2017 Mobile Industry Impact Report: Sustainable Development Goals

The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with more than 300 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

Two years into the 2030 Agenda for Sustainable Development, we are witnessing decisive commitment and transformational progress towards its achievement. This agenda and its 17 Sustainable Development Goals seek to ensure that every individual realises his or her potential on a healthy planet for generations to come, an ambition that will require swift action by public and private actors alike.

The participation of business in the implementation of the Sustainable Development Goals (SDGs) is critical as a key driver of innovation and employment. Mobile technology has a particularly important role to play, as an essential part of our everyday lives, our societies and markets, providing connectivity and services for billions of people around the world.

Mobile technology has a special role as a tool for empowering women and young people, giving them a voice online when they may struggle to be heard in their communities and societies. And mobile technology helps migrants to send remittances back to their families, which can make an enormous economic contribution in many countries and regions.

I welcome this report, in which the mobile technology industry sets an important example by measuring, tracking and disclosing its collective impact, helping to identify opportunities to stimulate and expand collaboration. Mobile technology is a driving force behind the data revolution that will bring SDG implementation to scale.

This report shows that mobile technology is having an impact across all 17 SDGs, and is increasing its contribution. More people than ever are connecting and using mobile services to improve their lives. Financial services, health information and educational resources are just a few of the ways in which mobile technology is contributing to achieving the SDGs.

As the report highlights, mobile technology is also critical to humanitarian response. Connectivity and information are essential for refugees and displaced people, and in the aftermath of natural disasters. The mobile industry is stepping up to fulfil its important role in disseminating life-saving information and supporting social and economic stability.

Achieving the 2030 Agenda will require robust leadership, concerted action and collaboration. The mobile industry must continue to lead the private sector, and to partner with public institutions to maximise its reach. Further, the industry has a unique opportunity to engage with today's young people to shape the economic and political future of our communities.

I am confident the mobile industry, with the support of operators and other key partners across the sector, will continue to be a key player in achieving the SDGs.

Amina J. Mohammed
Deputy Secretary-General
United Nations

CONNECTING EVERYONE AND EVERYTHING TO A BETTER FUTURE

#betterfuture

Eighteen months ago, the mobile industry became the first sector to commit as a whole to the United Nations Sustainable Development Goals (SDGs). As an industry, we have an important opportunity to leverage the mobile networks we have built and the services we deliver to help achieve the SDGs.

A year ago, we released the inaugural edition of the Mobile Industry Impact Report. This first-of-its-kind study provided a baseline of our industry's impact in achieving the SDGs and detailed the actions needed to extend and strengthen our impact.

With the publication of the 2017 Mobile Industry Impact Report, I am proud to report that the mobile industry has increased its impact across all 17 Goals. Mobile operators around the world are working to deploy mobile-enabled solutions that drive greater inclusion in cities and remote communities, enable access to essential services such as health and education, create employment opportunities and empower people with the tools to reduce poverty and inequality. Here are a few examples:

SDG 1: No Poverty – Over the last decade, mobile money has done more to extend the reach of financial services than traditional bricks and mortar banking was able to do over the last century. As of the end of 2016, there were more than half a billion registered mobile money accounts in over 90 countries.

SDG 5: Gender Equality – The mobile industry is focused on increasing women's access to and use of mobile services in low- and middle-income countries around the world. Through the Connected Women Commitment Initiative and others, GSMA Connected Women and its mobile operator partners have delivered life-enhancing services to more than 17 million women in developing countries.

SDG 7: Affordable and Clean Energy – There are now approximately 1 million mobile-enabled pay-as-you-go solar home systems globally, impacting 5 million people, with nearly 40,000 new systems added each month.

SDG 11: Sustainable Cities and Communities – Today, more than 110 operators in nearly 80 countries support the GSMA Humanitarian Connectivity Charter to contribute to humanitarian response, improve access to communication and information for those affected by crisis, reduce loss of life and aid recovery.

We are focused on amplifying and accelerating our industry's impact on the SDGs, through collaborative initiatives such as Big Data for Social Good. Launched earlier this year, this leverages the world's leading mobile operators' big data capabilities to address epidemics and natural disasters.

From services such as mobile money and mobile agriculture, to the Internet of Things and the 5G networks of the future, we're making a difference to the lives of people around the world and helping to preserve and protect our planet. As you review this report, I encourage you to consider how you can contribute to the SDGs. This is not something we can accomplish alone as individuals, as companies, even as an industry; we must work together, united, to make the 2030 agenda a reality.

Mats Granryd
Director General
GSMA

The United Nations have laid out a clear path for global progress with the Sustainable Development Goals. The World Economic Forum is endorsing these principles and is dedicating its Sustainable Development Impact Summit to achieving concrete steps towards these important goals. Of course, it could not be done without the private sector playing a central role. This report is testament to the active participation of GSMA and highlights the impressive impact of mobile on achieving progress for all.

Prof. Klaus Schwab, Founder and Executive Chairman of the World Economic Forum

Connecting people is critical to the World Bank Group's mission to end extreme poverty, and we are working to further enhance our capacity to deploy technology and innovation to address the development challenges we need to tackle. The GSMA and its members bring a deep knowledge of mobile financial services, a proven ability to innovate, and a commitment to accelerating financial inclusion. They are key partners in the effort to deliver universal financial access and help people lift themselves out of poverty.

Dr Jim Yong Kim, President, World Bank Group

The Sustainable Development Goals are the vision-piece of our globalization puzzle.

Complex and comprehensive, the Goals and Targets reflect the diversity of humankind and respond to the important challenges it faces.

Specific and measurable, they are the basis of a new social contract between the world's leaders and "We the Peoples".

The Goals are anchored in the reality that we are interconnected and interdependent to an unprecedented degree.

We are grateful to count the Mobile Industry amongst our partners, helping to ensure that globalization leads to more inclusive prosperity, equality and social justice.

Thomas Gass, Assistant Secretary-General, United Nations Department of Economic and Social Affairs

The immense impact of the mobile is to bring in every people's hands the power to engineer solutions of their own to challenges of their own. I saw that directly with the youth I support in vulnerable communities of Mexico, South Sudan and Uganda: mobile access magnifies their capacity as direct actors of lasting peace and sustainable development.

Forest Whitaker, SDG Advocate and Founder of the Whitaker Peace & Development Initiative

Continued investment in mobile is by far the most efficient and cost-effective way to connect the unconnected and deliver on the vision of the SDGs. The mobile industry has perhaps one of the most important roles to play in shaping a more sustainable future. Every goal — from ending poverty and halting climate change to fighting injustice and inequality — can be positively impacted by ICT, and I commend the GSMA for its 2017 Mobile Industry Impact Report highlighting what our industry ecosystem has achieved, and what more we can do.

Börje Ekholm, CEO, Ericsson

I am delighted to see this report which highlights the positive impact of mobile technology on sustainable development, and especially how greater access to telecommunication networks and improved connectivity has enabled social and economic progress. Mobile technology is one of the key technologies that will be essential to the achievement of the UN's Sustainable Development Goals by 2030.

Dr Houlin Zhao, Secretary-General, ITU

At a time when our economic model is condemning many to a future without hope, the Sustainable Development Goals offer us a unique chance to eradicate poverty and drive a more sustainable form of capitalism. Actions from business leaders and companies across all sectors will be central to achieving this. Many are now realizing the enormous opportunities that exist for enlightened businesses willing to stand up and address the world's urgent challenges. The leadership of the mobile industry to collectively commit to driving progress on the SDGs and deliver a true sector-wide approach is an example to others, and one we should applaud and follow.

Paul Polman, CEO, Unilever

EXECUTIVE SUMMARY

In February 2016 at Mobile World Congress in Barcelona, the mobile industry became the first industry to commit to the Sustainable Development Goals (SDGs), an ambitious plan unanimously adopted in 2015 by all 193 countries in the United Nations General Assembly aiming to end extreme poverty, fight inequality and protect our planet. As part of this commitment, in September 2016 the GSMA published its first Impact Report measuring the industry's impact on the SDGs.[1] This second report shows the progress our industry has made since in terms of impacting each Goal.

Figure 1 presents the impact scores for 2015 and how they changed in 2016, showing that the industry's impact increased across all 17 SDGs in the first year after the Goals were adopted. The greatest upward movement in 2016 was in SDGs 3: Good Health and Well-being, 11: Sustainable Cities and Communities, and 13: Climate Action. For all three, enhanced connectivity, network quality and resilience are the key drivers behind the industry's increased impact. The Goals where the industry is contributing the most are SDGs 9: Industry, Innovation and Infrastructure, 13: Climate Action, and 11: Sustainable Cities and Communities. The overall impact remains lowest for SDGs 14: Life below Water, 2: Zero Hunger, and 6: Clean Water and Sanitation.

1.   2016 Mobile Industry Impact Report: Sustainable Development Goals, GSMA, 2016

FIGURE 1

SDG impact scores

Normalised score (out of 100)

Three underlying trends explain much of the improvement in the industry's impact on the SDGs in 2016:

Better networks

Mobile operators have invested heavily in expanding infrastructure and improving quality of service. More than half the world's population – around 4 billion people – are now within reach of a 4G network, while 350 million more people were covered by a 3G network in 2016, bringing overall 3G coverage to 83%. In addition to providing access to mobile services, wider coverage, improved network quality and resilience play a critical role before and during epidemics, conflicts and natural or climate-related disasters. They support emergency communication and broadcast services and provide accurate and timely information on the movement of affected populations.
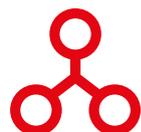
More connectivity

Operators continue to connect the unconnected, with 230 million new subscribers in 2016, bringing the total to 4.8 billion (65% penetration); 350 million new mobile internet subscribers, bringing the total to 3.5 billion (48% penetration); and 100 million more cellular machine-to-machine (M2M) connections, bringing the total to 410 million. The economic and social benefits of this are wide-ranging, with connectivity driving improvements in economic growth through improved productivity, infrastructure development and efficiency. Operators have been particularly proactive in pursuing more innovative solutions to roll out mobile networks in remote areas, making mobile services more affordable to the poorest individuals and driving efforts to accelerate digital inclusion for women.

Doing more with mobile

Users are becoming increasingly sophisticated in how they use their mobile phones and are starting to access more advanced mobile-enabled services. In 2016 more than 100 million new mobile money accounts were registered to reach a total of more than half a billion, allowing users to access financial services that enable them to make investments and manage expenses. There were also 500 million new users of social media on mobile to reach a total of 2.5 billion, helping promote social and political inclusion and facilitating the development of education networks.

Although the mobile industry's achievements are substantial, it is still far from realising its potential impact, with the highest score at 45 out of 100 (for SDG 9). Mobile operators, working with the broader mobile ecosystem, still have much to do to contribute to achieving the SDGs. This includes working towards universal access, scaling up new solutions such as IoT, and helping to fill gaps in areas such as health, education, finance and utilities through the development of mobile-enabled solutions. Only when this has been achieved will operators be able to maximise their impact across all the SDGs.

To help the world achieve the SDGs and their targets, operators must continue to think above and beyond 'business as usual' improvements and accelerate every activity that contributes to the SDGs. Not only is there a moral imperative in connecting everyone and everything to a better future; there are wider benefits in terms of the "triple bottom line" of people, planet and profits. Digital solutions that help achieve the SDGs could generate $2.1 trillion in additional annual revenues for the broader information and communications technology (ICT) sector by 2030[2] – this includes both connecting the unconnected and expanding the range of services and digital solutions offered. Furthermore, achieving the Goals will not only bring revenue opportunities from new customers and products; it will also increase the value of existing users through enhanced services that improve their living conditions, which will ultimately increase revenues, enhance user loyalty and grow subscriber uptake.

Finally, it is critical that operators continue to work together as an industry and establish partnerships and collaborations with a range of organisations – governments, international organisations and other industries – to maximise efforts towards the SDGs. As the mobile industry looks to meet the demands of a digitalised world, the need to work with governments to develop pro-investment conditions and modernised regulatory policies has never been greater. Both industry and governments must approach this digital revolution with the right mix of policies, regulation and consumer protection while providing the framework for companies to compete and innovate.

2. System Transformation: How digital solutions will drive progress towards the Sustainable Development Goals, GeSI and Accenture, 2016

With the mobile industry's impact on the SDGs increasing in 2016, the GSMA – in collaboration with operators – has made several commitments and taken part in a number of initiatives that seek to continue this momentum. During the next year, we will focus on delivering these commitments:

1. Big Data for Social Good – this initiative leverages mobile operators' big data capabilities to address humanitarian crises, including epidemics and natural disasters.

2. National Dialogues for Digital Impact – an initiative to bring the industry's SDG commitment to the local level by convening key government ministries, leaders of the mobile industry and consumer insights to explore how mobile can accelerate its positive impact on society.

3. We Care Campaign – in Latin America, mobile operators have joined forces as an industry and made a series of commitments to ensure that users can enjoy the transformative benefits of mobile technology in a safe and reliable environment.

4. Connected Women Commitment Initiative – this initiative supports mobile operators in low- and middle-income countries to reduce the gender gap in mobile internet and mobile money by 2020.

5. IoT Big Data – the GSMA is working with the mobile industry to establish an IoT Big Data Ecosystem to encourage a common approach to data sharing that will help IoT realise its full potential and encourage the development of new projects across transport, the environment and smart cities.

6. Mobile for Development (M4D) Initiatives – GSMA M4D, in collaboration with the mobile industry, has undertaken a number of projects to drive progress across the SDGs.

- As part of the M4D Utilities Fund, operators are partnering with utility service providers to deliver energy, water and sanitation solutions for over 4 million people.

- The GSMA and the industry have committed to support the creation of 500 million new registered mobile money accounts over the course of the World Bank's Universal Financial Access 2020 initiative.

- The GSMA will offer expertise in mobile money to address the opportunities and challenges of mobile cash disbursements in disaster-prone countries.

- Under the Ecosystem Accelerator programme and its Innovation Fund, the GSMA is committed to helping start-ups and mobile operators in Africa and Asia build partnerships and scale commercial innovation with positive socio-economic impact.

- Under the GSMA's Humanitarian Connectivity Charter, a set of principles adopted on preparedness and response activity, more than 110 operators in nearly 80 countries are contributing to humanitarian response and improving access to communication and information for those affected by crisis.

7. Partnerships for the Goals – partnerships with different entities, including the UN, will look at new business models and mechanisms to support the implementation of the SDGs, and engage governments and mobile industry leaders to increase the positive social impact of mobile technologies.

In the meantime, the GSMA and the mobile industry will continue to report on its progress each year and will continue to develop and improve the evidence used to track operators' impact on the SDGs. With this framework in place, both the industry and the international community will be able to understand the impact, progress, challenges and ultimately action needed for the mobile industry to harness its full potential to achieve the SDGs.

01

INTRODUCTION

In February 2016 at Mobile World Congress in Barcelona, the mobile industry became the first industry to commit to the Sustainable Development Goals (SDGs), an ambitious plan unanimously adopted in 2015 by all 193 countries in the United Nations General Assembly aiming to end extreme poverty, fight inequality and protect our planet[3].

3. Transforming our world: the 2030 Agenda for Sustainable Development, United Nations, 2015

FIGURE 1.1

UN Sustainable Development Goals

As part of this commitment, in September 2016, the GSMA published its first Mobile Industry Impact Report, which provided a framework to assess the industry's impact on the SDGs.[4] This second report assesses mobile operators' progress towards each Goal against last year's findings. The framework used in this report is the same as last year, though some changes have been made in its implementation to improve the robustness of the analysis and to make the results easier to interpret and track over time.

