access to essential communications and a vast array of services that improve lives on a daily basis. This is the mobile industry's promise: to intelligently connect everyone and everything to a better future.

What does this better future look like?

In Peru, 1 million children do not have access to primary education. Mobile classrooms are bringing digital learning to the most remote part of the Amazon rainforest, giving students access to exciting educational resources and providing innovative teaching methods to educators.

In Tanzania, mobile is helping to solve the "identity crisis". Mobile-based systems have registered 1.7 million children under the age of five, providing the critical ID that will allow them to participate in society and access services such as healthcare, education, financial services and social protections.

In Malaysia, where half of the mangroves have been destroyed, mobile is enabling forestry officials to monitor new growth of mangroves. This new growth will help protect coastal areas from environmental risks and allow fish populations to recover.

Through efforts such as these around the world, the mobile industry is contributing to an even bigger vision: achieving the United Nations Sustainable Development Goals (SDGs). With networks spanning the globe and serving more than 5 billion people, the mobile industry is already positively impacting every one of the 17 SDGs.

As highlighted in this 2018 edition of the Mobile Industry Impact Report, we continue to build on this positive impact, across all of the SDGs. As we celebrate the strong progress we have made against the SDGs over the past three years, we recognise that we must also do more, faster, if we are to achieve these audacious goals. We need to extend mobile connectivity to those that remain offline, and deliver and scale the mobile-enabled solutions that will truly accelerate our achievement of the SDGs.

The 2030 deadline to meet the SDGs may seem a distant horizon today, but we cannot afford any delay in addressing the monumental issues facing our world – poverty, climate change, conflict, inequality and so many others. Together, across the private and public sectors, we must work now to preserve our planet and ensure a peaceful and prosperous future for its citizens.

Mats Granryd
Director General
GSMA

The World Economic Forum fully realizes the importance of public-private collaboration in addressing global issues. Gatherings such as the Sustainable Development Impact Summit are important milestones for world and business leaders to advance common goals. At the Forum, we are proud to work alongside organisations such as the GSMA in support of private-sector efforts towards achieving the SDGs. The GSMA Industry Impact Report demonstrates the crucial role of the mobile industry in turning commitment into tangible results in the course of the past three years.

**Professor Klaus Schwab, Executive Chairman,
World Economic Forum**

At Turkcell, we build our business on two premises: Using our technology in service of the people who need it the most, and empowering all segments of the society to create solutions for sustainable growth. As a telecommunications company with the capability to develop digital tools, we have a very solid technological foundation on which we build this approach. This report demonstrates that we are not alone: Under the leadership of the GSMA, mobile operators everywhere do not only have the technological means to make an impact, but also the will to do so.

We will continue to partner with governments, NGOs, international organisations, but most importantly, our users – the very beneficiaries of our digital tools – to help sustainable growth as we step into the era of the 4th Industrial Revolution. I am excited about the opportunities that new technologies – 5G, artificial intelligence, AR/VR, robotics – can offer for us to collectively achieve the targets set by the UN through SDGs.

Kaan Terzioğlu, CEO Turkcell and GSMA Foundation Board Member

The Sustainable Development Goals are the blueprint for a world in which no one is left behind. This report illustrates just how important the mobile industry will be if we are to achieve those Goals by 2030. Through advances in technology, remote villages are enjoying access to health care for the first time and people who were once undocumented are acquiring digital identities that connect them to the global economy. In the next 12 years, all of us – the United Nations, governments, civil society and the private sector – must work together to ensure that we build a more equal and collaborative world.

Alison Smale, Under-Secretary-General for Global Communications, United Nations

We live in an increasingly interconnected world—one where the importance of the mobile industry in shaping a thriving and just future is undeniable. The bold leadership GSMA, and its members, have shown toward achieving the Sustainable Development Goals is testament to the power of mobilising industry commitment. While the impact of this brave action is immense, the 2018 Mobile Industry Report indicates that it's time to accelerate progress and truly transform the way we work. At The B Team, we're ready to rise to this challenge with GSMA and spark the courageous leadership needed to bring our vision of healthy communities and a purpose-driven and principled private sector to life.

Halla Tómasdóttir, CEO, The B Team

Mobile is one of the most far-reaching technologies in history, enabling more and more people to join the digital revolution. As the head of the lead UN agency for information and communication technologies, I am delighted to see in this year's Impact Report from GSMA the increasingly positive impact of our partners in the mobile industry on all Sustainable Development Goals. This progress comes at a time when the world needs the SDGs, and the SDGs need ICTs and a strong mobile industry.

Mr Houlin Zhao, Secretary-General, ITU

Connected societies are empowered societies. By making sure as many as possible of us can participate—having an identity, a bank account, an ability to access healthcare—we can make real impact on reducing inequalities. None of us can do this alone, but we can do it through mutually beneficial partnerships: with industry, governments and organisations. Telenor has chosen #SDG10 as our commitment. This is reflected in our business strategy and our purpose. At Telenor we are convinced that a more equal world is good for our business and for the people we serve. We welcome the GSMA's strong support on the SDGs and this report measuring impact and showcasing concrete efforts.

Sigve Brekke, President & CEO, Telenor Group and GSMA Foundation Board Member

Mobile technology is revolutionary because it puts knowledge, information and opportunity directly into the hands of individuals. As the GSMA SDG Impact Report demonstrates, mobile services have a multiplier effect on virtually every dimension of human well-being, from health to agriculture to education. That is why the Broadband Commission for Sustainable Development emphasizes that universal access to affordable broadband is essential for achieving the SDGs. Success requires effective public-private partnership, and we are fortunate that the collaboration with the mobile industry continues to be one of the most productive in global development.

His Excellency Paul Kagame, President of Rwanda

We commend GSMA's report for measuring the impact of the mobile industry in enabling implementation of the Global Goals. The mobile sector has a vital role to play in making the SDGs everyone's business. While big infrastructure projects need sizeable investments and enabling government policies, examples from the sector illustrate how innovators can achieve SDG impact with low cost mobile technologies. We applaud the creative, entrepreneurial partnerships that are being pursued by the industry to advance key SDG targets. ICC looks forward to working with GSMA and partners across the world to support and inspire further action for the Goals.

John W.H. Denton AO, Secretary General, International Chamber of Commerce

The 2030 Agenda and its 17 Sustainable Development Goals (SDGs) call for a paradigm shift from the prevailing development patterns and existing culture of privilege towards a new model that prioritizes sustainability and equality. This global agenda requires actions and policies geared towards inclusive growth, the elimination of poverty and sustainable patterns of production and consumption, integrating the economic, social and environmental spheres. In this context, the GSMA report provides very relevant insight on the contribution and commitment of the mobile industry to support the implementation of the 2030 Agenda and the achievement of the SDGs as part of the multilateral cooperation effort. As emphasized by the Digital Agenda for Latin America and the Caribbean, known as eLAC, this industry has a huge role to play in contributing to the fulfillment of the SDGs, given its scope and importance in both economic and social activities, mainly because mobile communications are undoubtedly the means that have facilitated bringing the benefits of the Internet and digitization to a large part of the population in Latin America and the Caribbean.

Ms. Alicia Barcena, Secretary-General of ECLAC

Executive Summary

Mobile connectivity continues to transform the lives of billions. More than two-thirds of the global population are now connected to mobile, making it one of the most far-reaching technologies worldwide. For many, mobile is the primary – sometimes only – channel for accessing the internet and life-enhancing services. With its unprecedented scale and growing impact on daily lives, mobile is a powerful tool for achieving the United Nations Sustainable Development Goals (SDGs), helping to reduce poverty, improve healthcare and education, and drive sustainable economic growth.

Countries with high levels of mobile connectivity have made the most progress in meeting their SDG commitments – put simply, quality of life improves as people gain access to mobile technology. By adequately leveraging the power of mobile networks and the services they provide, the mobile industry will continue to play a central role in accelerating achievement of the SDGs.

Turning industry commitment into action

Now in its third year since the mobile industry became the first sector to commit to the UN SDGs, this edition of the Mobile Industry Impact Report assesses the progress of the sector's contribution. The report uses the GSMA's proprietary 'impact score' methodology: each SDG is given a score out of 100, with a higher score representing increased industry impact on that particular goal. For example, SDG 1 (No Poverty) currently scores 42, meaning that the industry is achieving 42% of its potential impact.

Since 2015, the **mobile industry's impact has increased across all 17 SDGs**. Mobile operators have made significant progress aligning their activities with the SDGs and integrating them into their core values, strategies, policies and services. The improved impact scores are testament to this, demonstrating that the industry is turning its commitment into action and driving tangible results and impacts on lives. For example, since 2015, we have seen the following:

- Almost 600 million people have connected to the mobile internet, the vast majority in low- and middle-income countries. Information and services are now at the fingertips of those otherwise excluded from basic rights such as health, education and gender equality.

- More than 250 million people have started to use mobile money, facilitating access for individuals who would otherwise be excluded from using financial services

- More than 1 million households have installed solar home systems using a mobile-enabled pay-as-you-go model, bringing them clean and affordable access to electricity.

- 5 million more people have used mobile-enabled agricultural services supported by the GSMA's mNutrition Initiative, giving farmers access to vital information that allows them to improve agricultural productivity and incomes.

IMPACT
SDGs most impacted by mobile:

SDG 9
Industry, Innovation and Infrastructure

SDG 4
Quality Education

SDG 13
Climate Action

PROGRESS
Most improved SDG impact scores since 2015:

SDG 13
Climate Action

SDG 11
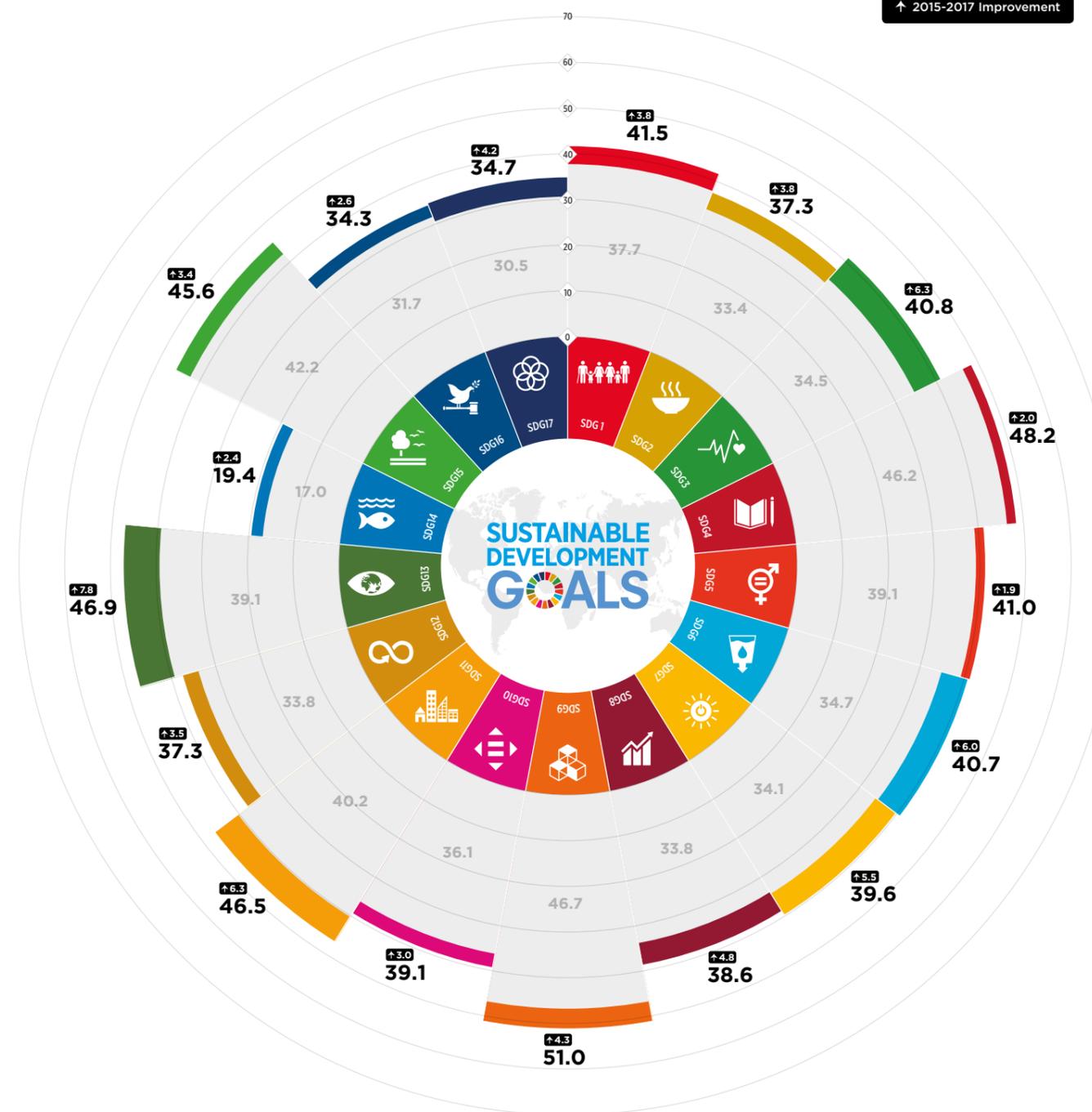Sustainable Cities and Communities

SDG 3
Good Health and Well-being

SDG impact scores

Normalised score (out of 100)

2015 Impact Score

2017 impact score

↑ 2015-2017 Improvement

Source: GSMA Intelligence

The industry currently achieves its biggest impact on SDG 9: Industry, Innovation and Infrastructure. With more than 5 billion people already using a mobile phone, and more than 7 billion people covered by a mobile network, mobile is enabling innovation and new business models such as the sharing economy, mobile savings and credit, and pay-as-you-go solar models to access clean energy. It also allows businesses to expand trade and enhances the productivity of industry.

The second biggest impact from mobile is on SDG 4: Quality Education. The provision of affordable services and the availability of a range of content on mobile devices has resulted in 1.2 billion people using mobile to improve their education or that of their children. Importantly, women are more likely than men to use mobile for educational purposes, showing mobile can help reduce gender inequality.

Analysis of the mobile industry's contribution to the SDGs over time shows the most improved impact scores since 2015 are for SDG 13: Climate Action, SDG 11: Sustainable Cities and Communities, and SDG 3: Good Health and Well-Being. A key driver of this increased impact is the use of mobile phones to provide essential humanitarian assistance during epidemics and natural or climate-related disasters. Since committing to the SDGs, the mobile industry has played a much larger and increasingly expanding role in humanitarian response. In 2017, the response efforts of mobile operator signatories and humanitarian partners in the Humanitarian Connectivity Charter reached more than 30 million people affected by crisis and disasters.

Three industry-specific characteristics help explain how the industry continues to increase its contribution across all the SDGs:

1 **Deployment of infrastructure and networks:**
The mobile industry drives impact through the provision of and investment in high-performing mobile networks, which provide the foundations for the digital economy and act as a catalyst for a diverse and innovative range of services. In 2017, 3G coverage reached almost 90% of the world's population, while more than 70% of the global population were covered by a 4G network.

2 **Access and connectivity:**
Mobile operators are continuing to connect the unconnected, with 400 million new mobile subscribers since 2015. An increasing number of people are moving beyond voice to take up mobile internet services, enabling them to participate in the digital economy. Since 2015, there have been almost 600 million new mobile internet users, bringing the total to 3.3 billion people globally.

3 **Enabling services and relevant content:**
Mobile technology has enabled a range of life-enhancing services such as mobile financial services, mobile agriculture and mobile health. In 2017, there were 690 million registered mobile money accounts worldwide, helping to expand financial and social inclusion. Meanwhile, new and emerging areas such as IoT, big data and artificial intelligence are demonstrating their potential for transformative impacts on lives. The implementation of IoT and big data solutions for improved environmental monitoring is helping reduce the adverse environmental impact of cities.

The mobile industry can contribute further to the SDGs

Three years after the launch of the UN SDGs, the industry is already helping countries meet their commitments to the goals. However, there is still much more the mobile industry can do. In 2017, only one SDG (9) had an impact score greater than 50; for 16 SDGs, the industry is achieving less than half its full potential impact. Furthermore, while the industry's impact has increased in the three years since the SDGs were adopted, the increase in impact in 2017 slowed for the majority of the SDGs. This is primarily due to three factors:

1 **Market maturity:** In certain areas where the mobile industry has already achieved a great deal, such as network coverage, there is naturally less scope to match the progress seen in earlier years.

2 **Challenges connecting the final third of the population:** Expanding coverage and driving mobile internet adoption among the remaining unconnected population is increasingly challenging due to remote locations, affordability issues and a lack of digital skills and local content.

3 **Growth in new technologies only partially compensating:** Growth in new technologies and mobile-enabled services that impact the SDGs, such as IoT and mobile agriculture, continued to increase in 2017, but not enough to compensate for the 'deceleration' effect in network expansion and connecting the unconnected.

Concerted action and an acceleration of efforts is required to achieve the SDGs by 2030

With just 12 years left until the 2030 deadline, concerted action and an acceleration of efforts by all stakeholders – governments, the mobile industry and other sectors – is necessary. Accelerating mobile connectivity, especially mobile internet access, to unconnected populations is the first area of critical importance. The private sector and policymakers need to jointly address the key barriers to mobile connectivity, particularly around incentives for infrastructure investment, affordability, digital skills, the gender gap and the availability of locally relevant content and services.

The second area is providing and scaling mobile-enabled solutions that will help catalyse the achievement of the SDGs. Among the range of mobile solutions where contribution to the SDGs can be increased are mobile money, digital identity, mobile health, education, agriculture, mobile-enabled energy, water and sanitation, and digital humanitarian assistance, as well as the products and services IoT is beginning to support. Here, it is important that operators, governments, international organisations and other industries do not work in isolation but rather work together to support the scaling of new and existing mobile business solutions.

The mobile industry must also continue to drive improvements beyond 'business as usual' and accelerate activities that contribute to the SDGs. The industry has a clear incentive to do so, given the SDGs not only ensure a healthy and viable society but also offer new and substantial commercial opportunities, through more inclusive and prosperous societies, dynamic and inclusive marketplaces, reliable regulatory frameworks and thriving ecosystems. As more companies in the mobile industry build the SDGs into their core business, including the products and services they provide, we expect this to drive higher impact.

The GSMA and its mobile operator members will continue to work together, with adjacent sectors, governments and the development community to ensure mobile technology is maximised to achieve economic growth, social inclusion and environmental sustainability. We will also continue to report on the industry's progress each year. With this reporting framework in place, both the industry and the international community can understand the impact, progress, challenges and ultimately action needed for the mobile industry to harness its full potential to achieve the SDGs. In this regard, the *Mobile Industry Impact Report* can also serve as a reference tool for other industries to assess their own impact on the SDGs.

01

Introduction

In 2016, the mobile industry became the first to commit to the UN Sustainable Development Goals (SDGs). Now in its third year, *The Mobile Industry Impact Report* assesses the progress the industry is making to contribute to the SDGs and offers insight into the central role mobile operators play in redefining how individuals, societies and businesses around the world function and interact.[1]

1. This is the third annual edition of the Mobile Industry Impact Report; the previous two reports can be found at:
   2016 Mobile Industry Impact Report: Sustainable Development Goals, GSMA, 2016
   2017 Mobile Industry Impact Report: Sustainable Development Goals, GSMA, 2017
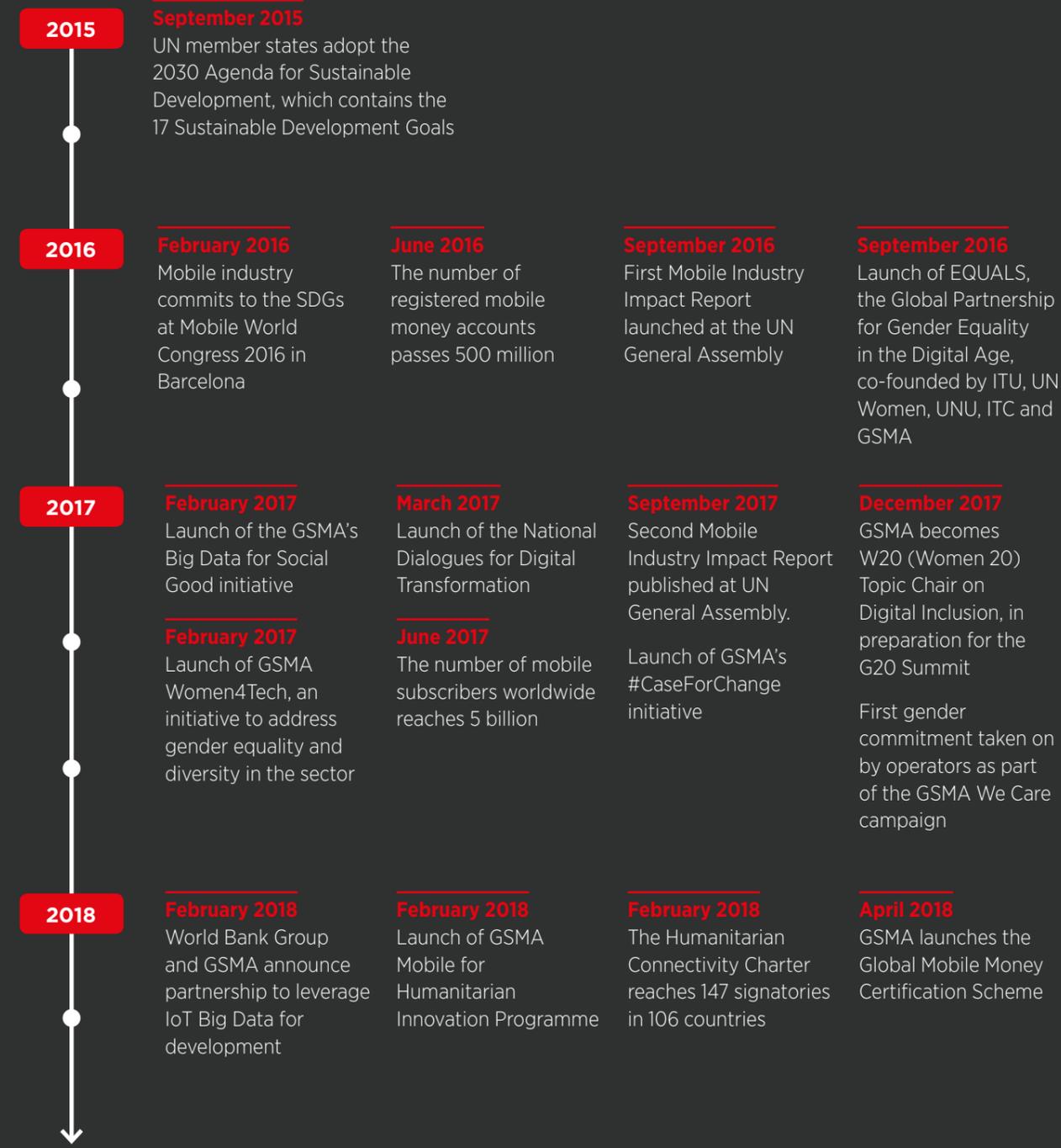
Figure 1

UN Sustainable Development Goals

This annual study demonstrates that the mobile industry contributes to all 17 SDGs, and provides in-depth analysis of five SDGs where the mobile industry is making a significant impact. It also describes several commitments and initiatives the GSMA and its members will continue delivering over the coming years, contributing further to achieving the SDGs.

The report uses the same analytical framework as in previous years, plus some improvements in its implementation to enhance the robustness of the analysis and to make the results easier to interpret and track over time.

Key milestones

As part of the mobile industry's commitment to the SDGs, several key milestones have been achieved over the last three years:

2015

September 2015
UN member states adopt the 2030 Agenda for Sustainable Development, which contains the 17 Sustainable Development Goals

2016

February 2016
Mobile industry commits to the SDGs at Mobile World Congress 2016 in Barcelona

June 2016
The number of registered mobile money accounts passes 500 million

September 2016
First Mobile Industry Impact Report launched at the UN General Assembly

September 2016
Launch of EQUALS, the Global Partnership for Gender Equality in the Digital Age, co-founded by ITU, UN Women, UNU, ITC and GSMA

2017

February 2017
Launch of the GSMA's Big Data for Social Good initiative

March 2017
Launch of the National Dialogues for Digital Transformation

September 2017
Second Mobile Industry Impact Report published at UN General Assembly.

Launch of GSMA's #CaseForChange initiative

December 2017
GSMA becomes W20 (Women 20) Topic Chair on Digital Inclusion, in preparation for the G20 Summit

First gender commitment taken on by operators as part of the GSMA We Care campaign

February 2017
Launch of GSMA Women4Tech, an initiative to address gender equality and diversity in the sector

June 2017
The number of mobile subscribers worldwide reaches 5 billion

2018

February 2018
World Bank Group and GSMA announce partnership to leverage IoT Big Data for development

February 2018
Launch of GSMA Mobile for Humanitarian Innovation Programme

February 2018
The Humanitarian Connectivity Charter reaches 147 signatories in 106 countries

April 2018
GSMA launches the Global Mobile Money Certification Scheme

02

The mobile industry's impact on the SDGs

Mobile technology improves lives

Countries with high levels of mobile connectivity have made the most progress in meeting their SDG commitments. Put simply, quality of life improves with access to mobile technology.
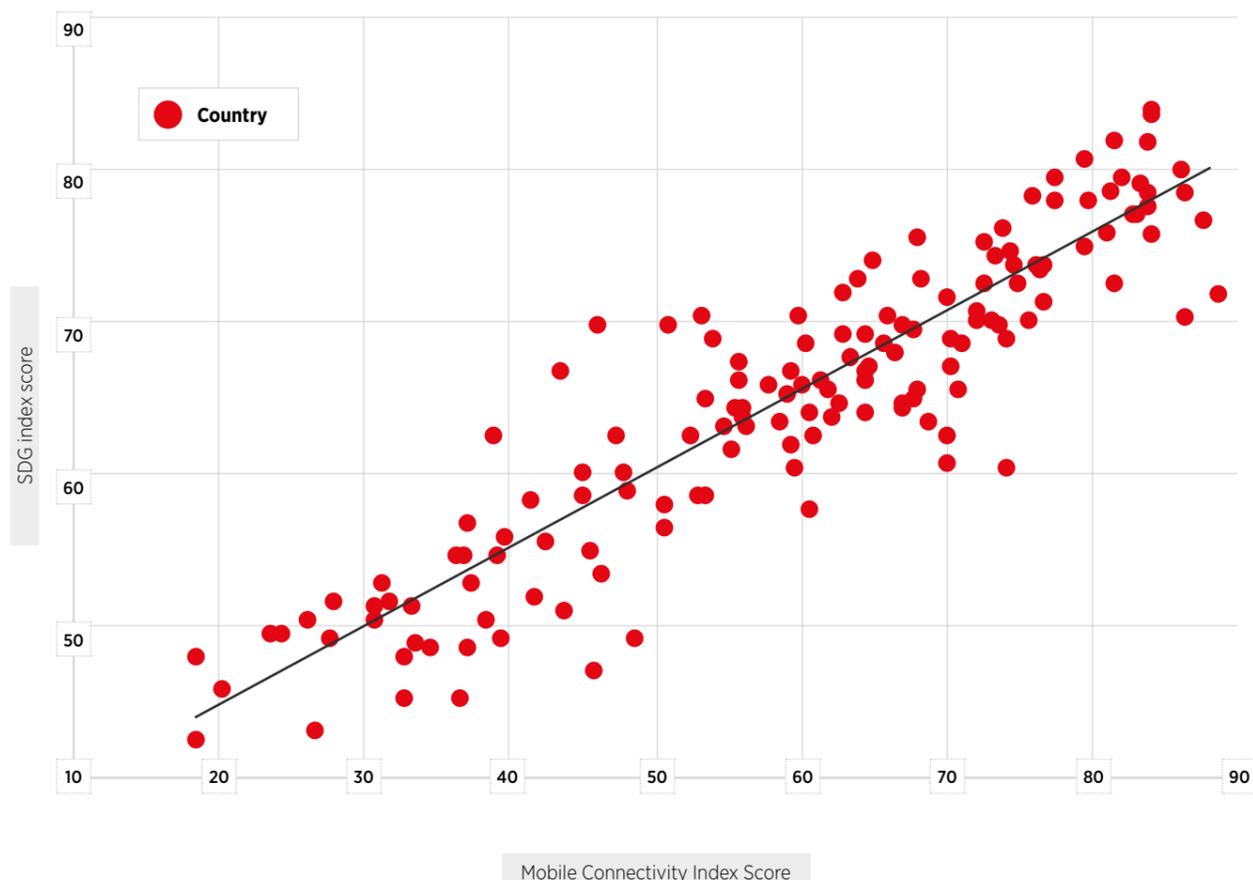
The relationship between mobile connectivity and sustainable development is evident in two indices, which track progress on the implementation of the SDGs (SDG Index[2]) and the enablers of mobile internet adoption (Mobile Connectivity Index[3]). Figure 2 shows that countries with higher mobile connectivity scores have achieved greater progress in SDG implementation,

while countries with lower mobile connectivity scores have achieved less progress on the SDGs. This also holds if income is controlled for; the relationship between SDG progress and mobile connectivity is not just explained by a country's level of income.

This is consistent with academic and empirical evidence which shows that the adoption of mobile technology drives higher economic growth, poverty reduction, improved social outcomes (for example, in health and education) and environmental sustainability.[4]

Figure 2

Relationship between 2018 SDG Index and Mobile Connectivity Index

Source: GSMA Intelligence for the 2018 Mobile Connectivity Index, and Sustainable Development Solutions Network (SDSN) and the Bertelsmann Stiftung for the 2018 SDG Index.
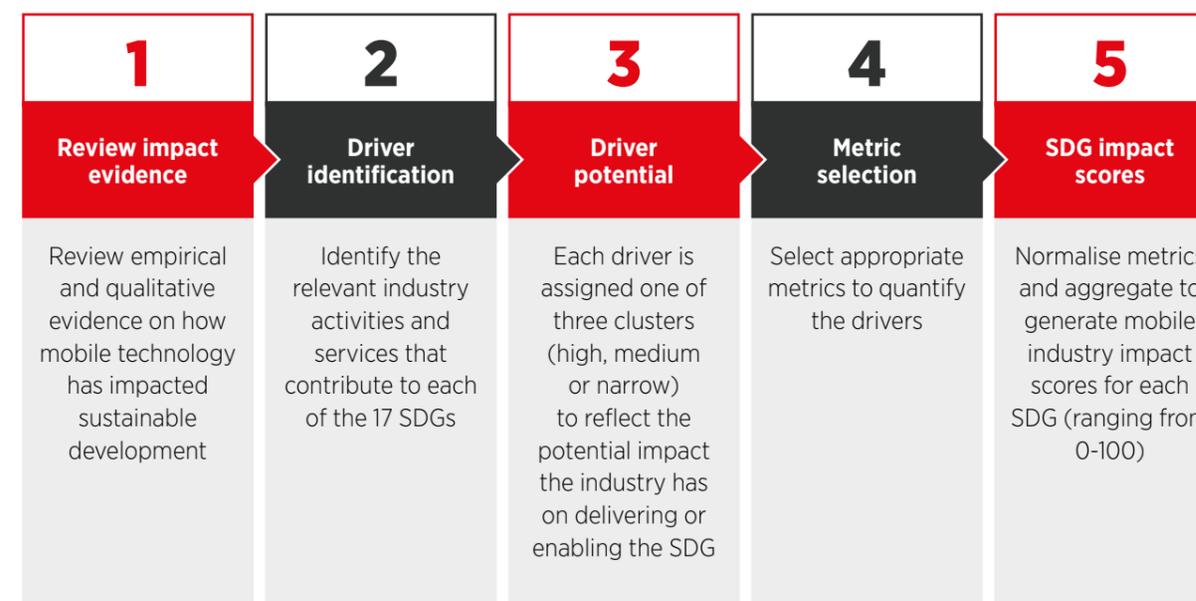
Mobile industry SDG impact scores

The GSMA has developed a methodology to measure and track annually the impact of the mobile industry across all 17 SDGs. For each goal, an 'impact score' is calculated out of 100. A score of 0 means the industry is having no impact at all, while a score of 100 means the industry is doing everything in its capacity to contribute to that SDG. For example, SDG 1 currently scores 42, meaning the industry is achieving 42% of

what it could potentially contribute to that SDG (or it is achieving 42% of its potential impact).

The methodology used to construct the impact scores is summarised in Figure 3, with a more detailed description provided in Appendix A. Figure 4 presents the impact scores for 2015 and shows how they changed in 2016 and 2017.[5]

Figure 3

Calculation of SDG impact scores

2. http://www.sdgindex.org/
3. www.mobileconnectivityindex.com
4. See Appendix A for a review of some of the literature assessing the impact of mobile technology on sustainable development.
5. Some of the performance scores for 2015 and 2016 differ from those presented in the first two Mobile Industry Impact Reports as we have improved the underlying metrics to track the industry's progress (2015 and 2016 data was therefore updated to ensure consistency across years). A more detailed explanation of the methodology and the changes made in this year's report is provided in Appendix A.
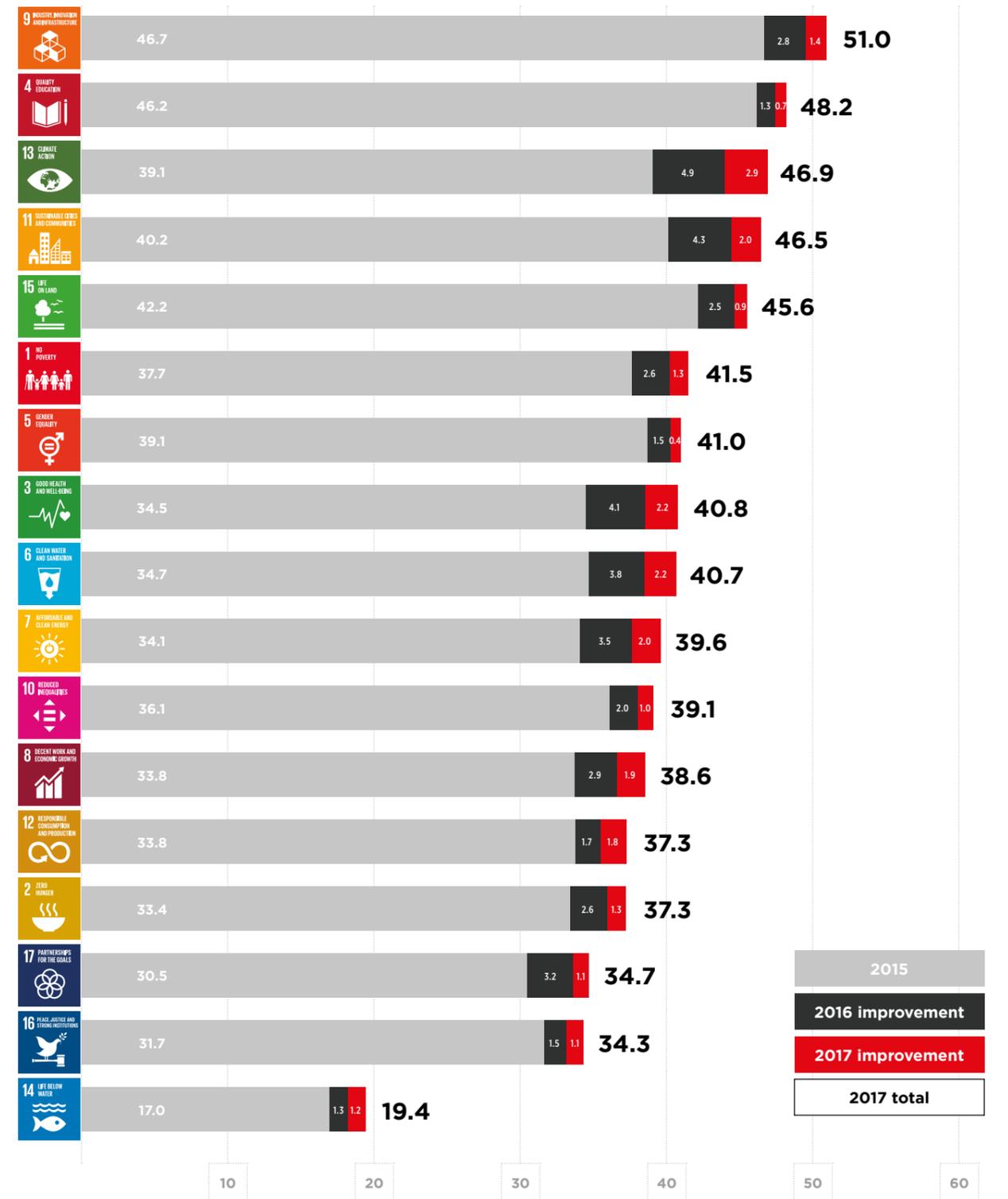
Figure 4

SDG impact scores
Normalised score (out of 100)

SDG	2015	2016 improvement	2017 improvement	2017 total
9 Industry, Innovation and Infrastructure	46.7	2.8	1.4	**51.0**
4 Quality Education	46.2	1.3	0.7	**48.2**
13 Climate Action	39.1	4.9	2.9	**46.9**
11 Sustainable Cities and Communities	40.2	4.3	2.0	**46.5**
15 Life on Land	42.2	2.5	0.9	**45.6**
1 No Poverty	37.7	2.6	1.3	**41.5**
5 Gender Equality	39.1	1.5	0.4	**41.0**
3 Good Health and Well-being	34.5	4.1	2.2	**40.8**
6 Clean Water and Sanitation	34.7	3.8	2.2	**40.7**
7 Affordable and Clean Energy	34.1	3.5	2.0	**39.6**
10 Reduced Inequalities	36.1	2.0	1.0	**39.1**
8 Decent Work and Economic Growth	33.8	2.9	1.9	**38.6**
12 Responsible Consumption and Production	33.8	1.7	1.8	**37.3**
2 Zero Hunger	33.4	2.6	1.3	**37.3**
17 Partnerships for the Goals	30.5	3.2	1.1	**34.7**
16 Peace, Justice and Strong Institutions	31.7	1.5	1.1	**34.3**
14 Life Below Water	17.0	1.3	1.2	**19.4**

2015
2016 improvement
2017 improvement
2017 total

10 20 30 40 50 60

Three years since the SDGs were adopted by UN member states, the **mobile industry is driving significant impact**, especially for SDG 9: Industry, Innovation and Infrastructure, which has the highest impact score at 51. This SDG – which is focused on building resilient infrastructure, inclusive and sustainable industrialisation and fostering innovation – recognises the critical role that mobile networks play. For example, one of the targets (9.c.) aims to significantly increase access to ICT, especially mobile, and to provide universal and affordable access to the internet in least developed countries by 2020.

In 2017, more than 5 billion people across the world (or two thirds of the population) were using a mobile phone[6], while more than 7 billion people (around 95% of the population) were covered by a mobile network[7]. This highlights the reach of mobile technology and its role not just in providing the ability to communicate but also in fostering innovation and driving inclusive and sustainable industrialisation.

For example, mobile connectivity enables innovation and new business models such as the sharing economy, mobile money and pay-as-you-go solar models to access clean energy[8]. It also allows businesses, especially MSMEs[9], to expand trade by giving them access to a much larger customer base and making it easier for consumers (and firms) to purchase goods and services via digital payments. Mobile technology also increases productivity and the efficient use of resources in industry, for example via industrial Internet of Things (IoT) and smart energy grids. The reach of mobile in rural and less densely populated areas, particularly compared to fixed networks, also promotes more equitable access to productivity-enhancing technologies.

Most impacted SDGs since 2015

SDG 9
Industry, Innovation and Infrastructure

SDG 4
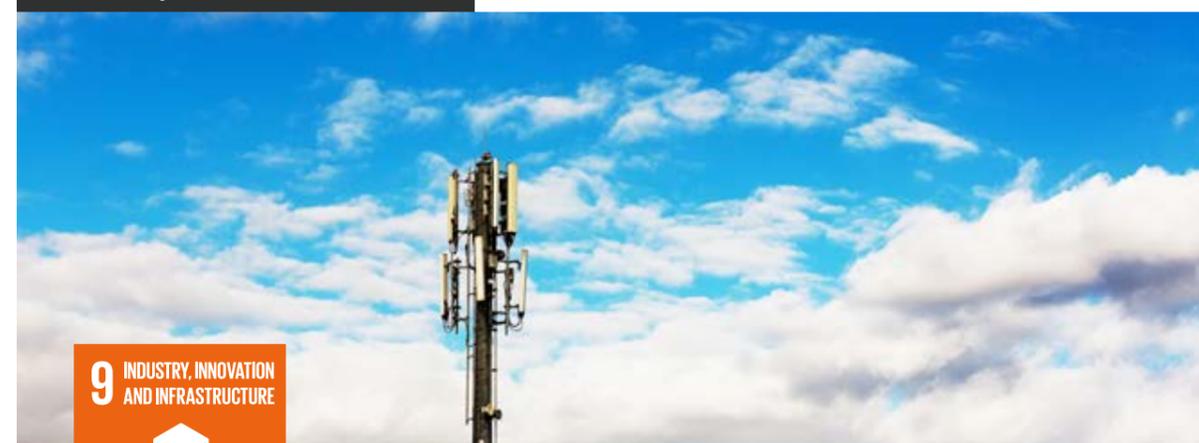**Quality Education**

Most improved SDGs since 2015

SDG 11
Sustainable Cities and Communities

SDG 13
Climate Action

SDG 9 and least developed countries

SDG 9, target 9.c: "Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020".[10]

In least developed countries (LDCs) where mobile is the cheapest and often only way of accessing the internet, accelerating mobile internet connectivity is essential to the growth of the digital economy, ensuring no one is left behind.

Digital inclusion is key for essential mobile-enabled basic services, for example in healthcare, education and utilities.

Progress against target 9.c is measured by the proportion of population covered by a mobile network, highlighting the essential role of mobile network operators in enabling access to the internet and achieving the SDGs. Table 1 provides some key performance indicators to measure progress on this target.

Table 1

Mobile internet access and usage in LDCs

	2015	2016	2017
Mobile internet adoption*	14%	17%	19%
2G coverage (% total population)	84%	87%	88%
3G coverage (% total population)	52%	59%	62%
Cost of 500 MB data plan (% of GDP per capita)**	9.7%	7.7%	7.1%

Source: GSMA Intelligence, ITU and Tarifica
*Number of mobile internet users as a proportion of total population
**This represents the average cost across the 47 LDCs.

6. Source: GSMA Intelligence
7. Source: GSMA Intelligence
8. This is investigated in more detail in Chapter 3 as part of the deep dive into SDGs 6 and 7.
9. Micro, small and medium-sized enterprises

10. For details on LDCs (including a list of relevant countries), see https://www.un.org/development/desa/dpad/least-developed-country-category.htm

Thanks to continued investments by the mobile industry in LDCs, an additional 60 million people have been connected to the mobile internet in LDCs since 2015, while 120 million more people have been covered by 3G network expansion. In 2017, 62% of the population in LDCs were covered by 3G networks (including 43% of the rural population) and almost one-fifth were connected to the mobile internet.[11] The latter is more than four times greater than the proportion of population using fixed internet[12], demonstrating the importance of mobile in addressing the digital inclusion gap in LDCs.

Although this shows significant progress, the pace at which 3G coverage is expanding in LDCs is now slowing, posing a risk to the achievement of SDG 9.c. Expanding coverage and driving mobile internet adoption among the remaining population, many of whom earn low incomes and live in remote and rural areas, poses significant challenges. Deploying infrastructure in remote areas can be twice as expensive, while revenue opportunities are as much as 10 times lower, making the business case around rural expansion particularly complex.[13] Based on current trends, more than 60% of the population in LDCs will remain unconnected to the internet by 2025, according to GSMA Intelligence forecasts.

Although target 9.c focuses on increasing access to mobile internet connectivity, addressing barriers to mobile internet usage also remains an important challenge. While around 40% of the population in LDCs are not covered by 3G networks (the 'coverage gap'), a further 40% *are* covered by 3G networks but do not use the mobile internet (the 'usage gap').

Affordability remains an important driver of mobile internet usage. Since 2015, mobile internet affordability has improved significantly, with the average cost of a 500 MB data plan across the 47 LDCs falling by around 25% to reach an average of 7.1% of monthly income per capita in 2017. Nevertheless, this remains unaffordable for a significant proportion of the population.[14]

Closing the usage gap will also require enhancing **literacy and digital skills**, and increasing the availability of **locally relevant content** (further analysis of these barriers can be found in the GSMA's State of Mobile Internet Connectivity 2018 report). A particular **focus on women** will also be necessary to ensure they can effectively benefit from greater digital inclusion – in 2017, women in LDCs were 33% less likely to have internet access than men.[15]

Although this analysis pertains to LDCs, it highlights a broader issue as to why the mobile industry's impact decelerated in 2017 compared to the year before across many SDGs. Table 1 shows that the percentage increases in 3G coverage and mobile internet adoption were higher in 2016 than in 2017. A similar trend exists in other non-LDC countries, particularly low- and middle-income markets.

Accelerating mobile internet adoption to achieve universal access will therefore require deliberate and strategic efforts by the mobile industry, policymakers and the international community, especially for rural populations, women and other underserved groups. In Section 4 of this report, we outline a number of ways in which operators, governments and other stakeholders can help accelerate mobile internet connectivity and connect the unconnected.

4 QUALITY EDUCATION

SDG 4: Quality Education

The second most impacted SDG is 4: Quality Education, with an impact score of 48. This SDG is focused on ensuring inclusive and equitable quality education and the promotion of lifelong learning opportunities for all. Mobile technology supports this SDG in several ways:

- It enables students and teachers to access learning materials, school curricula, tests and online courses and certifications, especially in underserved and remote areas.

- It allows students and teachers to interact and communicate with each other and develop new approaches to learning (for example, online teaching and tutorials). This is particularly important in countries and regions with high teacher-to-pupil ratios.

- It can be used to facilitate reading and enhanced literacy. A UNESCO study found that large numbers of people in developing countries read books and stories on inexpensive mobile phones. Among those surveyed, almost two-thirds of mobile readers read more on their mobile device compared to paper books.[16]

Mobile drives such a significant impact on this SDG as it provides affordable access to educational materials. In its study on mobile reading, UNESCO found that the average cost of a 500 MB data plan meant reading a book of 1,000 pages on a mobile phone cost around $0.02[17], compared a cost of $5–30 for paper books.[18] Furthermore, the amount of educational content available on mobile has increased significantly: between 2015 and 2017, for example, there was a 60% increase in the number of education applications available on a smartphone, bringing the total to more than 750,000 apps.[19]

The provision of affordable services and the availability of a wide range of educational content on mobile has resulted in 1.2 billion people (almost one quarter of subscribers) using mobile to improve their education or the education of their children in 2017.[20] Furthermore, women were more likely than men to use mobile to improve their education (or the education of their children)[21], demonstrating that mobile can help to reduce gender inequality in education outcomes.

11. Source: GSMA Intelligence
12. Source: GSMA Intelligence calculations based on ITU data
13. Enabling Rural Coverage: Regulatory and policy recommendations to foster mobile broadband coverage in developing countries, GSMA, 2018
14. To put the 7.1% figure into context, the Broadband Commission established a target to bring the price of internet access below 5% of average income per capita by 2015, meaning that the majority of LDCs still exceeded this in 2017 (Source: http://www.broadbandcommission.org/documents/broadband_targets.pdf)
15. Source: ITU

16. Reading in the mobile era, UNESCO, 2014
17. As the UNESCO study was published in 2014, the cost of mobile reading will have fallen since. GSMA Intelligence analysis of pricing data collected by the ITU and Tarifica suggests that average mobile broadband prices (for a 500 MB basket) have fell by more than 40% between 2014 and 2017.
18. Reading in the mobile era, UNESCO, 2014
19. Source: Appfigures
20. Source: GSMA Intelligence
21. Source: GSMA Intelligence

Mobile industry's impact continues to increase across all SDGs

While there is variation in the extent to which mobile currently impacts each SDG, the **industry's impact has increased across all 17 SDGs since 2015** (both in 2016 and 2017). The mobile industry is turning its commitment to the SDGs into action and driving tangible results and impacts on lives. For example, almost 600 million people have been connected to the mobile internet since 2015, the vast majority in low- and middle-income countries.[22] This provides those individuals with a platform to access

information on goods and services, medical advice and education, as well as an opportunity to connect to wider social networks and become more politically aware and engaged. Given the lack of fixed network infrastructure in many developing countries, the majority of these individuals would not have access to the internet if it were not for mobile and so would not be able to realise the economic and social benefits that the internet enables.

Most improved SDGs since 2015

SDG 11
Sustainable Cities and Communities

SDG 13
Climate Action

The most improved SDG impact scores since 2015 are for SDG 11: Sustainable Cities and Communities and SDG 13: Climate Action. The increased impact for these has resulted in them respectively being the third and fourth most impacted SDGs overall (after SDGs 9 and 4). A main driver for this increased impact is the use of mobile phones to communicate and access information, education, financial and health services in emergency situations, thereby providing essential humanitarian assistance during epidemics and natural or climate-related disasters.[23]

The expansion in network coverage and mobile adoption means more people are able to use mobile in emergency situations. Operator investments have also significantly increased network quality and resilience,

which is crucial in maintaining communications services in disaster-stricken areas. Furthermore, since 2015, the mobile industry has played a bigger role in humanitarian response, as reflected by the 35% increase in the number of signatories to the GSMA Humanitarian Connectivity Charter in 2017.[24] That year, the response efforts of operator signatories and humanitarian partners reached more than 30 million people affected by crisis and disaster, including in the Caribbean following hurricanes Harvey, Irma and Maria, and in Nepal following the 2017 floods.[25] The role of mobile in facilitating humanitarian assistance is explored in greater detail in Section 3 as part of the deep dive into the mobile industry's impact on SDG 11: Sustainable Cities and Communities.

Three industry-specific characteristics cut across all 17 SDGs and explain why the industry has increased its impact across each SDG:

Deployment of infrastructure and networks

The mobile industry drives impact on the SDGs through the provision of high-performing mobile networks (underpinned by enabling policies), which provide the foundations for the digital economy and act as a catalyst for a diverse and innovative range of services.

Access and connectivity

Even if high-quality infrastructure is in place, the industry will have limited impact if people are not connected or not using mobile. It is therefore important that people can afford to own a mobile device and are able to use it in ways that allow them to fully realise its benefits. While infrastructure and connectivity are obvious prerequisites, **digital skills** are also just as important for people to be able to use and benefit from mobile. Building digital skills is particularly impactful among disadvantaged and underserved populations, as well as senior citizens.

Enabling services and relevant content

Connectivity alone does not realise the ambitions of the SDGs. Mobile technology has enabled a range of life-enhancing services such as mobile money, mobile agriculture and mobile health. It also continues to drive new innovations that can have a transformative impact on lives – for example, access to utility services, IoT and artificial intelligence.

22.   Source: GSMA Intelligence
23.   These are particularly relevant to: Target 11.5, which calls for a substantial decrease in the direct economic losses caused by disasters; and Target 13.1, which calls for strengthened resilience and adaptive capacity to climate-related hazards and natural disasters in all countries. It also impacts SDG 3, where Target 3.d requires the strengthening of capacity for all countries for early warning, risk reduction and management of national and global health risks
24.   For more information, see https://www.gsma.com/mobilefordevelopment/mobile-for-humanitarian-innovation/humanitarian-connectivity-charter/
25.   Source: GSMA Humanitarian Connectivity Charter: Annual Report - 2017

Infrastructure and networks

Improvements

Population coverage

2G **95%** More than **7 billion** people covered

3G **80%** 2015 → 2017 **87%** 6.5 billion people covered

650 million more people covered

4G **48%** 2015 → 2017 **72%** More than **5 billion** people covered

1.5 billion more people covered

Source: GSMA Intelligence

Network quality

Average mobile broadband download speed

14 Mbps 2015 → 2017

22 Mbps

57% INCREASE

Source: Based on analysis by Ookla® of Speedtest Intelligence® data for 2015 to 2017

Examples of how infrastructure and networks impact the SDGs

Underpin connectivity, internet access and mobile-enabled digital solutions that drive impact across all SDGs

Provide emergency broadcast systems to enable effective risk mitigation of disasters and environmental threats

Support emergency communication and provide location data before and during epidemics and natural or climate-related disasters.

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Access and connectivity

Improvements

Mobile subscriber penetration

62% → **66%**
2015 → 2017

5 billion subscribers

400m
New subscribers

Source: GSMA Intelligence

Mobile internet subscriber penetration

36% → **44%**
2015 → 2017

3.3 billion mobile internet subscribers

580m New mobile internet subscribers

Cellular IoT connections

320m → **690m**
2015 → 2017

118% INCREASE

Source: GSMA Intelligence

Examples of how connectivity impacts the SDGs

Promote inclusiveness of economic development by expanding trade and enabling participation in the labour force

Foster social inclusion by allowing people to build and maintain social networks

Empower women by making them more connected, safer and providing access to information and life-enhancing opportunities

Give local communities a voice and can foster greater political engagement and awareness

Provide a platform to access health, education and other government services

Drive economic growth through improved productivity and infrastructure development

Examples of how cellular IoT impacts the SDGs

Monitor air quality, climate change and water and energy efficiency

Provide innovative solutions to agricultural, industrial and manufacturing processes
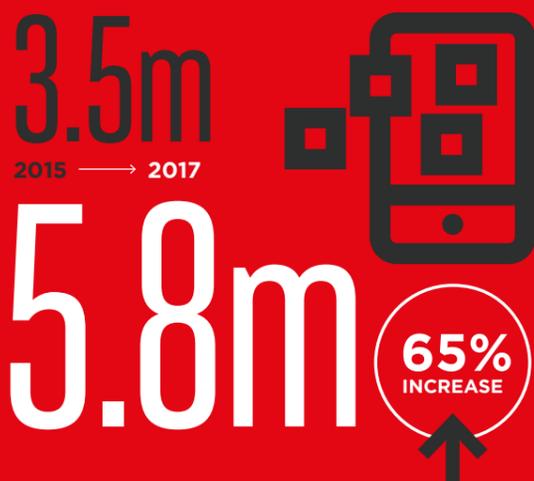
Monitor marine, coastal and forest ecosystems

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Mobile-enabling services and relevant content

Improvements

Active mobile applications available on smartphones

3.5m
2015 → 2017

5.8m

65% INCREASE

Source: Appfigures

Including

Education
480,000
2015 → 2017
780,000
↑ **62% increase**

Health
165,000
2015 → 2017
275,000
↑ **66% increase**

Use of mobile-enabled services

Source: GSMA Intelligence

In 2017, **850 million subscribers** (more than 15% of total) used mobile to access government services

In 2017, **1 billion subscribers** (20% of total) used mobile to access health services

In 2017, **1.2 billion subscribers** (25% of total) used mobile to access education services

Examples of how mobile-enabled services impact the SDGs

Provide an effective and affordable solution to addressing healthcare needs (including good nutrition and advice on pregnancy)

Contribute digital literacy content to primary and secondary education to improve relevance of traditional education

Enable access to primary and secondary e-learning and facilitate equitable online learning opportunities (e.g. massive open online courses) for men and women

Create mobile solutions for identity management, including the registering of births. This allows individuals to establish legal identities, which facilitates access to government services, employment opportunities and financial services

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Mobile-enabling services and relevant content

Mobile money registered accounts

425m **2015 → 2017** 690m

62% INCREASE

Source: GSMA Mobile Money

Examples of how mobile money impacts the SDGs

Provide financial services to individuals and small businesses that would otherwise be financially excluded

Help to access electricity, water and sanitation through pay-as-you-go solutions

Facilitate access to low-cost remittances

Provide means for parents to pay school fees and utility bills

Provide humanitarian cash transfers during crises, emergencies and disasters

Mobile platform retail spending

$350bn 2.2% of overall retail spend
2015 → 2017
$730bn **109% INCREASE**
4.4% of overall retail spend

Source: Euromonitor. Based on data for 80 countries. Excludes B2B and C2C payments and excludes contactless payments.

Examples of how mobile-enabled payments impact the SDGs

Enable firms (especially MSMEs) to access larger markets

Provide consumers with more choice of goods and services

Local content and services

Mobile social media users
2bn **2015 → 2017** 3bn
↑ 50% increase
Source: We Are Social

Mobile views to Wikipedia sites
89bn **2015 → 2017** 96bn
↑ 8% increase
Source: Wikimedia Foundation

Examples of how locally developed content and services impact the SDGs

Expand social networks and increase social inclusion

Provide businesses with a means to market their products and services

Increase social, economic and political inclusion by enabling users to access information on local news, politics, education, health and local services

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The mobile industry can contribute further to the SDGs

While the mobile industry is already helping countries meet their commitments across all 17 SDGs, there is still much more to be achieved. In 2017, only one SDG (9) had an impact score greater than 50; for 16 SDGs, the industry was achieving less than half its potential impact. Furthermore, while the industry's impact has increased in the three years since the SDGs were adopted, in 2017 the increase in impact was less than it was in 2016 for the majority of the SDGs (see Figure 4). This is primarily due to three factors:

1. **Market maturity** – In certain areas, the industry has already achieved a great deal and there is little scope to achieve the progress seen in earlier years. Network coverage is an example here. In 2017, the proportions of the global population covered by 2G and 3G networks were 95% and 87% respectively, while 4G coverage was more than 70%. Rolling out mobile networks underpins most of the SDGs, and there was more scope for this to increase a few years ago (especially for 4G). However, as the majority of the population are now covered by mobile networks, the same increases cannot be achieved going forward. Instead, operators that have achieved wide network coverage are likely to increase their focus on capacity and network quality.

2. **Challenges connecting the final third** – With around two-thirds of the global population using mobile technology, connecting the 'final third' is a primary goal of the mobile industry. However, this is challenging as the majority of those not currently using mobile services have low incomes and often live in rural and remote areas. We therefore do not observe the same year-on-year increases in mobile adoption. A similar issue exists for mobile internet connectivity, where more than 50% of the global population remain unconnected. In this respect, the analysis outlined earlier for LDCs is relevant in explaining why mobile industry impact has increased at a slower rate more generally.

3. **Growth in enabled services and new technology only partially compensating** – Growing industries such as IoT and mobile agriculture have increased at a similar pace year-on-year and so have not compensated for the 'slowing' effect seen in infrastructure deployment and connecting the unconnected. The emerging nature of these technologies is the main reason for the low score of SDG 14: Life below Water, which will primarily be driven by IoT technologies – for example, to monitor water quality and marine pollution, and the provision of mobile agricultural services to small-scale fishers.

As new technologies and services expand and accelerate, we expect to see the mobile industry fulfilling more of its potential for SDG impact. In Sections 3 and 4 of this report, we highlight some of the key actions the mobile industry, governments and other stakeholders can take to support faster growth of mobile solutions that will drive significant impact on the SDGs.

Companies in the mobile industry have incorporated the SDGs into their core values, strategies, policies and services

While responsible and sustainable business strategies are already well-established in the mobile industry, achieving the SDGs goes beyond business as usual. The SDGs offer new substantial commercial opportunities and benefits for the mobile industry, through more inclusive and prosperous societies, dynamic and inclusive marketplaces, reliable regulatory frameworks and thriving ecosystems. As such, the SDGs need to be prioritised as a core activity and not just as an add-on to protect reputations or manage risks.