The report is structured as follows:

Chapter 2   The mobile industry's impact improvement compared to last year

Chapter 3   Commercial opportunities derived from implementing the SDGs

Chapter 4   In-depth analysis of five SDGs where the mobile industry is making a significant contribution: SDGs 1: No Poverty, 3: Good Health and Well-being, 5: Gender Equality, 9: Industry, Innovation and Infrastructure, and 13: Climate Action

Chapter 5   Industry commitments for the year ahead

Appendix A   A detailed explanation of the methodology and framework used to quantify the industry's impact for the SDGs (including changes to the 2016 report)

Appendix B   Impact scores for each SDG by region and by developed, developing and transition countries. For each Goal, it also lists the mechanisms through which operators drive an impact, as well as providing additional examples of operator activities that contribute to the SDGs.

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4.   2016 Mobile Industry Impact Report: Sustainable Development Goals, GSMA, 2016

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02

THE MOBILE INDUSTRY'S IMPACT ON THE SDGs

This chapter shows how the mobile industry's impact on the SDGs evolved in 2016. Each SDG has a score out of 100, with a higher score representing increased impact. A score of 0 would mean no impact at all, while a score of 100 would mean the industry is doing everything possible to influence that SDG. The approach to scoring is summarised here, with a more detailed description provided in Appendix A. A detailed list of the mechanisms (or drivers) through which mobile impacts all 17 SDGs is provided in Appendix B.

Scoring calculation overview

Driver identification – for each SDG, a number of drivers have been identified. A driver describes an activity that is performed or supported by the mobile industry and contributes to the achievement of the SDG. For example, two of the drivers for SDG 1: No Poverty are:

- the provision and use of communication services to stimulate local businesses and economic growth in poor communities

- generating employment opportunities in the mobile ecosystem for people living in poverty.

Driver importance – each driver is given an importance score of 'high', 'medium' or 'low' to reflect the potential impact the industry has on delivering or enabling the SDG.

For example, the provision of communication services to poor communities has a high potential impact because everyone can access mobile services, and there is strong evidence showing mobile connectivity can drive economic growth and reduce poverty).[5]

In the case of generating employment opportunities, the industry's impact is low because the mobile ecosystem cannot employ a substantial proportion of those living in poverty.

Driver measurement – the industry's performance for each driver is quantified using appropriate metrics at a country level. Each metric is then normalised such that it takes a value between 0 and 100, with a higher score representing better performance.

For example, providing communication services to poor communities is measured using network coverage (including 2G, 3G and 4G technologies) and mobile penetration among the poorest 40% of the population in each country. A score of 100 for this driver in a given country would mean there is 100% network coverage for all technologies and the poorest 40% of the population are all using mobile.

SDG impact scores – for each SDG, the driver scores are aggregated to produce an overall score between 0 and 100 for each country. A score of 100 means the mobile industry has achieved everything possible to contribute to that Goal. Global SDG scores are then calculated as a population-weighted average of the country-level scores (a similar approach is used to calculate scores by region and development status). For example, SDG 1 currently scores 37.5, meaning the industry is doing 37.5% of what it could potentially contribute to that SDG. To achieve a score of 100, each country (especially developing countries) would need to achieve 100% coverage and mobile voice and internet penetration among the poorest populations in each country. It would also require them to utilise mobile-enabled services that are capable of alleviating poverty – for example, financial services (such as mobile money), digital commerce and digital identity services.

2.1   2016 GLOBAL IMPACT SCORES

Based on our assessment of the importance of each driver, we have clustered each SDG according to whether the industry has the potential to have a high, medium or low impact. The criteria for this assessment is as follows:

HIGH POTENTIAL

The mobile industry can have significant impact in delivering or enabling the SDG and it can play a critical or leading role.

1 NO POVERTY	5 GENDER EQUALITY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES	13 CLIMATE ACTION		

MEDIUM POTENTIAL

The mobile industry can make an important and distinctive contribution to the SDG but is reliant on other participants or industries.

2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	7 AFFORDABLE AND CLEAN ENERGY
11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	17 PARTNERSHIPS FOR THE GOALS	

LOW POTENTIAL

The mobile industry can make an important contribution to the SDG but the impact is narrow in nature, as it only relates to a small number of targets and/or does not have the potential to drive significant impact across a majority of countries.

6 CLEAN WATER AND SANITATION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Figure 2.1 presents the impact scores for 2015 and shows how they changed in 2016.[6] It shows that the industry's impact has increased across all 17 SDGs. However, the mobile industry is still far from realising its potential impact; the highest score is 45 out of 100. Reasons for this distance from the full potential include the increased cost of connecting the unconnected, constraining regulation and cultural barriers. Operators therefore still have much to do to realise their full potential and contribute to achieving the SDGs.

The industry's impact most improved for SDGs 3: Good Health and Well-being, 11: Sustainable Cities and Communities, and 13: Climate Action. For all three, enhanced connectivity, network quality and resilience are the key drivers behind the industry's increased impact. These drivers enable operators to play a critical role in supporting emergency communication and broadcast services before and during epidemics and natural or climate-related disasters.[7]

The SDGs that increased the least in 2016 are SDG 6: Clean Water and Sanitation, 8: Decent Work and Economic Growth, and 12: Responsible Consumption and Production. Many of the potential industry impacts on these particular SDGs rely on solutions that are at a relatively early stage of development in many countries – for example, pay-as-you-go (PAYG) energy and water solutions, mobile money and machine to machine (M2M).

The overall impact remains highest for SDG 9: Industry, Innovation and Infrastructure and lowest for SDG 14: Life below Water. Where the industry drives much of its impact from rolling out networks and providing basic connectivity (as with SDG 9) it scores highly compared to SDGs where the industry contributes primarily through emerging technologies, such as M2M or mAgri solutions (both of which are relevant to SDG 14).

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6. The majority of data used for the first Impact Report was from 2015 while this year's update is predominantly based on 2016 data. Some of the performance scores for 2015 differ from those presented in the first Impact Report as we have improved the underlying metrics to track the industry's progress (2015 data was therefore updated to ensure consistency across years). We have also changed the scores so that they only measure the performance of the industry with respect to its theoretical maximum performance. A more detailed explanation of the methodology and the changes made in this year's report is provided in Appendix A.
7. These are particularly relevant to: Target 3.d. which requires the strengthening of capacity for all countries for early warning, risk reduction and management of national and global health risks; 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.

FIGURE 2.1

SDG impact scores

Normalised score (out of 100)

2015 Impact score   **2016 Improvement**
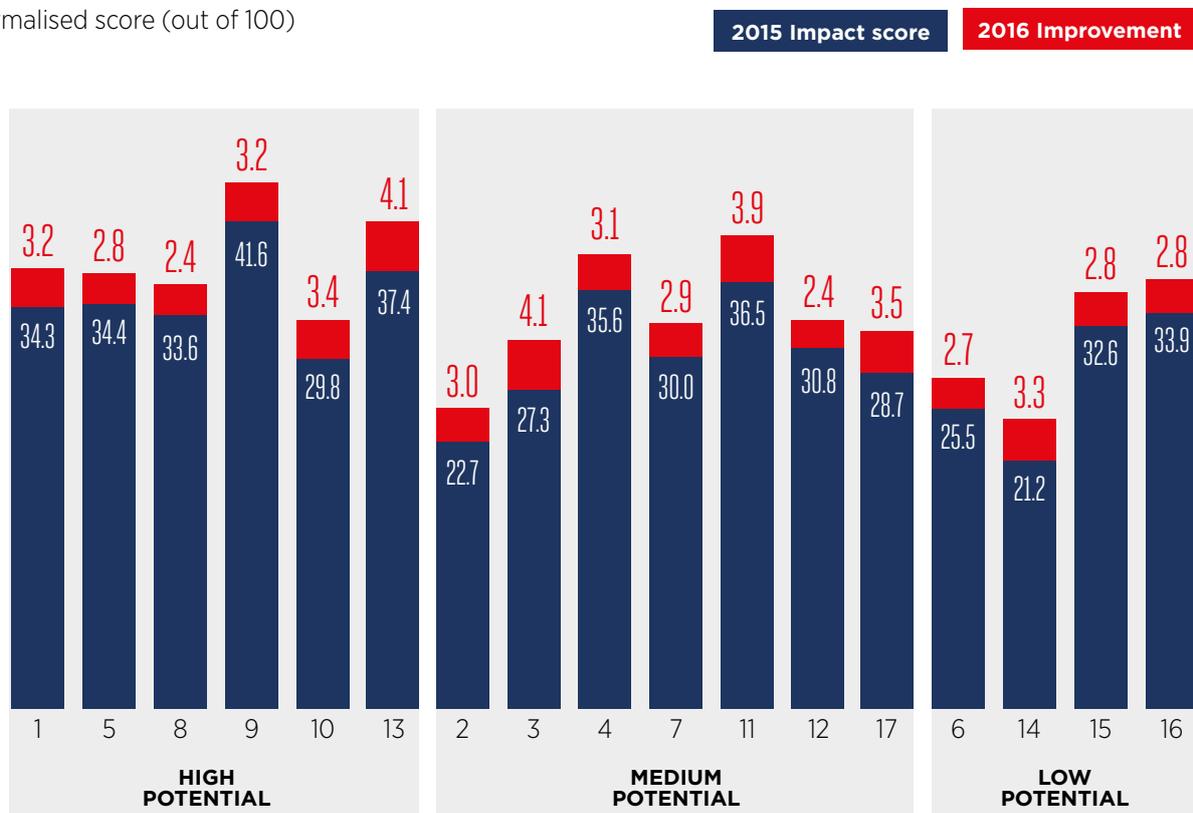
While operators contribute to each SDG in different ways, three underlying trends explain much of the improvement in the industry's impact across all 17 SDGs in 2016:

BETTER NETWORKS – mobile operators have invested heavily in expanding infrastructure and improving quality of service.
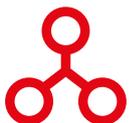
MORE CONNECTIVITY – operators continue to connect the unconnected. The economic and social benefits of this are wide-ranging, with connectivity driving improvements in economic growth through improved productivity, infrastructure development and efficiency.

DOING MORE WITH MOBILE – users are becoming increasingly sophisticated in how they use their mobile phones and are starting to access more advanced mobile-enabled services such as mobile money, mAgri and government services. These have been shown to have a significant and positive socio-economic impact.

Better networks

Improvements

Population coverage

3G 79% **83%**
2015 / 2016

4G More than half of the world's population
4billion

Source: GSMA Intelligence

Network quality

Average mobile broadband download speed

13.5 Mbps **16.6 Mbps**
2015 / 2016

Source: GSMA Intelligence calculations using Speedtest Intelligence data from Ookla

SDGs impacted

1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
11 SUSTAINABLE CITIES AND COMMUNITIES
13 CLIMATE ACTION

Examples

How better networks impact the SDGs

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

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

Provide communication services to stimulate local business (and economic) growth in poor communities.

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More connectivity

Improvements

Mobile subscriber penetration

63%
2015

65%
2016

230m NEW SUBSCRIBERS

Mobile internet subscriber penetration

44%
2015

48%
2016

350m NEW MOBILE INTERNET SUBSCRIBERS

Cellular M2M connections

310 million
2015

410 million
2016

32% INCREASE

Source: GSMA Intelligence

SDGs impacted

1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR THE GOALS	

Examples of how more connectivity impacts the SDGs

Drive economic growth through improved productivity, infrastructure development and improved consumption efficiency.

Promote the transfer and diffusion of new technologies.

Monitor air quality, climate change and water and energy efficiency.

Improve the inclusiveness of economic development by expanding trade, enabling participation in the labour force (particularly for women and people with disabilities) and increasing access to public services.

Improve productivity of manufacturing and industrial processes.

Monitor marine, coastal and forest ecosystems.

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Doing more with mobile

Improvements

Mobile money

450m
REGISTERED ACCOUNTS
2015

555m
REGISTERED ACCOUNTS
2016

23% INCREASE

Source: GSMA Mobile Money

Source: GSMA Intelligence Consumer Survey

1.5bn PEOPLE
MORE THAN **30%** OF SUBSCRIBERS
have used mobile to
purchase goods or services

1.3bn PEOPLE
MORE THAN **25%** OF SUBSCRIBERS
have used mobile to access
government services

Social media users

2bn
2015

2.5bn
2016
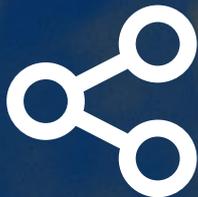
29% INCREASE

Source: We Are Social

mAgri

13m
more users of
mAgri services
in 2016

54% INCREASE

Source: GSMA mAgri.
This figure only captures applications tracked by the GSMA

SDGs impacted

1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR THE GOALS	

Examples of how doing more with mobile impacts the SDGs

Provide financial services to individuals and small businesses that would otherwise be financially excluded, and facilitate access to low-cost remittances.

Promote social and political inclusion (irrespective of age, sex, disability, race, ethnicity, religion or economic status).

Facilitate the development of networks to enhance education and provide a digital solution for parents to pay school fees.

Provide businesses with the means to market their products and services.

Help to access electricity, water and sanitation through pay-as-you-go solutions, and provide digital payment services for utility bills.

Provide information about weather conditions, pest outbreaks and new farming technologies through mAgri solutions, and enable the upskilling of agricultural communities.

Provide access to information to communities, increasing awareness of sustainable development practices.

Facilitate the provision of digital forms of identity, which is critical to protecting legal rights and accessing basic services and social safety nets.

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2.2 SDG IMPACT BY REGION

In most regions, the top ranking SDG is 9: Industry, Innovation and Infrastructure, while SDG 14: Life below Water is the lowest ranking. However, there are some exceptions, notably Europe, CIS and Latin America.

In the case of Latin America and CIS, SDG 16: Peace, Justice and Strong Institutions ranks top because operators in the region have been increasingly proactive in committing to SDG-related activities, such as signing up to the UN Global Compact's Ten Principles. Meanwhile, take-up of certain mobile-enabled services (such as mobile money) has been relatively limited compared to other regions, which lowers the scores for SDG 9.

In Europe, SDG 11: Sustainable Cities and Communities ranks first because of the advanced mobile infrastructure and quality of service provided. SDG 15: Life on Land ranks last due to the relatively higher amounts of e-waste per inhabitant compared to other regions.[8] A full list of regional scores for each SDG is provided in Appendix B.

There is significant variation in terms of the SDGs where operators achieved the most improvement in 2016. We explain the drivers for each below.

8. The Global E-Waste Monitor 2014, UNU-IAS, 2014

SDGs by region[9]

Impact scores rank and improvement rank by region, 2016

	HIGHEST IMPACT SCORE	LOWEST IMPACT SCORE	MOST IMPROVED IMPACT SCORE	LEAST IMPROVED IMPACT SCORE
Asia Pacific	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	14 LIFE BELOW WATER	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
Latin America	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	14 LIFE BELOW WATER	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	14 LIFE BELOW WATER
MENA	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	14 LIFE BELOW WATER	13 CLIMATE ACTION	16 PEACE, JUSTICE AND STRONG INSTITUTIONS
Sub-Saharan Africa	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	14 LIFE BELOW WATER	10 REDUCED INEQUALITIES	15 LIFE ON LAND
Commonwealth of Independent States (CIS)	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	14 LIFE BELOW WATER	4 QUALITY EDUCATION	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
Europe	11 SUSTAINABLE CITIES AND COMMUNITIES	15 LIFE ON LAND	3 GOOD HEALTH AND WELL-BEING	16 PEACE, JUSTICE AND STRONG INSTITUTIONS
North America	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	6 CLEAN WATER AND SANITATION	16 PEACE, JUSTICE AND STRONG INSTITUTIONS

9. Figures in the infographics are estimated by taking data at the country level and a population- or subscriber-weighted average (depending in the data point) for each region. Where data is missing for a set of countries, we impute by taking an average based on geography and income. For example, if a low-income country in Asia-Pacific is missing data, we assume the value is the same as the average in low-income Asia-Pacific countries for which there is data. A similar method is used to calculate global figures in this report.

Asia Pacific

Mobile subscriber penetration

62%
2015

66%
2016

175 million
↑ **NEW SUBSCRIBERS**
highest increase of any region

Source: GSMA Intelligence

Coverage

250m
more people
covered by 3G networks in 2016

4G networks

are now within reach of more than half the region's population

(around 2 billion people)

Source: GSMA Intelligence

Government services

MORE THAN
500 million
people use mobile to access government services

22%
of subscribers in Asia Pacific

Source: GSMA Intelligence Consumer Survey

Highest SDG scores

| 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE | 13 CLIMATE ACTION | 11 SUSTAINABLE CITIES AND COMMUNITIES |

Most improved SDG scores

| 11 SUSTAINABLE CITIES AND COMMUNITIES | 13 CLIMATE ACTION | 3 GOOD HEALTH AND WELL-BEING |

Analysis

Increase in coverage and mobile take-up has better enabled the region to cope with disasters such as the 2015 earthquake in Nepal. In New Zealand, users will be able to receive alerts about earthquakes and tsunamis on their mobile phones by late 2017.

Governments have been particularly proactive in enabling a greater number of services to be accessed online via SMS, mobile apps and user-friendly social media tools. For example, Shanghai, as part of its smart city initiative, created one-stop e-government services for citizens and businesses.

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Commonwealth of Independent States (CIS)

Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Uzbekistan and Ukraine.

Mobile internet penetration

Source: GSMA Intelligence

48%
2015

54%
2016

17 million
↑ NEW SUBSCRIBERS
highest percentage point
increase of any region

Smartphone adoption

Source: GSMA Intelligence

41%
2015

48%
2016

35 million
new connections using smartphones

Affordability

↓ Mobile broadband
prices fell from
6% to 2%
of GNI per capita

FOR THE LOWEST
40%
BY INCOME

Source: GSMA Intelligence, ITU, World Bank

Highest SDG scores

| 16 PEACE, JUSTICE AND STRONG INSTITUTIONS | 11 SUSTAINABLE CITIES AND COMMUNITIES | 1 NO POVERTY |

Most improved SDG scores

| 4 QUALITY EDUCATION | 17 PARTNERSHIPS FOR THE GOALS | 11 SUSTAINABLE CITIES AND COMMUNITIES |

Analysis

Improved internet take-up impacts the majority of SDGs, including SDG 4: Quality Education by offering youths and adults access to remote online and mobile learning (including massive open online courses or MOOCs). It can assist teachers in their professional development by connecting them to teaching networks and allowing them to prepare for classes at any time.

Mobile internet helps schools to improve digital skills and support quality, individualised learning opportunities for students. Almost 70% of schools in the CIS region have internet access, the highest of any region other than Europe.*

Wider internet access also directly contributes to SDG 17: Partnerships for the Goals by promoting the diffusion of new technologies.

*Analysis excludes North America due to insufficient data.

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Europe

Productivity

More than

25,000 SMEs

started to use mobile broadband
to access the internet in 2016,
bringing overall SME take-up to
almost 65%

Source: GSMA Intelligence calculations using
UNCTAD and Eurostat data
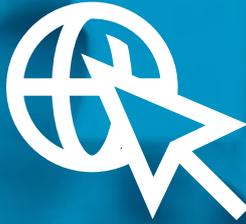
250m users

More than half of all mobile
subscribers in Europe are using
mobile to purchase goods and
services digitally

Source: GSMA Intelligence Consumer Survey

Cellular M2M connections

67 million
2015

80 million
2016

18% INCREASE

Source: GSMA Intelligence

Highest SDG scores

| 11 SUSTAINABLE CITIES AND COMMUNITIES | 13 CLIMATE ACTION | 4 QUALITY EDUCATION |

Most improved SDG scores

| 3 GOOD HEALTH AND WELL-BEING | 17 PARTNERSHIPS FOR THE GOALS | 10 REDUCED INEQUALITIES |

Analysis

Mobile is increasingly being used to drive productivity improvements and promote more inclusive growth, contributing to SDG 10: Reduced Inequalities.

The increase in cellular M2M connections includes a 60% increase in connections for car safety, thereby contributing to SDG 3: Good Health and Well-being, by helping to reduce road traffic accidents (Source: Machina).

Operators have also started to contribute to the IoT big data ecosystem – for example, they have released 8 APIs since 2016 (e.g. on air quality and weather data) to help harness big data for sustainable development and promote technology transfer.

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Latin America

Operator commitments

26 operators, accounting for around 270 million connections, signed up to the **Humanitarian Connectivity Charter** in 2016

9 operators, accounting for 130 million connections, signed up to the **UN Global Compact Ten Principles**

Social media penetration on mobile

39%
2015

51%
2016
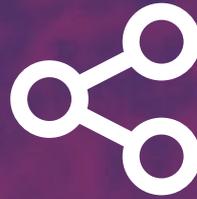
75 million more users

Source: We Are Social

Mobile money

98,000
2015

167,000
2016

71% increase in the number of registered agents

35% increase in the number of registered accounts

17 million
2015

23 million
2016

Source: GSMA Mobile Money

Highest SDG scores

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

4 QUALITY EDUCATION

Most improved SDG scores

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

10 REDUCED INEQUALITIES

Analysis

Operators in the region have been increasingly proactive in committing to SDG-related activities. In addition to the **Humanitarian Connectivity Charter** and **UN Global Compact**, a number of operators are also involved in **We Care** initiatives, which works hand-in-hand with the UN SDGs on areas such as child protection and public safety.

The social media penetration increase is the highest of any region, having a direct impact on SDG 16: Peace, Justice and Strong Institutions, and 10: Reduced Inequalities, by helping to promote political and social inclusion.

Increasing take-up of mobile financial services influences a number of SDGs by providing access to low-cost remittance services and financial services to promote economic and financial inclusion.

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Middle East and North Africa (MENA)

4G coverage

18%
2015

33%
2016

93 million
MORE PEOPLE COVERED

Source: GSMA Intelligence

Network quality

70%
INCREASE IN AVERAGE MOBILE
DOWNLOAD SPEEDS TO

11 Mbps
↑ the biggest improvement
of any region

Source: GSMA Intelligence calculations using
Speedtest Intelligence data from Ookla

Smartphone connections

249 million
2015

306 million
2016

23%
INCREASE

Source: GSMA Intelligence

Highest SDG scores

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

4 QUALITY EDUCATION

11 SUSTAINABLE CITIES AND COMMUNITIES

Most improved SDG scores

13 CLIMATE ACTION

11 SUSTAINABLE CITIES AND COMMUNITIES

3 GOOD HEALTH AND WELL-BEING

Analysis

Improvements in network coverage and resilience along with higher smartphone use have better enabled the region to cope with disasters and conflicts, particularly in war-torn countries such as Syria and Yemen.

Smartphones have been used by refugees to find safe passage and communicate with family and friends. Meanwhile, mobile applications are used to provide health and education solutions to those fleeing conflict.

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North America

Cellular M2M connections

Cellular M2M connections account for more than

15%

OF TOTAL CELLULAR CONNECTIONS IN NORTH AMERICA

By far the highest of any region

Source: GSMA Intelligence

Highest SDG scores

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	4 QUALITY EDUCATION	5 GENDER EQUALITY

Most improved SDG scores

6 CLEAN WATER AND SANITATION	14 LIFE BELOW WATER	15 LIFE ON LAND

Analysis

The development of IoT and supporting infrastructure underpins a number of SDGs, including 6: Clean Water and Sanitation, 14: Life below Water and 15: Life on Land.

Water network sensors and usage meters can drive supply- and demand-side efficiency (for example, identifying leaks and recording timely consumption behaviour). Studies have shown that smart meters can cut water use by more than 15%.

IoT solutions can also be deployed to improve monitoring and management of coastal ecosystems, including fisheries, as well as terrestrial ecosystems.

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Sub-Saharan Africa

Mobile money

43 million

new registered mobile
money accounts, reaching

277 million

130m

increase in transaction
volumes (18%)

$1.9bn

increase in transaction
values (15%)

2016

Eight countries
now have active account
penetration greater than 40%
among adults (compared to two
countries in 2015)

Source: GSMA Mobile Money

Operator commitments

22 operators,
accounting for
around

130 million connections

signed up to the **Humanitarian Connectivity Charter** in 2016

mHealth

58% increase in the number of mHealth services available in 2016

Source: GSMA mHealth. This figure only captures applications tracked by the GSMA

More than 20% of subscribers

90 million users

used mobile to improve their health
in 2016

Source: GSMA Intelligence

Highest SDG scores

| 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE | 15 LIFE ON LAND | 1 NO POVERTY |

Most improved SDG scores

| 10 REDUCED INEQUALITIES | 3 GOOD HEALTH AND WELL-BEING | 13 CLIMATE ACTION |

Analysis

Increased take-up and use of mobile money and financial services contributes to most of the SDGs, including SDG 10: Reduced Inequalities and 3: Good Health and Well-being (for example, by enabling people to send or receive transfers to/from remote friends and family so they can build resilience and reduce vulnerability to health shocks).

Access to information and assistance during natural disasters and other humanitarian emergencies contributes to SDGs 3: Good Health and Well-being, and 13: Climate Action

mHealth solutions provide an effective and affordable way to address healthcare needs (including good nutrition and advice on pregnancy).

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03

BUSINESS CASE FOR SDGs

Achieving the SDGs will create a world that is more equal and inclusive, economically prosperous and environmentally secure. The industry plays a critical role in achieving the Goals, but fulfilling its potential impact will require significant levels of investment and innovation, even for an industry characterised by frequent cycles of technology change.

The mobile industry has two main business incentives to realise its commitment to the SDGs and accelerate its impact:

- Firstly, not meeting the SDGs represents a significant business risk for the mobile industry and the private sector more generally. The economic cost of existing global burdens such as war, climate change and biodiversity and ecosystem damage is already higher than 20% of global GDP and will only increase if no action is taken.[10] Achieving the SDGs is therefore essential to mitigate fundamental risks to the industry's activities and ensure they remain viable in the long term.

- Secondly, the SDGs offer new opportunities and substantial efficiency gains for the mobile industry, through more inclusive and prosperous societies, dynamic and inclusive marketplaces, reliable regulatory frameworks and thriving ecosystems. Additionally, commitment and action to deliver the SDGs will enhance trust among the industry's stakeholders. There is therefore a need for operator CEOs to take a responsible leadership path and develop sustainable business strategies.

3.1 NEW COMMERCIAL OPPORTUNITIES

Digital solutions that help achieve the SDGs could generate $2.1 trillion in additional annual revenues for the ICT sector by 2030, representing a 60% increase compared to current revenues.[11] This revenue opportunity is divided into two areas: connecting the unconnected and expanding the range of services and digital solutions offered. While this includes opportunities for the broader ICT sector, the mobile industry is in a strong position to capture a substantial proportion of that value.

Connecting the unconnected

Providing connectivity is the core mission of the mobile industry. Operators could generate up to $400 billion in additional annual revenue from connecting the unconnected by 2030.[12] Given the vast majority of the unconnected live in developing countries, particularly in remote and rural locations, the mobile industry is best placed to realise this opportunity considering the relatively higher costs of rolling out fixed networks.

Digital solutions for the SDGs

Although increasing connectivity represents a significant opportunity for operators, the majority of value arising from the SDGs for the ICT sector – up to $1.7 trillion – lies in the provision of digital solutions that catalyse the achievement of the SDGs. Over the last decade, as convergence in the ICT sector has intensified, mobile operators have offered an increasing number of services on top of voice, SMS and data, such as mobile money and other mobile-enabled services. The industry can build on this by continuing to expand offerings and realise the full commercial benefits available from contributing to the SDGs. Table 3.1 highlights examples of services where the mobile industry can play a leading role and the potential revenues available.

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10. Valuing the SDG Prize. Unlocking Business Opportunities to Accelerate Sustainable and Inclusive Growth, AlphaBeta and the Business and Sustainable Development Commission, 2017
11. System Transformation: How digital solutions will drive progress towards the Sustainable Development Goals, GeSI and Accenture, 2016
12. System Transformation: How digital solutions will drive progress towards the Sustainable Development Goals, GeSI and Accenture, 2016

FIGURE 3.1

Examples of SDG-driven business opportunities

	Solution	SDGs impacted	Opportunity
	E-commerce and digital payments	1, 2, 5, 8, 9, 10	$580 billion revenue opportunity from e-commerce as users carry out more transactions online.[13] With mobile phones increasingly used as a default payment mechanism by users, operators are in a strong position to benefit from this. Furthermore, mobile phone usage will be fundamental to the digital payments economy in emerging markets, where cash remains the predominant method of payment among users. An example of a direct opportunity available to operators is the digitisation of agricultural payments in developing countries. The digitisation of formal procurement by agribusinesses and of agricultural subsidy disbursement by governments could result in up to $2 billion in direct annual revenues for mobile money service providers.[14]
	Mobile money and financial services	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 17	$380 billion revenue opportunity from closing the small business credit gap and including unbanked adults in the formal financial system.[15] Given that the majority of the under- and unbanked population are in developing markets, mobile operators are well positioned to realise some of this value through services such as mobile money, mobile credit, insurance and savings.
	Mobile health	3, 5	$60 billion mHealth market opportunity, including services such as remote monitoring, healthcare provider connectivity and management of medical infrastructure.[16] These services enable patients to receive health information and alerts, and connect with service providers. Operators are well placed to expand this market given their digital infrastructure. They can also partner with healthcare providers to deliver digital health solutions.
	Mobile education	4, 5	$70 billion mEducation market opportunity in Africa, including services such as online courses and education applications.[17] Mobile technology has already enabled disruptive business models and, with its ability to provide low-cost, innovative and flexible services customised to consumer needs, it is well placed to provide mobile education services. Operators can also partner with schools and other educational bodies to deliver mEducation services.
	Energy	7, 13	Approximately $27 billion per year is currently spent globally on lighting and mobile phone charging using kerosene, candles or disposable batteries.[18] Mobile and digital technologies can transform how energy is delivered, especially in developing countries – for example, via off-grid solar energy technology. Operators can leverage their existing infrastructure to provide both connectivity and energy to rural and remote areas, and increase revenues through use of data services to pay electricity bills and through mobile money platforms.
	IoT	1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17	More than $1 trillion revenue opportunity in the IoT market.[19] As this includes devices, connectivity and application revenues as well as non-cellular technologies, operators may not capture all of this – but even realising a small proportion would offer revenues of tens or hundreds of billions. Mobile-driven IoT solutions for areas such as smart cities, energy, water management, agriculture, conservation, logistics, manufacturing, police and traffic control have the potential to impact almost all the SDGs.

13. #SMARTer2030: ICT Solutions for 21st Century Challenges, GeSI and Accenture, 2015
14. Market size and opportunity in digitising payments in agricultural value chains, GSMA Intelligence, 2016
15. Billion Reasons to Bank Inclusively, Accenture, 2015
16. Corporate Disruptors: How business is turning the world's greatest challenges into opportunities, Accenture Strategy, 2016
17. Corporate Disruptors: How business is turning the world's greatest challenges into opportunities, Accenture Strategy, 2016
18. Off-Grid Solar Market To Hit $3.1 Billion By 2020, Bloomberg New Energy Finance, 2016
19. Global M2M Market To Grow To 27 Billion Devices, Generating USD1.6 Trillion Revenue In 2024, Machina Research, 2015

3.2 EFFICIENCY GAINS

Achieving the goals will not only bring revenue opportunities from new customers and products; it will also increase the value of existing users through enhanced voice, SMS and data services that improve their living conditions. Such services, in addition to connecting people and societies to a better future, can increase revenues, enhance user loyalty and increase subscriber uptake. Table 3.2 provides examples of such benefits where operators have rolled out new digital services that enhance people's lives.