Mobile operators worldwide have made significant progress in aligning their activities with the SDGs, helping drive their achievement by 2030. For example, in 2017 Safaricom completed the first phase of its integration of the SDGs, which was largely concerned with raising awareness (an independent survey found that 83% of staff members are now familiar with the SDGs), while the next phase will focus on monitoring progress against SDG-related targets[26]. Safaricom has also released an SDG Purpose Statement:

"We commit to deliver connectivity and innovative products and services (SDG 9) that will provide unmatched solutions to meet the needs of Kenyans by enabling access (SDG 10) through our technologies and partners (SDG 17) and by exploring opportunities in Health (SDG 3), Education (SDG 4) and Energy (SDG 7). We will do so by managing our operations responsibly (SDG 12) and ethically (SDG 16). This will stimulate growth and generate value for our company, society and economy (SDG 8)."

Other operators have also mapped the SDGs against their strategies to identify the SDGs relevant to their activities and see where their networks, products and services can have the greatest impact. As such, the approach to the SDGs differs by each individual operator, depending on a range of factors, such as business objectives, operating markets, customer base and current policies and initiatives. For example, some operators have chosen to focus on specific goals as part of their sustainability strategies in order to maximise impact. Examples include Telenor Group (SDG 10) and Vodafone Group (SDGs 4, 5, 8, 9 and 13).[27]

Many operators have also made clear commitments, with performance-related targets to monitor and assess progress, while some have made concerted efforts to integrate products and services that impact the SDGs into their core business. From a strategic perspective, integrating the SDGs into core strategy means being clear on the opportunity that comes from running a business in a responsible and sustainable manner, including through a diverse and properly recognised workforce and through products and services that contribute to the well-being and sustainability of people, society and the planet.

While the industry's impact on the SDGs is principally driven by the provision of mobile connectivity and services, companies in the mobile industry also make a significant contribution to sustainable development through their business and operational activities. Responsible and sustainable business practices and policies are widely implemented by operators, to ensure their operations align with values such as respecting labour rights, sustainable supply-chain management, employee diversity, climate change and environmental stewardship, which can contribute to the achievement of the SDGs. Examples include the following:

- **Climate change:** Mobile operators are committing to contribute to the Paris Agreement[28] with new energy and emissions reduction targets. For example:

- Telefónica has committed to ensuring that 50% of the electricity used in its operations will come from clean sources by 2020 and 100% by 2030. Between 2010 and 2015, it carried out more than 250 initiatives in energy efficiency and the reduction of greenhouse gas emissions, which resulted in a 25% reduction in energy intensity.[29]

- Verizon set a goal in 2009 to reduce its carbon intensity by 50% by 2020. Having exceed that goal four years early, in 2016 it set a new target to reduce carbon intensity by 50% by 2025 (from its 2016 baseline).[30]

- Orange also set a target for 2020 to reduce CO2 emissions per customer-use by 50% (compared to its 2006 baseline). This was also achieved early – at the end of 2017. It has continued to maintain momentum as part of its Green IT 2020 plan.[31]

- **Employee diversity:** Mobile operators are implementing programmes within their own operations to promote equal opportunities, helping accelerate achievement of SDGs including 5: Gender Equality and 10: Reduced Inequalities. These initiatives include measuring and promoting diversity in the workforce and management as well as preventing discrimination in promotion, hiring, training and compensation. Gender inequality in the mobile industry is one area of increased focus (see Section 3 for a case study relating to operators promoting gender equality within their own operations). Through its Women For Tech programme, the GSMA is also encouraging companies to adopt diversity policies and procedures conducive to closing the gender gap in the mobile workplace.

- **Waste and e-waste:** Companies in the mobile industry are also implementing programmes for sustainable production and consumption cycles, which relate to the achievement of several SDGs including 11: Sustainable Cities and Communities, 12: Responsible Consumption and Production, and 13: Climate Action. Many companies are looking specifically at collection and disposal of waste, e-waste and hazardous waste created in the production or use of their products, including waste returned by customers (see Section 3 for a case study related to how operators are dealing with waste and e-waste).

In addition, many operators have introduced operating standards based on internationally recognised standards such as the ILO Conventions, the UN International Bill of Human Rights, and the UN Guiding Principles for Business and Human Rights to improve working conditions in their supply chains.

As more operators consider their contribution to the achievement of the SDGs as part of their core values, strategies and operations, we expect to see a greater impact in terms of their business and the services they provide.

26. For more information, see: https://www.safaricom.co.ke/sustainabilityreport_2017
27. For more information, see: https://www.telenor.com/sustainability/strategic-direction/ and https://www.vodafone.com/content/index/about/sustainability/index.html

28. For more information, see https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
29. For more information, see https://www.telefonica.com/en/web/responsible-business/article/-/blogs/telefonica-commits-to-contribute-to-the-paris-agreement-with-new-energy-and-emissions-reduction-targets
30. For more information, see https://www.verizon.com/about/responsibility/sustainability
31. For more information, see https://www.orange.com/en/news/2018/Juin/Orange-and-green-colours-that-go-well-with-nature

03

Deep dive on the SDGs

In this section, we provide an in-depth analysis into five SDGs:

| 2 ZERO HUNGER | 10 REDUCED INEQUALITIES | 6 CLEAN WATER AND SANITATION | 7 AFFORDABLE AND CLEAN ENERGY | 11 SUSTAINABLE CITIES AND COMMUNITIES |

These SDGs have been selected as they demonstrate the range of activities in which operators are engaged. They also represent SDGs where operators have either achieved a significant impact, made a significant improvement in impact since 2015 and/ or developed particularly innovative digital solutions that have the potential to drive significant progress towards the goals going forward.[32]

For each of these SDGs, we look at how the industry's impact has evolved over the last three years and identify the key drivers for those changes. We also present relevant case studies of operators making a significant contribution to the SDGs through new and existing activities, including, where available, some indication of the impact being achieved. Finally, we identify ways the industry's contribution to the SDG can be enhanced and brought closer to its potential.

For further examples of what operators around the world are doing to contribute to the SDGs, see the GSMA's SDG Impact explorer

sdgexplorer.gsma.com

32.   For a deep dive analysis on a different set of SDGs, please visit our 2016 and 2017 SDG Impact Reports.

2 ZERO HUNGER

3.1 SDG 2: Zero Hunger

SDG 2 focuses on ending hunger, achieving food security and improved nutrition, and promoting sustainable agriculture.

Global context[33]

- One in nine of the world's population remained undernourished in 2016, equivalent to 815 million people.

- In 2017, 151 million or 22% of children under the age of five were stunted (too short for their age), while 51 million in this age group were wasted (too light for their height) and 38 million were overweight.

Figure 5 shows that the mobile industry's impact on SDG 2 has steadily improved over the last two years, with the score rising from 33 to 37 between 2015 and 2017. While, at this level, the industry's impact on SDG 2 is low relative to other SDGs, this in part reflects the nascent opportunity for mobile operators in this space.

Rural areas in many developing countries are expected to account for a large share of new connections going forward due to saturation in urban centres. In 2017, mobile operators connected 140 million new mobile subscribers living in rural areas in developing countries. But more than that, operators are increasingly facilitating access to value added services (VASs) related to agricultural and nutritional practices, and to mobile financial services (via mobile money). Meanwhile, emerging areas, including smart drones and IoT solutions to monitor weather patterns, are helping farmers become more resilient to climate change. These areas collectively represent a substantial opportunity for the mobile industry to further improve its impact on SDG 2.

Table 2

Key SDG 2 targets that the mobile industry impacts upon

2.2	By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.
2.3	By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.
2.4	By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.
2.c	Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.

33. The Sustainable Development Goals Report 2018, UN, 2018

Figure 5

Industry performance on

SDG 2
Zero Hunger

33.4	36.0	37.3
2015	2016	2017

Since 2015, around
140m
people in rural areas in developing countries started using mobile

Increasing penetration from **53%** in 2015 to **58%** in 2017

Source: Gallup World Poll and GSMA Intelligence

Since 2015, around
200m
additional people in rural areas in developing countries have been connected to the mobile internet

Increasing penetration from **23%** in 2015 to **29%** in 2017

Source: Gallup World Poll and GSMA Intelligence

The proportion of adults receiving payments for agricultural products via mobile doubled in developing countries between 2014 and 2017

Source: Global Findex Database and GSMA Intelligence

24m
more adults in developing countries received payments for agricultural products via mobile

Around
175m
people living in rural areas use mobile to access information and services that benefit their farm or fishery.

Approximately **9%** of rural mobile subscribers

Around
250m
people living in rural areas use mobile to access health services or information to improve their health.

Approximately **12%** of rural mobile subscribers

Source: GSMA Intelligence

Mobile information services supporting agricultural and nutritional needs

In 2016, the incidence of world hunger increased for the first time since the turn of the century. Some 815 million people were undernourished in 2016, up from 777 million in 2015[34], with almost two-thirds of these living in Southern Asia and Sub-Saharan Africa. Several factors, including population growth, the accelerating rate of urbanisation, and the growing threat of climate change, will serve to heighten the world's food security challenges. This necessitates that many agriculture-dependent countries adopt more efficient and sustainable agricultural production methods.

Mobile operators are already playing a key role in many rural communities, helping to connect previously underserved areas, and to boost agricultural productivity by providing farmers with mobile-enabled information services on agricultural inputs, prices for crops across markets and accurate weather data. Furthermore, through mobile health services, operators in several markets are enabling access to nutritional information and practices, helping to empower people to make better and more informed decisions about nutrition practices in their households. A study of eight services in the GSMA's mNutrition initiative portfolio found that, on average, the mobile health (mHealth) service was the only source of nutrition information for one in three users, underscoring the importance of mobile as a key information distribution channel for underserved populations.[35]

CASE STUDY
Living Goods Uganda[36]

Context: Poor nutrition is a key factor in deaths arising from diarrhoea, malaria and pneumonia for children, and anaemia for pregnant women. In Uganda, 29% of children under five years old are considered to be stunted, and stunting is greater among children in rural areas (30%) than urban areas (24%)[37].

Solution: Living Goods Uganda deploys a network of door-to-door Community Health Workers (CHWs), who are responsible for guiding families towards improved health and well-being. They do this by counselling families on appropriate health and nutrition practices, providing disease diagnosis, some treatment services and selling life-enhancing products to the families they visit.

Two apps are available to CHWs. Living Goods SmartHealth App allows CHWs to register members of a household, record relevant health information, manage their workload scheduling and guide CHWs through customer health assessments. Meanwhile, a second app provides CHWs with a product catalogue and reference material to help drive sales and improve their support to customers. Living Goods also provides its customers with life-saving maternal and newborn child health information, delivered for free via SMS.

Impact: Living Goods has created a sustainable platform for community health services driven by motivated and performance-driven CHWs. The Living Goods model generates retail revenues that recover 100% of the product and distribution costs and provides motivating incomes for the CHWs. Living Goods CHWs also earn incentives, linked to health and sales-based KPIs, which drives work ethic and improves the quality of the service they provide.

Living Goods users demonstrated improved nutrition behaviours over non-users across all topics tested. The most notable improvement was around exclusive breastfeeding rates. Some 82% of users who had a consultation with a CHW and received SMS on this topic reported to be exclusively breastfeeding their babies – a 32 percentage-point improvement over non-users of whom only 50% reported to be implementing this practice. Almost all Living Goods users reported initiating breastfeeding within the first hour of birth, compared to only 88% of non-users.

34.   The Sustainable Development Goals Report 2018, UN, June 2018
35.   Creating mobile health solutions for behaviour change A study of eight services in the mNutrition Initiative portfolio, GSMA, 2018

36.   Living Goods Uganda A community health service leveraging mobile technology, GSMA, 2018
37.   Uganda Demographic and Health Survey 2016, UBOS, 2016

CASE STUDIES
Enabling access to mobile information services

CASE STUDY
China Mobile's Targeted Poverty Alleviation System

Ooredoo, Myanmar – Site Pyo
Launched in March 2016, Site Pyo is an agricultural smartphone app that supports smallholders suffering the effects of climate change. The app is designed to improve farmers' lives by providing information that improves yields. A GSMA study showed that the likelihood a Site Pyo user reporting a change in planting was 3.2 times greater than a non-user, with most users having made a change in their on-farm practices compared to the previous season[38]. As of December 2016, the app had more than 150,000 users. Recognising that farmers were cost conscious, the app was kept free for end users and brought benefits for Ooredoo in the form of greater reach into rural Myanmar, improved ARPU, and enhanced customer loyalty in a multi-SIM market.

Airtel, Malawi – Airtel 321
Airtel 321 is a mobile information service available to users on the Airtel network in Malawi. Users dial 321 and navigate through interactive voice response (IVR) menus to access voice messages containing information on various topics, including health, nutrition, gender, agriculture and weather. Users can also access the content via USSD and SMS. Following its launch in Q4 2015, Viamo[39] undertook a number of service improvement initiatives that have resulted in higher user satisfaction rates and improvements in nutrition knowledge and behaviour among users.[40] This includes an increase in the percentage of users who correctly recalled appropriate nutrition practices, from 55% to 72%, as well as an increase in the proportion of users who reported to be implementing appropriate nutrition practices, from 49% to 70%.

As part of Airtel 321, the M'chikumbe (Farmer) 212 service provides farmers with access to practical information about agriculture and Airtel Money via IVR and SMS. The service had almost 400,000 users by the end of 2016, 72% of the target market identified for the year. The likelihood that a power user (active repeat user of the service) reported changes in land management practices was 3.75 times greater than for a non-user, while for increased water use it was 2.21 times greater.[41]

Context: China has the largest agricultural sector in the world, and for the millions of people living in rural areas, agriculture is a way of life. However, there are still more than 30 million rural people living in poverty. To combat this, the Chinese government's "targeted poverty alleviation strategy" aims to eradicate poverty for all rural residents by 2020.

Mobile solution: Introduced at the beginning of 2016, China Mobile's Targeted Poverty Alleviation System (TPAS) consists of two parts: a mobile poverty application and a big data management & analytics platform. Through the system, government anti-poverty staff can use smartphones to collect information on rural families in poverty (to understand their health, diet and drinking conditions) to enable the government to manage poverty alleviation work more effectively. Concurrently, information and resources from NGOs and the government is shared (via the app) among the rural population, so that people can learn about poverty alleviation policies, apply for jobs, and access vital information (such as health advice or educational opportunities). China Mobile's TPAS also enables rural poverty families to market and sell their agricultural produce through e-commerce channels, helping them to generate an income.

Impact: To date, China Mobile's targeted poverty alleviation platform has been applied in 60 cities and counties in 10 provinces (namely Chongqing, Hunan, Henan, Anhui, Shanxi, Liaoning, Shannxi, Yunnan, Jiangxi, Ningxia) covering 7.18 million impoverished people and serving 710,000 poverty alleviation cadres. By 2020, China Mobile aims to cover 10 million impoverished people in China, to provide intelligent tools and link thousands of welfare resources to government staff, and help the government run targeted poverty alleviation policies.

38.   Site Pyo: A weather and agriculture app by Ooredoo Myanmar, GSMA, 2017
39.   The social enterprise organisation that manages the 321 service
40.   Creating mobile health solutions for behaviour change: A study of eight services in the mNutrition Initiative portfolio, GSMA, 2018
41.   M'chikumbe 212: A mobile agriculture service by Airtel Malawi, GSMA, 2017

Digitising agricultural value chains

Alongside mobile agriculture (mAgri) information services, the agricultural sector presents an opportunity to drive the adoption of mobile financial services (MFS) beyond urban areas and into rural and remote regions. Globally, there are more than 450 million smallholder households who produce and supply nearly 70% of the food consumed worldwide. However, farmers remain largely excluded from accessing financial services. Digitising agricultural payments for the procurement of crops via mobile money brings smallholder farmers into formal economies and supports them in developing economic identities (transaction records) to eventually access financial products such as credit and savings.

For agribusinesses and farmers in agricultural value chains, mobile presents an opportunity to increase the safety and reduce the cost of payments to farmers, and increase the overall efficiency and transparency of operations in the agricultural last mile. In developing countries, the proportion of adults in rural areas with a mobile money account grew from 1.7% to 3.4% between 2014 and 2017 (the equivalent of 37 million new adult mobile money users in rural areas). With increasing mobile money penetration in rural areas, mobile operators can take the lead in digitising agricultural payments in developing countries, leveraging the reach, convenience, security and flexibility of mobile technology.

Opportunity for digitisation of agricultural payments

- Mobile money providers that actively approach the digitisation opportunity in business-to-person (B2P) for the procurement of crops or government-to-person (G2P) payments in agriculture, for example for input subsidies, could add as new customers a significant share of the 350 million farmers forecast to have a mobile phone in 2020.
- This could result in just over $2 billion from B2P and $202 million from G2P in additional direct annual revenues in 2020.

Recommendations to accelerate impact

While the mobile industry has a significant impact on SDG 2: Zero Hunger, many of the services through which it can maximise its impact are still at early stages of adoption and use at a global level. Nevertheless, given the expected growth in mobile connectivity in rural areas, operators have a substantial opportunity to engage with these customers more effectively and therefore drive their impact on this SDG.

Beyond closing the coverage gap, the primary opportunities for operators to help address productivity and food security challenges are through mobile value added services (VASs) and emerging technologies, including mobile money and IoT-based applications. These technologies collectively can help accelerate productivity for farmers, improve agricultural knowledge and best practices, enable financial inclusion and increase farmers' resilience to climate change.

Operators can continue to accelerate their impact on SDG 2 through the following:

- Providing farmers with mobile-enabled information services on agricultural inputs and nutrition, prices for crops across markets and accurate weather information.

- Digitising agricultural value chains:

  - Digitising payments to farmers for procuring crops (business to farmer) and for agricultural subsidies (government to farmer) is beneficial for businesses and the government, as it can lower the cost of distributing payments, facilitate real-time and scalable payments to smallholder farmers across multiple locations, mitigate cash-handling risks such as theft and fraud, and enable transparent and traceable transactions. For farmers, digital payments pave the way to financial inclusion as they help to create an entry point to financial services and a recorded economic history.

  - Mobile-enabled track-and-trace systems support agribusinesses in the agricultural last mile facing the pressure from global markets of ensuring that supply chains are not only reliable and efficient but also adhere to international standards and are traceable. For farmers, these tools can also enable efficiency and transparency in the last mile, via for example digital receipting.

- Engaging with and educating users to improve their behaviour in agriculture and nutritional practices.

How governments and policymakers can support the mobile industry[42]

If greater impact is to be achieved, it is also crucial that governments support the mobile industry with an enabling regulatory framework to support the development of a mobile money ecosystem in rural areas and to allow for the implementation of Mobile IoT for climate resilience. Specifically, governments should do the following:

- **Support proportional know your customer (KYC) for mobile money services in rural areas:** It is important to minimise due diligence requirements while also maintaining the integrity of the financial system. Proportional KYC for farmers and simplified compliance for agents can help overcome this systemic challenge.

- **Enable mobile money transaction value and account size limits that support agricultural payments:** In many countries, the mobile money transaction value and account size limits mandated by financial sector regulators are not able to handle the size and value of payments for the sale of crops from agribusiness and cooperatives to farmers. To allow the full breadth of opportunities in the digitisation of agricultural payments, it is imperative that service providers and regulators understand the unique nature of the agricultural sector.

- **Support Mobile IoT for climate change:** It is important that national governments allow the formation of public-private partnerships between national meteorological agencies, commercial weather service providers and mobile operators. New models are required to complement existing infrastructure, generate new data and ultimately improve weather services.

42. For more information, see the GSMA's Mobile Policy Handbook

10 REDUCED INEQUALITIES

3.2   SDG 10: Reduced Inequalities

The mobile industry has a critical role to play in achieving SDG 10, which aims to reduce inequalities across social, economic and political statuses within and among countries.

Global context[43]

- Between 2010 and 2016, in 60 out of 94 countries with data, the incomes of the poorest 40% of the population grew faster than those of the entire population.

- However, 46% of global household wealth is controlled by the richest 0.7%; whereas 70% of

the world's population own just under 3% of total wealth.[44]

- Remittances to low- and middle-income countries represented over 75% of total global remittances in 2017, reaching $466 billion.

Table 3

Key SDG 10 targets the mobile industry impacts upon

10.2	By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status
10.7	Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies
10.c	By 2030, reduce to less than 3% the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5%

As a provider of connectivity, the mobile industry generates a range of social and economic benefits[45] and can help facilitate digital inclusion by enabling access to information, services, social networks and marketplaces. The mobile ecosystem also makes a significant contribution to the global economy, with an economic value of $3.6 trillion in 2017 (equivalent to 4.5% of global GDP), supporting almost 30 million jobs and contributing almost $500 billion to the funding of the public sector.[46] In many countries, the ecosystem's economic impact is even higher – for example, in Sub-Saharan Africa it accounted for 7.1% of total GDP in 2017.[47]

The mobile industry's impact score on SDG 10 increased from 36 in 2015 to 39 in 2017, spurred by a combination of operators expanding networks and increased access to mobile money, which facilitates remittances that are affordable – a vital component for achieving SDG target 10.C (see Table 3). With 690 million registered accounts worldwide, mobile money has evolved into the leading payment platform for the digital economy in many emerging markets.

43.   The Sustainable Development Goals Report 2018, UN, 2018
44.   Credit Suisse Global Wealth Databook 2017
45.   See Appendix A
46.   The Mobile Economy 2018, GSMA, 2018
47.   The Mobile Economy Sub-Saharan Africa, GSMA, 2018

Figure 6

Industry performance on

SDG 10
Reduced Inequalities

36.1	38.1	39.1
2015	2016	2017

Mobile penetration for the poorest 40% of the populations in developing countries grew from

53% 57%
2015 ⟶ 2017

An increase of **140 million** new subscribers

Source: Gallup World Poll and GSMA Intelligence[48]

Between 2014 and 2017, mobile money adoption among women in low-income countries doubled from
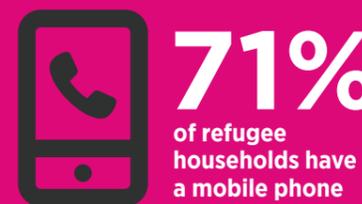
8m 16m
2014 ⟶ 2017

female adults

4% to 8% penetration

Source: Global Findex Database

93%
of refugees live in areas covered by mobile networks

71%
of refugee households have a mobile phone

Source: UNHCR and GSMA

In 2017, mobile money processed

$2.5bn
in international remittance transactions

Source: GSMA Mobile Money

Affordability

The average cost of sending $200 via mobile money is

1.7%

well below the SDG 10.C target of 3%

48.   This calculation of mobile penetration takes into account the poorest 40% of population in each developing country.

Mobile money continues to improve affordability of international remittances

The revolution mobile money brought for domestic payments and cash transfers is now being repeated in international remittances. Mobile money-enabled remittance services are available across 184 corridors, connecting migrants in 35 remittance-sending countries to their families in 40 remittance-receiving countries.[49] The core characteristics of mobile money – convenience, privacy and reach – make it a particularly attractive remittance channel for people with limited access to traditional financial institutions. As such, mobile money plays a key role in expanding access to international remittances for the most underserved, particularly women and rural households, as well as migrant workers and refugees.

In the context of the SDGs, mobile money is a key tool for achieving target 10.C. GSMA research[50] found the cost of sending $200 using mobile money is actually below 3% in most country corridors (96%), compared to three quarters of the corridors (76%) in August 2016. As a result, the average cost of sending $200 using mobile money stands at 1.7% of the transaction – a significant reduction of nearly 40% compared to the previous year. Even when mobile money cash-out fees are included, the cost of sending $200 is still significantly lower than the average cost of sending remittances via other formal remittance service providers, including banks and mobile transfer operators (MTOs). Furthermore, the average cost of sending $50 and $100 was below 3% in August 2017 – again, a significant reduction compared to 2016 – making mobile money a compelling tool for low-income migrant workers who find it more valuable to make frequent, low-value transactions.

CASE STUDY
Digicel and KlickEx enabling remittances[51]

In the Pacific region (Fiji, Tonga and Samoa), a partnership between Digicel, a mobile network operator offering mobile money, and the KlickEx digital remittance service provider and hub, has diverted the flow of cash-to-cash remittances into digital channels. Today, 10,000 households in Tonga receive remittances into their Digicel mobile money account via KlickEx. Moreover, 70% of formal remittances between New Zealand and Tonga are processed through the KlickEx/Digicel service, while the total value of transactions in this corridor has stayed roughly the same since 2011. This suggests that the KlickEx/Digicel service has taken market share from the traditional cash-to-cash services, advancing the digitisation of remittances in the New Zealand-Tonga corridor.

Addressing the gender gap in mobile can deliver substantial socio-economic benefits

With more than 5 billion unique subscribers worldwide, mobile technology is transforming lives. Through the provision of connectivity and information services, the mobile industry can support the empowerment of individuals, and there is a significant opportunity to further promote the social, economic and political inclusion of all.

Women's empowerment and gender equality will be key to how the mobile industry can contribute to the achievement of many of the SDGs, including SDG 5: Gender Equality and SDG 10: Reduced Inequalities. Mobile can help to empower women, make them more connected and safer,[52] as well as provide access to information, services and life-enhancing opportunities including health information, financial services and employment opportunities.

Despite growth in female access to and use of mobile, its benefits are still not spreading equally. There remains a substantial gender gap in both mobile phone ownership and usage, driven by a complex set of socio-economic and cultural barriers. In low- and middle-income countries, women are 10% less likely than men to own a mobile and 26% less likely than men to use mobile internet.[53] This translates into 184 million fewer women than men owning a mobile phone and 327 million fewer women than men using mobile internet across these countries.

Addressing the mobile gender gap will help to advance women's digital and financial inclusion, bringing significant benefits to women, their families, society and the economy, while at the same time unlocking significant growth potential for the mobile industry.

If mobile operators in low-
and middle-income countries
could close the gender
gap in mobile ownership
and mobile internet use
today, this would generate
estimated incremental
revenue of $15 billion over
the coming year.

CASE STUDY
Tigo Women Entrepreneurship Fund

Despite rapid mobile money growth in Rwanda, women are 29% less likely to have a mobile money account than men.[54] Joint research between GSMA Connected Women and Tigo Rwanda revealed that both men and women agreed that female agents offer better customer service than male agents. Female interviewees also reported they prefer interacting with a friend or fellow woman, and that they would be more comfortable and confident using Tigo Cash if this person were to show them.[55] Tigo Women Entrepreneurship Fund was established to address this issue. Women are recruited and trained to become Tigo Cash agents, and offered start-up capital. More than 70 women to-date have benefitted from this fund and are now Tigo Cash agents. In less than a year since its launch, the proportion of women in Tigo's mobile money customer base has already started to increase and Tigo Rwanda aims to empower more than 1,280 women agents through this scheme by 2020.

49. Mobile money: Competing with informal channels to accelerate the digitisation of remittances, GSMA, 2018
50. Mobile money: Competing with informal channels to accelerate the digitisation of remittances, GSMA, 2018
51. Mobile money: Competing with informal channels to accelerate the digitisation of remittances, GSMA, 2018

52. At least 89% of women in each of the 11 low- and middle-income countries in a GSMA study (2015) said mobile phones help them (or would help them) stay in touch with friends and family; and at least 68% in every country reported that they feel (or would feel) safer with a mobile phone. Source: Bridging the gender gap: Mobile access and usage in low and middle-income countries, GSMA, 2015
53. The Mobile Gender Gap Report 2018, GSMA, 2018
54. Based on analysis from the Global Findex Database 2017
55. For more information, see https://www.gsma.com/mobilefordevelopment/commitment/tigo-rwanda/

Another key issue is that too few women are involved in the design, development, production and governance of digital technologies, which indirectly reinforces barriers to access and use, such as the availability of relevant content. To work towards addressing these barriers, from a mobile industry perspective, mobile operators are implementing programmes within their own operations which serve to promote equal opportunities.

Examples of operator initiatives demonstrating commitment to women empowerment in their own operations

The **Vodafone** ReConnect programme is designed to attract talented women across 26 countries who have left the workplace for several years (in most cases to raise a family) who would like to return to work but are struggling to make the professional connections needed or refresh the skills required. In addition, the Global Maternity Policy provides an inclusive working environment for women across the company's global footprint by providing women across 30 countries with a minimum of 16 weeks fully paid maternity leave. It also offers women a return to work policy for the first six months back from maternity leave that allows them to work for four days per week and get paid for five.

Telenor aims to foster a diverse and dynamic workforce at all levels of the organisation, be it in terms of nationality, gender or competence required for the future. Recently, Telenor has:

- implemented WIN (Women Inspirational Network) as a leadership development platform for more than 200 middle managers across all its business units

- implemented a six-month paid maternity leave policy for employees as a minimum standard globally

- updated its recruitment policy to ensure 50/50 (women/men) in the interview process, when possible, and formed a People Committee to continue to focus on the recruitment of senior leaders.

Mobile technology facilitating the integration of forcibly displaced persons

In 2017, there were more than 68 million forcibly displaced persons (FDPs) worldwide.[56] According to the UNHCR, 93% of refugees live in areas with either 2G or 3G coverage. Given the ubiquity and pace of growth of mobile connectivity, there are a number of ways in which mobile technology and digital solutions are benefitting the lives of people affected by crisis, including refugees and those forced to flee. This is particularly relevant to SDG target 10.7, where mobile connectivity and services have the potential to provide crucial support to FDPs at every stage of their journeys, and help to facilitate integration into new countries.