FIGURE 3.2

Mobile operator efficiency gains

	Area	SDGs impacted	Service	Description	Efficiency gain
	Health	3	My Health – Telenor Pakistan	A mobile health service with information on general, maternal and child health, wellness and lifestyle topics	Average monthly churn rate for My Health between January and July 2016 was 8.2%, compared to 20% for all value-added services
	Agri	2	Site Pyo – Ooredoo Myanmar	A mobile app that delivers agricultural information and weather updates to farmers	ARPU was 14% higher and data usage was 6% higher for Site Pyo users compared to non-users in 2016
	Agri	2	M'chikumbe – Airtel Malawi	A mobile service that provides farming information while promoting financial literacy and cash security awareness	M'chikumbe users churn on average 70% less than non-users
	Financial services	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 17	Juvo and Cable & Wireless	Allows prepaid users to request credit extensions for immediate usage	In addition to increasing financial inclusion across Caribbean markets, Juvo drove a 65% increase in spend among Cable & Wireless customers in 2016
	Mobile money	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 17	M-Pesa – Safaricom Kenya	A mobile money transfer service	In 2015, by selling through M-Pesa, savings on commission to airtime agents were $64 million
	Utilities	7	Lumos – MTN Nigeria	Offers off-grid customers in Nigeria access to energy-as-a-service via a solar home system	MTN found that the Lumos service reduced churn by half in 2016
	Utilities	7	Tigo and PEG – Ghana	Pay-as-you-go solar energy solution; customers use mobile payments to pay for a home solar lighting system on a pay-per-use basis	122% higher ARPU for PEG customers compared to non-customers

To help the world achieve the SDGs and their targets, operators must continue to think above and beyond 'business as usual' improvements and accelerate every activity that contributes to the SDGs. The examples presented here show that not only is there a moral imperative in connecting everyone and everything to a better future; there are also wider benefits in terms of the 'triple bottom line' of people, planet and profits.

Dili, Timor-Leste. UN Photo/Martine Perret

Iceland. UN Photo/Eskinder Debebe

04

DEEP DIVE ON SDGs

In this section, we provide an in-depth analysis into five SDGs 1: No Poverty, 3: Good Health and Well-being, 5: Gender Equality, 9: Industry, Innovation and Infrastructure, and 13: Climate Action. These SDGs have been selected because they demonstrate the wide 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 in 2016 and/or developed particularly innovative digital solutions to drive progress towards the Goals.

For each of the five SDGs, we explain how the industry's impact increased in 2016 and identify the key drivers for those changes. We also present relevant case studies of operators making a significant impact through new and existing activities. Lastly, we identify ways in which the industry's contribution to the SDGs can be enhanced and brought closer to its potential.

1 NO POVERTY

2016
2015

Figure 4.1
Industry performance on SDG 1

34.3

37.5

4.1 SDG 1: NO POVERTY

SDG 1 focuses on eradicating poverty, providing equal access to economic resources and basic services, and building the resilience of the poor. Figure 4.1 shows that the mobile industry's impact on this SDG increased, with the score growing from 34.3 in 2015 to 37.5 in 2016. This was primarily driven by operators expanding networks, connecting more people and providing increased access to financial services via mobile money. However, to further increase the industry's impact, it is important to increase mobile internet adoption and uptake/usage of mobile financial services.

Mobile money is expanding access to financial services. By providing the poor with the financial services they need to make investments and manage unexpected expenses, the mobile money industry is helping eliminate poverty.[20] Additionally, mobile networks and connectivity are critical in supporting risk reduction and relief efforts during disasters and humanitarian crises. Having a way to communicate reduces exposure and vulnerability to extreme events and other economic, social and environmental shocks.[21]

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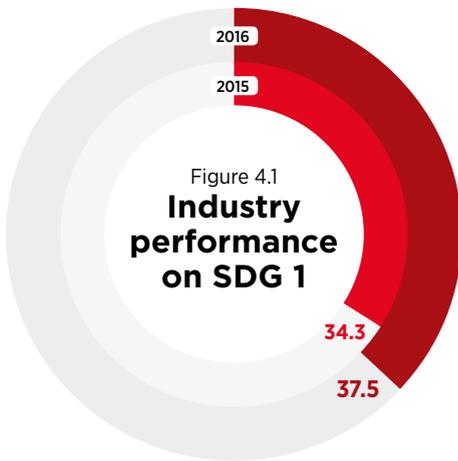
20. Mobile money is particularly relevant to Target 1.4, which seeks to ensure all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, including financial services.
21. This is particularly relevant to Target 1.5, which looks to build the resilience of the poor and vulnerable and reduce their exposure to shocks and disasters.

Mobile penetration in developing countries increased from **58%** to **61%** in 2016

CONNECTING **200 MILLION** MORE PEOPLE

(Source: GSMA Intelligence)

3G **3G network coverage in developing countries increased** from **74%** to **79%** in 2016

AN ADDITIONAL **340 MILLION** PEOPLE

(Source: GSMA Intelligence)

MOBILE MONEY

277 live mobile money services in 92 countries

31 million new active (90-day) mobile money accounts in 2016, **reaching 174 million active accounts**

(Source: GSMA Mobile Money)

200 million increase in mobile money transactions processed in 2016, reaching **1.3 billion transactions** in December 2016

$3.7 billion increase in value of mobile money transactions in 2016, reaching **$22.4 billion** in transactions in December 2016.

4.1.1 MOBILE MONEY

Mobile money has been around for more than 10 years and in this time has demonstrated the potential of mobile technology to transform access to financial services in developing countries. Mobile money is now available in 92 countries, representing two thirds of low- and middle-income countries. Registered accounts surpassed half a billion in December 2016. In Sub-Saharan Africa, there are more mobile money registered accounts than the total number of bank accounts.[22]

CASE STUDY
10 years of mobile money

The launch of M-Pesa in Kenya in 2007 was the first service to demonstrate the potential of mobile technology in transforming access to financial services in emerging markets. The service (literally 'mobile money' in Swahili) is now present in 10 countries and has around 30 million active users.

In West Africa, Orange was the first mobile operator to launch mobile money, with Orange Money in Côte d'Ivoire in 2008. In the same year, mobile money was piloted in Latin America by Tigo Paraguay. By 2010, MTN Mobile Money was live across seven Sub-Saharan Africa markets: Benin, Cameroon, Côte d'Ivoire, Ghana, Guinea-Bissau, Rwanda and Uganda. By 2012, Airtel had launched mobile money in India and across 12 Sub-Saharan African markets.

Mobile money enables people to transfer money via SMS simply, securely and instantly. They can then "cash out" through an agent, send money to other users, pay bills and pay for goods in shops. In some countries, mobile money providers have partnered with financial institutions to provide savings, loans and insurance products, and in a growing number of countries, mobile money providers have partnered with governments to offer payments for school fees, taxes, licences and health insurance.

Mobile money has transformed the lives of millions of people. According to a study by Tavneet Suri and Billy Jack, 2% of Kenyan households were lifted out of poverty (living on less than $1.25 per day) through use of M-Pesa.[23] Life stories include Felista in Kenya who tells how M-Pesa allowed her to send vital funds to her mother to pay for healthcare while she was ill. She also uses the service to send money to her father to pay for her brother's school fees.[24]

Mobile money is also helping businesses to be more efficient. A recent study found that in three East African countries – Kenya, Tanzania and Uganda – mobile money increased the opportunity of a firm to invest in fixed assets by reducing transaction costs and increasing credit worthiness.[25] Additionally, businesses can receive payments from customers and pay employees directly into their mobile money accounts.

22. Decade Edition of the State of the Industry Report on Mobile Money, GSMA, 2017
23. The long-run poverty and gender impacts of mobile money. Science Vol. 354 (6317), 1288-1292. New York: American Association for the Advancement of Science, 2016
24. https://www.youtube.com/watch?v=NN3_ZXH6Ttc
25. Does Mobile Money Use Increase Firms' Investment? Evidence from Enterprise Surveys in Kenya, Uganda and Tanzania. World Bank Group Policy Research Working Paper 7890, 2016

Mobile money continues to drive a price revolution in international remittances

Mobile money is supporting low-cost, accessible international remittance services in developing regions. By decreasing barriers to access remittance services, the mobile sector can increase flows of capital, therefore stimulating economic growth. Remittances have spillover effects on the economy of the receiving country, resulting in growth and development. Mobile money is particularly driving a price revolution in international remittances by increasing competition, leveraging existing networks and infrastructure, and capturing smaller remittance values than traditional players. Using mobile money for international remittances is more than 50% cheaper than using global money transfer operators (MTOs).[26]

CASE STUDY
International remittances

Digitising informal transaction flows across West Africa

In July 2013, Orange Money launched international money transfers between Côte d'Ivoire, Mali and Senegal. Since launch, transaction volumes and values have roughly doubled every six months. Eighteen months after launch, the value of cross-border remittances on Orange Money accounted for 25% of all remittances reported by the World Bank between these three markets. Orange has recently announced new corridors between Burkina Faso, Niger and Mali.

MTN and Airtel offer transfers from MTN Mobile Money customers in Côte d'Ivoire to Airtel Money customers in Burkina Faso. This had particular traction in rural Burkina Faso, where 60% of recipients live. The example shows the potential of mobile money to capture large flows of informal transfers.[27]

Remittance services for migrant workers in Qatar

In 2010, Ooredoo Qatar launched Ooredoo Mobile Money, a mobile money service with remittance options, targeting low-income migrant workers sending money back home on a regular basis. The service launched in partnership with MoneyGram. Recipients have the option to receive money directly to their mobile money account or to collect the amount received at a MoneyGram agent. Ooredoo Mobile Money offers lower remittance prices compared to alternatives. For example, the average cost of sending $200 from Qatar to Bangladesh is $8.92, compared to $6.89 with Ooredoo Mobile Money.[28] Additionally, in October 2015, Ooredoo launched a new payroll service to allow migrant workers to receive their salaries digitally, directly into their mobile money account.

The mobile money service quickly became a commercial success for Ooredoo, with a compound annual growth rate (CAGR) of 150% between 2011 and 2015. By the end of 2016, more than 50,000 international transfers were being sent every month using Ooredoo Mobile Money, primarily to Bangladesh, Indonesia, Kenya and the Philippines.

26. Driving a price revolution: Mobile money in international remittances, GSMA, 2016
27. Driving a price revolution: Mobile money in international remittances, GSMA, 2016
28. World Bank

4.1.2 ADDRESSING HUMANITARIAN CRISES THROUGH MOBILE TECHNOLOGY

By the end of 2016, 65.6 million individuals were forcibly displaced worldwide due to persecution, conflict, violence or human rights violation.[29] During a humanitarian crisis, mobile networks and the connectivity they enable can provide critical support to people affected by an emergency.[30] In addition to providing connectivity and information to refugees prior to and during their often-treacherous journeys, mobile technology is increasingly important for facilitating refugees' integration in the new country they are living in (for example, legal support, instant translation, information about asylum processes and education opportunities).[31] Mobile operators are increasingly aware that people affected by disasters have specific needs, so are providing solutions to support them.

CASE STUDY
Mobile and refugees

Zain connecting refugees

In 2015, Touch, managed by Zain Group, launched Al Tawasol in Lebanon, targeting Syrian refugees (nearly 2 million live in Lebanon). Al Tawasol is a prepaid service priced at $11 per month and includes 40 minutes of calls, 30 SMS to Syria, 100 MB of data and local Lebanese calls/SMS. Over 50,000 customers now use the Al Tawasol package.

At the end of 2016, Zain Group, in collaboration with the United Nations High Commissioner for Refugees (UNHCR) and Facebook, signed a deal to provide Wi-Fi connectivity (free and high speed) for refugees in Jordan for the next five years. Using UNHCR's expertise and knowledge about where refugees are located, Zain is able to provide Wi-Fi services to key areas across Jordan. During the first phase of the project, four centres were equipped with Wi-Fi connectivity, where an average of 1,700 users per month are benefitting from the service. In the second phase of the project, Wi-FI connectivity was brought to six more community centres, with an average of 21,000 users per month benefitting.

Facilitating the integration of Syrian Refugees through "Hello Hope"

Some 3 million Syrian refugees live in Turkey, 1.3 million of which are Turkcell customers. To facilitate the integration of refugees, in September 2016 Turkcell launched Hello Hope, a free mobile app. The app has four main elements: Turkish vocabulary flashcards of 900 of the most common words and expressions, including audio files for pronunciation; instant audio translation between Turkish and Arabic; an FAQ section to helps refugees access reliable information on public services such as registration, health and education; and one-click access to Turkcell's Arabic language call centre. Some 300,000 people currently use the service.[32]

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29. UNHCR
30. http://www.gsma.com/refugee-connectivity/
31. The Importance of Mobile for Refugees: A landscape of new services and approaches, GSMA, 2017
32. Turkcell

CASE STUDY
Mobile and refugees

Vodafone digital school in a box for refugees

In 2015, the Vodafone Foundation launched a portable 'Instant Classroom' to give child refugees access to tablet-based education. This digital school in a box can be set up in 20 minutes and works in classrooms without electricity. Vodafone partnered with UNHCR to bring Instant Classroom to 12 schools in Kenya, Tanzania and the Democratic Republic of Congo (DRC).

The digital school box is equipped with a laptop, 25 tablets pre-loaded with educational software, a projector, a speaker and a hotspot modem with 3G connectivity. The tablets can connect to the laptop locally, enabling teachers to deliver content and applications to students without the need to access the internet. All the components can be charged simultaneously from a single power source while the case is locked. After six to eight hours of charging time, the Instant Classroom can be used for a full day in a classroom without access to electricity. The portable nature of the equipment has allowed for Instant Classroom to be moved between schools, enabling more students to benefit from tablet-based learning.

Bamako, Mali. UN Photo/Marco Dormino

Humanitarian cash assistance

There is a growing consensus across the humanitarian and donor sectors that cash assistance is more beneficial for vulnerable people than traditional forms of aid (e.g. the provision of food and blankets). In addition to providing connectivity and access to education services, operators are well placed to leverage mobile financial services to disburse cash transfers, which are becoming more digitised. Mobile operators and humanitarian agencies are starting to partner to enable the delivery of cash aid transfers through mobile money.[33] At the World Humanitarian Summit in May 2016, the GSMA made a commitment to expand the remit of the Humanitarian Connectivity Charter to include a focus on this emerging topic.

CASE STUDY
Humanitarian cash assistance

Airtel Rwanda and UNHCR

Rwanda is one of the 19 countries where the number of mobile money accounts exceeds the number of bank accounts. In November 2016, UNHCR and Airtel partnered to allow Rwanda returnees to receive cash aid via mobile money. Previously, returnees were supplied with three months' worth of food and household supplies. Now, returnees receive $250 per adult and $150 per child as part of the financial resettlement package through Airtel Money. Once returnees are registered, an Airtel agent provides a phone if they do not own one, trains them on the use of mobile money, and helps with the initial withdrawal of cash.[34]

Zain Cash Iraq

In Iraq, Zain has partnered with UNHCR and the International Committee of the Red Cross (ICRC) to distribute cash assistance via Zain Cash, in support of those affected by the ongoing conflict. In February 2017, there were 30 cash-out locations in Mosul, and 2,500 across the country. Beneficiaries of the ICRC have been registered for the service. They receive an SMS notification when their Zain Cash Wallet is credited and can cash out at an agent. Agents can be located via GPS on basic phones and smartphones.[35]

33. Disaster Response GSMA Humanitarian Connectivity Charter: Annual Report 2016, GSMA, 2017
34. Landscape Report: Mobile Money, Humanitarian Cash Transfers and Displaced Populations, GSMA, 2017
35. One year on from the World Humanitarian Summit: New Research on Mobile Money, Humanitarian Cash Transfers and Displaced Populations, GSMA, 2017

4.1.3 ACCELERATING IMPACT

While the mobile industry has a significant impact on SDG 1: No Poverty, there remains a substantial opportunity to enhance the contribution to help every country realise the SDGs.

Accelerating mobile money

Mobile operators continue to take the lead in making mobile financial services accessible in new markets and to underbanked people. If greater impact is to be achieved, it is essential that governments support the industry with a regulatory framework that incentivises investment and the development of innovative products that meet the needs of the underbanked.

The principal opportunities for operators to better support poverty reduction by offering mobile financial services in the future are as follows:

• The rise of smartphones, which will provide operators with an opportunity to offer MFS users a richer interface (via an app), a smoother customer journey, and access to more advanced financial services.

• Partnering with businesses and governments in order to digitise new payment streams, helping to make the service more relevant to the lives of individuals, as well as helping governments and businesses to increase efficiency, security and transparency.

• Increasing partnerships across borders to provide access to even lower cost international remittances.

Increasing mobile adoption among refugees

Refugees face many of the same common barriers to mobile adoption as other underserved populations – accessibility, affordability and literacy. The barriers are, however, more acute for refugee populations – and yet their particular needs and vulnerabilities make mobile services even more important. According to UNHCR's Connecting Refugees paper, there are three pillars to addressing connectivity issues for refugees – access, affordability and usage. Firstly, mobile operators, governments and regulators need to work together to improve network coverage in refugee hosting areas. Secondly, with regards to affordability, UNHCR wants to work with mobile operators and other connectivity service providers to deliver low-cost refugee-specific products. Thirdly, developing and implementing training programmes and supporting the development of refugee-specific content are key to increasing usage among refugees.[36]

36. Connecting Refugees, UNHCR, 2016

3 GOOD HEALTH AND WELL-BEING

2016
2015

Figure 4.2
Industry performance on SDG 3

27.3

31.4
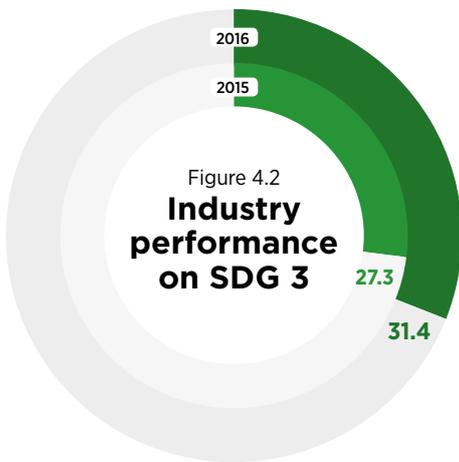
4.2 SDG 3: GOOD HEALTH AND WELL-BEING

Figure 4.2 shows the mobile industry's impact on SDG 3: Good Health and Well-being increased from 27.3 to 31.4 in 2016, the largest overall increase for any SDG. A key driver of this is the improvements in network coverage, resilience and connectivity, which can facilitate emergency communication and broadcasting during health epidemics. These improvements also enable the use of big data; operators can provide critical information on the flow of people to and from affected areas and therefore help public health organisations more effectively respond to the spread of disease and better target relief efforts.

Increased connectivity also enables users to access formal and informal health-related information via voice, SMS and mobile health applications. For example, pregnant women and new mothers can use mobile phones to access essential healthcare and nutritional information. In 2016, an estimated 33% of mobile subscribers (more than 1.5 billion people) used a mobile phone to improve their health.[37] Connectivity also facilitates access to a broader suite of digital health services, including remote patient monitoring, digital booking systems and drug stock management, which have the potential to improve a range of health outcomes.

Lastly, new mobile-driven IoT solutions are contributing to SDG 3: Good Health and Well-being. For example, in 2016 there was a 33% increase in the number of cellular M2M connected cars. By enabling smart vehicles that can reduce the incidence of road and traffic accidents, this can help countries reduce the number of deaths and injuries from road traffic accidents.[38] Other IoT solutions, such as wearable technology and biosensors, are also relevant to SDG 3 as they can enable individuals to receive diagnosis for medical problems remotely and therefore significantly reduce the costs of seeing a doctor.

An estimated

1.5bn PEOPLE

(more than 30% of mobile subscribers) used mobile phones to improve their health

(Source: GSMA Intelligence Consumer Survey 2016)

74%

increase in the number of mHealth services in 2016

(Source: GSMA mHealth. This figure only captures applications tracked by the GSMA)

42 million

increase (33%) in the number of cellular M2M connected cars in 2016

(Source: Machina)

37. Source: GSMA Intelligence Consumer Survey
38. This is particularly relevant to Target 3.6

# 4.2.1 MOBILE BIG DATA FOR EPIDEMIC PREVENTION

The use of mobile big data for social good is today largely in the pilot phase. Although there are examples that showcase the potential of using big data for social good, there are only a few examples that have scaled or become sustainable. At Mobile World Congress 2017, the GSMA launched the Big Data for Social Good initiative, which will leverage mobile operators' big data capabilities to address humanitarian crises, including epidemics and natural disasters. The initiative was launched through the collaboration of 16 mobile operators, the United Nations Foundation, the Global Partnership for Sustainable Development Data (GPSDD), the Digital Impact Alliance (DIAL) and Data 2X. Trials of Big Data for Social Good, focusing on epidemics, started in summer 2017 in Bangladesh (Telenor), Brazil (Telefónica), India (Bharti Airtel), Myanmar (Telenor) and Thailand (Telenor). The objective of the multi-operator pilot is to develop common capabilities to monitor, alert and predict the spread of diseases that, if unaddressed, could create epidemics.

CASE STUDY
Epidemic prevention

KT global epidemic prevention project

KT has developed a model to help epidemic prevention using mobile data. The Global Epidemics Prevention Project is designed to help governments prevent the entry of global epidemics into their country by travellers that have visited other countries affected by a disease. Additionally, the government can send SMS alerts to its citizens abroad with self-prevention measures. Currently with quarantine systems, there is no quarantine for travellers who travel from an epidemic-prone country but transit via a non-affected country before returning home. Through roaming data from travellers, it is possible to fill this gap.
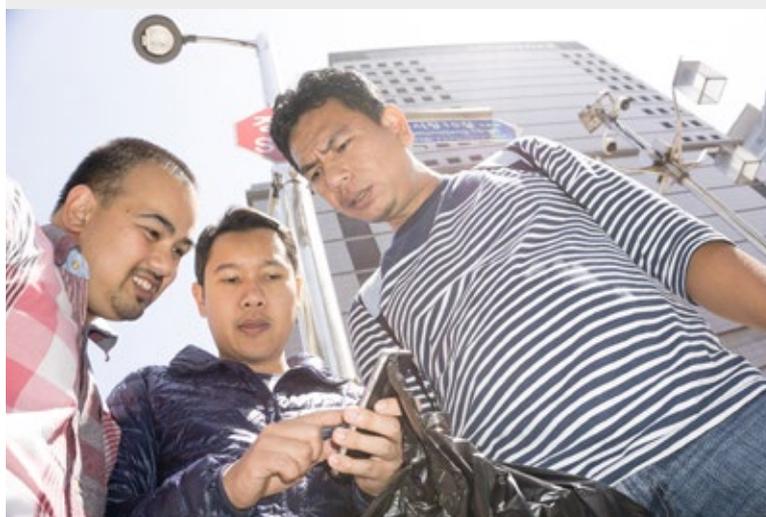
The project was launched in South Korea as a pilot in November 2016. In January 2017 206,000 SMS alerts had been sent to Korean travellers travelling to epidemic-prone countries, and 8,700 people travelling via transit countries that were not affected by epidemics were notified to the government for quarantine. Per year, this means around 90,000 likely-infectious cases could be monitored.

Since prevention of infectious diseases is a challenge not only for Korea, but at a global level, KT has reached out to the global community with the project. As a result, it was introduced in the Business 20 health initiative policy paper. KT recently signed a memorandum of understanding with Kenya Safaricom, and is now in talks with Cambodia's Ministry of Posts & Telecommunications and the UAE government.

CASE STUDY
Epidemic prevention

Telenor and dengue fever in Pakistan

Telenor Research, in cooperation with the Harvard T.H. Chan School of Public Health, Oxford University, the US Centre for Disease Control and the University of Peshawar, has demonstrated how big data can be harnessed to anticipate and track the spread of dengue fever. Anonymised call data from more than 30 million Telenor Pakistan subscribers during the 2013 dengue outbreak was analysed to accurately map the geographic spread and timing of the epidemic.

The project took two years from inception to the publication of the study in September 2015. Telenor Group plans to replicate the epidemic use case in several countries depending on local legislation.[39]

UNICEF and Telefónica Magic Box partnership

In February 2017, Telefónica joined UNICEF in the Magic Box initiative. This initiative is a Big Data for Social Good platform which collects real-time data, combining and analysing aggregated and anonymised data from private sector companies together with other existing public data sets relating to climate, GIS (UNICEF's Geographic Information System), and socioeconomic and epidemiological data to better understand humanitarian disasters.

At Mobile World Congress 2017 in Barcelona, Telefónica and UNICEF demonstrated how mobile network data from Colombia could be analysed to improve the management of humanitarian disasters, providing alarms and supporting critical response and recovery monitoring.

39. State Of Mobile Data For Social Good Report, GSMA, 2017

4.2.2 ADDRESSING HEALTHCARE THROUGH DIGITAL HEALTH

Digital health solutions have the potential to address key healthcare issues. Firstly, they increase access to healthcare delivery as some services, such as patient monitoring and diagnostics, can be delivered and managed remotely. Secondly, the quality of healthcare can improve through digital health services as they enable faster and more effective coordination of care and professionals as well as timely data sharing. Lastly, costs for public and private institutions delivering healthcare services can be reduced.[40]

Mobile operators are actively involved in delivering digital health services in developing countries. Operators are looking for partners in governments and health tech players that can leverage the key assets that mobile operators possess. These include strong customer relationships, and relationships with local authorities in countries where tech players lack presence. Operators can also leverage the SIM card for identity-related services, mobile money for payments, and bundling.

CASE STUDY
Mobile health centres

In Lesotho, where 1 in 4 people are HIV-positive, it is difficult to access antiretroviral treatment (ART) because of the mountainous terrain, the cost of travel and the stigma of HIV. In April 2016, Vodafone Foundation and Vodacom Lesotho, in partnership with the Ministry of Health, USAID, Elton John AIDS Foundation, ViiV Healthcare and The ELMA Foundation, launched Mobilising HIV Identification and Treatment (MHIT). Through this programme, HIV-positive children and pregnant women living in rural areas can receive primary healthcare, testing and life-saving treatment close to home. The aim of the programme is to double the number of HIV-positive children accessing ART in three years. The programme combines Vodafone's M-Pesa mobile money service, to ensure that all children living with HIV/AIDS can access treatment by supporting their transportation costs to health clinics, together with travelling clinics and a smartphone app that enables the tracking of patients in remote areas. The initiative was launched in two districts, but, due to its success, is due to be expanded across the country in 2017.[41]

Korogocho, Kenya. © UNICEF/UNI149615/Schermbrucker

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40. Scaling digital health in developing markets, GSMA Intelligence, 2017
41. See http://www.vodafone.com/content/foundation/hiv-treatment.html

CASE STUDY
Remote patient monitoring

AxisMed is a chronic care management provider based in Brazil and acquired by Telefónica in 2016. Rising incidence of chronic diseases is a key cost issue: AxisMed estimates patients with chronic conditions account for 40% of healthcare costs. AxisMed is a remote monitoring solution that tracks and transmits biometric data from connected devices given to patients to medical professionals who oversee their treatment plans. The devices are capable of monitoring blood glucose, blood pressure and other metrics, depending on the patient's condition. The professionals are on-call 24×7 in the event of any complications. Over 80% of patients monitored have adhered to their treatment plan, which AxisMed claims has reduced hospital emergency ward visits by two-thirds and the length of hospital stays by 50%.

In 2015 in Sweden, **Telia** launched HomeCare. This is a device connected to various sensors that wirelessly communicates between a user's home and the caregiver. Users get help with different types of services such as blood tests or ECG measurement in their home. Users can also monitor their health development and share information during illness. The system can provide reminders, such as taking medicines. It allows resources in public and private healthcare systems to be used more efficiently. Chronic medical conditions where HomeCare is currently applied include inflammatory bowel disease, chronic obstructive pulmonary disease and heart failure.[42]

In 2016, there were 65 pilot users using Telia HomeCare. Following a recent partnership with a major Swedish public healthcare player, the solution is being rolled out to more than 500 patients.

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42. See http://www.systemtransformation-sdg.gesi.org/case-studies.html

4.2.3 ACCELERATING IMPACT

While the mobile industry made significant progress in increasing its impact on SDG 3: Good Health and Well-being in 2016, many of the technologies and platforms through which it can maximise its influence remain in their early stages, such as big data, IoT and digital health. There is therefore great potential to increase the impact further.

Accelerating big data for social good initiatives

As there is still a lack of scalable and sustainable examples of big data used for social good, there is a need to build an enabling environment by:

- developing business cases to understand the value of return, as well as business models that are sustainable, replicable and scalable

- investing more in resources, as unique skills and expertise are required to fully leverage mobile data for social impact

- considering privacy and data protection and the associated regulatory and ethical frameworks that govern them

- reducing fragmentation and duplication to create a normative framework for this field.[43]

Scaling digital health

Digital health in developing countries is still in its infancy. Many pilots are not followed by full-scale implementation due to lack of sustainable financing, high risks for individual stakeholders and long time-to-market for commercial solutions. Some of the key enablers that can drive scale are:

- greater public funding, as in developing countries the majority of people have low disposable incomes to self-finance their health expenditure

- policy and regulation that promote investment and facilitate faster time-to-market of healthcare solutions

- public-private partnerships – ecosystem collaboration is needed as individual digital health stakeholders do not own the full set of resources and capabilities

- tech interoperability – without this, professionals need to carry multiple devices to perform their activities and send data to centres.

Mobile operators have an opportunity to become leading stakeholders in digital health, take a central role and scale digital health solutions. They are increasingly looking to collaborate with governments and healthcare providers as they are in a strong position to leverage key assets such as their customer relationships, wide coverage, and deep in-country knowledge and presence. Additional assets that operators can offer in digital health include data centres and cloud computing.[44]

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43. State Of Mobile Data For Social Good Report, GSMA, 2017
44. Scaling digital health in developing markets, GSMA Intelligence, 2017

5 GENDER EQUALITY

Figure 4.3
Industry performance on SDG 5

2016
2015

34.4
37.2

4.3 SDG 5: GENDER EQUALITY

Gender equality and women empowerment will be key to achieving many of the SDGs as well as SDG 5: Gender Equality. With regards to the latter, Target 5b requires countries to enhance the use of enabling technology, in particular information and communications, to promote the empowerment of women.
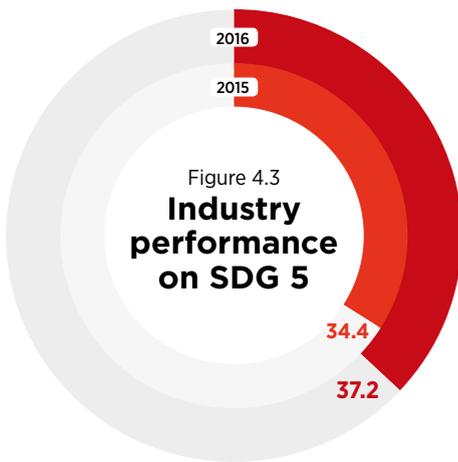
Figure 4.3 shows the mobile industry's impact on SDG 5: Gender Equality increased from 34.4 to 37.2 in 2016. This was driven by operators connecting more women, particularly in developing markets; there were almost 100 million new female mobile subscribers and 160 million new female internet subscribers in 2016. Women are also using mobile to access services that enhance their lives, with an estimated 400 million women in developing countries using mobile to improve their health and an estimated 300 million women in developing countries using mobile to improve their education (or that of their children).