Mobile operators are using their technical expertise and unrivalled reach to create impact at scale for displaced populations. This includes extending or upgrading mobile coverage to providing Wi-Fi hotspots, developing translation apps and information portals, and collaborating with humanitarian organisations to deliver cash aid through mobile money. Moreover, by providing FDPs access to reliable mobile connectivity, not only does this allow refugees to communicate with their families; it also enables the use of a range of digital services that can help to improve empowerment and resilience, and therefore benefit the livelihoods of FDPs over the long term.[57]
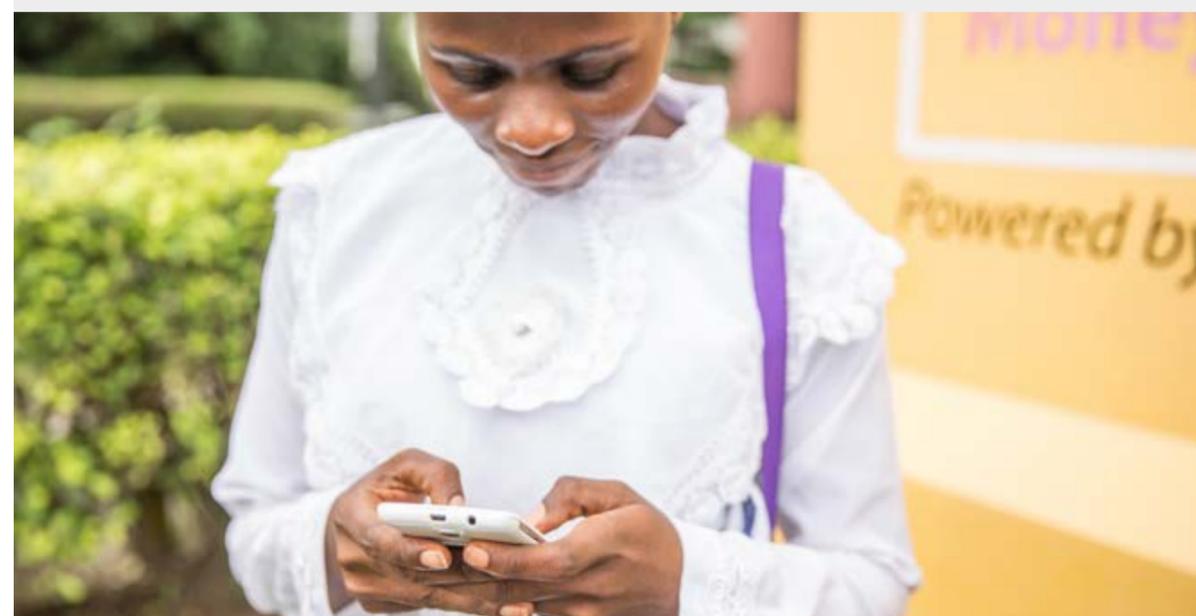
CASE STUDY
Uganda's Bidi Bidi refugee settlement

In response to the mass displacement of South Sudanese into Uganda, mobile operators in the country began partnering with NGOs, leveraging their mobile money bulk payment services to deliver humanitarian cash transfers to refugees, which can offer a cheaper, faster, more secure and more transparent means of getting aid to those who need it, compared to a physical cash equivalent.

In a report published in November 2017[58], the GSMA explored how humanitarian organisations are collaborating with operators and shared insights about the business models, modalities and operations involved in two mobile money humanitarian cash transfer (HCT) projects in Bidi Bidi refugee settlement. Both projects are based on partnerships between the private and humanitarian sectors; the first between Airtel and Mercy Corps, and the second between MTN and the International Rescue Committee. The report outlines the success factors and challenges of these partnerships in deploying HCTs for refugees. Operators and NGOs experienced similar challenges in trying to reach these difficult-to-serve communities:

- fast-changing KYC regulations for electronic money transfers

- low mobile penetration among beneficiaries, many of whom are selected precisely because of their heightened vulnerability and are therefore unlikely to already own a mobile

- managing agent liquidity to ensure agents have the correct denominations of physical cash to perform cash-outs.

However, several factors also contributed to their success: significant investment from mobile operators and humanitarian agencies in (a) training on how to use mobile money; and (b) connectivity infrastructure, an agent network and liquidity management to ensure beneficiaries have a positive and smooth experience. The project has also benefitted from appropriate organisational capacity, trusted relationships, and the flexibility, agility and willingness to make projects succeed.

56.   Global Trends: Forced Displacement in 2017, UN HCR, 2018
57.   Mobile is a Lifeline: Research from Nyarugusu Refugee Camp, Tanzania, GSMA, 2017

58.   Humanitarian Payment Digitisation: Focus On Uganda's Bidi Bidi Refugee Settlement, GSMA, 2017

Turkcell providing translation and internet services to support integration of Syrian refugees

Since launching Hello Hope – a free mobile app designed to help Syrian refugees living in Turkey overcome the language barrier – in September 2016, Turkcell has supported more than 900,000 people. The app teaches basic language skills, provides instant speech translation, offers key information in Arabic and Turkish languages, and provides daily news in Arabic. Turkcell collaborated with the Turkish Red Crescent to improve the Useful Info section of the app, helping to advance the integration of Syrians into the Turkish community.

In the next phase of its Hello Hope project, Turkcell, which now has more than 1.8 million Syrian customers, launched a technology centre at the Kahramanmaras refugee camp (in the southeast

of Turkey) to connect refugees to the internet and provide them with relevant education, information and content services. Working in association with its partners AFAD (Disaster and Emergency Management Presidency of Turkey), the centre provides the following:

• the first free fibre internet service made available for the education of refugees in Turkey

• the Hello Hope application for learning Turkish and accessing communication and information on Turkcell T tablets

• opportunity to listen to music with Turkcell's music app fizy, watch TV on Turkcell TV+, and access Khan Academy's K12 training, which includes content on news and health.

Digital identity enabling access to mobile services

The World Bank estimates that 1 billion people[59] lack formal identification, predominantly in developing countries across Sub-Saharan Africa and Asia. While SDG Target 16.9[60] specifically addresses the identity gap, the ability to prove one's identity is essential to economic, social and political inclusion, and is therefore highly relevant to SDG 10.

Formal identification can help to secure access to a number of life-enhancing services such as healthcare, education, financial services, connectivity and social protections. Moreover, the increasing emphasis on proof-of-identity requirements is becoming ever more critical to gaining access to mobile connectivity and a range of mobile services, particularly across the 147 countries where mandatory SIM registration policies are in place. This is particularly relevant to FDPs, who often relocate within their own countries or to other

countries without any form of legal identification, and are therefore likely to be impacted by identity-related barriers and face digital, financial and social exclusion where these barriers prevent them from accessing mobile services. Enabling FDP access to mobile services can lead to numerous positive outcomes, not only for FDPs themselves, who can communicate with their loved ones and access a range of services, but also for humanitarian agencies and host countries.[61]

Mobile operators are playing a variety of roles in enabling and growing digital identity ecosystems. This includes leveraging their footprint and capabilities to extend birth registration through mobile, partnering with governments on enrolment into national ID programmes, and verifying and authenticating identification digitally to extend access to services.

Digital birth registration in Pakistan

Context: In Pakistan, the births of approximately 60 million children remain unregistered, with registration rates lowest among girls, children from rural areas and the poorest households. The low birth registration rate in Pakistan is due to a combination of social and economic factors. In many areas, registering a birth can be difficult, in some cases nearly impossible – especially for children born at home, in remote locations, or in displacement. Birth registration is a prerequisite to obtaining a birth certificate, which in Pakistan is needed for issuing national identity cards, passports and in some provinces, school enrolment. Birth data is also an essential tool used by government to deliver socio-economic services, such as planning healthcare and new schools.

Solution: In 2014 UNICEF and the governments of Punjab and Sindh provinces, with support from Telenor Pakistan, commissioned a new pilot project to test how mobile technology could effectively augment the traditional, paper-based birth registration process. A simple mobile app developed by Telenor was provided to authorised personnel, including health workers, marriage registrars and at Telenor distribution points. These authorised personnel reported birth-related data along with required documentation directly to the approving authority via the app. A dashboard solution was also developed to allow government authorities to review registration applications and monitor progress.

Impact: Following the success of a six-month pilot – during which the targeted districts saw registration rates increase by an average of 200% – the project was renewed in 2017 with an aim to register 700,000 additional births across Punjab and Sindh by the end of 2018. The project has registered approximately 120,000 children as of July 2018. Telenor Group has stated its ambition to register 7 million people by 2020 as part of its commitment to SDG 10 and has recently launched a pilot with UNICEF and authorities in Myanmar to reduce inequalities in birth and death registration.

59.   World Bank ID4D initiative: http://www.worldbank.org/en/programs/id4d
60.   'By 2030, provide legal identity for all, including birth registration'
61.   For more information, see: Enabling Access to Mobile Services for the Forcibly Displaced: Policy and Regulatory Considerations for Addressing Identity Related Challenges in Humanitarian Contexts, GSMA, 2017

Recommendations to accelerate Impact

There is still much to do for mobile operators to increase their impact on SDG 10 and to realise their full potential. It is essential to continue to support the adoption and use of mobile internet services; in addition to expanding infrastructure, this necessitates providing affordable access to basic data services, particularly in underserved areas. GSMA Intelligence analysis of the 163 countries included in the Mobile Connectivity Index shows that the average monthly cost of 500 MB of data across fell from 4.8% to 2.5% of monthly GDP per capita between 2014 and 2017. However, in low-income countries the cost is almost 10% of monthly GDP per capita – and for the poorest 40% of the population, the cost is often several times this.

Increasing access to mobile money, along with other vital services that can be delivered over mobile such as digital identity, can help further reduce barriers to social, economic and political inclusion.

Mobile money

The mobile money industry is making great strides towards economic empowerment among the underserved, helping to achieve the SDGs and build financial resilience. However, several barriers are slowing the uptake of mobile money for international remittances. To harness the potential of mobile money for international remittances, the following recommendations[62] are critical:

- establishing an open and level playing field and encouraging competition
- facilitating the opening of new corridors
- adopting a risk-based approach to mobile money international remittances
- including mobile money as a key component of any policy initiative aimed at reducing the cost of remittances.

Closing the gender gap

The cause of the mobile gender divide is complex, and rooted in a range of social, economic and cultural factors. Targeted intervention is needed by industry, policymakers and the development community to address issues of gender equality and social norms, and to focus on the following[63]:

- **accessibility** – including access to quality network coverage, handsets, electricity, agents and recognised proof-of-identity documents
- **affordability** – including handsets, tariffs, data and transaction fees
- **usability and skills** – including for handsets and services and addressing a lack of awareness and understanding
- **safety and security** – including addressing harassment, theft, fraud and data protection
- **relevance** – of policies, content, products and services.

Facilitating refugee integration through mobile

While each refugee context is unique, there are common barriers to mobile adoption for these populations. According to UNHCR's Connecting Refugees paper[64], there are three pillars to addressing connectivity issues for refugees – access, affordability and usage. Research from the GSMA[65] shows that there is an important market opportunity to deliver both social and commercial value in serving refugee populations, and investing in the capex, opex and partnerships required. To realise the opportunity and benefits of improved connectivity for refugees, the report provides recommendations for mobile operators, humanitarian organisations and governments to consider. Those for mobile operators are summarised as follows:

- Recognise there is significant market demand from refugee populations. Think creatively about how to extend coverage to refugee populations, including ways to share commercial risk.
- Consider a blended model of commercial and philanthropic offerings that can co-exist to meet the unique needs of refugee populations, including those in the most vulnerable segments of the population.
- Align with donors and humanitarian agencies to address barriers to maximising access to a range of mobile services in refugee contexts.
- Consider providing special bundled services to meet the particular needs of refugees and humanitarian organisations while expanding the customer base.

How government and policymakers can support the mobile industry in addressing identity-related challenges in humanitarian contexts

The role of host-country governments and regulators in establishing enabling policy environments cannot be underestimated. The GSMA recently published[66] a set of considerations for policymakers (including central banks) for adopting flexible and proportionate regulatory frameworks that would empower FDPs to be able to access mobile services, particularly in emergency contexts. These considerations include the following:

- Providing clear guidelines on what identification is acceptable for FDPs to access mobile services, and ensuring that a critical mass of FDPs has access to an acceptable form of identity.
- Allowing the use of UNHCR-issued identification, where available, to satisfy any mandatory SIM registration or KYC requirements for opening mobile money accounts.

- Enabling lower, 'tiered' thresholds of KYC requirements to allow FDPs to open basic mobile money accounts, particularly in emergency contexts.
- Harmonising identity-related SIM registration requirements with the lowest tier of KYC requirements in countries where SIM registration is mandatory.
- Establishing proportionate risk assessment processes that take into account the diverse types of FDPs when considering proof-of-identity policies.
- Exploring the use of new digital identity technologies.
- Promoting robust identity validation processes while adopting consistent data protection and privacy frameworks.

The GSMA is working closely with a number of partners and humanitarian agencies to engage with host-country governments and advocate these considerations with a view to creating more conducive policy environments that advance FDPs' access to mobile services and digital humanitarian assistance.

62. Mobile money: Competing with informal channels to accelerate the digitisation of remittances, GSMA, 2018
63. For more information, see: https://www.gsma.com/mobilefordevelopment/connected-women/accelerating-digital-and-financial-inclusion/

64. Connecting Refugees, UNHCR, 2016
65. Mobile is a Lifeline: Research from Nyarugusu Refugee Camp, Tanzania, GSMA, 2017
66. Enabling Access to Mobile Services for the Forcibly Displaced, GSMA, 2017

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

3.3
SDG 6: Clean Water and Sanitation
SDG 7: Affordable and Clean Energy

Key components of SDGs 6 and 7 include achieving access to safe water and sanitation for all, and ensuring universal access to affordable, reliable and modern energy services. A vast number of households globally do not have access to energy, water and sanitation, but are covered by mobile networks. These basic services are essential to an individual's well-being and social-economic development, but universal access is far from a reality. Through spill-over effects, improving access to energy, water and sanitation also helps to improve health, education, income generation and other areas that enhance the lives of underserved people, and can therefore help to achieve progress across the SDGs.

Global context[67]

- 3 in 10 people lack access to safely managed drinking water services

- 6 in 10 people lack access to safely managed sanitation facilities

- Data from 79 countries shows that 59% of all wastewater is safely treated

- 87% of the global population had access to electricity in 2016, with around 1 billion people still living off the grid

- 55% of renewable energy was derived from modern forms in 2015

- 4 in 10 people still lack access to clean cooking fuels and technologies

Figure 7 shows that the mobile industry's impact on both SDG 6 and 7 improved significantly between 2015 and 2017, with the score for SDG 6 rising from 35 to 41, while for SDG 7 the score increased from 34 to 40.

The mobile industry is driving progress in addressing the challenge of providing critical utility services to off-grid populations through mobile-enabled utility solutions, which utilise a pay-as-you-go (PAYG) model. These new service delivery models are underpinned by different mobile channels – connectivity, mobile money and M2M technologies – which provide flexible payment terms for users (creating a transaction record for those with no formal financial history), while also enabling predictive maintenance through M2M connectivity and better understanding of customer consumption profiles.

In the off-grid energy sector, the mobile-enabled, solar pay-as-you-go model, or PAYG solar, is a flagship example of a maturing business model that has harnessed these functionalities to enable access to financed, clean energy solutions since the early 2010s. Although East Africa accounts for the majority of solar home systems (SHSs) sold to date (in part, driven by the adoption of mobile money in the region), PAYG solar sales are making good progress in other regions, including West Africa, South Asia and Latin America. Such is the success of PAYG solar in East Africa that it has encouraged other sectors to replicate the business model; although these new products are at nascent stages of commercialisation, they include PAYG cookstoves, solar-powered irrigation, water delivery and sanitation products.

Crucially, these emerging business models are creating an important commercial opportunity in the mobile-enabled utilities sector. As Figure 8 shows, the addressable market in this space is significant; mobile operators are increasingly looking to develop or support new mobile-enabled utilities services, either through partnerships with utility providers or as leaders (for example, Orange recently confirmed its ambitions to become a key player in the energy transition sector in Africa[68]). In terms of new revenue streams, operators across Africa and Asia consider mobile payments for utility services one of the principal avenues for growth.[69] In Asia, M2M connectivity and, more broadly, IoT services are considered the most interesting potential source of new revenue in the utilities space.

Table 4

Key SDG 6 and 7 targets that the mobile industry impacts upon

6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all
6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
6.b	Support and strengthen the participation of local communities in improving water and sanitation management
7.1	By 2030, ensure universal access to affordable, reliable and modern energy services
7.2	By 2030, increase substantially the share of renewable energy in the global energy mix
7.3	By 2030, double the global rate of improvement in energy efficiency
7.a	By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
7.b	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support

67. Sources: World Bank, The Sustainable Development Goals Report 2018, UN, 2018

68. "Orange aims to become a key player in energy transition in Africa and extends its services to five new countries", orange.com, March 2018
69. Mobile for Development Utilities: Achieving SDGs 6 and 7: The promise and impact of mobile technology, GSMA, 2018

Figure 7

Industry performance on

SDG 6
Clean water and sanitation

| 34.7 | 38.5 | 40.7 |
| 2015 | 2016 | 2017 |

Industry performance on

SDG 7
Affordable and clean energy

| 34.1 | 37.6 | 39.6 |
| 2015 | 2016 | 2017 |

Figure 8

Addressable market: total utility access gap and individuals within the access gap covered by 2G/3G networks[70]

		Total access gap	Addressable market
6 CLEAN WATER AND SANITATION	WATER	848 million people	373 million people
	SANITATION	2.5 billion people	2.0 billion people
7 AFFORDABLE AND CLEAN ENERGY	ENERGY	1.1 billion people	855 million people

PAYG solar sales

450,000
2015 → 2017
1.6m

8.5m individuals
benefitted from access to clean and reliable energy in their homes[71]

Accessing more services

IoT utilities connections grew

540m
2015 → 2017
790m

Representing **250 million** net additions

Between 2014 and 2017,

335m
more adults in developing countries used mobile to pay for utility bills

An increase of almost **500%**

Source: GSMA Intelligence

Source: Global Findex database and GSMA Intelligence

70.   Mobile for Development Utilities: Achieving SDGs 6 and 7: The promise and impact of mobile technology, GSMA, 2018

71.   Going greenfield with utility pay-as-you-go models: Enabling access to water, sanitation and energy in and beyond East Africa, GSMA, 2017

PAYG solar

PAYG solar is a prime example of how mobile technology can help to make clean energy affordable and create sustainable business models, opening up opportunities to make significant progress on SDG 7. PAYG solar has successfully unlocked a large segment of the solar off-grid market by allowing lower income customers to buy solar products on credit or pay small fees for continuous use. GSMA data found that by mid-2017, over 1.6 million PAYG solar units had been sold,[72] and an estimated 8.5 million individuals had benefitted from access to clean and reliable energy in their homes. PAYG SHSs represent 10–15% of solar home systems sold globally today, but account for most of the sector's recent growth. [73]

CASE STUDY
d.light and RE-VOLT: Pay-as-you-go (PAYG) solar service driving mobile money adoption in Haiti[74]

Context: Haiti is highly prone to natural disasters, with in excess of 90% of the population at risk[75]. Its vulnerability to climate change exacerbates many of the development challenges facing the country, including investment in infrastructure. In particular, at 38% of the population, access to electricity remains a perennial challenge in Haiti. This rate of access is even lower, at 17%, when considering the rural population share.

Solution: RE-VOLT launched its PAYG and M2M-enabled lease-to-own SHSs, in partnership with d.light (as the product supplier), while RE-VOLT provided the marketing, distribution, training, customer education, credit check and after-sales service, and managed the relationship with Digicel, the largest mobile operator in Haiti.

RE-VOLT offers a lease-to-own[76] 10W SHS with three lights, a torch and a radio for a down payment of $20 to customers in Haiti. RE-VOLT distributes d.light products and registers customers with a Digicel Mon Cash mobile money account at the time of registration. Customers can purchase prepaid electricity in daily, weekly or monthly increments using mobile money, and have their account credited remotely through an embedded SIM card in the SHS which uses M2M technology to monitor and control energy usage.

Impact: During the course of an 18-month grant awarded to d-light by the GSMA M4D Utilities programme, d.light products improved energy access for 12,440 people and resulted in savings of $646,600 in energy-related expenditure for the beneficiaries.[77] Other project outcomes include:

- **1.8x** growth in solar home system sales in just over a year

- **43%** of RE-VOLT customers were new mobile money users

- **20%** increase in Digicel's ARPU for its RE-VOLT customers following the introduction of a PAYG SHS.

72.   Going greenfield with utility pay-as-you-go models: Enabling access to water, sanitation and energy in and beyond East Africa, GSMA, 2017
73.   Reaching Scale in Access to Energy: Lessons from Practitioners, Hystra, 2017
74.   d.light and RE-VOLT: Pay-as-you-go solar service driving mobile money adoption in Haiti, GSMA, 2018
75.   World Bank
76.   In the lease-to-own model, customer payments go towards paying off the system, allowing customers to eventually own their SHS. They can also complete their payments ahead of the collection schedule.
77.   Calculations based on Global Off-Grid Lighting Association (GOGLA) metrics

Using IoT to improve water monitoring

The mobile industry is helping to improve water and sanitation service delivery by enabling new business models which rely on mobile technologies for payment collection, remote monitoring – including real-time data collection – as well as improved planning and effective communications. These tools provide the transparency and accountability essential for sustainable service delivery, enabling water authorities (or other bodies) to engage communities with water and sanitation education, planning and feedback. The continued development of IoT solutions to monitor and improve water and sanitation networks creates sizable opportunities for the mobile industry to continue to drive their impact on SDG 6.

CASE STUDY
Using IoT to monitor and introduce prepayment for remote water stands in The Gambia[78]

Africa Water Enterprises (AWE) installed eWATERtaps on rural solar pumps in The Gambia and established a prepaid bill collection system with an app that agents used to transfer cash to credit on customers' NFC tokens. M2M connectivity enabled real-time monitoring and responsive maintenance, financed through collected funds, to address the issue of broken water systems. Having initiated the project in April 2016, AWE went on to install 100 eWATERtaps in 7 villages in The Gambia by June 2017, improving water services for more than 9,000 people. Some 52 of the eWATERtaps were transmitting data via GSMA-enabled M2M and were monitored via the eWATERcare cloud management system. In addition, bill collection was managed through a contactless pay-per-use system based on offline NFC tags, on which customers loaded water credit via an agent with an app; this led to 100% revenue collection in six rural villages.

CASE STUDY
Digitising water utilities in Kenya[79]

Wonderkid developed a suite of mobile tools for water utilities – a mobile app for meter reading, customer-initiated meter reading by SMS, and a customer care system for complaints and bill queries. At Kisumu Water and Sewerage Company (KIWASCO), one of 21 utilities where Wonderkid has deployed its solutions, complaint resolution time dropped from 15 to six days, and meter reading efficiency by utility staff increased by 8%. Efficiencies led to an 8% increase in billed revenues and a 28% increase in collected revenues between August 2015 and December 2016, which allowed KIWASCO to expand its service to new customers and increase the number of billable accounts by 9%.

28% increase in revenue collected and 8% increase in revenue billed

71% increase in number and 50% increase in value of mobile money transactions

Recommendations to accelerate impact

Given the rapid uptake in developing markets, mobile is set to play an ever more important role in unlocking access to essential utility services for the underserved. A combination of mobile technologies is helping to deliver new business models for utility services, particularly mobile money, M2M communications and mobile communication services. Despite the substantial opportunity for the mobile industry to further engage in the utilities sector, there is still much work to do for the industry to further increase its impact on these SDGs.

Beyond continuing to expand mobile network coverage and improve access to and adoption of mobile services, particularly in rural and remote areas of the world (which we discuss in more detail in Chapter 4), there are several supply-side challenges to consider. GSMA research[80] highlights that mobile operators face a number of key barriers to successful mobile-enabled utility services. These include internal challenges such as the need to change traditional business mindsets and build internal capacity, and an education effort, to ensure that customers understand how to use the mobile-enabled utility products or services. Furthermore, due to the technology gap that often exists between mobile operators and centralised utilities in developing markets, it is important to adapt technology platforms to the needs of centralised utilities.

78.   Africa Water Enterprises: Using IoT to monitor and introduce pre-payment for remote water stands in The Gambia, GSMA, 2018

79.   Wonderkid Multimedia LTD, Digitising water utilities in Kenya, GSMA, 2017
80.   Mobile for Development Utilities Achieving SDGs 6 and 7: The promise and impact of mobile technology, GSMA, 2018

11 SUSTAINABLE CITIES AND COMMUNITIES

3.4 Sustainable Cities and Communities

SDG 11 focuses on making cities and human settlements inclusive, safe, resilient and sustainable. Many cities around the world are facing acute challenges in managing rapid urbanisation – from ensuring adequate housing and infrastructure to support growing populations, to confronting the environmental impact of urban sprawl, to reducing vulnerability to disasters.

Global context[81]

- Half the world's population live in cities; this is forecast to reach almost 60% by 2030
- 883 million people lived in slums in 2014, up from 807 million in 2000
- In 2016, 9 of 10 people who live in cities were breathing air that did not comply with the safety standard set by WHO
- 445 million people around the world were affected by natural disasters in 2017[82]

Table 5

Key SDG 11 targets that the mobile industry impacts upon

11.5	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.
11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.
11.b	By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels.

The mobile industry's impact on SDG 11 Sustainable and Smart Cities has steadily increased over the last three years, rising from 40 in 2015 to 46 in 2017 (see Figure 9). As discussed in Section 2, enhanced connectivity, network quality and resilience are key drivers behind the increased impact. The mobile industry also continues to play a critical role in providing essential humanitarian assistance during epidemics and natural or climate-related disasters. Moreover, the continued

development of IoT and big data monitoring solutions are providing critical inputs for governments and local authorities to take action for city planning and management. Although still in early stages of development, the implementation of IoT solutions for improved environmental monitoring, including air quality, is helping to reduce the adverse environmental impact of cities.

81. https://sustainabledevelopment.un.org/sdg11
82. "With focus on natural disasters, UN risk reduction forum opens in Mexico", news.un.org, May 2017

Figure 9

Industry performance on

SDG 11
Sustainable Cities and Communities

40.2   44.5   46.5
2015   2016   2017

IoT smart city connections grew 62% between 2015 and 2017

105m 170m
2015 ⟶ 2017

Representing **65 million** net additions[83]

IoT smart vehicle connections grew 34% between 2015 and 2017

330m 440m
2015 ⟶ 2017

Representing **110 million** net additions[84]

22 of the top 25 operators globally

(by number of connections) disclose performance data on how they manage the collection and disposal of waste, e-waste and hazardous waste

The Humanitarian Connectivity Charter

147 signatories in 106 countries (up 35% in 2017)

Reached more than 30 million people affected by crisis and disaster

63% take part in national disaster preparedness initiatives

42% responded to and supported a disaster/crisis situation in 2017

38% already support a mobile-based early warning system

31% provided free SMS, calls or data following a disaster

83. GSMA Intelligence
84. GSMA Intelligence

Supporting disaster response through mobile technology

The mobile industry is central to disaster response efforts, with mobile networks helping facilitate access to information and coordination assistance within affected populations and among governments, NGOs and international humanitarian associations. In 2017, global economic losses attributed to disasters totalled more than $300 billion, due primarily to the three major hurricanes in the Atlantic (Harvey, Irma, and Maria), severely affecting the US and several Caribbean countries. Yet, against this backdrop mobile operators are leveraging their networks, technology and expertise to protect and prepare the communities in which they operate, including by continuing to invest in building and extending high-quality, resilient infrastructure: in 2017, capital expenditure by mobile operators totalled $176 billion[85].

The Humanitarian Connectivity Charter

Now in its third year, the Humanitarian Connectivity Charter (HCC) provides a support system for the mobile industry, governments, NGOs and the international humanitarian community to assist affected populations in disasters. Signatories to the Charter commit to a set of shared principles and work collaboratively to respond effectively to disasters. The GSMA Disaster Response programme supports HCC partners with research, capacity building and thought leadership.

The principles of the Charter are as follows:

- Enhance coordination within and among mobile network operators before, during and after a disaster.

- Scale and standardise preparedness and response activities across the industry to enable a more predictable response.

- Strengthen partnerships.

In 2017, the number of HCC signatories reached 147 mobile operators (up 35% on the year) from 106 countries. The response efforts of operator signatories and humanitarian partners reached more than 30 million people affected by crisis and disaster.

CASE STUDY
AT&T's Flying COWs - Puerto Rico

The 2017 Atlantic hurricane season was one of the worst ever recorded, causing widespread destruction, loss of life and long-term economic damage to multiple Caribbean small island states. Following Hurricane Maria, 90% of Puerto Rico's telecoms infrastructure was damaged, costing an estimated $1.2 billion.[86]

To support disaster recovery efforts in Puerto Rico, AT&T deployed its flying drone, COWs (Cells on Wings), to provide data, voice and text services to its customers and recovery teams. The Flying COWs provided wireless connectivity to customers in an up to 40 square mile area, flying 200 feet above the ground. With the ability to extend coverage further than other temporary cell sites, this makes it ideal for providing coverage in remote areas. The COW carried dozens of gigabytes of data, facilitating thousands of calls and texts. This was the first time an LTE cell site on a drone was successfully deployed to connect residents after a disaster.

CASE STUDY
Ncell Axiata – early flood warning system in Nepal

Nepal is a country with a high risk of several types of natural disaster:[87] earthquakes, riverine and flash floods, glacial lake outburst floods, droughts and forest fires. The country is still recovering from the devastating earthquakes in 2015 that took almost 9,000 lives. In 2016, Ncell Axiata implemented the Early Flood Alerts Project in collaboration with the Department of Hydrology and Meteorology. This enabled Ncell customers living in the 42 implementation locations to receive early warning SMS alerts and take necessary precautions in the event of flooding. Ncell's Flood Alert System was put to the test in August 2017, when 18 districts in the country were hit by large-scale flooding. A total of 9.4 million SMS alerts were sent to those living near the rising rivers. Many who received the alert were able to leave their houses and move to safer locations.[88]

Environmental monitoring through IoT and big data technologies

Rapid urbanisation has brought about enormous societal, economic and environmental challenges. Air pollution remains a major threat: the World Health Organisation estimates that around 7 million people die every year due to ambient (outdoor) and household air pollution, with 90% of these deaths occurring in low- and middle-income countries, mainly in Asia and Africa. To this end, air quality and the monitoring of pollutants that can cause health issues are becoming ever more critical for governments, policymakers, regulators, city planners and citizens.