Female mobile take-up increased from

60% → 62%

with **90m** new female subscribers

(Source: GSMA Intelligence calculations using GSMA Intelligence and Gallup World Poll data)

Female internet take-up increased from

41% → 45%

with **160m** new female internet subscribers

(Source: GSMA Intelligence calculations using GSMA Intelligence, ITU and Gallup World Poll data)

An estimated
400m FEMALE SUBSCRIBERS
in developing countries **(25%)**

have used mobile to improve their health

(Source: GSMA Intelligence Consumer Survey 2016)

An estimated
300m FEMALE SUBSCRIBERS
in developing countries **(20%)**

have used mobile to support education for themselves or their children

(Source: GSMA Intelligence Consumer Survey 2016)

Women accessing mobile helps to catalyse broader gender equality in social, economic and political dimensions, benefiting not only women themselves, but also their communities, businesses and the broader economy.

- Mobile can help empower women, making them more connected and safer, and providing access to information. At least 89% of women in each of the 11 low- and middle-income countries in a GSMA study 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.[45]

- Mobile also provides women with access to services and life-enhancing opportunities, such as health information and guidance, financial services and employment opportunities, often for the first time. Mobile has the potential to contribute positively to protecting women's human rights and also to their economic, social and political empowerment and development by lowering information costs, creating information goods, expanding information bases and boosting financial independence and productivity.

- Women are half of the potential market for the mobile industry. Closing the gender gap in mobile phone ownership and use in low- and middle-income countries could unlock an estimated $170 billion market opportunity for the mobile industry from 2015 to 2020.[46]

- Connecting women to mobile and mobile-enabled services also has wider economic and social benefits. A recent study that found mobile money had lifted 2% of Kenyan households out of extreme poverty also showed that mobile money increased consumption in female-headed households twice as much as male-headed households, suggesting mobile money can disproportionately benefit women.[47]

45. Bridging the gender gap: Mobile access and usage in low and middle-income countries, GSMA, 2015
46. Bridging the gender gap: Mobile access and usage in low and middle-income countries, GSMA, 2015
47. The long-run poverty and gender impacts of mobile money. Science Vol. 354 (6317), 1288-1292. New York: American Association for the Advancement of Science, 2016

4.3.1 CLOSING THE GENDER GAP

Mobile operators around the world are driving progress to connect more women, helping them access essential services such as health, education and financial services. Across Africa, Asia and Latin America, operators are driving the effort to accelerate digital and financial inclusion for women through the GSMA Connected Women Commitment Initiative.[48] 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, over 25 operators – representing approximately 10% of connections worldwide – have made a formal Connected Women Commitment to connect millions more women by 2020. Through this initiative and others, Connected Women and its mobile operator partners have delivered life-enhancing services to more than 17 million women in developing countries.

CASE STUDY
Addressing barriers to mobile internet adoption in India

Safety and harassment are among the major barriers to mobile internet adoption that women face. To address this issue, in November 2016 Vodafone India launched two services – Smart Snehidi and Vodafone Sakhi. Smart Snehidi aims to improve digital inclusion among rural women by overcoming their barriers to internet usage. The service offers an affordable phone on instalments, free data for a year and digital skills training. Since the launch, 2000 'Snehidis' have been enrolled across three districts in Tamil Nadu. Vodafone Sakhi allows women to make a private top-up through an OTP code, without mobile number sharing, make emergency calls and receive health tips.

In August 2016, Idea Cellular, in partnership with Mahindra Comviva, launched a private top-up service that allows women to top up at retailers without disclosing their phone number. Instead of using their actual phone number, women can request an alias number to share with the retailer to top up.

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48. See https://www.gsma.com/mobilefordevelopment/programmes/connected-women/the-commitment

CASE STUDY
Enabling access to mobile financial services to promote financial inclusion

In December 2014, Orange Mali launched two services, Sini Tonon and Tin Nogoya, on the Orange Money platform. Sini Tonon is a savings product. The account can be opened by any Orange Money subscriber with a minimum initial deposit of XOF3,000 (approximately $5). Initial results show Sini Tonon is encouraging its customers to save – 55% of women and 48% of men had not saved before registering to this service. Sini Tonon users reported feeling more safe and secure in saving with this service rather than through other methods.

Tin Nogoya is an insurance product that activates automatically when a savings balance reaches XOF40,000 (approximately $66) on the Sini Tonon account. The insurance gives the user 12 months of life/disability and maternal health insurance. The payout to the beneficiary for death or permanent disability is XOF150,000 (approximately $260). Tin Nogoya is well positioned to provide first-time access to insurance, especially for women. Some 97% of female users had never been insured before using this product. A third of women identify Tin Nogoya as the reason why they use the saving product; insurance products are effectively driving savings among women.[49]

49. Case Study – Orange Mali: Reaching Women Customers with Mobile Savings and Insurance, GSMA, 2015

CASE STUDY
How mobile-enabled services have improved the lives of women

MAMA Bangladesh (Mobile Alliance for Maternal health Action), known locally as Aponjon, is a public-private initiative that leverages mobile phone penetration to deliver health education messages to new and expecting mothers. The programme is led by the Bangladesh social enterprise, Dnet, in partnership with the government of Bangladesh's Ministry of Health and Family Welfare. The mobile operators involved in this project are Airtel, Banglalink, Citycell, Grameenphone and Robi. The initiative was piloted in 2011 and was scaled to the whole country in 2012. The platform is a voice and SMS broadcast service, but also includes a helpline and mobile app.

The service now has 1.9 million subscribers and has had a significant impact on expectant mother behaviours. After receiving Aponjon SMS, 44% of women increased their food intake, 50% avoided heavy work and 13% made plans for the birth. Additionally, following service subscription, 58% of women users learned more about supplementary food and nutrition for babies older than six months, 41% increased their knowledge of hygiene, 21% learned how to create a special bond between mother and child, and 13% learned how to take care of the newborn's umbilical cord.[50]

50. Scaling digital health in developing markets, GSMA Intelligence, 2017

4.3.2 ACCELERATING IMPACT

While mobile technology has been spreading quickly, it has not done so equally, with women showing lower uptake of mobile and mobile services, especially in low- and middle-income countries. For example, in low-income countries the gender gap in mobile phone ownership remained above 20% in 2016.[51] Even when women do own a mobile device, they are less likely to use it for more sophisticated services such as mobile internet and mobile money. For example, in a survey of smartphone and feature phone owners in Kenya, only 42% of women surveyed (versus 62% of men) had used Facebook.[52] The gender gap for internet access

more broadly in developing countries increased in 2016 from 15% to 17%, with at least 200 million fewer women accessing the internet than men.[53]

GSMA research highlights that women face many barriers to owning and using mobile phones including cost, network quality, safety & harassment issues and digital skills. Social norms and disparities between men and women in terms of education and income influence women's access to and use of mobile technology, and often contribute to women experiencing these barriers more acutely than men.

The digital gender gap is not going to close on its own. Its root causes are driven by a complex set of social, economic and cultural barriers. Targeted intervention is therefore needed by industry, policymakers and the development community to address the barriers faced by women and ensure the following:

Accessibility
including access to quality network coverage, handsets, electricity, agents and formal IDs

Safety
when using a mobile phone, including protection from theft, harassment and fraud

Affordability
including handsets, tariffs, data and transaction fees

Relevance
policies, products, content and services that meet women's needs as well as men's.

Usability and skills
including handsets and services

51. Source: GSMA Intelligence calculations using GSMA Intelligence and Gallup World Poll data. GSMA Connected Women define the 'gender gap' as how less likely a female is to own a mobile phone than a male. Gender gap in ownership (%) = ((male take-up)) – (female take-up)) / (male take-up))
52. Bridging the gender gap: Mobile access and usage in low and middle-income countries, GSMA, 2015
53. Source: GSMA Intelligence calculations using ITU data

**9 INDUSTRY, INNOVATION AND INFRASTRUCTURE**

4.4 SDG 9: INDUSTRY, INNOVATION AND INFRASTRUCTURE

The mobile industry has a critical role to play in SDG 9, which focuses on building resilient infrastructure, promoting inclusive and sustainable industrialisation and fostering innovation. It contributes both as a provider of critical infrastructure and as a catalyst for the evolution of other industries. Operators also directly influence Target 9c, which calls for a significant increase in access to information and communications technology as well as universal and affordable access to the internet in least developed countries (LDCs) by 2020.

Figure 4.4 shows the mobile industry's impact on SDG 9 increased from 41.6 to 44.8 in 2016, making it the SDG where the industry has the biggest impact. The main drivers behind the improvement were the increases in coverage and take-up of mobile, mobile internet and M2M services discussed earlier. Operators also made progress in helping to provide more affordable access to the internet in lower income countries, with the price of a 500 MB plan falling from 5% to 4% of GNI per capita in developing countries and 17% to 11% in LDCs.[54] Although the latter is still unaffordable for many people, the reduction achieved in one year is significant and likely one of the reasons why mobile internet penetration in LDCs almost reached one quarter in 2016, with 45 million additional people connected.

2016
2015

Figure 4.4
Industry performance on SDG 9

41.6

44.8

54. Source: GSMA Intelligence calculations based on ITU data

2G **Increase in 2G coverage in LDCs from**
85% → 87%
an additional
30m people covered
(Source: GSMA Intelligence calculations based on ITU data)

3G **Increase in 3G coverage in LDCs from**
49% → 54%
an additional
60m people covered
(Source: GSMA Intelligence)

Increase in mobile internet penetration in LDCs from
19% → 23%
an additional
45m people connected
(Source: GSMA Intelligence)

MOBILE BROADBAND
Mobile broadband prices as a proportion of GNI per capita:
5% → 4% in developing countries
17% → 11% in LDCs
(Source: GSMA Intelligence calculations based on ITU data)

Two of the key components of SDG 9 are developing high-quality, reliable, sustainable and resilient infrastructure and increasing access to information and communications technology, in particular providing universal and affordable access to the internet in LDCs. Mobile operators have a crucial role to play in increasing network infrastructure and providing universal and affordable access to the internet.

4.4.1 EXPANDING MOBILE NETWORK INFRASTRUCTURE

Operators have been investing heavily in 3G and 4G technology to connect the unconnected. 3G population coverage has increased from 79% to 83% in the past year, while more than half the world's population are now covered by 4G networks. However, many still remain unconnected, especially in LDCs and rural and remote areas, which are usually commercially and economically less sustainable. Operators are therefore pursuing more innovative solutions to roll out mobile networks in remote areas and make mobile services more affordable to the poorest individuals.

CASE STUDY
Network rollout

Tanzania – rural coverage pilots

In July 2016, Airtel, Tigo and Vodacom signed a letter of agreement to implement 3G pilot sites – using solar-powered base station technology – and test a tripartite national roaming agreement in Tanzania, the first of its kind in Africa. The three Tanzanian MNOs agreed to trial a low-cost 3G solution on six pilot sites (two per operator) spread across the country. The GSMA supported the drafting of the agreement and coordinated the operational effort to implement the pilots on the ground and ensure efficient dissemination of information between the parties.

The 3G pilot sites commissioned by Tigo and Vodafone went live in Q1 2017, offering mobile broadband coverage for the first time to 50,000 rural Tanzanians. Airtel sites went live in June 2017, covering an additional 20,000 people. Under the pilot agreement, each operator partnered with their respective technology vendors. The site locations were chosen in partnership with UCSAF in order to address the universal service fund priority list and assess viability in real-life conditions. UCSAF provided full support in the planning stages of the new sites including the assessment of the site locations, and supported operators in clearing administrative approvals for site deployments.

This pilot sets an early stake in the ground for further collaboration and discussion between policymakers and operators on what initiatives will support further deployment of mobile broadband coverage. It shows that mobile operators, vendors, government, UCSAF and other entities can work together, under the coordination of the GSMA, to do the following:

- invest further in expansion of mobile broadband services to underserved communities

- further improve the policy environment to ease the investment pressure and distribution of equipment and services (for example, reductions in taxes and regulatory fees, and fast-tracking of planning permission and rights of way).

- individually or in combination trial business models that address consumer barriers to mobile internet adoption, including basic digital literacy and product knowledge, access to relevant content in primary and secondary languages, access to affordable smartphones, and digital safety for vulnerable population groups such as women and children.

Telefónica's Internet4All

Internet4All is Telefónica's initiative to bring connectivity to rural and remote areas of Latin America. The project aims to provide mobile broadband connectivity to unconnected populations using innovative software technologies such as low orbit satellites, flying networks and software-defined and virtualised networks. The initiative, which started more than two years ago, is key to achieving a sustainable business model that provides high-speed internet access to the most isolated populations. The pilot connects close to 200,000 users in rural areas of the coast, highlands and jungle of Peru. It will scale up in 2017 and 2018 to other Latin American countries.

Vodacom's innovative coverage rollout solution

The rapid increase in mobile data usage is putting pressure on mobile networks. Speedily deploying new base stations to address this demand growth can be challenging for operators. In 2015 in South Africa, Vodacom, Vodafone's affiliate, developed an innovative solution to meet the demand, allowing mobile base stations to be fitted on the roofs of shipping container shops. This allows new sites to be rolled out in weeks as opposed to the 12–18 months it takes to build a new base station. Vodacom has successfully deployed seven sites so far, providing coverage for hundreds of thousands of citizens.

China connecting rural areas

Guided and organised by the Ministry of Industry and Information Technology, in 2004 China Mobile launched the Village Connected Project to promote universal access in rural areas. By 2016, China Mobile had built nearly 62,000 base stations cumulatively, enabling mobile phone access for around 122,000 remote villages and broadband access for around 33,000 administrative villages and 2,167 rural schools.

In 2016, China Telecom continued building communication networks for rural areas and remote villages and towns. It participated in government-led universal-service pilot projects and expanded network infrastructure to reach 35,000 administrative villages (16 administrative villages in remote areas in west and northwest Guangxi were connected in November 2016).

In 2016, China Unicom began to roll out broadband access in more than 12,000 administrative villages across 17 provinces. It completed broadband construction work in almost 5,000 villages. China Unicom has also launched various tariff packages, allowing users in rural areas to access communication services at a low cost.

4.4.2 INCREASING ACCESS TO INFORMATION AND COMMUNICATION TECHNOLOGY

Target 9.c focuses on significantly increasing access to information and communications technology and striving to provide universal and affordable access to the internet in LDCs by 2020. Given the lack of fixed infrastructure in LDCs, mobile is the most common way people access the internet so it is critical that services are affordable, both in terms of the cost of the service and the device necessary to access it.

Progress has been made towards making the internet more affordable – the average price of a 500 MB prepaid mobile data plan in LDCs fell to just over 10% of GNI per capita in 2016. This is however still higher than the target of the Broadband Commission of 5% of GNI per capita and increases significantly when considering only the bottom 40% of the population by income, for whom mobile broadband prices were more than 30% of GNI per capita in 2016 in LDCs. According to GSMA studies, affordability – both of handsets and mobile services – is among the top barriers to mobile internet adoption in Africa[55], Asia[56] and Latin America[57].

Research from the Alliance for Affordable Internet (A4AI) has identified three mobile data service plans in developing countries that assist with affordability barriers:

1. **Service-specific data bundles:** The user can purchase a data bundle that allows them to use specific apps and access certain sites for a certain period of time (e.g. social media packs which offer data for use on specific social networking sites).

2. **Earned data:** Instead of directly purchasing data, the user receives data in exchange for performing an action (e.g. completing a survey, watching an advertisement, or purchasing a specific service or handset from an operator). Typically, this data can be used to access any site or service.

3. **Zero-rated data:** Services that make a specific set of content, websites or applications available at no additional cost to the user. The data used to access the specified site or app does not count towards the user's data usage.[58]

In terms of handset affordability, a GSMA and Dalberg study identified three business models addressing this barrier:

1. **Direct payment:** Consumers use their own income and/or savings to purchase new or second-hand devices. Mobile operators can lower the cost of devices by offering subsidised devices or a bundled plan.

2. **Asset financing:** Given that low-income populations often cannot afford to pay upfront, credit allows consumers to obtain devices even when they cannot afford the upfront payment.

3. **Third-party payment:** For people living in extreme poverty and for whom buying a mobile phone would be beyond their means, governments, businesses and others that derive value from increased access may subsidise or offset device costs.

By supporting handset affordability initiatives, mobile operators can derive benefits such as increased ARPU, reduced churn, customer acquisition and brand awareness.

55. Consumer barriers to mobile internet adoption in Africa, GSMA Intelligence, 2016
56. Consumer barriers to mobile internet adoption in Asia, GSMA Intelligence, 2016
57. Digital inclusion in Latin America and the Caribbean, GSMA Intelligence, 2016
58. The Impacts of Emerging Mobile Data Services in Developing Countries, A4AI, 2015

CASE STUDY
Improving affordability of mobile data services[59]

Service-specific data bundles

Etisalat Nigeria offers customers "smartpaks", which provide unlimited access (subject to fair-use policy) to specific sites. It offers various packages, such as the chat pak (which includes WhatsApp, BBM and WeChat) and the social me pak (Facebook, Twitter, Instagram, Eskimi, WhatsApp, BBM and WeChat) on daily, weekly or monthly plans. The costs range from NGN50 (approximately $0.16) for the daily plan to NGN700 (approximately $2.20) for the monthly plan.

Earned data

One of Grameenphone's digital services in Bangladesh is WowBox, a lifestyle app that can be browsed without any data charges. This app also offers customers 20 MB of free data each week. In addition to browsing the full range of content offered in the app (which includes daily news updates, lifestyle tips, games, sports, horoscopes, jokes and competitions), users can earn tokens (reward points) to spend on internet offers.

In Colombia, Claro offers customers 15 to 30 days of free WhatsApp, Facebook and Twitter use once they top up their accounts with the required amount. In Peru, Claro offers a similar promotion for WhatsApp if the user maintains a minimum balance.

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59. The Impacts of Emerging Mobile Data Services in Developing Countries, A4AI, 2015

CASE STUDY
Addressing the barrier of handset affordability

Direct payment through device subsidies and bundling

In 2016, Orange and Google partnered to offer a high-quality smartphone for $40 bundled with voice, SMS and data. The partnership, called Pamoja, has been a collaborative project all the way through to the retail level, with Google also involved in the go-to-market strategy and user education campaign. The project is now live in 14 African countries and Jordan. The handset included in the package is the 3G Orange Rise 31 special edition and comes with Google Search, YouTube and Google Maps pre-installed.

Both Google and Orange realised commercial benefits from the project. For Google, there is an opportunity to add more users of its suite of mobile services, while Orange benefits from moving users from feature phones to smartphones, thus increasing the number of mobile data users on its network.[60]

Asset financing

In 2017, Mobisol and MTN began offering the Tecno W2 smartphone along with the Mobisol solar home system (SHS). MTN offers a special data bundle for customers with this offer, including free data bundles while customers are paying off the cost of the phone. The promotion is made affordable by a payment plan through MTN Mobile Money for as little as RWF66 per day (approximately $0.08). They also use alternative credit scoring to offer smartphone loans to low-income and financially excluded groups.

Third-party payments

SocialEco's $1 smartphone initiative uses a pre-installed advertising application on smartphones to generate funding to subsidise the cost of a handset for low-income users. SocialEco has included an option for third parties to be involved by either purchasing a smartphone for a low-income end user, and/or supporting a beneficiary by directly sponsoring the monthly broadband connectivity for between $5 and $10 per month. Mobile operators can partner with SocialEco to increase data use among new smartphone users.[61]

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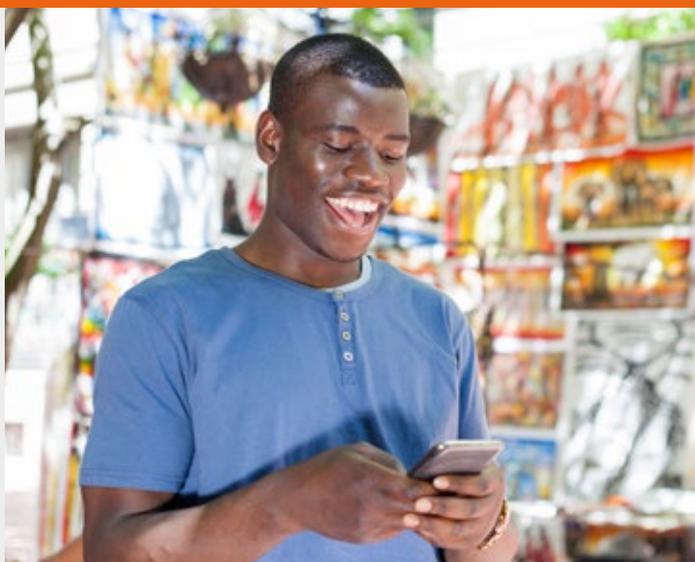
60. Accelerating affordable smartphone ownership in emerging markets, GSMA, 2017
61. Accelerating affordable smartphone ownership in emerging markets, GSMA, 2017

4.4.3 ACCELERATING IMPACT

Network coverage and take-up continue to increase in LDCs, with more than 85% of the population within reach of a mobile network. However, while 2G enables a basic level of internet access, it does not provide users with the quality and applications available from 3G networks. Without universal access to the latter, many people in LDCs will not be able to realise the economic and social benefits of the internet. It is therefore important to accelerate the rollout and affordability of mobile broadband services in these countries.

Increasing network rollout

The economic challenges involved in covering rural locations with low population density, low income levels and weak or non-existent enabling infrastructure such as electricity are often overwhelming, with operators having no strong business case for expansion. A GSMA study found that the revenue opportunity for new base stations in rural or remote locations can be as low as a tenth of that for an equivalent site in an urban area, and the operating costs can be as much as three times higher.[62]

While it is important for operators to continue to explore alternative business models such as infrastructure sharing and partnerships with third parties, the public sector has an important role to play by providing cost-effective access to low frequency spectrum; providing support for all forms of infrastructure sharing; allowing access to public infrastructure; streamlining planning approval processes; and providing flexibility on licence conditions for quality of service in remote locations.

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62. Unlocking Rural Coverage: Enablers for commercially sustainable mobile network expansion, GSMA, 2016
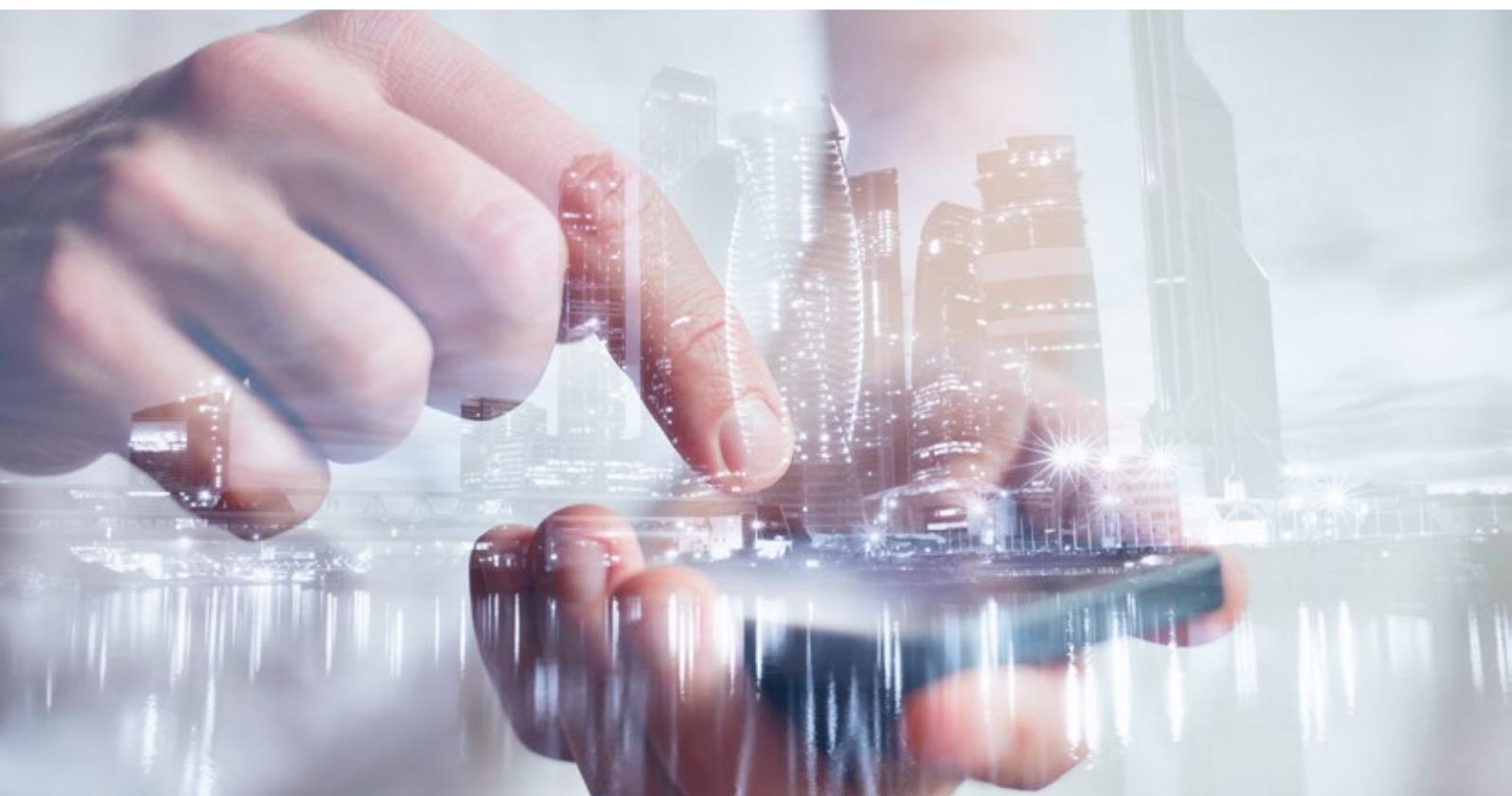
Improving affordability

Operators and governments will also need to collaborate to address the affordability barrier. To make mobile internet services more affordable to the poorest people in the world, mobile operators have been creative in their pricing plans. Examples include plans with limited download volumes; plans allowing 'all-you-can-eat' internet access for a 24-hour period; and restricted use plans allowing users to pay for just what is most accessed, such as email, social networks, chat or navigation. Offering a flexible range of plans is key to reaching every segment of the population, as people can decide what to access based on their own needs and what they can afford.

However, government policies, such as taxes, fees and levies, also directly affect the prices paid by end users. Taxation of mobile services should be aligned with best-practice principles: taxation should be broad based, easily understandable and enforceable, and should not disincentivise industry investment. A more balanced and equitable tax structure can benefit consumers, businesses and governments.[63]

Addressing other barriers

For people to adopt and use the internet, in addition to having the infrastructure in place and making services affordable, it is important that consumers have the necessary digital skills to engage with mobile technology as well as the awareness and ability to access locally relevant content. In 2016 the GSMA launched the Mobile Connectivity Index, which measures the performance of 150 countries (accounting for 98% of the world's population) against the four key enablers of mobile internet connectivity – infrastructure, affordability, consumer readiness and content. It is built up through 39 specific indicators and has been designed as a tool to help focus the efforts and resources of the mobile industry and wider international community on the right projects in the right markets at the right time, so progress towards universal access can be as swift and economically sustainable as possible. The data and interactive tool can be accessed at www.mobileconnectivityindex.com and is available to use by operators and policymakers within governments, regulators and international organisations.

63. Taxing mobile connectivity in Sub-Saharan Africa, GSMA Intelligence, 2017

13 CLIMATE ACTION

2016
2015

Figure 4.5
Industry performance on SDG 13

37.4

41.4

4.5 SDG 13: CLIMATE ACTION

Figure 4.5 shows that the mobile industry's impact on SDG 13: Climate Action increased from 37.4 to 41.4 in 2016. The main drivers behind the improvement were the increases in network coverage, quality and take-up of mobile services discussed earlier. This enables operators to play an increasingly important role in building resilience to climate-related and natural disasters via early-warning and emergency communication and broadcasting. The use of big data can also provide critical information to track movements of populations before and during emergencies, allowing governments to better focus disaster planning and relief. The industry is increasingly committed to supporting such initiatives, as demonstrated by the number of operators that signed up to the Humanitarian Connectivity Charter in 2016.
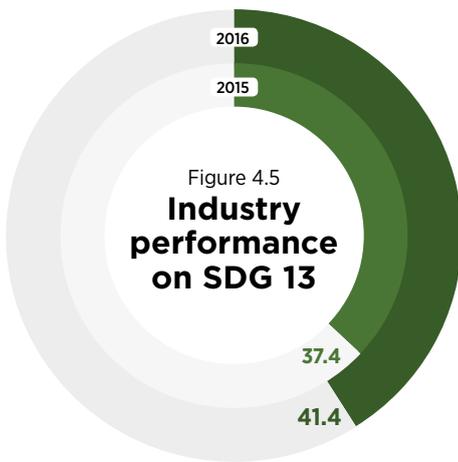
While still in its early stages of development, the rollout of IoT solutions is starting to have an impact on the SDG by enabling governments to collect data critical to the adaptation to, and management of, climate change – for example, by providing real-time climate and weather information and early-warning systems. Other smart applications, such as in the areas of energy, transport, buildings, manufacturing and agriculture, can also help tackle climate change. For example, innovations in smart logistics can enable more efficient traffic flows, thereby easing congestion and avoiding the need for new transport infrastructure. Smart metering and smart grids can reduce household and business energy consumption, which drives increased energy efficiency and reductions in carbon emissions. The impact of IoT is closely linked to improvements in network quality, as more extensive coverage, higher throughputs and lower latencies give utilities more real-time control of their networks and meet the growing need to analyse more data.

In 2016

69 operators

signed up to the **Humanitarian Connectivity Charter**, up from 38 in 2015.

Total operator signatories represented 20% of global connections (end-2016)

(Source: GSMA Disaster Response)

Cellular M2M connections for environmental monitoring

7.2m 2015

8.6m 2016

20% INCREASE

(Source: Machina)

4.5.1 CLIMATE CHANGE MONITORING THROUGH IoT SOLUTIONS

Air pollution is a major challenge in cities. Nearly 90% of air-pollution-related deaths occur in low- and middle-income countries, two out of three occurring in South-East Asia and Western Pacific regions.[64] City planners therefore need to develop appropriate infrastructure and services to improve the lives of citizens. Many are turning to smart, connected services. It has been estimated that digital solutions using smart technology could cut over 12 gigatons of CO_2 emissions across the global economy by 2030, which would represent a fifth of total emissions.[65] For example, smart transport networks run more efficiently, reducing fuel costs and carbon emissions. Smart metering and smart buildings can also save hundreds of gigawatt-hours of energy in large cities.

Furthermore, given the increase in population and climate change, there is increasing demand for fresh water. Governments, businesses and individuals are looking for more effective ways to monitor and combat water pollution.