The mobile industry contributes directly to SDG target 11.6[89] by developing IoT and big data solutions for environmental monitoring to improve air quality, sanitation and waste management. Advances in technology have led to the emergence of portable, low-cost, mobile-enabled sensors that can measure environmental factors and report back in real time, supporting a cost-effective way to monitor sites in addition to traditional static monitoring stations. Big data analytics derived from aggregated and anonymised mobile operator network usage data is already being employed by some operators to gain an understanding of people and traffic movements, and can be used to replace legacy networks of traffic monitoring sensors, at lower cost and with greater detail.

In combination, IoT and mobile big data can be used to inform the planning of transport to improve air quality. The datasets they generate can be used to create sophisticated, accurate and real-time city-wide air quality alerting and prediction models. This, in turn, can help deliver socio-economic benefits in terms of improved quality of life, reduced healthcare costs and working days lost to illness, thereby helping to lessen the negative environmental impact of cities.

85.   GSMA Intelligence
86.   "Puerto Rico telecom board to present state of communications after Hurricane María to FCC", Caribbean Business, January 2018

87.   Nepal Hazard Risk Assessment, Government of Nepal
88.   "Text message alerts prove life saver in flood-hit Nepal", Thomson Reuters Foundation, August 2017
89.   SDG Target 11.6: By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

CASE STUDY
Telefónica Brazil – São Paulo[90]

Problem: Air quality in large urbans areas is a serious threat to public health and is therefore a major concern for local governments. One study in Brazil estimated that more than 20,000 deaths per year, across 29 Brazilian metropolitan regions, can be attributed to air pollution[91]. Air quality monitoring is currently costly for cities, as it either requires a network of fixed-point air quality and traffic sensors or extensive manual surveys.

Solution: Telefónica Brazil (Vivo) has developed a solution to estimate and predict air quality in São Paulo, the largest city in the Southern Hemisphere by population, with around 12 million. Telefónica is providing aggregated and anonymised mobile data, algorithms and tools, which the municipalities of São Paulo can integrate into their traffic and pollution management processes.

Developed by the LUCA team (Telefónica's dedicated big data unit), machine learning algorithms use data from weather, traffic and pollution IoT sensors combined with anonymised and aggregated traffic data from the mobile network, to monitor and predict pollution levels over the entire city. The solution can predict pollution levels 24 to 48 hours in advance, enabling local authorities in São Paulo to take preventative steps if nitrogen dioxide (NO2) emissions could endanger human health.

Impact: Telefónica's project in São Paulo has proven IoT and mobile big data together are a powerful tool with which to predict and analyse traffic patterns, and resulting air pollution, providing a unique solution to address air quality's impact on the city and its inhabitants. Leveraging the air quality data from IoT sensors together with data and insights from the operator can significantly reduce costs, increase accuracy and provide valuable information for decision makers on how to define urban transport policies or assess pollution levels. For example, it can improve urban planning by guiding traffic via alternative routes or issuing early health warnings to affected populations.

CASE STUDY
Deutsche Telekom and Smart Sense – improving the monitoring of air quality[92]

Deutsche Telekom and sensor provider Smart Sense have developed and deployed Smart AirQ monitoring system – a smart sensor platform for monitoring air quality – in Croatia, Germany, Greece and Saudi Arabia. The system supports indoor and outdoor monitoring of multiple air quality parameters at room, street and city level including relative humidity, temperature, atmospheric pressure, CO2, NO2, NOX, CO, SO2, O3 and airborne particles.

With the goal of helping students with chronic respiratory diseases and improving cognitive functions and attention spans of students and professors, Smart Sense has delivered AirQ Indoor systems to several schools in Croatia. AirQ Indoor uses hardware and software developed by Smart Sense. AirQ Outdoor sensors wirelessly communicate using mobile or Mobile IoT (NB-IoT) technology with a custom-built cloud platform, where the data is analysed and presented to users.

Deutsche Telekom, T-Systems and Smart Sense believe a number of new use cases and business opportunities will arise with the data obtained. The data will not only be used to generate direct revenue but also used indirectly when automatic decisions and actions can be triggered depending on the data received. Deutsche Telekom, T-Systems and Smart Sense plan to offer the Smart AirQ solution as a customisable product and service that will be marketed and deployed in cities where Deutsche Telekom offers Mobile IoT services.

90.   For further information, see: Telefónica Case Study: Predicting air pollution levels 24 to 48 hours in advance in São Paulo, Brazil, GSMA, 2018
91.   Costs of air pollution in Brazilian metropolitan regions. Cienc. Saude Colet. 2014; 19:4141–4147

92.   For further information and other case studies see: Air Quality Monitoring Using IoT and Big Data - A Value Generation Guide for Mobile Operators, GSMA, 2018

Mobile industry and e-waste

Growing levels of electronic waste (e-waste) present considerable health and environmental risks, particularly in urban areas, due to inadequate treatment and disposal. In 2016, 44.7 million metric tonnes of e-waste were generated, but only 20% was recycled through appropriate channels.[93] Target 11.6 specifically aims to reduce the adverse per-capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management. The management and treatment of e-waste is also closely linked to several other SDGs including SDG 3: Good Health and Well-being, and SDG 12: Responsible Consumption and Production.

While 66% of the world's population are now covered by e-waste regulation, more action is needed to help achieve the SDGs. Steps are being taken by governments, industry players and the international development community to address the lack of reliable e-waste data, in order to help better track developments, set targets and assess performance.

From a mobile industry perspective, operators are implementing programmes for sustainable production and consumption cycles. This is important because while small IT and telecoms equipment (including mobile phones) only accounted for 9% of total e-waste in 2016, it represented an increase of 32% since 2014, which is significantly higher than the 7% increase for total e-waste over the same period.[94]

CASE STUDY
Orange targeting e-waste as part of circular economy commitments

Orange has committed to progressively integrating circular economy principles by 2020, which involves a progressive shift in its economic models and processes connected to the company's wider ecosystem. This transition covers several areas: eco-design, limiting its consumption of critical resources, optimising waste management, and the possibility of giving a second life to electronic and electrical resources.

In an effort to improve collection and sorting to be able to reuse equipment, as well as recycle, track and repurpose waste, Orange chose to optimise its waste management systems and promote schemes to collect used customer mobile devices. The group has set a target to collect 30% of its customers' used mobile devices in Europe by 2020 (up from 15% in 2017).

Recommendations to accelerate impact

The mobile industry is already playing a central role in supporting cities and communities in the wake of natural or man-made disasters. Mobile networks are a vital enabler of humanitarian response efforts, by facilitating effective communication and the dissemination of critical information. However, as telecommunications infrastructure is among the most damaged during a disaster, it is imperative for mobile operators, humanitarian organisations and other stakeholders to work closer together to continue to strengthen the resilience, preparedness and response capability of connectivity systems[95].

While still in a nascent stage, environmental monitoring through IoT sensors and solutions are increasingly attractive for governments, city administrators and regulators as they work towards tackling major challenges including air pollution. Advances in computing power, big data and IoT enable more cost-effective environmental monitoring solutions, which in turn help to improve cities' and communities' ability to reduce the per-capita environmental impact of cities. As the market begins to mature, and as trials and pilots begin to move to the next phase of implementation, it is important for mobile operators, governments and city councils to work together to agree a common approach to these solutions that will deliver real, long-term benefits to businesses and citizens, and deliver maximum impact on this SDG.

93.   Global e-Waste Monitor 2017
94.   Based on analysis of Global e-Waste Monitor

95.   For further information, see https://www.gsma.com/mobilefordevelopment/mobile-for-humanitarian-innovation/

04

Moving forward: recommendations to accelerate impact

Now in its third year since becoming the first industry to commit to the SDGs, the mobile industry's impact continued to increase in 2017. While it has progressed significantly in contributing to the SDGs, it is still far from fulfilling its potential. Concerted action and an acceleration of efforts by mobile operators, governments and other stakeholders is needed in two broad areas if the ambitious and transformational agenda of the SDGs is to be achieved by 2030. The first area is accelerating mobile connectivity (especially mobile internet access) to unconnected populations. The second area is providing and scaling mobile-enabled solutions that will help catalyse the achievement of the SDGs.

Accelerate mobile connectivity across the world

The GSMA has identified four key enablers of mobile connectivity: infrastructure, affordability, consumer readiness and content & services. Table 6 outlines some of the key activities the mobile industry and policymakers can focus on to ensure everyone is connected before 2030.

Table 6

Actions for the private sector and governments to accelerate mobile connectivity

	Recommendations for the private sector	Recommendations for governments
Infrastructure	Focus on closing the coverage gap in 3G/4G by continuing to develop and invest in alternative operating models and technology innovations that can unlock revenue potential in rural areas, for example: • infrastructure sharing deals to decrease the capital intensity of rural rollout • pursuing initiatives to identify the geographic location of unserved or underserved populations • deploying low-cost rural-specific sites to improve return on investment in targeted areas of low revenue potential.	Ensure a regulatory framework that encourages investment by setting clear policy objectives, maintaining neutrality with respect to different technologies and evincing certainty and predictability in enforcement. Enable mobile network operators to have timely and affordable access to spectrum, comprising both coverage and capacity bands. Reduce red tape for infrastructure investment by ensuring consistency of regulations across municipalities and streamlining approval procedures.
Affordability	Build on existing innovative approaches, and investigate new ones, to improve the affordability of mobile data plans (e.g. service-specific data bundles and earned data). Design solutions to make internet-enabled handsets more affordable: e.g. reduce the burden of the 'one-off payment' for consumers by providing microloans or instalment repayment plans with third parties (e.g. pay-as-you-go solar providers).	Implement an investment-friendly tax policy to support private sector efforts to offer affordable services. This involves: • eliminating sector-specific taxes that can distort the market • encouraging re-investment by estimating tax payments on profits and not revenues • including direct incentives to invest in rural areas such as import duty exemptions. Reduce the complexity and uncertainty in tax levels to increase investor confidence.
	Work together to improve understanding of affordability issues. Investigate ways in which diverse population segments are affected by affordability issues and develop strategies to achieve affordable access based on this understanding.	
	Recommendations for the private sector	Recommendations for governments
Consumer readiness	Build digital skills, for example by leveraging agent networks to provide education, advice and training where necessary, recognising that some parts of the population require additional support. Closing the gender gap in access and usage should be prioritised.	Work to improve general literacy and school attendance to help establish the basic tools people often require to use the internet. Integrate ICT technical/literacy skills and digital skills into education.
	Work together to understand mobile internet adoption among different demographics, including women and girls, rural populations, senior citizens, and persons with disabilities, among others, and then establish strategies and targets to close any gaps.	
Content and services	Work with content providers to develop content and services that are locally relevant (including using local languages), especially those that appeal to currently unconnected groups.	Ensure online government services are accessible to all, including individuals with lower levels of literacy and digital skills.

Scale mobile-enabled solutions that can drive achievement of the SDGs

This report highlights a range of mobile-enabled solutions that can contribute to the SDGs, including mobile money, digital identity, mobile health, mobile education, mobile agriculture, PAYG solar and digital humanitarian assistance, as well as the products and services that IoT is beginning to support.

While there are specific actions for industry and policymakers to accelerate the adoption of these different services, there are also some key enabling factors that cut across all of them. One of the most important is that operators need to work not just with each other but also with the following:

• **governments and policymakers** – to help create enabling regulatory frameworks, enhance the provision of public services (e.g. e-government and digital identity) and ensure people are able to use mobile safely and reliably

• **international organisations such as the United Nations and the World Bank** – to share data, expertise and best practice, and identify synergies and potential partners to maximise efforts

• **other industries** – particularly those that use mobile platforms to contribute to the SDGs, for example, health and education professionals, financial enterprises and agricultural firms.

When working with governments, it is also important that industry engagement extends beyond national regulatory authorities and Ministries of Communications or their equivalents. Mobile impacts many areas of society, governed by many different areas of government, so it is critical that policymakers and operators take a coordinated approach to leveraging mobile technology to help achieve the SDGs.

GSMA commitments

As part of its commitment to the SDGs, the GSMA will continue to work with industry, policymakers, and the international development community to help connect the unconnected and to identify new opportunities to leverage and scale mobile-enabled solutions that improve people's quality of life. This will be done through several ongoing programmes and initiatives.

Big Data for Social Good

The Big Data for Social Good (BD4SG) initiative leverages mobile operators' big data capabilities to address humanitarian crises, including epidemics and natural disasters. Today, the programme is backed by 20 mobile operators who collectively account for more than 2 billion connections across 124 markets worldwide. A number of operators around the globe have ongoing or completed pilots on various BD4SG use cases, and several others intend to launch pilots within the next two years. In 2018, the next wave of BD4SG implementations will focus on disaster preparedness, building on the foundation established over the last year.

We Care

Currently implemented in Latin America, the We Care initiative convenes mobile operators in a specific country to join forces, as an industry, and tackle country-specific social issues that can be addressed through industry action. Government representatives, regulators, civil society and UN agencies often participate in the initiative ensuring a multi-stakeholder approach to entrenched social issues affecting local populations and the implementation of the SDGs. The initiative has been implemented in 16 Latin American countries, addressing issues such as digital inclusion, child protection, environmental stewardship, disaster response and public safety. We Care will continue to convene the industry, civil society and governments to accelerate the implementation of the SDGs at the local level.

GSMA Sustainability Initiative

The GSMA Sustainability Initiative identifies opportunities for operators to incorporate the SDGs and sustainability into core business through advancing responsible business models and practices in the mobile sector. The initiative is working with GSMA members' CEOs and their companies to provide necessary insights and tools to equip them to implement change.

GSMA Mobile for Development

Mobile for Development is a dedicated global team within the GSMA which brings together mobile operator members, tech innovators, the development community and governments to prove the power of mobile in emerging markets. Mobile for Development identifies opportunities and delivers innovations with socio-economic impact in financial services, health, agriculture, digital identity, energy, water, sanitation, disaster resilience and gender equality:

14m
farmers reached with mobile agriculture services which change practices, improve crop yields and increase income

2 million
women and their families can access lifesaving health and nutrition information through mHealth services

5m
users have benefited from mobile-enabled water, sanitation and energy services

The Connected Women Commitment Initiative and other efforts have supported life-enhancing services delivered to more than

27 million
women through mobile network operator partners

As of August 2018, six mobile money providers have gained the **GSMA Mobile Money Certification**, collectively covering

104m
mobile money accounts

GSMA Mobile for Development programmes and initiatives deliver on 15 of the 17 SDGs. The nine Mobile for Development programmes include:

Connected Society
This programme is focused on accelerating digital inclusion. It works with the mobile industry and key stakeholders to increase access to and adoption of the mobile internet, focusing on underserved population groups in developing markets. The programme supports the mobile industry in its efforts to extend network coverage and address consumer barriers to mobile internet adoption to unlock the significant socio-economic benefits of increased digital inclusion.

mAgri
This programme's mission is to advance the productivity and profitability of smallholder farmers and the agricultural industry at large through scalable and commercial mobile services. The mAgri Programme forges partnerships between mobile operators, technology providers and agricultural organisations with the objective to digitise agricultural value chains and bridge the information and financial gap in rural areas. Since its inception, the GSMA mAgri programme has reached 14 million smallholder farmers in developing countries with mobile agricultural information services that improve their productivity and income.

Mobile for Humanitarian Innovation
This programme works with the mobile industry, humanitarian sector and other partners to accelerate the delivery and impact of digital humanitarian assistance, powered through mobile. Through the Mobile for Humanitarian Innovation Fund, the programme invests in new technologies, partnerships and ideas that will deliver dignified and impactful support for the growing number of people vulnerable to, or affected by, natural disasters and complex emergencies.

mHealth
This programme supports commercially sustainable health services that transform the lives of people in need and promote the wellbeing of mothers and families in developing countries. The mHealth programme works with mobile operators and other mobile and health sector stakeholders to launch and scale value-added services. As of July 2018, these services have cumulatively delivered lifesaving maternal and newborn child health and nutrition information to over 2 million women and their families across eight Sub-Saharan African markets.

Ecosystem Accelerator
This programme supports start-ups and mobile operators in Africa and Asia Pacific to build partnerships to help scale commercial innovation with positive socio-economic impact. Through its Innovation Fund, the programme provides equity-free funding and technical assistance to selected start-ups. The Ecosystem Accellerator Innovation Fund has received 1,646 applications from 50 countries, which collectively tackle 13 of the 17 SDGs. A selection of 24 startups across the two regions have already received a grant from the programme between 2017 and 2018, , collectively reaching over a million end users.

Mobile for Development Utilities
This programme supports innovative business models that leverage mobile technology to deliver energy, water and sanitation services in developing markets. To date, its £9.4 million innovation fund has provided grants to 53 organisations, reaching five million beneficiaries across four continents. These grants have contributed to an additional $275 million raised by grantees from the private sector, highlighting the market potential for mobile-enabled utility services to generate greater social and commercial impact.

Connected Women Commitment Initiative

Launched in 2016, this initiative supports mobile operators in low- and middle-income countries to reduce the gender gap in mobile internet and mobile money by 2020. Activities undertaken by operators participating in the Initiative include: increasing the number of female agents; improving the data top-up process to be safer and more appealing to women; improving digital literacy among women through educational programmes and interactive content; and developing and marketing use cases that appeal to women.

So far, 36 operators in 27 countries have made a formal Connected Women Commitment, committing to connect millions more women by 2020. Together, GSMA Commitment partners have already reached more than 10 million new women with mobile money or mobile internet services.

National Dialogues for Digital Impact

This initiative works at a national level to convene key government ministries (finance, ICT, planning, energy, agriculture, education etc.), the leaders of the mobile industry and consumer insights to explore how mobile can further act as a positive force for societal change and commit to deliver on this opportunity. The dialogues aim to: demonstrate the positive impact mobile technology has on society and populations; provide country-level recommendations to industry and government; and create forums for national policymakers and operator leadership to

agree collaborative next steps for social and economic progress towards digital transformation through mobile.

The GSMA is facilitating these National Dialogues in partnership with the Swedish International Development Cooperation Agency (Sida), the UK Department for International Development (DFID), and is supported by the United Nations Development Programme. To date, three National Dialogues have been undertaken and resulted in targeted actions to leverage mobile technology for the SDGs.

The GSMA and the mobile industry continue to explore and foster partnerships to maximise efforts and accelerate the contribution of mobile technologies to the SDGs.

The GSMA Mobile Money Certification

This is a global initiative to bring safer, more transparent and more resilient financial services to millions of mobile money users around the world. Launched in April 2018, the Certification is the result of years of collaboration between the GSMA and the mobile money industry. The Certification comprises eight detailed principles designed to raise the bar for the delivery of secure and reliable mobile money services, to protect the rights of consumers and to combat money laundering and the financing

of terrorism. By defining industry best practice, the Certification facilitates the implementation of trusted partnerships, builds trust with regulators and encourages the implementation of appropriate and proportional regulatory standards. As of August 2018, six mobile money providers have gained the GSMA Mobile Money Certification: Safaricom, Vodacom Tanzania, Tigo Tanzania, MTN Côte d'Ivoire, Orange Côte d'Ivoire and Telenor Pakistan, collectively covering 104.3 million mobile money accounts.

APPENDIX

APPENDIX A
Impact score methodology

This appendix describes the framework and methodology for assessing the impact of the mobile industry on SDGs. The underlying framework is based on the methodology used in the 2017 report[1] but some changes have been made to its implementation. These are also explained in this appendix.

Step 1: Review impact evidence

To measure the mobile industry's impact on the SDGs, it is necessary to identify the mechanisms or 'drivers' through which mobile technology can influence the three dimensions of sustainable development – namely, economic growth, social inclusion and environmental protection.

We therefore draw on the extensive evidence that has already demonstrated the impact mobile can have on sustainable development across the world. Figure A1 summarises some of the empirical evidence, though it is by no means exhaustive.

Figure A1

Impact of mobile on sustainable development – summary of relevant literature

	Author	Scope	Finding
Economic	Various – Haftu (2018), Edquist et al (2017), Scott (2012), Gruber and Koutroumpis (2011), Thompson & Garbacz (2011), Czernich et al (2009), Qiang et al (2009)	Global and regional	The rapid diffusion of mobile and mobile broadband technologies has driven positive impacts on macroeconomic growth. **A 10% increase in mobile or mobile broadband adoption causes an increase in GDP per capita growth of around 1-2%.**
	Suri and Jack (2016)	Kenya, 2008-2014	Mobile money increases the efficiency of the allocation of consumption and labour over time. The M-PESA mobile money service increased per capita consumption and **has lifted 2% of Kenya households out of poverty**. Impacts were **more pronounced for female-headed households**
	Beuermann et al (2012)	Peru, 2004-2009	Mobile technology makes a significant contribution to economic development in rural areas. Mobile phone expansion in rural Peru **increased real household consumption by 11%**, with the greatest effects on health and transport. Mobile coverage also drove an **8 percentage point reduction in overall poverty and a 5 percentage point reduction in extreme poverty.**

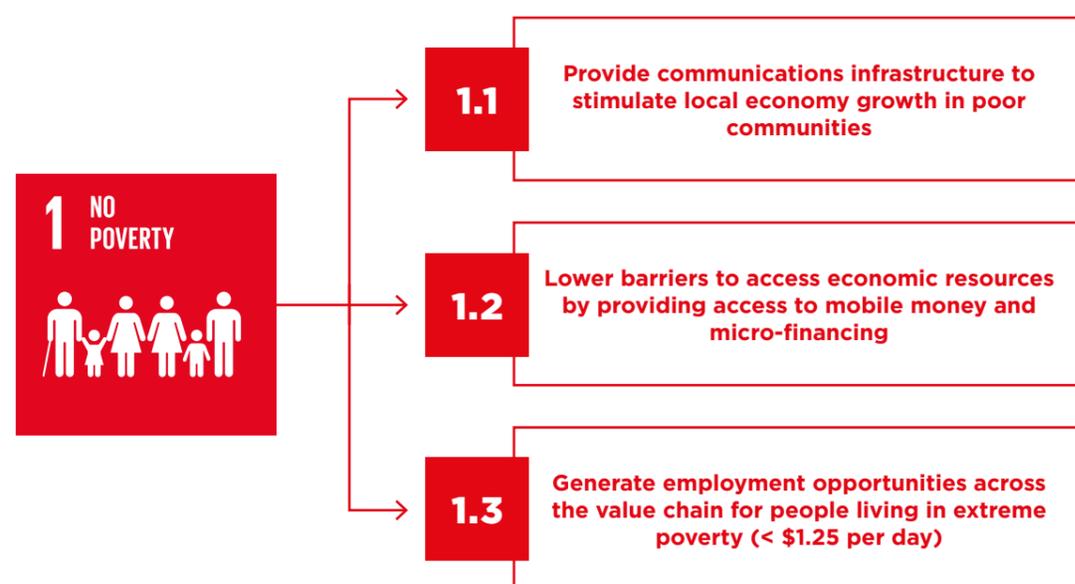|	Author	Scope	Finding
Social	GSMA and Gallup (2018)	Global, 2016	**Mobile phone ownership supplemented with internet access is associated with an improvement in peoples' lives**, with increases in average life evaluations and net positive emotions.
	GSMA (2018)	Malawi, Ghana, Tanzania, Kenya, Nigeria, Zambia, Uganda and Mozambique, 2015-2017	Mobile health drives material improvements in nutrition. **mHealth service users are 13 percentage points more likely to demonstrate appropriate nutrition behaviours** than non-users.
	Wu et al (2012)	UK, 1995-2006	The use of mobile phones to alert emergency services in a life-threatening situation is associated with improved outcomes for patients. **When mobile phones are used to report emergencies, 137 more lives are saved per 100,000 patients compared to a landline.** The risk of being transferred to the emergency department and inpatient admission are also significantly lower when emergencies are reported from mobile phones.
	UNESCO (2014)	Ethiopia, Ghana, India, Kenya, Nigeria, Pakistan and Zimbabwe, 2013	Mobile technology is increasingly used to facilitate reading and enhance literacy in developing countries. • Among those surveyed, around one quarter read on their mobile because they cannot access paper books. • **Almost two-thirds of mobile readers read more on their mobile device.** • **One third of mobile readers use their phones to read stories to their children.** • Women read six times more per month than men
Environment	GeSI and Carbon Trust (2015)	US and Europe	Use of mobile communications technology currently enables **a total reduction of 180 million tonnes of CO_2 emissions a year across the US and Europe**, equivalent to 1.5% of all greenhouse gas emissions from those regions (and five times greater than carbon emissions from mobile networks). 70% of abatement comes from use of M2M technologies and 20% comes from use of smartphones to enable behaviour changes.

1.   2017 Mobile Industry Impact Report, GSMA, 2017

Step 2: Driver identification

Based on both empirical and qualitative evidence, we then identify the drivers through which mobile impacts the SDGs. A full list of the drivers is provided in Appendix B, but the following provides an illustration of three drivers for SDG 1.

Figure A2

Examples of drivers for SDG 1

1 NO POVERTY

→ **1.1** Provide communications infrastructure to stimulate local economy growth in poor communities

→ **1.2** Lower barriers to access economic resources by providing access to mobile money and micro-financing

→ **1.3** Generate employment opportunities across the value chain for people living in extreme poverty (< $1.25 per day)

Each driver must describe an activity that meets the following criteria:

Can be performed or supported by the mobile industry

Contributes to the achievement of the UN SDG, either by

- fulfilling a necessary condition to achieve the SDG

- increasing the speed to achieve the SDG

- improving the economics of reaching the target.

Step 3: Driver potential

Having identified drivers for each SDG, each is given a score of high, medium or narrow, based on its potential impact. The criteria for this assessment was as follows:

- **High potential.** The driver can have significant impact in delivering or enabling the SDG, and the mobile industry plays a critical or leading role. There should be strong empirical evidence that demonstrates the impact of mobile on the SDG. In the absence of empirical evidence there should be strong qualitative evidence, demonstrating a clear and significant impact.

- **Medium potential.** The driver can make an important and distinctive contribution to the SDG, and the mobile industry plays a key role. However, it cannot have a significant impact on its own and is reliant on other participants or industries. The impact should be supported by at least some qualitative evidence.

- **Narrow potential.** The driver makes some contribution to the SDG but the impact is narrow in nature (e.g. it only drives impact on a small number of Targets and/or only has the potential for significant impact in a minority of countries). Drivers that are considered important but for which there is no or limited evidence are scored as Narrow.

In the above example for SDG 1, drivers 1.1 and 1.2 are assigned as having high potential because everyone can theoretically access mobile communication or mobile money services, and there is strong evidence demonstrating that the two services drive economic growth and reduce poverty. On the other hand, driver 1.3 is assigned as narrow potential because the mobile ecosystem is not able to employ a substantial proportion of individuals living in poverty. The potential impact of employment in the mobile industry on poverty is therefore much more limited compared to providing communication or financial services via mobile.

Based on the number of drivers for each SDG and their potential impact, we determine whether the industry has the potential to have a high, medium or narrow impact with respect to countries achieving each of the Goals. Our current scoring is as follows:

- **high potential:** SDGs 1, 4, 5, 8, 9, 10, 13, 17

- **medium potential:** SDGs 2, 3, 6, 7, 11, 12, 16

- **narrow potential:** SDGs 14, 15.

Step 4: Metric selection

The next step is to identify appropriate metrics to quantify each driver and measure the industry's contribution, relative to its theoretical maximum contribution. When selecting metrics, the following criteria must be fulfilled:

- Must be an observable measure that represents the driver

- Must be influenced by operators

- Must have a direct link to the driver or be a proxy for driver measurement

- Must be obtainable across relevant geographies (country or region)

- Must be measured on an ongoing basis (to allow for year-on-year comparison)

- Must be available for enough countries so that at least 65% of the global population is covered.

If a driver cannot be measured, for example if there is no or insufficient data, it is not included in the quantification of impact. Metrics are sourced from the following organisations:

- GSMA Intelligence
- GSMA M4D
- World Bank
- UN (including UIS, UN Statistics, UNCTAD and UNDP)
- ITU
- Gallup World Poll
- Ookla
- We Are Social
- Tarifica
- Appfigures
- Wikimedia Foundation
- Euromonitor
- WEF
- ILO
- Strategy Analytics.

Figure A3 illustrates how the metrics work for two of the drivers for SDG 1. To measure the industry's impact in the provision of communication services in poor communities, we use four metrics: network coverage for 2G, 3G and 4G technologies and mobile take-up by the poorest 40% in each country. These indicators are well suited to measuring the impact of the mobile industry on poverty because we know from existing evidence that higher levels of mobile coverage and adoption have reduced poverty across different countries and regions.

Therefore, to maximise its impact on this driver and SDG 1 more generally, it is necessary for the industry to connect everyone to mobile. For the industry to achieve maximum impact for this driver in a given country, it needs to achieve universal coverage for all technologies and provide mobile services to everyone in the two lowest income quintiles.

To measure the impact of the mobile industry in providing access to mobile money, we use three metrics on take-up (the proportion of adults with an active account), the average number of transactions per account and average transaction values.

Figure A3

How the metrics work

Changes compared to 2017 report: The approach to metric selection is the same as used in the 2017 report but we have improved and added certain metrics due to the availability of better data. As discussed in the 2017 report, the lack of consistently measured and disaggregated data across countries constrains our ability to accurately measure the industry's impact across each and every driver for the SDGs. However, for this report, the following metrics have been added:

- value of retail spend via a mobile internet platform (source: Euromonitor)

- number of Wikipedia articles viewed on a mobile phone (source: Wikimedia Foundation)

- indicators that capture the extent to which mobile operators have policies, performance data, targets and compliance frameworks with respect to: child online safety; digital inclusion; privacy and freedom of expression; anti-bribery and corruption; human rights; tax transparency; employee diversity; employee health and safety; conflict minerals; waste and e-waste; climate change adaptation; and climate change mitigation (source: GSMA)

- number of mobile applications developed by country across the largest operating systems

(including iOS, Google Play and Windows) and also split by the category of application, for example health and education (source: Appfigures).

To ensure that impact scores are consistent over time, we have applied these changes to the 2015 and 2016 scores too. As a result, some of the 2015 and 2016 SDG performance scores are different to those presented in the 2017 report.

While these represent significant improvements to the scoring framework, there remain a number of areas where better data is needed. The following in particular still require suitable metrics:

- energy use apportioned to mobile operations and the percentage from renewable sources

- the use of mobile to verify individuals' identity

- the use of mobile internet in schools and public education

- the use of mobile and mobile internet services by businesses (split by size and type).

As part of the GSMA's reporting framework, we will continue to collect better data on these and other areas going forward to provide a robust analysis of the industry's impact on the SDGs.

Step 5: Impact score calculations

The next step is to calculate industry impact scores for each SDG. This is done using a bottom-up approach described below, using all available data for the 193 countries that have adopted the SDGs.

A: Standardisation of metrics

Metrics that have been identified based on the drivers are standardised on a 0-100 scale to ensure comparability. This is based on a theoretical maximum and minimum value, where 100 represents the best performance. In some cases, metric values are bounded (e.g. between 0 and 100% for mobile penetration) in which case there is an obvious maximum and minimum to use. Where this does not apply, we use the actual maximum and minimum values.[2] For example in the case of download speeds, if the highest speed was 40 Mbps and the lowest was 10 Mbps, the country with the highest speed would receive a score of 100 (effectively representing the benchmark against which other countries are compared) and the country with the lowest speed would receive a score of 0. Other countries would be scored based on where they lie within the 10-40 range (e.g. a country with download speeds of 25 Mbps would receive a score of 50). The formulae used to standardise the indicators are as follows, depending on whether increases in the unstandardised Indicator are positive.

Where the industry's impact increases as the value of the metric increases:

$$Metric\_Norm_i = \frac{Metric_{i,\,Dimensioned} - Metric_{Theoretical\,Min}}{Metric_{Theoretical\,Max} - Metric_{Theoretical\,Min}}$$

Where the industry's impact decreases as the value of the metric/sub-metric decreases:

$$Metric\_Norm_i = \frac{Metric_{Theoretical\,Max} - Metric_{i,\,Dimensioned}}{Metric_{Theoretical\,Max} - Metric_{Theoretical\,Min}}$$

- $Metric\_Norm_i$ represents the normalised (0 – 100) value of a metric / sub-metric in country i

- $Metric_{i,Dimensioned}$ represents the dimensioned (i.e., original) value of a metric / sub-metric in country i

- $Metric_{Theoretical\,Max}$ represents the theoretical maximum value of metric / sub-metric; this does not vary by country

- $Metric_{Theoretical\,Min}$ represents the theoretical minimum value of metric / sub-metric; this does not vary by country

B: Derivation of SDG impact score

The SDG impact score is obtained by averaging the underlying metric scores. This reflects the current performance of the mobile industry with respect to its theoretical maximum.
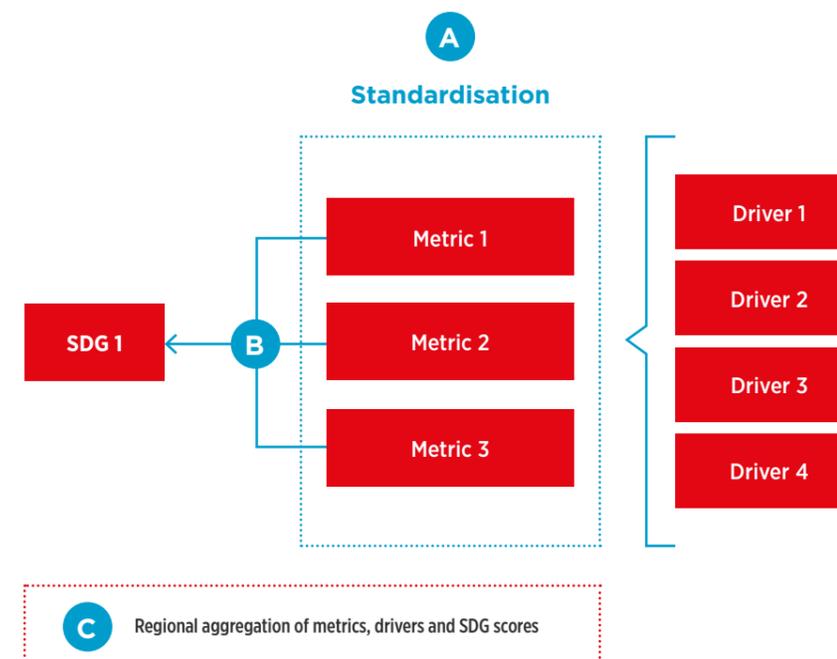
C: Regional aggregation

Regional scores for metrics and SDGs are calculated as a population weighted average of the country level scores, accounting for missing countries through geo-income based clusters.[3]

High-level overview of calculation framework

Changes compared to 2017 report: There are two significant differences in this step compared to the 2017 report. Previously, certain metrics may have been used to measure more than one driver for an SDG (for example, mobile adoption and mobile internet penetration) and because scores were calculated at the driver level before being aggregated to the SDG level, some metrics that cut across multiple drivers would be given more weight when calculating an impact score. For this report, we aggregate directly from the metric level to the SDG level such that metrics are not used multiple times to measure the mobile industry's impact on an SDG. This change has been made primarily to simplify the methodology and make it easier to identify how the industry is driving impact on the SDGs and where the main bottlenecks are.

The second difference is that we no longer apply population adjustments to the impact scores. In previous reports, we did not consider some drivers to be relevant to certain countries. For example, in the case of SDG 1, drivers that were focused on reducing poverty were assumed to be not applicable to most developed countries where the incidence of extreme poverty (based on the international poverty line of less than $1.90 a day) was very low or had been eliminated. However, poverty is a relative concept, and many countries have the objective of reducing or eliminating poverty based on national definitions (this is captured by SDG Target 1.2[4]). We therefore employ a broader approach to the SDGs by taking into consideration the underlying concepts of sustainable development, with each one applicable to all countries. As with the changes to metrics, to ensure a consistent approach over time, we have applied these changes to the 2015 and 2016 scores as well as the 2017 results.

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2. Where we have forecasts, we use maximum/minimum value in future years in order to allow all countries to improve their scores over time.
3. This essentially means that if we are missing data for a country, we impute it by taking the average of countries in the same region and income group. For example, a low income country in Asia-Pacific with no data would be assumed to have the same value as the average of other low income countries in Asia-Pacific for which there is data.

4. By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

SDG impact scores

The SDG impact score is a synthetic indicator that represents the contribution of the industry relative to its theoretical maximum. It is calculated by taking the average of the underlying metric scores. A score of 100 means that the mobile industry has achieved everything possible to contribute to that Goal.

Metric and SDG scores are aggregated globally and by region and development status.[5] These are calculated by weighting the country scores by population in each region and development group, using World Bank income classification clusters to account for countries with missing data.

APPENDIX B

SDG impact scores and drivers

This appendix presents the updated impact scores for each region and development group for the 17 SDGs. For each Goal, it also lists each driver and some of the key indicators used to measure the mobile industry's impact.

1 NO POVERTY

No Poverty

End poverty in all its forms everywhere

Drivers

- Generate employment opportunities across the value chain for people living in extreme poverty (<$1.25 per day)

- Provide a platform for people in poverty to find employment

- Provide communications services to stimulate local business (and economy) growth in poor communities

- Use mobile to address asymmetry of information for people living in poor and remote communities

- Enable social enterprise in small and remote communities by providing the ability to sell in non-local markets via mobile services

- Support access to financial services

- Support low-cost, accessible remittance services in developing areas

- Provide affordable mobile services to poor communities to enable access to basic communication

- Facilitate access to utility services for all, using channels such as mobile money and/or IoT

- Provide access for the poor to basic services through mobile-enabled service platforms such as health and mobile money

- Increase competitiveness of local businesses by improving their productivity through access to mobile services

- Provide digital identity services to enable the delivery of social services and safety nets, improve access to financial services, improve the protection of legal rights (including access to ownership of land) and protection against exploitation

- Increase exposure and support adoption of appropriate new technology through access to the internet

- Provide mobile services to support emergency calls for help

- Develop resilient infrastructure to support emergency broadcast systems

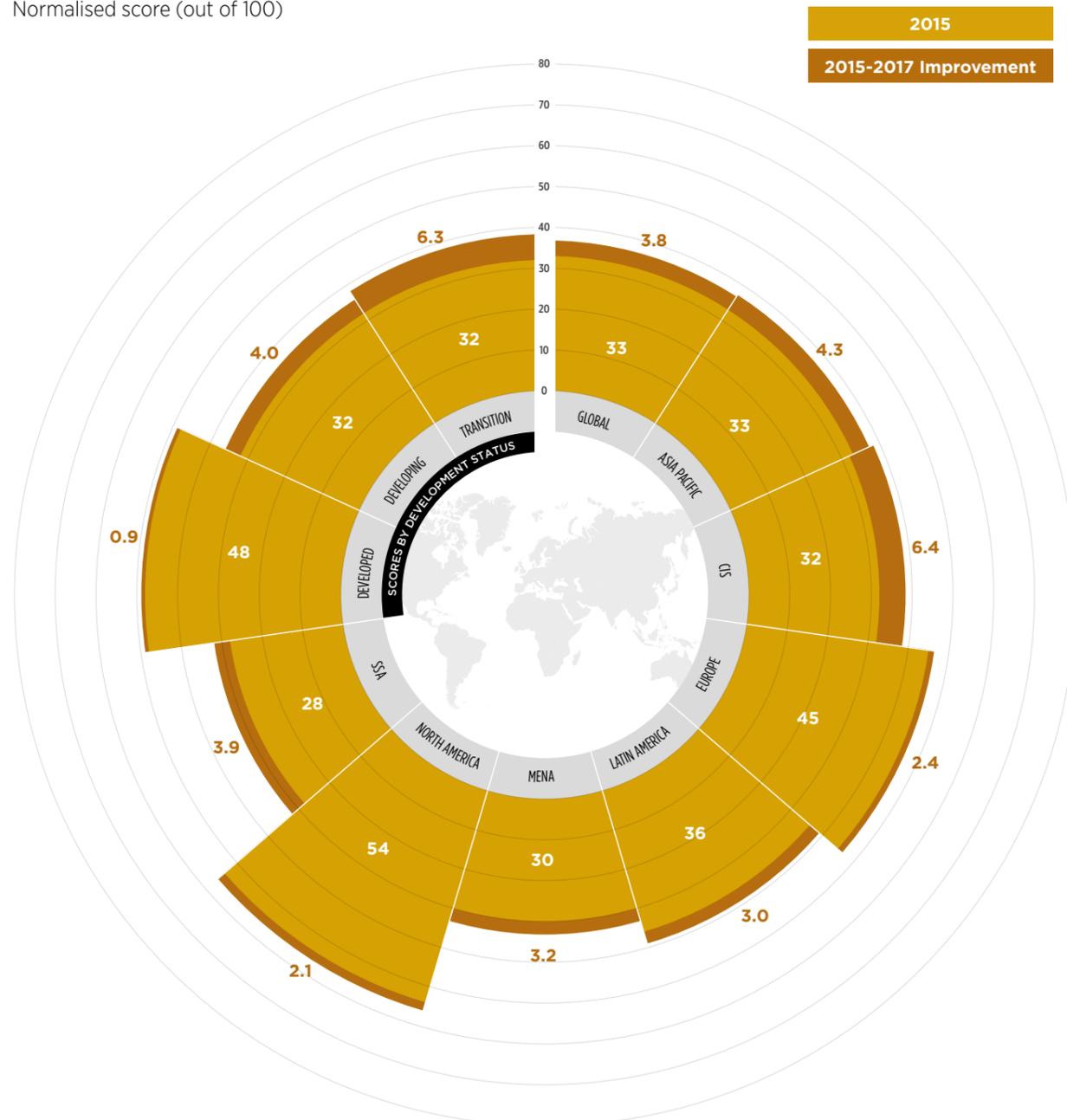- Provide location data to support disaster relief co-ordination

Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

SCORES BY DEVELOPMENT STATUS

TRANSITION	36	6.3
DEVELOPING	35	4.2
DEVELOPED	55	0.7
SSA	31	3.8
NORTH AMERICA	64	1.8
MENA	35	3.1
LATIN AMERICA	39	4.2
EUROPE	51	2.2
CIS	36	6.6
ASIA PACIFIC	36	4.3
GLOBAL	38	3.8

2 ZERO HUNGER

SDG 2

Zero Hunger

End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

Scores by region and development status

Normalised score (out of 100)

| 2015 |
| 2015-2017 Improvement |

Drivers

- Increase productivity of agribusinesses through access to mobile-enabled service platforms (e.g. mobile money) and facilitate access to financial services for smallholder farmers

- Provide digital identity services to enable access to affordable internet, health services, energy, food and clean water and to enable the protection of legal rights (including access to ownership of land) and protection against exploitation

- Enable access to nutritional information and monitoring through m-health programmes and applications

- Connect communities to agri-education through mobile to communicate effective agricultural practices

- Provide access to micro-finance to encourage more productive use of land and agricultural resources

- Connect remote communities to digital agricultural marketplaces to increase price transparency, reduce price volatility of food commodity markets, improve price outcomes and increase the income of farmers

- Provide emergency broadcast systems to enable effective risk mitigation of environmental threats to agriculture

- Establish the technical architecture where data acquired by crop and weather sensors is shared in a harmonised way with applications that can increase harvest productivity and adapt to climate change

- Develop IoT (LPWA) infrastructure to enable crop and weather condition sensor monitoring that increases harvest productivity and adaptation to climate change
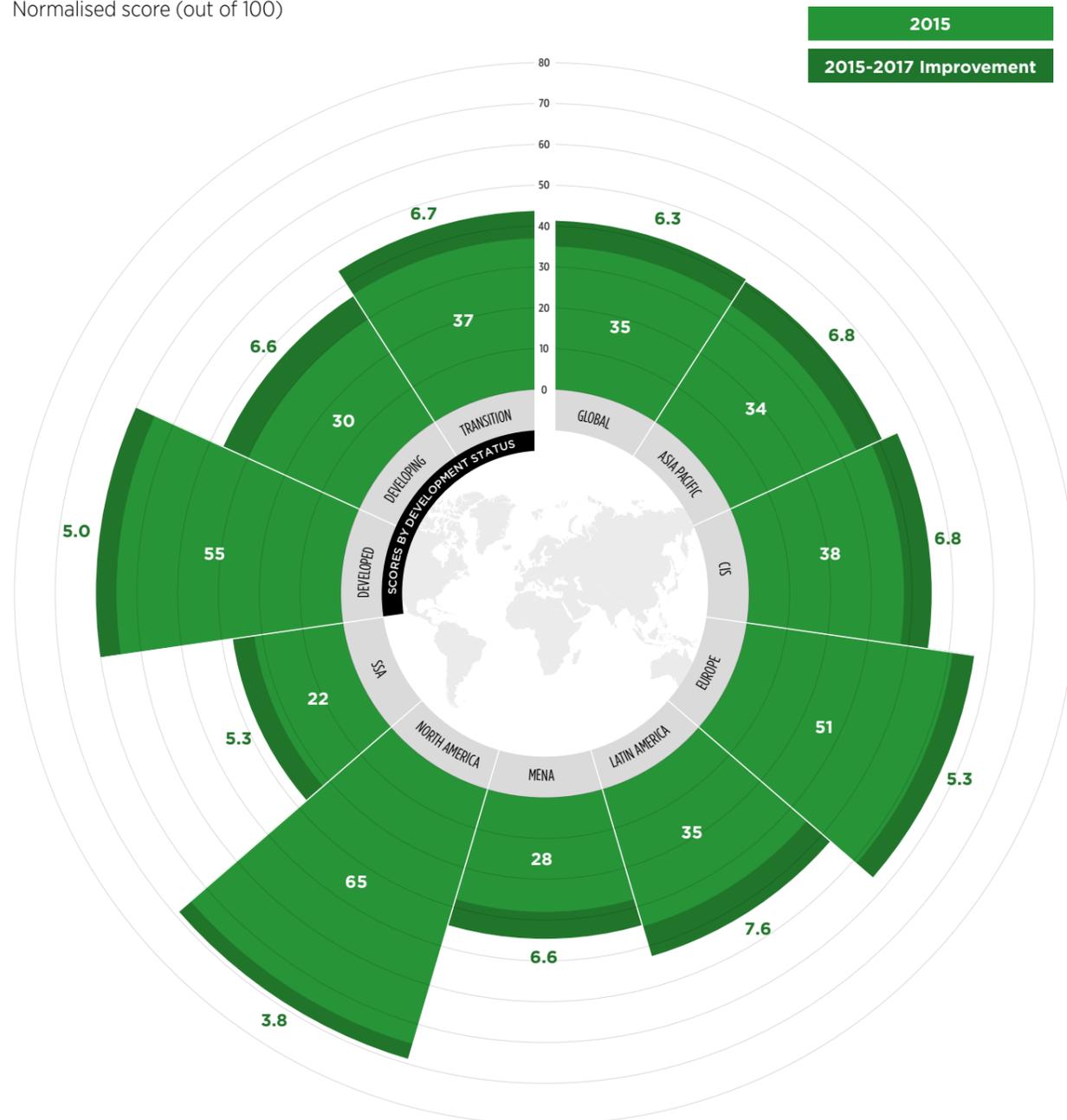
SDG 3

Good Health and Well-being
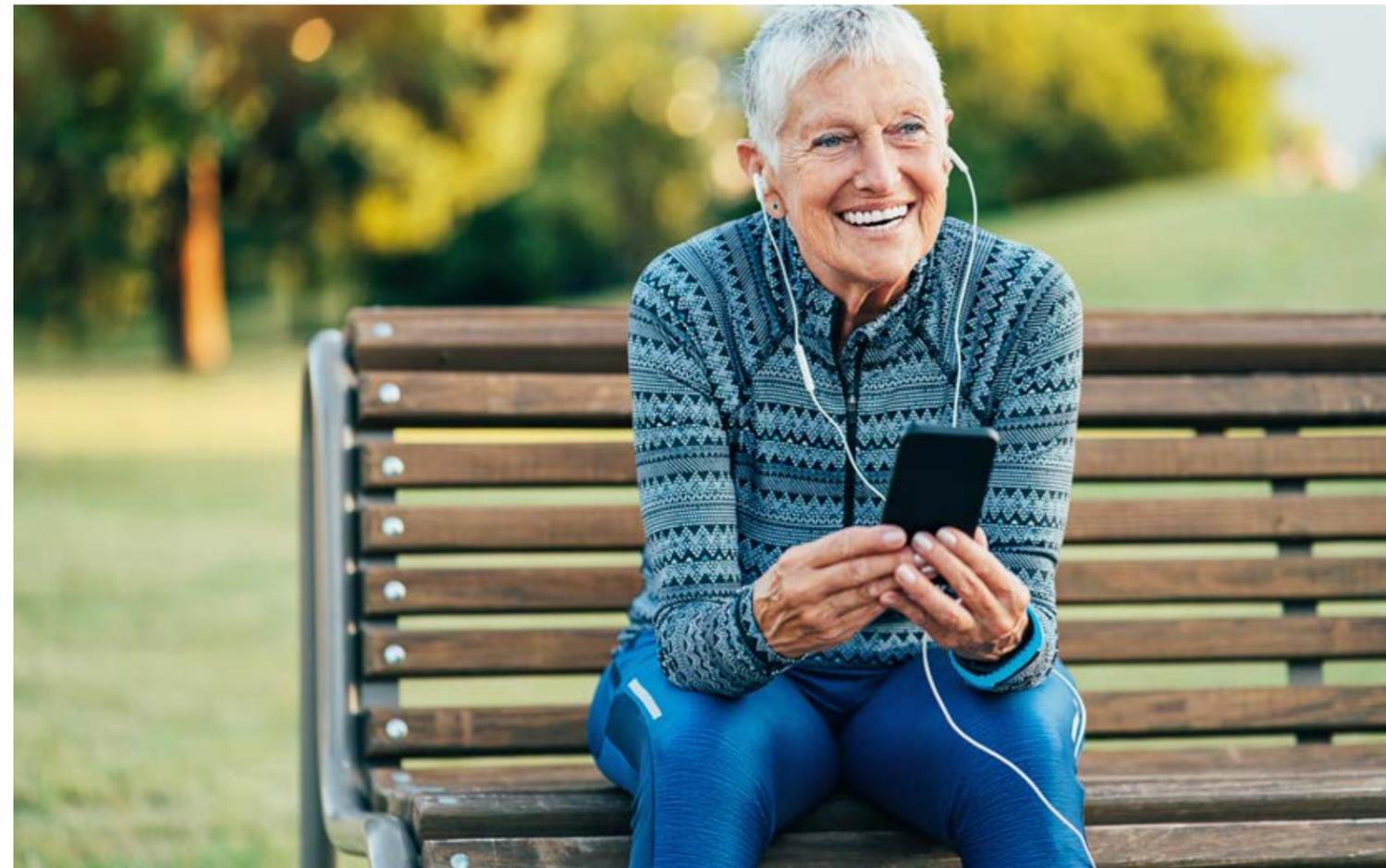
Ensure healthy lives and promote well-being for all

3 GOOD HEALTH AND WELL-BEING

Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

Drivers

- Enable communication with qualified medical practitioners through voice/SMS services

- Provide access to health programmes through mobile to monitor well-being

- Provide access to health programmes through mobile to educate local communities

- Provide access to mobile money services to reduce the cost barrier to receiving care

- Provide digital identity services to enable access to affordable internet, health services, energy, food and clean water

- Establish the technical architecture where data acquired by smart vehicles and related IoT traffic sensors is shared in a harmonised way with applications that can improve road safety

- Support the development of M2M technology to enable 'smart' vehicles

- Provide a channel through which organisations can educate local communities on sexual and reproductive health related issues

- Provide emergency broadcast systems to enable effective management of contamination incidents and health epidemics

- Use IoT technology to improve water quality, monitoring of toilets and analysis of faecal matter

- Big data for epidemics

- Apply best-practice risk management of hazardous chemicals in company operations and supply chain
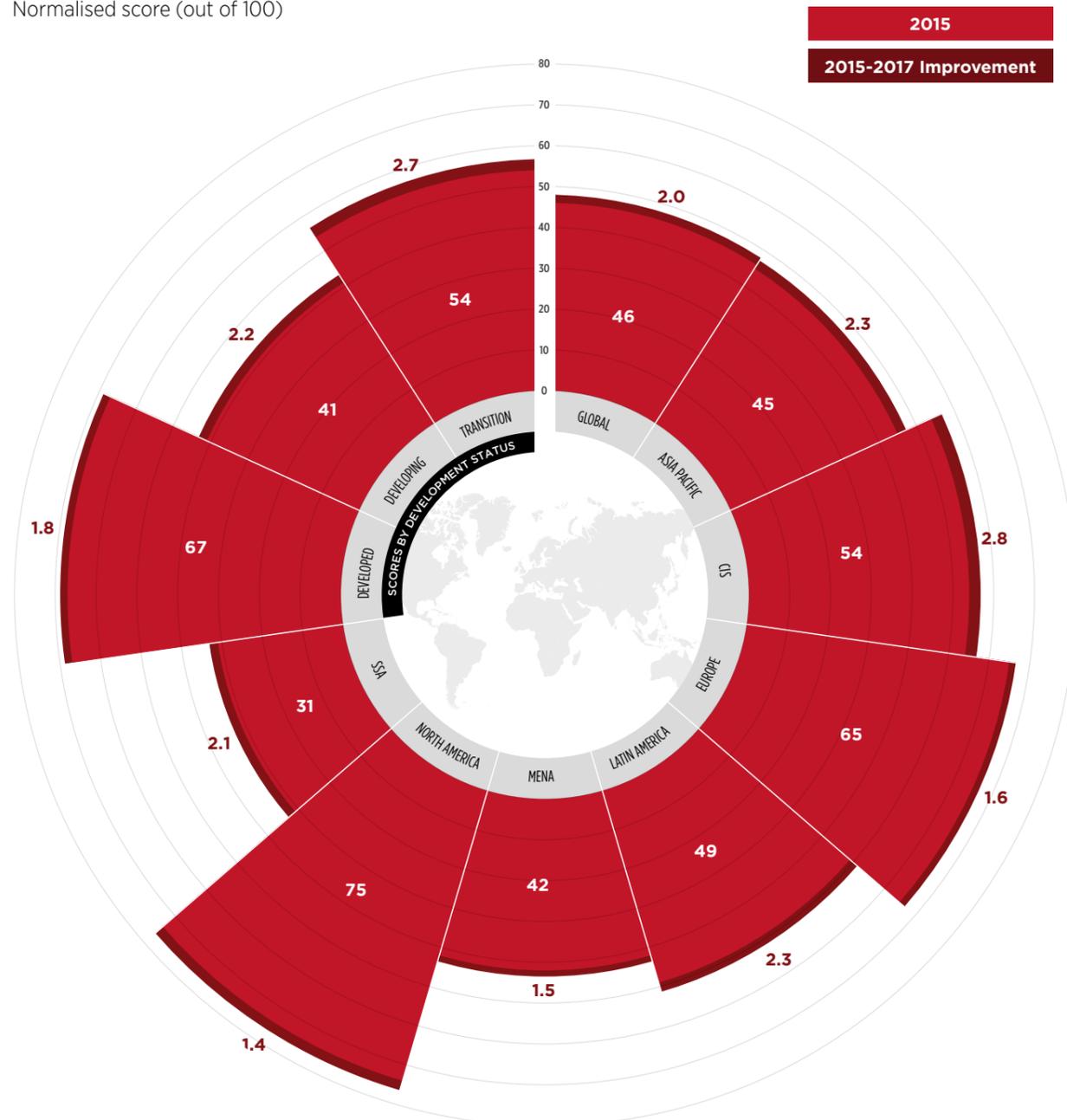
4 QUALITY EDUCATION

SDG 4

Quality Education

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Drivers

- Provide affordable access to basic voice/data services to enable access to primary and secondary e-learning and to facilitate equitable online learning opportunities (e.g. massive open online courses) for men and women

- Contribute digital literacy content to primary and secondary education providers to improve relevance of traditional primary and secondary education

- Enable access to online teaching networks via mobile internet allowing teachers to exchange information and access professional support to improve teaching outcomes

- Provide digital identity services to enable access to inclusive and equitable education and decent livelihoods

- Facilitate school fees payments through mobile money

- Provide a channel through which organisations can educate local communities on sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

- Establish vocational ICT training placements and fund scholarships for higher education/vocational training programmes in ICT for least developed countries to increase capacity building and quality education opportunities in developing countries
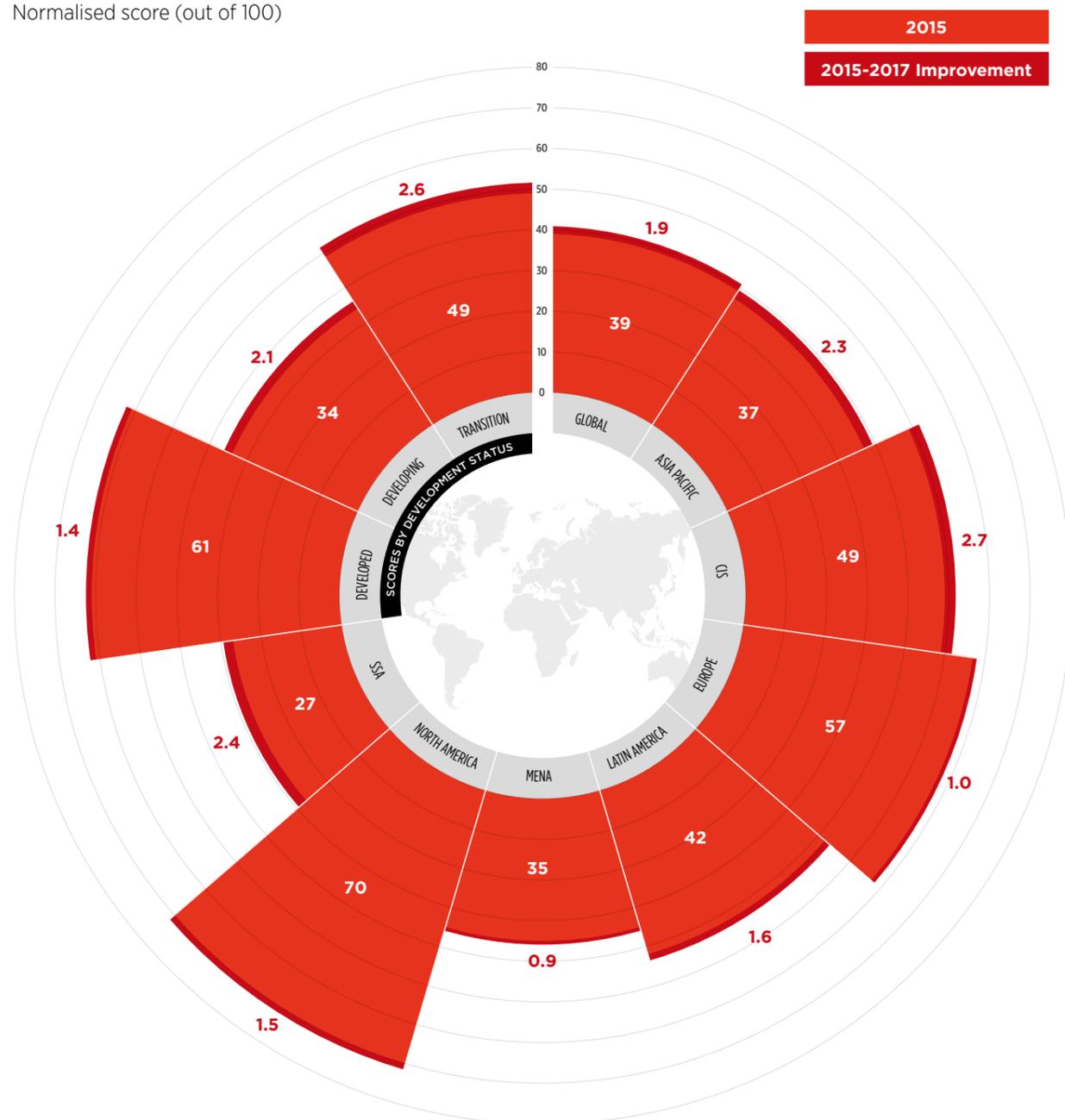
Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

GLOBAL 46 — 2.0
ASIA PACIFIC 45 — 2.3
CIS 54 — 2.8
EUROPE 65 — 1.6
LATIN AMERICA 49 — 2.3
MENA 42 — 1.5
NORTH AMERICA 75 — 1.4
SSA 31 — 2.1

SCORES BY DEVELOPMENT STATUS
DEVELOPED 67 — 1.8
DEVELOPING 41 — 2.2
TRANSITION 54 — 2.7

5 GENDER EQUALITY

SDG 5

Gender Equality

Achieve gender equality and empower all women and girls

Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

Drivers

- Connect women to sharing economy infrastructure through mobile internet, enabling trading or monetisation of traditionally unpaid care and domestic work

- Implement leadership equality programmes to increase the number of female CEOs and senior managers, and promote equal leadership opportunity throughout the supply chain and across other industries

- Enable access to female-specific e-health services to support access to sexual and reproductive health services for women

- Provide an affordable mobile service entry point to women in all areas

- Implement mobile awareness/digital literacy programmes for women through low- and middle-income targeted initiatives

- Enable access to mobile financial services to promote financial inclusion

- Provide digital identity services to enable gender equality

- Increase the likelihood of female mobile take-up by creating offerings that are more accessible to women, given literacy rates are often lower and digital literacy/confidence is lower
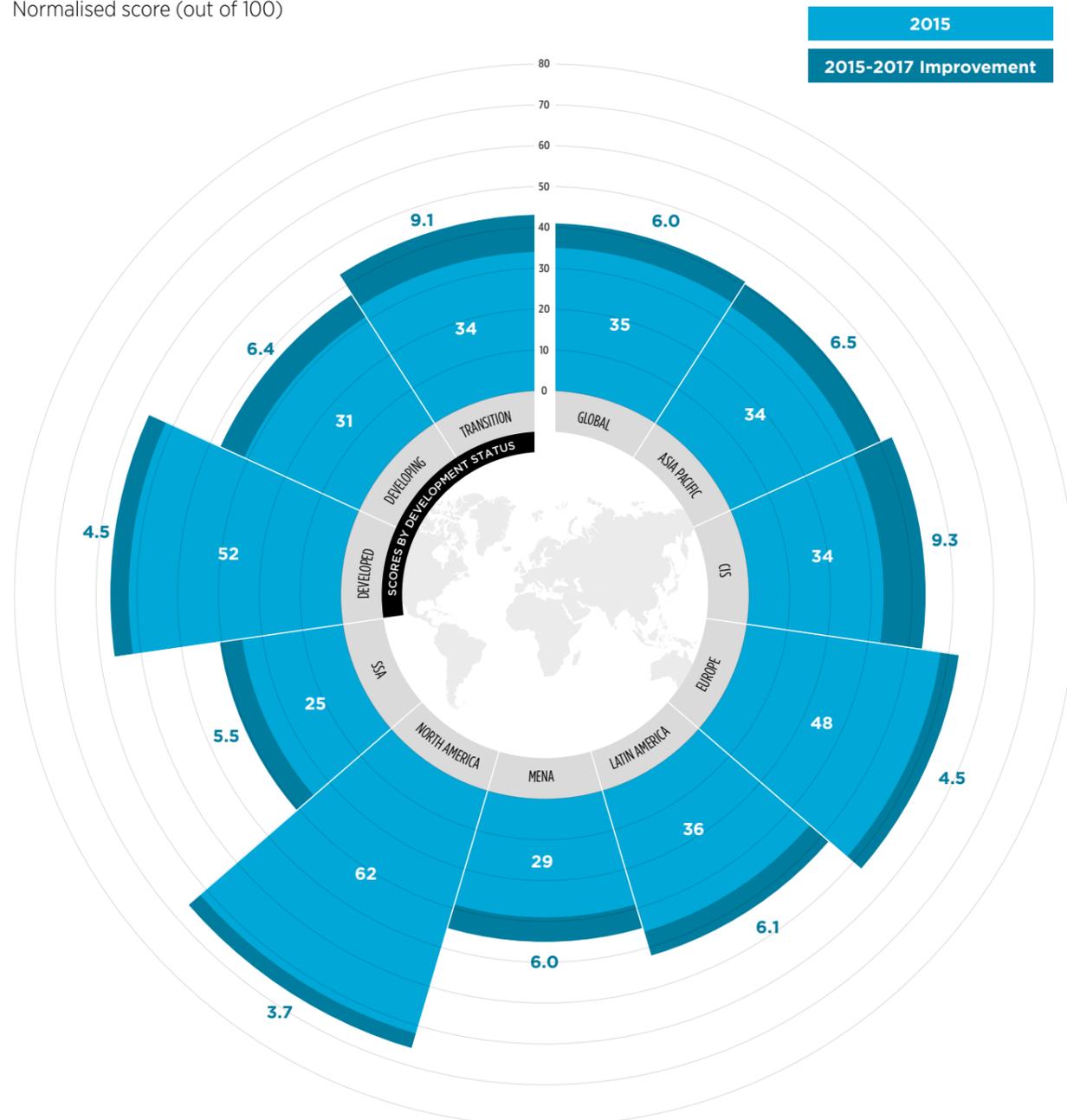
6 CLEAN WATER AND SANITATION

SDG 6

Clean Water and Sanitation

Ensure access to water and sanitation for all

Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

Drivers

- Enable the development of new water models relying on mobile technologies for payment collection, remote monitoring, improved planning and customer relationships

- Enable the development of new sanitation models relying on mobile technologies for payment collection, remote monitoring, improved planning and customer relationships

- Provide digital identity services to enable access to affordable internet, health services, energy, food and clean water

- Facilitate access to water and sanitation through mobile money (e.g. pay-as-you-go)

- Apply best-practice environmental impact management in company operations and supply chain

- Improve water quality through IoT technology

- Increase water efficiency by reducing water leakage

- Develop IoT infrastructure for water efficiency monitoring to increase water use efficiency across all sectors and improve consumption behaviours

- Develop IoT infrastructure for sanitation solutions

- Establish the technical architecture where data acquired by volumetric and water quality sensors is shared in a harmonised way with applications that can improve efficiency

- Enable access to water, sanitation and management programmes to educate local communities

- Enable communities to report back on water quality and sanitation issues through voice and SMS to identify and rectify issues effectively
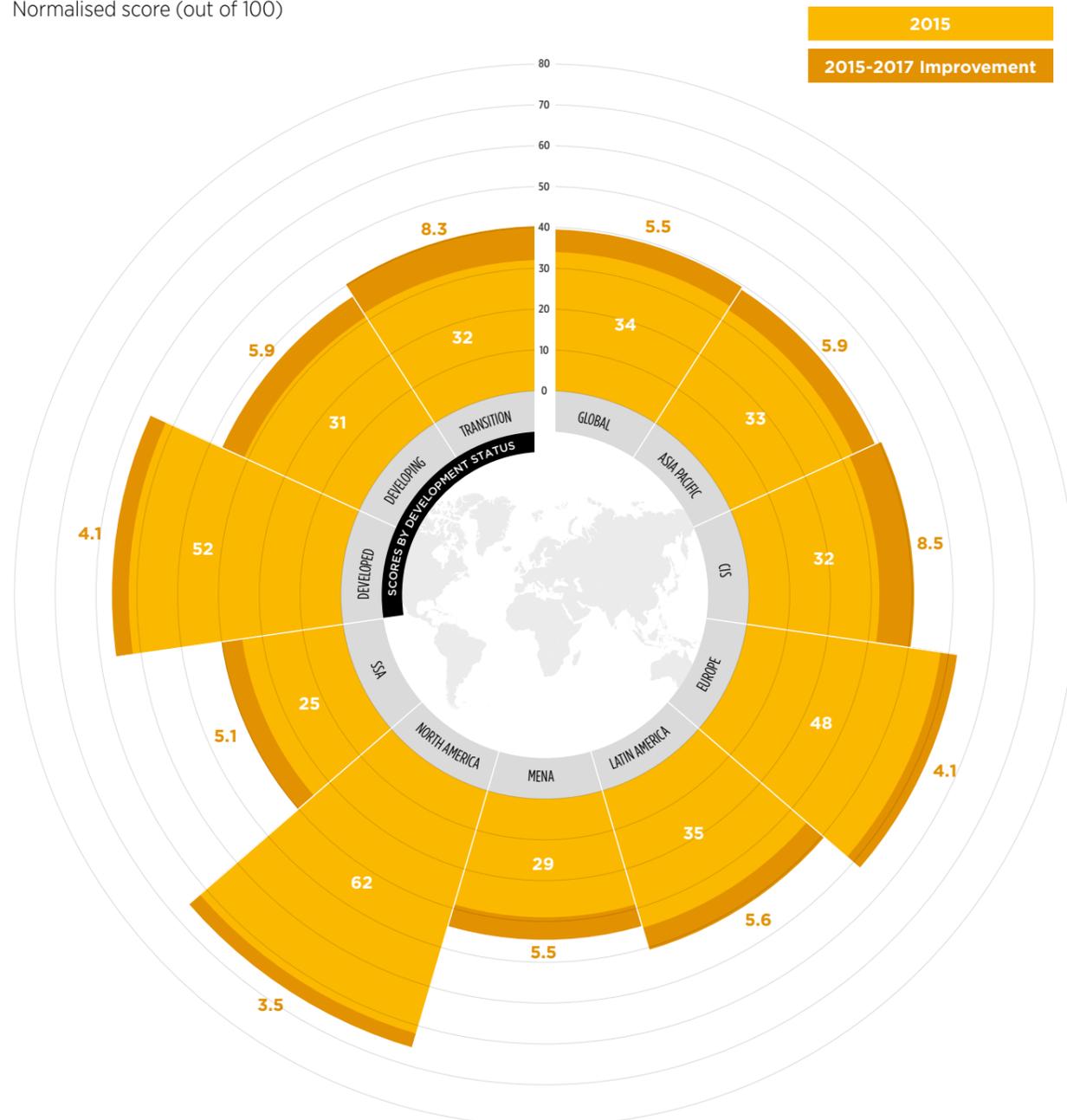
7 AFFORDABLE AND CLEAN ENERGY

SDG 7

Affordable and Clean Energy

Ensure access to affordable, reliable, sustainable and modern energy for all

Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

Drivers

- Enable access to clean energy solutions through mobile-enabled energy models using mobile payments and IoT

- Provide digital identity services to enable access to affordable internet, health services, energy, food and clean water

- Facilitate access to affordable and clean energy through mobile money (e.g. pay-as-you-go)

- Increase the proportion of renewable energy used to operate infrastructure such as base stations and data centres

- Develop IoT infrastructure for energy efficiency to enable energy monitoring and improve energy consumption behaviour

- Increase energy efficiency of operating infrastructure such as base stations and data centres

- Attract more investments to the clean energy sector based on the use of mobile channels and enabling donors/investors to assess their impact through data collection

- Establish the technical architecture where data acquired by energy management sensors is shared in a harmonised way with applications that can increase energy sustainability
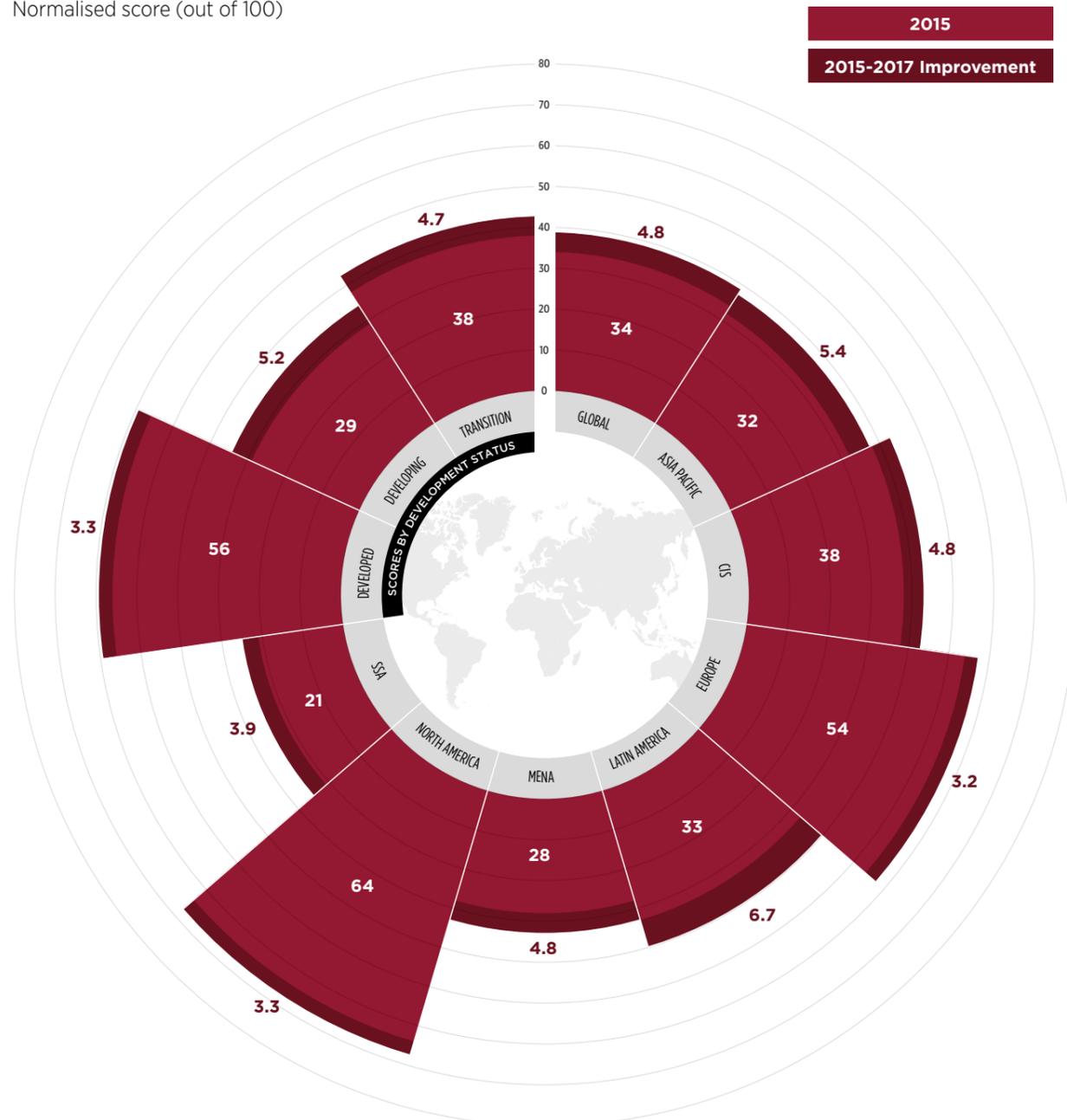
8 DECENT WORK AND ECONOMIC GROWTH

SDG 8

Decent Work and Economic Growth

Promote inclusive and sustainable economic growth, employment and decent work for all

Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

Drivers

- Provide consumer connectivity to increase the size of the addressable market in each country through online channels

- Provide business communications infrastructure to stimulate and support local economy growth

- Support the development of infrastructure for IoT solutions to increase the productivity of businesses

- Increase productivity of businesses through access to mobile services and mobile-enabled service platforms (e.g. mobile money)

- Increase productivity of agribusinesses through access to mobile-enabled service platforms (e.g. mobile money) and facilitate access to financial services for smallholder farmers

- Support access to mobile financial services to enable formalisation of micro, small and medium-sized enterprises

- Support the development of infrastructure for IoT solutions to improve consumption

- Provide digital identity services to enable financial inclusion and economic empowerment, inclusive and equitable education, decent livelihoods, the protection of legal rights (including access to ownership of land) and protection against exploitation

- Enforce strict labour policies across supply and distribution chain to prevent use of forced labour or child labour

- Provide access to mobile money, micro-finance and financial services products through mobile

- Create new job opportunities in the ecosystem (e.g. mobile money agents)

- Create mobile solutions for identity management (e.g. to simplify government targeting of specific population segments)
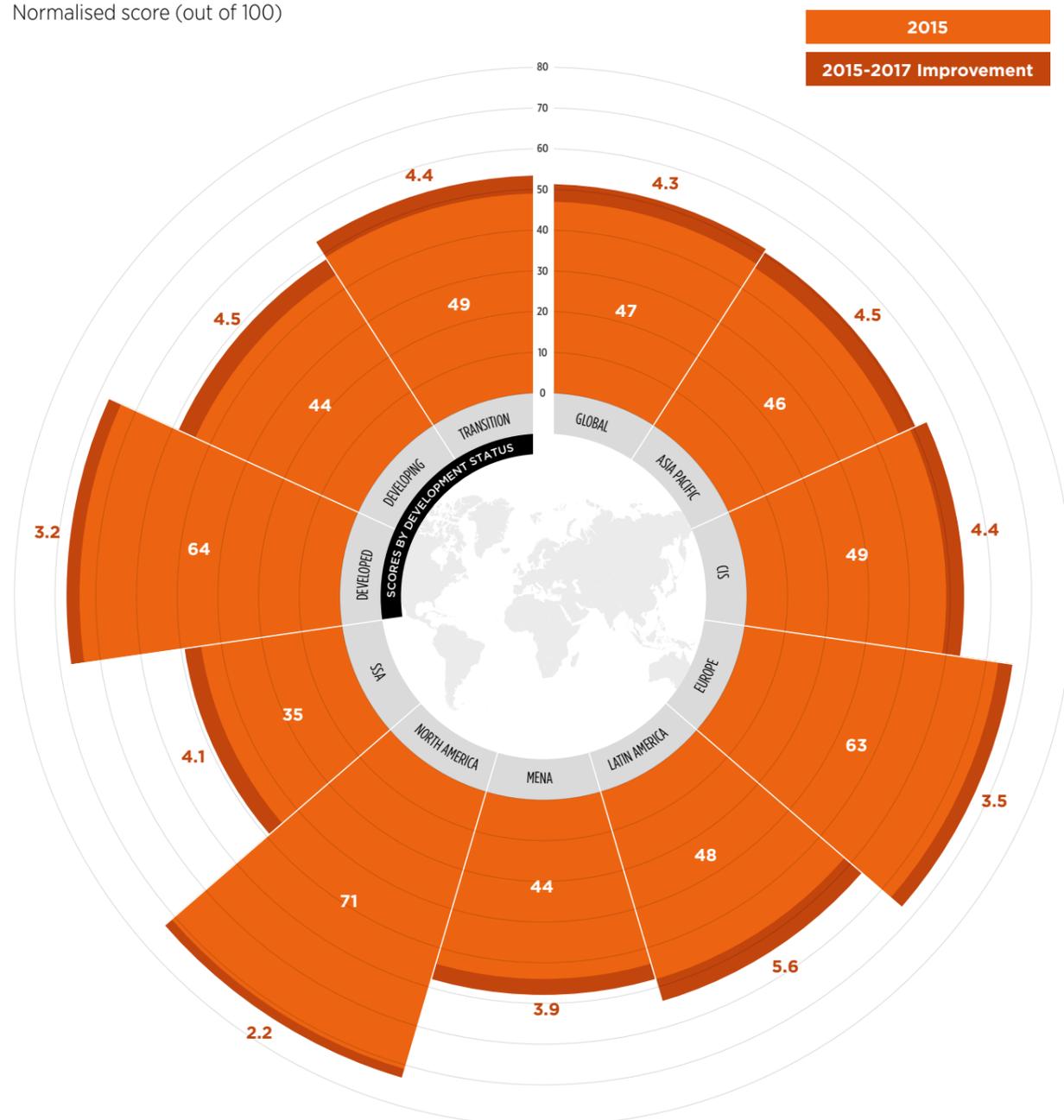
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SDG 9

Industry, Innovation and Infrastructure

Build resilient infrastructure, promote sustainable industrialisation and foster innovation

Scores by region and development status

Normalised score (out of 100)

2015
2015-2017 Improvement

GLOBAL 47, 4.3
ASIA PACIFIC 46, 4.5
CIS 49, 4.4
EUROPE 63, 3.5
LATIN AMERICA 48, 5.6
MENA 44, 3.9
NORTH AMERICA 71, 2.2
SSA 35, 4.1

SCORES BY DEVELOPMENT STATUS
DEVELOPED 64, 3.2
DEVELOPING 44, 4.5
TRANSITION 49, 4.4

Drivers

- Develop reliable mobile communications infrastructure to provide affordable access to voice services and basic data services

- Support the development of infrastructure supporting IoT solutions to drive sustainability of manufacturing and industrial processes

- Increase inclusiveness of industrialisation by connecting rural/remote communities to employment opportunities

- Support the emergence of new industries (e.g. pay as you go solar)

- Build agent networks as financial touch points for customers

- Enable access to mobile money (micro-finance/insurance) for small-scale industrial enterprises

- Upgrade mobile infrastructure to improve sustainability and energy efficiency, maximising use of clean energy

- Enable the deployment of new mobile towers, based on the community power concept, where mini grid providers generate electricity for towers and the community

- Provide digital identity services to enable access to affordable internet, health services, energy, food and clean water

- Support the development of infrastructure for IoT solutions to drive technological upgrade across sectors

- Build and upgrade infrastructure in developing countries, especially network infrastructure to provide enhanced communication and bandwidth

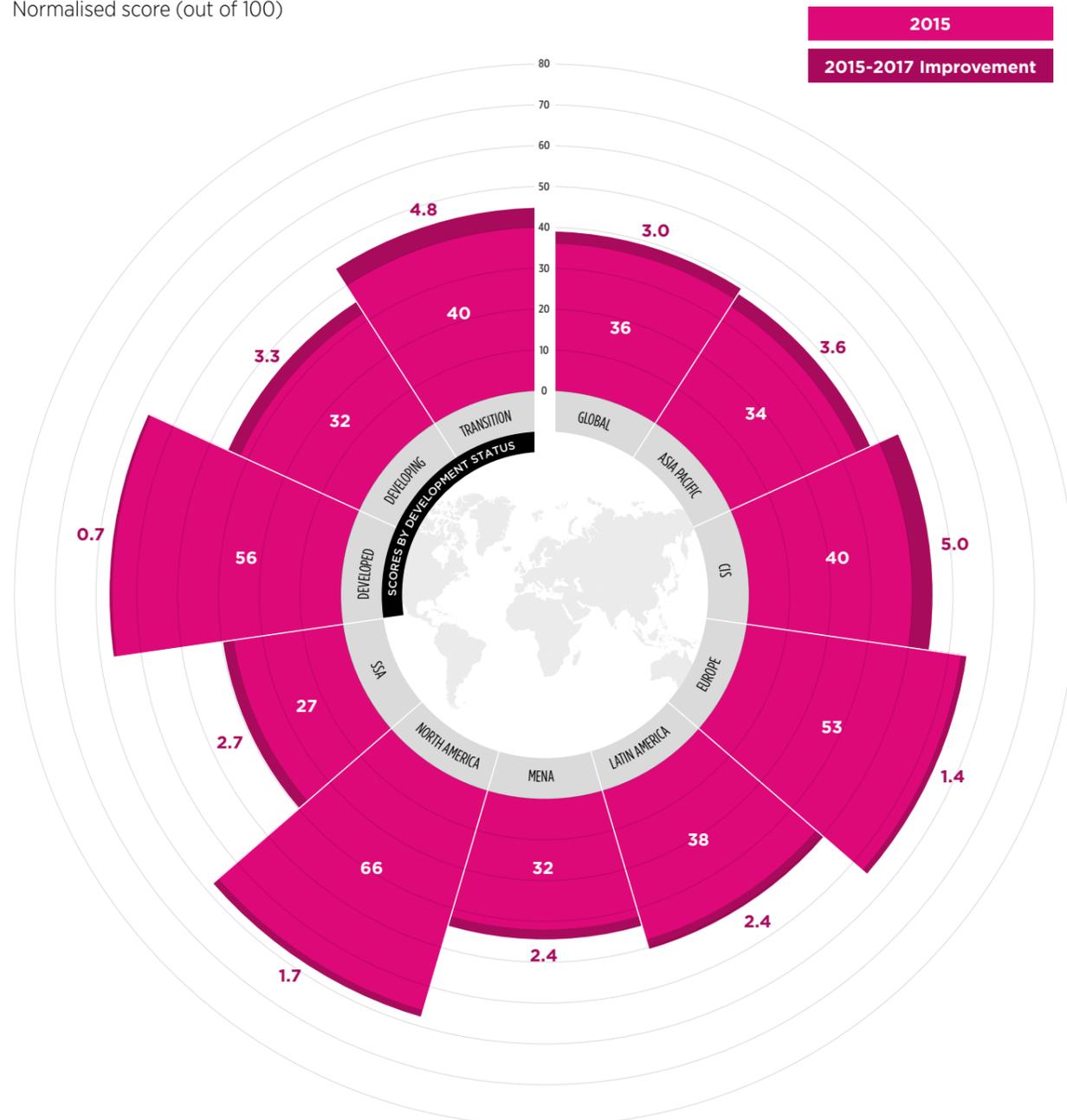- Provide affordable access to mobile voice services in least developed countries

10 REDUCED INEQUALITIES

SDG 10
Reduced Inequalities

Reduce inequality within and among countries

Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

Drivers

- Enable access to information/social networks through mobile to promote social and political inclusion

- Enable access to marketplaces through mobile to increase economic inclusion irrespective of discriminatory factors

- Provide affordable access to basic data services in least developed countries to remove financial barriers to online content and hence reduce barriers to social, economic and political inclusion

- Enable access for all to mobile money/micro-finance/insurance to promote economic inclusion

- Enable access to connectivity and mobile money services for refugees and migrants

- Provide digital identity services to enable financial inclusion and economic empowerment, and to enable good governance and political inclusion

- Enable access to financial services

- Introduce or expand remittance services through mobile money to increase ease of remittances and reduce cost
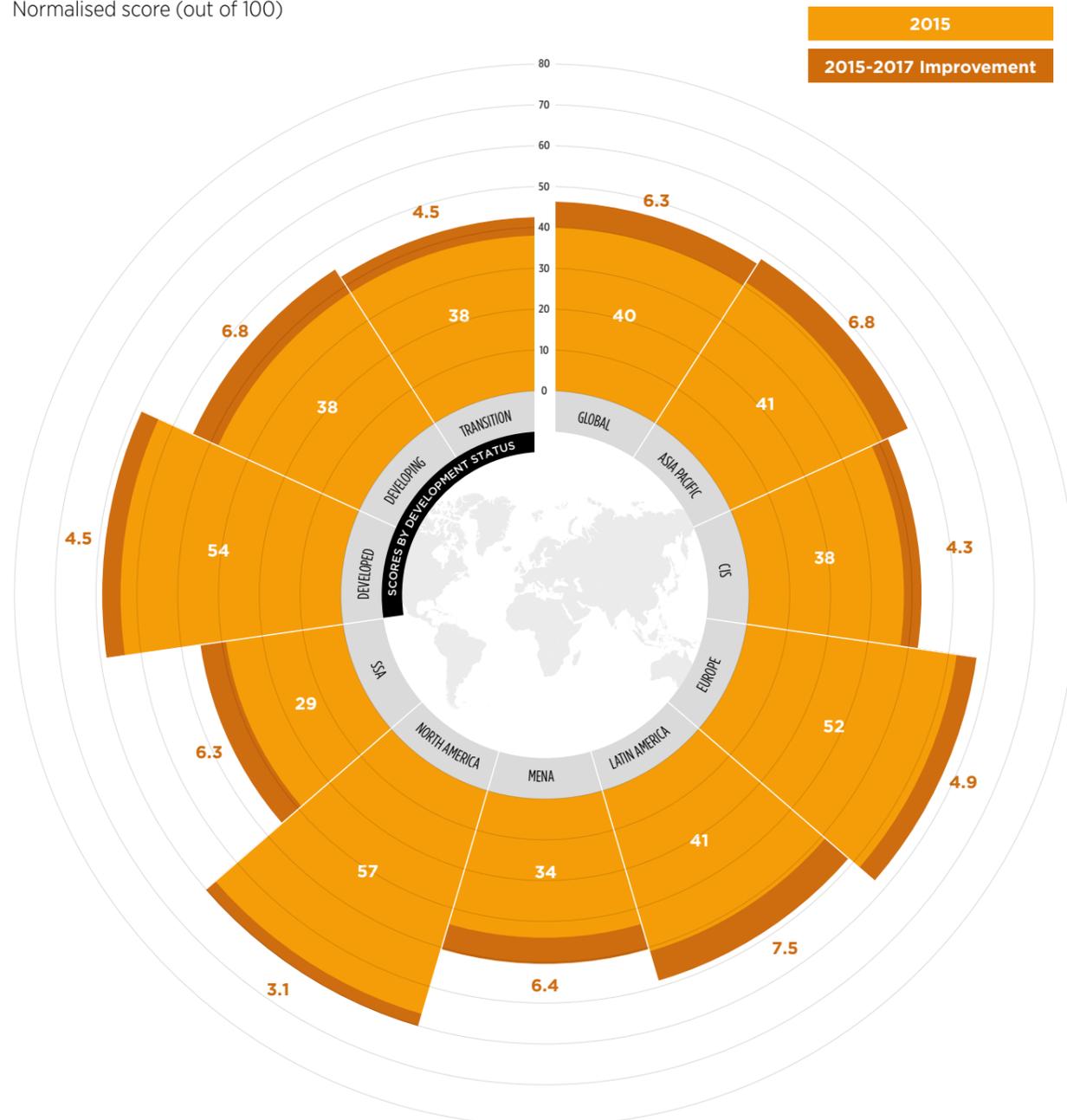
11 SUSTAINABLE CITIES AND COMMUNITIES

SDG 11

Sustainable Cities and Communities

Make cities and human settlements inclusive, safe, resilient and sustainable

Drivers

- Provide digital identity services to enable the protection of legal rights (including access to ownership of land) and protection against exploitation

- Improve monitoring of air quality and waste using IoT solutions, particularly in densely populated cities

- Provide IoT technology to produce data that can be used to inform planning decisions on municipal and waste management

- Establish the technical architecture where data acquired by air quality/waste management sensors is shared in a harmonised way with applications that can improve the environment for citizens

- Provide emergency broadcast systems in partnership with government agencies to enable effective disaster warning

- Enable emergency calling during disaster periods to reduce potential deaths and enable citizens to be located, marked as safe or sent relief as required

- Improving efficiency of transportation through IoT technology – strengthen building standards for infrastructure to increase network resilience
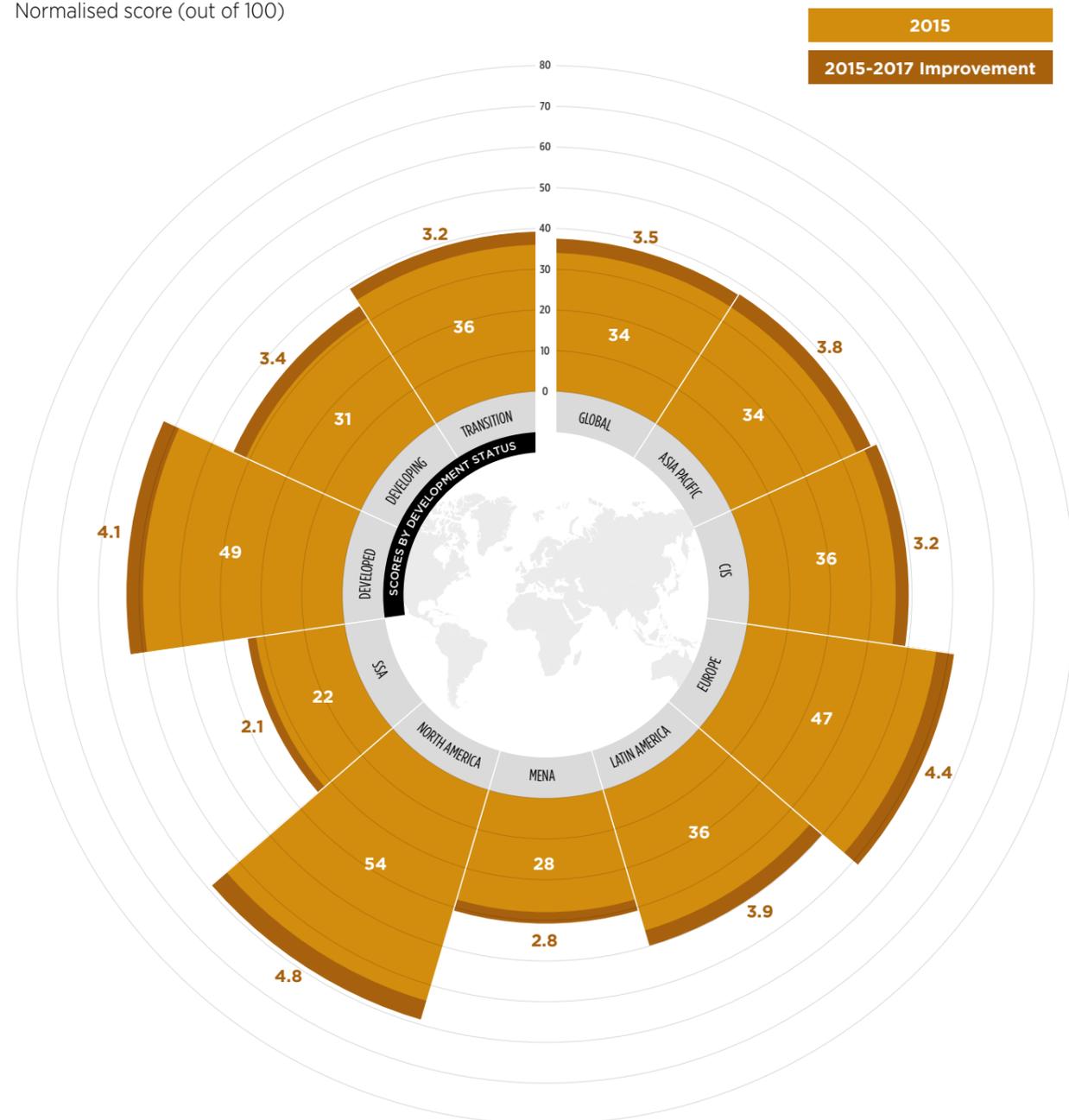
Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

GLOBAL	40, 6.3
ASIA PACIFIC	41, 6.8
CIS	38, 4.3
EUROPE	52, 4.9
LATIN AMERICA	41, 7.5
MENA	34, 6.4
NORTH AMERICA	57, 3.1
SSA	29, 6.3
DEVELOPED	54, 4.5
DEVELOPING	38, 6.8
TRANSITION	38, 4.5

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

SDG 12

Responsible Production and Consumption

Ensure sustainable production and consumption patterns

Drivers

- Increase energy efficiency of operating infrastructure to reduce energy usage
- Increase the proportion of clean energy used in the value chain
- Implement best-practice waste management to reduce waste generated
- Integrate sustainability information into core reporting

- Provide access to information to communities through mobile to improve their awareness of sustainable development practices
- Support the development of the infrastructure supporting IoT solutions to increase the ability to monitor energy consumption/production, therefore improving sustainable behaviours (business and individual)
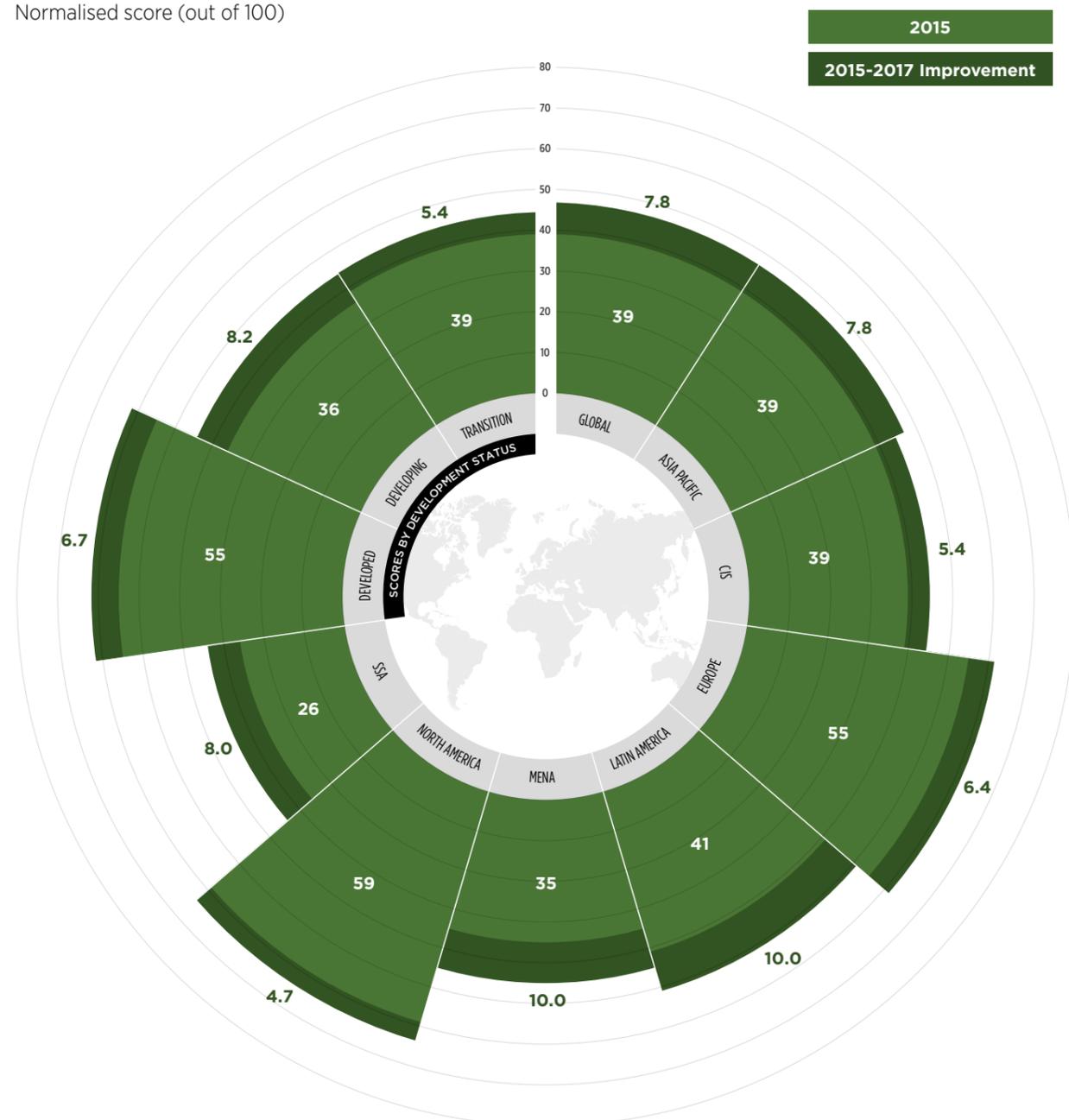
Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

GLOBAL 34 — 3.5
ASIA PACIFIC 34 — 3.8
CIS 36 — 3.2
EUROPE 47 — 4.4
LATIN AMERICA 36 — 3.9
MENA 28 — 2.8
NORTH AMERICA 54 — 4.8
SSA 22 — 2.1
DEVELOPED 49 — 4.1
DEVELOPING 31 — 3.4
TRANSITION 36 — 3.2

SCORES BY DEVELOPMENT STATUS

13 CLIMATE ACTION

SDG 13
Climate Action

Take urgent action to combat climate change and its impacts

Drivers

- Provide emergency broadcast systems in partnership with government agencies to enable effective disaster warning

- Establish resilient network infrastructure to ensure network functionality during and after disaster events

- Provide information to enable effective risk mitigation of environmental threats to agriculture

- Establish the technical architecture where data acquired for climate change monitoring sensors is shared in a harmonised way with applications that can improve awareness of climate change and a change in the behaviours of businesses and individuals

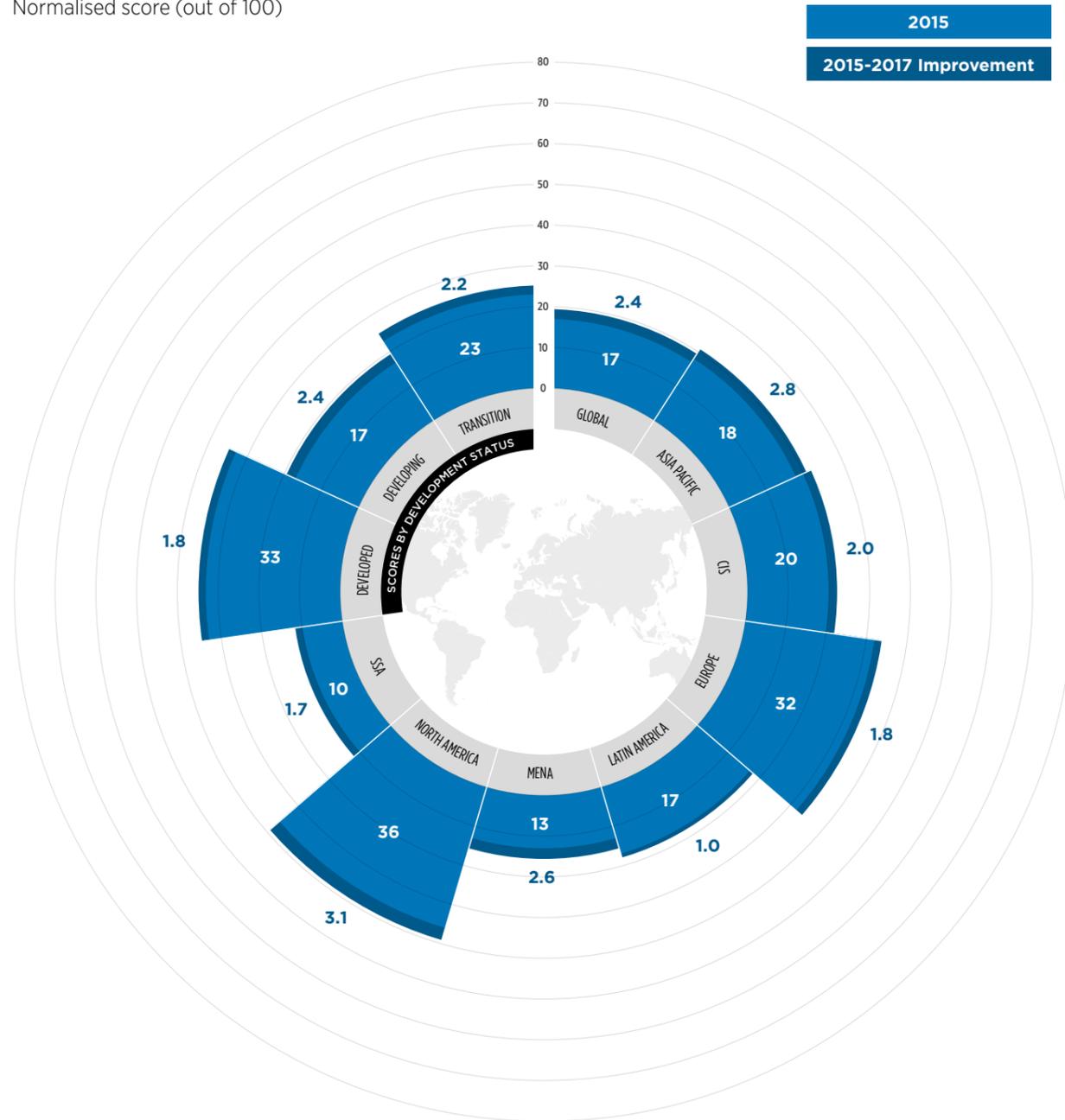- Develop IoT solutions for effective climate change monitoring

Scores by region and development status

Normalised score (out of 100)

| 2015 |
| 2015-2017 Improvement |

14 LIFE BELOW WATER

SDG 14

Life Below Water

Conserve and sustainably use the oceans, seas and marine resources

Drivers

- Develop IoT solutions (including LPWA) and infrastructure to support monitoring and management of coastal marine ecosystems (including fisheries)

- Provide digital identity services to enable access to inclusive and equitable education and decent livelihoods and to enable good governance and political inclusion

- Wirelessly connect artisanal fishing communities to critical information with a short lifespan but high value (e.g. weather, market prices, etc.)

- Establish the technical architecture where data acquired regarding marine biota, pollution etc can be shared in a harmonised way with applications that can improve the sustainability of the marine environment

- Provide information including sustainable best practices and guidelines on regulations to ensure ecosystem sustainability and compliance with local fishing laws
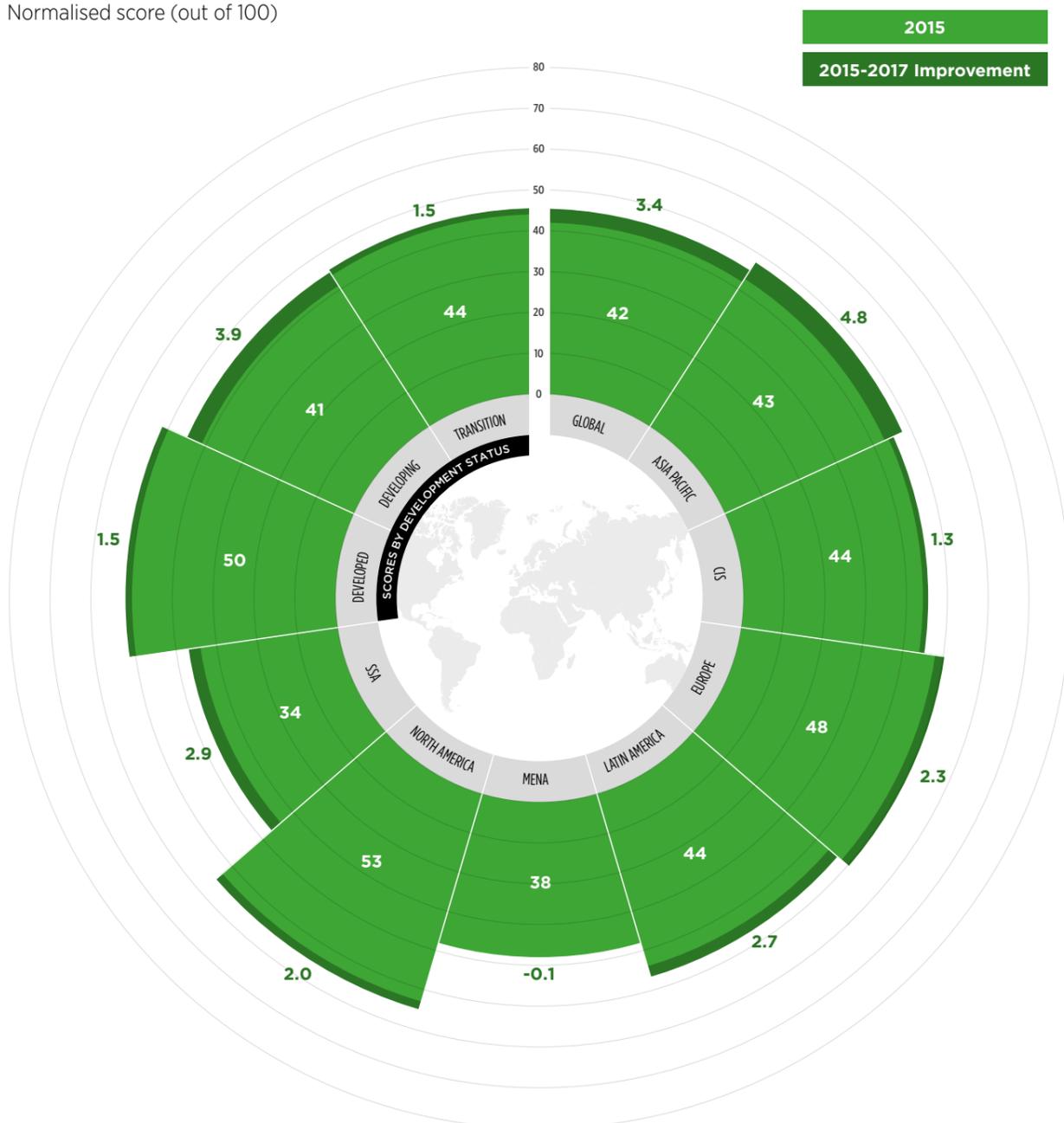
Scores by region and development status

Normalised score (out of 100)

| 2015 |
| 2015-2017 Improvement |

SDG 15
Life On Land

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss

15 LIFE ON LAND

Drivers

- Provide enabling technologies (including IoT) to support forest monitoring, monitor mountain ecosystems and support natural habitat and endangered species monitoring

- Effectively dispose of operational waste to reduce negative externalities and therefore improve biodiversity

- Provide digital identity services to enable access to inclusive and equitable education and decent livelihoods

- Establish the technical architecture where data acquired for the monitoring of life on land is shared in a harmonised way with applications that can improve the effectiveness of monitoring and interventions

- Provide connectivity to platforms that enhance stakeholder engagement in preventing poaching and trafficking
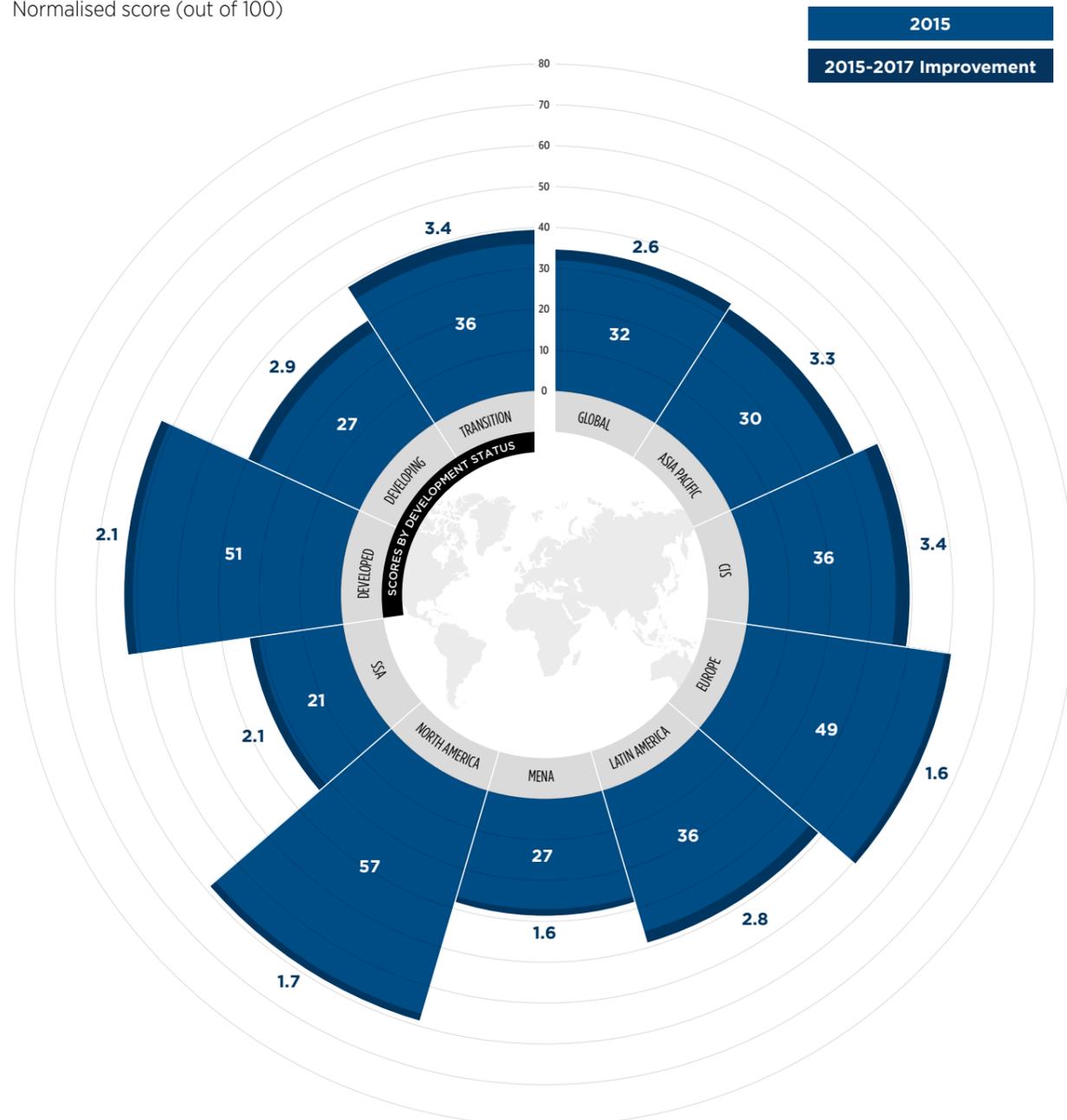
Scores by region and development status

Normalised score (out of 100)

| 2015 |
| 2015-2017 Improvement |

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

SDG 16

Peace, Justice and Strong Institutions

Promote just, peaceful and inclusive societies

Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

Drivers

- Provide mobile technology for use by police to prevent violence and related deaths

- Provide digital identity services to enable the protection of legal rights (including access to ownership of land), protection against exploitation, good governance, political inclusion and identity management

- Adhere to strict data privacy and security policies that align to national and international law

- Implement effective procurement policies to ensure suppliers/vendors adhere to rule of law

- Implement ethical practices against corruption and bribery within own operations and supply chain

- Support the fundamental freedoms of expression, thought, belief and opinion through equitable access to the internet

- Ensure children's safety both online and offline

- Help prevent activation of stolen devices and black market/crime

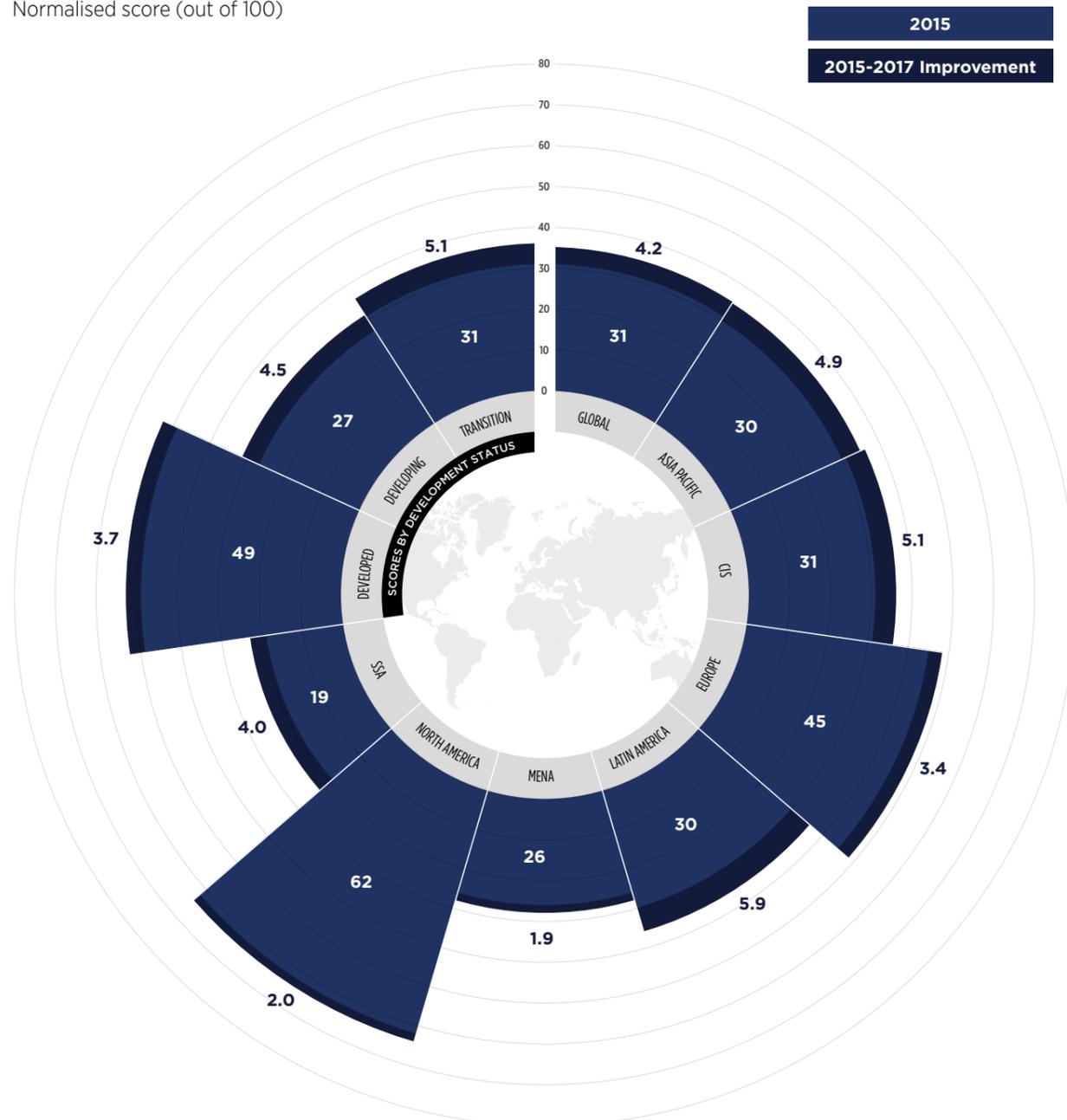- Support national security authorities to combat terrorism and crime

SDG 17

Partnerships for the Goals

Revitalise the global partnership for sustainable development

Drivers

- Provide mobile money services as a channel for capital flows for tax and other forms of revenue collection

- Build environmentally sustainable infrastructure and enable technology solutions that promote environmental sustainability

- Share mobile technology IP to build capacity in least developed countries by inputting into the UN Intellectual Property Bank

- Expand local communications operations in developing countries to accelerate capacity building for the developing country

- Partner with governments and institutions to harness the data revolution for sustainable development

- Actively seek engagement with public and private organisations to promote sustainability

- Provide digital identity services to enable good governance and political inclusion

- Provide accurate and timely disaggregated data to governments and institutions for effective decision making

Scores by region and development status

Normalised score (out of 100)

2015

2015-2017 Improvement

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