In June 2016, global standards body 3GPP (3rd Generation Partnership Project) published its Release-13 specifications which included the three licensed spectrum low power, wide area or LPWA (mobile IoT) technologies. Commercial deployments started in 2017. Mobile IoT technologies are designed to enable mobile operators to provide low-cost, long-range connectivity that uses relatively little power, making it well suited to many smart city and smart utility applications.

CASE STUDY
Smart city solutions

GSMA IoT Big Data Ecosystem

The GSMA is working with the mobile industry to establish an IoT Big Data Ecosystem to make harmonised data sets from multiple sources available to developers and third parties through common APIs. China Mobile, China Unicom, Korea Telecom, Orange and Telefónica are already contributing to the initiative. Available datasets on the environment include air quality data from China, India, France and Spain, and weather forecast and observed data for India, France, Spain and Portugal.[66]

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64. WHO
65. System Transformation: How digital solutions will drive progress towards the Sustainable Development Goals, GeSI and Accenture, 2016
66. See https://apidirectory.iot.gsma.com/

CASE STUDY
Smart city solutions

Chicago's Array of Things

In August 2016, the city of Chicago, University of Chicago and Argonne National Laboratory launched the Array of Things (AoT) project. A network of interactive modular sensor boxes will be installed around the city to collect real-time data on the city's environment, infrastructure and activity for research and public use. The sensors will be mounted on streetlight traffic signal poles around the city. The first nodes were installed in 2016. The plan is to install 500 nodes by the end of 2018. The AoT project is essentially a "fitness tracker" for the city, measuring factors such as climate, air quality and noise pollution that will be used for research and public use. AT&T is the project's communications partner, providing all AoT connectivity for Chicago.

Telia smart parking

In 2016 in Norway, Telia launched a smart parking solution for tracking and finding parking lots. This solution was launched in partnership with APX Systems (which provides a parking app for end-users), the Norwegian Association of Disabled (an advocacy organisation of people with disabilities) and Huawei (providing the latest generation of NB-IoT LPWA-enabled parking sensors). The solution is currently deployed for managing reserved spaces for disabled people. Additionally, in April 2017 Telia partnered with EasyPark to provide smart parking services in the connected car platform, Telia Sense.

Searching for parking consumes around 1 million barrels of oil per day globally. Smart parking solutions will significantly decrease unnecessary driving time, thus lowering traffic and the amount of daily vehicle emissions, ultimately reducing the global environmental footprint.

CASE STUDY
Smart city solutions

LPWA for water quality testing – AT&T and Ericsson

AT&T and Ericsson are trialling low-cost connected sensors to monitor the water quality of the Chattahoochee river, which supplies drinking water to 4 million people. These sensors will allow Chattahoochee Riverkeeper, an organisation dedicated to protecting the water in the river basin, to remotely monitor water quality. For the trial, AT&T is currently using its 3G network to connect the sensors, but it plans to use LPWA as a standard solution once it becomes available, as this will provide enhanced geographic coverage across the river basin.

Ericsson's Technology for Good programme challenged US university students to assist in designing a connected sensor prototype that would be much cheaper to produce than the highly accurate, but expensive, $6,000 devices currently used by the Chattahoochee Riverkeeper. The device would have to cost no more than $200, be waterproof, RoHS (Restriction of Hazardous Substances) compliant, environmentally safe and consume relatively little power. Two designs were selected as winners and Ericsson inventors created a composite design that has since been deployed in the Proctor Creek area of the Atlanta Watershed.

4.5.2 ADAPTING TO CLIMATE CHANGE

Climate change has affected weather patterns, making them more unpredictable and making extreme weather conditions more frequent and harsh. According to the Food and Agriculture Organisation (FAO), natural disasters triggered by climate change have doubled in frequency since the 1980s. In developing countries, the agricultural sector absorbs about 22% of the total damage and losses caused by natural hazards, which increases to 80% when considering droughts.[67] This hampers the achievement of sustainable development. Mobile operators can play a role in preparing and responding to climate-related disasters, and providing more accurate weather information to farmers to better deal with changes in climate conditions.

Preparing for and responding to natural disasters

Mobile networks are facilitating access to information and coordination assistance before, during and after an emergency. In March 2015, the GSMA launched the Humanitarian Connectivity Charter (HCC). The HCC is a set of principles adopted by operators on preparedness and response activity:

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

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

- To strengthen partnerships between the mobile industry, government and the humanitarian sector.

It will strengthen access to communication and information for those affected by crisis, in order to reduce loss of life and property damage and enable efficient humanitarian responses. At the end of 2016, there were 107 operator signatories (up from 38 operators in 2015), representing 20% of connections, with more joining in 2017.[68]

CASE STUDY
Disaster response

Early-warning flood alerts in Nepal

In July 2016, Ncell partnered with the Department of Hydrology and Meteorology (DHM) to send early-warning alerts to Ncell customers living in high-risk areas of floods and landslide in Nepal. When water levels become too high or severe water conditions are forecast, DHM provides SMS content to Ncell, which sends early-warning SMS messages to its customers. In this way citizens can move to government-designated safe locations with their belongings. Once water levels return to normal, Ncell sends another alert to customers to tell them it is safe to return. This can help them to stay safe and prevent loss of property.

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67. The impact of disasters on agriculture and food security, FAO, 2015
68. Disaster Response GSMA Humanitarian Connectivity Charter: Annual Report 2016, GSMA, 2017

CASE STUDY
Disaster response

Water disaster management system – Far EasTone Telecommunications

Tainan is the fifth largest city in Taiwan and home to 1.9 million people. It is located at the confluence of several major rivers that flow through an extensive low-lying delta into the sea. The newer parts of the city are built on reclaimed land and are vulnerable to flooding.

In 2015, Far EasTone Telecommunications (FET) partnered with Tainan City Government and started the 4G Smart City Project. A component of the project is the smart water disaster management system. This integrates real-time monitoring, instant warning and remote control of pump stations throughout Tainan and builds links with the government command center to reduce the impact of water disasters. The water disaster management system has benefitted 1 million citizens so far. FET plans to expand the analytics model and technology to cities facing similar issues.

During 2016, 48 pumping stations were equipped with 4G real-time surveillance and sensors. A real-time flood information app was also launched. The water disaster management system helped Tainan City Government successfully predict flooding and potential for disasters on at least four occasions. Today there are more than 35,000 users of the service.

Resilient large zone mobile base stations – NTT Docomo

After the 2011 Sendai earthquake, NTT Docomo deployed large zone base stations in more than 100 locations throughout Japan to help recover mobile services in case of a natural disaster. Large zone base stations cover a radius of up to 7km and provide coverage redundancy that is overlaid on top of coverage areas of smaller base stations. When a natural disaster occurs and renders the smaller base stations out of service, the large zone base stations take over and restore services. This helps improve the resilience of mobile infrastructure and services needed for all communications in the face of natural disasters. In the future, NTT Docomo plans to increase resilient coverage with medium zone base stations in disaster-critical areas such as major hospitals and mountainous areas.

Accurate weather forecasts for smallholder farmers

Rain-fed agriculture accounts for the majority of the agricultural land in Sub-Saharan Africa and the largest proportion of agricultural land in South America and South Asia.[69] Climate change is affecting weather patterns, making them more unpredictable. There is therefore a need for accurate, granular and localised weather forecasts for the 500 million smallholder farmers who depend on rain for their daily agricultural activities.

To better forecast weather, it is necessary to have accurate historical records. Historical ground-level data from weather stations on factors such as temperature, precipitation, barometric pressure, humidity and wind direction is used in weather modelling together with geo data from environmental satellites showing the evolution of weather systems for geographic regions. However, low levels of investment in weather stations by national meteorological agencies in the vast majority of developing countries have resulted in a lack of reliable ground-level weather data.

Given the ubiquity of mobile networks and the key role of mobile in disseminating weather services, mobile operators have a role to play in delivering better weather forecasts by investing directly in equipping base stations with weather monitoring devices. This could potentially open up new revenue streams from weather forecast providers or agribusinesses interested in the data. A new area of opportunity is the use of data from microwave links on radio spectrum propagation and degradation to produce rainfall maps by observing the extent to which electromagnetic signals are weakened by certain weather conditions. Rainfall mapping is a critical step in weather modelling and an area where mobile operators can play an important role. For these opportunities to work, however, three preconditions need to be met: mobile operators need to see real value in weather services; they must be prepared to invest in additional ad-hoc resources to generate weather data; and they need ecosystem partners to help interpret data and develop new services.[70]

CASE STUDY
Rainfall measurements in Africa

Telecel Burkina Faso, Orange Niger and Cameroon and Orange Group are working with the Rain Cell Africa consortium, a network of environment and climate change research institutions, on the feasibility and applications for predicting rainfall in Sub-Saharan Africa using microwave signals. In tropical areas there is limited or no coverage of traditional weather stations, particularly in rural and remote areas, while mobile network infrastructure is almost ubiquitous, offering an opportunity to dramatically improve the quality of weather forecasts. The first quantitative results were carried out in Africa in 2014. In 2015, the first international workshop on rainfall measurement from mobile networks was held, with 18 countries participating. In 2016 a pilot project was launched in Ouagadougou, Burkina Faso, to predict urban flooding. Other rain monitoring projects have been launched in Cameroon and Niger.

69. Source: International Food Policy Research Institute (IFPRI)
70. Weather forecasting and monitoring: Mobile solutions for climate resilience, GSMA, 2016

4.5.3 ACCELERATING IMPACT

Maximising the smart city opportunity

IoT solutions are still nascent but offer great potential. A recent study from the GSMA[71] has identified seven key recommendations for city planners looking to implement smart city solutions:

1. Adopt an agile institutional framework and governance mechanisms: a smart city needs an institutional framework that ensures co-ordination and support throughout the lifetime of each project.

2. Appoint a CIO/smart city director with strategic vision: a strong vision and strategy is key to the success of smart city projects.

3. Communicate effectively smart city project objectives and benefits: establishing a dialogue with the local community is essential to ensure effective smart city services design and functionality.

4. Promote technology investment in open and scalable systems: a smart city should avoid relying on proprietary technologies tied to a single provider. Standards-based solutions are an essential foundation for the long-term evolution of a smart city.

5. Comply with privacy and security best practice, rather than defining new service-specific rules: to safeguard privacy and security, smart cities need to draw on industry best practice and comply with national laws.

6. Make city data available to promote transparency and stimulate innovation: cities generate a wealth of data related to transport, the environment, health, demographics and service accessibility.

7. Explore new models of funding: smart city projects require significant initial investment. Smart city managers should explore public private partnerships or alternative finance mechanisms, such as municipal bonds, development banks or vendor finance.

Increasing adaptive capacity to climate change

Operators are increasingly sought as partners to deliver assistance in the wake of natural and climate-related disasters. With aid increasingly becoming digitised and mobile networks becoming ubiquitous, mobile technology has become a central component and an attractive delivery channel for many forms of humanitarian assistance. Given this shift, mobile operators and humanitarian organisations need to work together and develop closer partnerships to deliver life-changing interventions.[72]

With regards to the use of mobile to assist with weather forecasting, it is essential that viable ecosystem partnerships are formed to interpret data and develop services. It is also necessary to develop a strong business case for investment in location-based services. This has been challenging over the years but there is now an opportunity to increase focus on this core capability and derive value from new services (agri VAS and agri MFS) targeted at the fast-growing rural segment. By increasing their focus on weather services, operators have an opportunity to evolve mAgri services to a more compelling value proposition, including offering agronomic advice that is dynamically linked to localised weather forecasts. There is also potential to package information services with core network services (e.g. farmer tariff plans) and mobile money enabled agri MFS.

05

MOVING FORWARD

Just one year after becoming the first industry to commit to the SDGs, the mobile industry has continued to contribute to all Goals by providing greater network coverage, better quality networks, increased connectivity and more mobile-enabled services that are particularly relevant for vulnerable groups such as those in poverty and those affected by crisis and disaster. Additionally, the industry has established partnerships with a wide range of organisations to help maximise efforts and impact towards the SDGs.

With the mobile industry's impact on the SDGs increasing in 2016, the GSMA – in collaboration with operators – has made several commitments and taken part in a number of initiatives that seek to continue this momentum. During the next year, we will focus on delivering these commitments.

Big Data for Social Good

Launched at **Mobile World Congress 2017**, this initiative leverages mobile operators' big data capabilities to address humanitarian crises, including epidemics and natural disasters.

The programme was launched with **16 of the world's leading mobile operators** who collectively account for **over 2 billion connections across 100 countries.**

The United Nations Foundation is a supporting partner, providing coordination and integration with the broad ecosystem.

#BD4SG

National Dialogues for Digital Impact

The GSMA Mobile for Development **National Dialogues for Digital Impact** initiative will work at a national level to convene key government ministries (finance, ICT, planning, energy, agriculture, education etc.), leaders of the mobile industry and consumer insights to demonstrate how mobile can be a positive force for societal change and to commit to deliver on this opportunity.

Specifically, these dialogues will aim to:

Demonstrate the positive impact mobile technology has on society and populations

Provide country-level recommendations to industry and government

Create forums for national policymakers and operator CEOs to agree collaborative next steps to progress social and economic progress towards digital transformation through mobile.

GSMA is facilitating these National Dialogues through its strategic partnership with the UK Department for International Development (DFID) and is also working with UNDP to support this effort.

Department for International Development

UNDP

GSMA

We Care campaign

Latin America

Mobile operators have joined forces as an industry and taken on a series of commitments to ensure that users can enjoy the transformative benefits of mobile technology in a safe and reliable environment.

13 CAMPAIGN LAUNCHES IN THE REGION

1ST CAMPAIGN LAUNCHED IN FEBRUARY 2014

18 PUBLIC ANNOUNCEMENTS OF INDUSTRY INITIATIVES

10 AREAS OF INDUSTRY INITIATIVES

Key initiatives

Digital Inclusion

Child Protection

Environmental Care

Disaster Response

**Contribution to Public Safety**

Combating handset theft

With the help of government programmes, international humanitarian aid organisations, such as Unicef and Red Cross, and non-profit civil organisations working locally, mobile operators involved in the We Care campaign collaborate with the community by providing access to mobile technology.

The We Care campaign works hand in hand with the United Nations Sustainable Development Goals, becoming a vehicle for the Latin American mobile industry to make its contribution at a local level.

www.gsma.com/latinamerica/wecare

WE CARE

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

Developing and marketing use cases that appeal to women

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

Connected Women
GSMA

So far, over 25 operators – representing approximately 10% of connections worldwide – have made a formal Connected Women Commitment to connect millions more women by 2020.

IoT Big Data

The GSMA is working with the mobile industry to establish an IoT Big Data Ecosystem to make harmonised data sets from multiple sources available to developers and third parties through common APIs.

The directory, which is the first of its kind, is designed to encourage a common approach to data sharing that will help the IoT to realise its full potential and encourage the development of new projects across transport, the environment and smart cities. Global mobile operators such as China Mobile, KT Corporation, Orange and Telefónica have already implemented solutions enabling them to share harmonised IoT data.

The current data sets focus on the areas of:

Machines

Devices

Automotive

Roads

Environment

Smart home

Agriculture

Partnerships for the SDGs

The GSMA currently works in partnership with nearly a dozen organisations globally in support of the SDGs. The partnerships look at new business models and mechanisms to support the implementation of the SDGs, and engage governments and mobile industry leaders to increase the positive social impact of mobile technologies.

GSMA Mobile for Development Initiatives

Utilities

The M4D Utilities Innovation Fund aims to test and scale the use of mobile to improve or increase access to energy, water and sanitation services. As part of this initiative, 21 operators have already partnered with utility service providers to deploy innovations that accelerate the use of mobile connectivity to deliver energy solutions, improved water and sanitation for more than 4 million people.

Financial access

The World Bank's Universal Financial Access (UFA) 2020 initiative aims to provide all adults worldwide with access to a transaction account to store money and to send and receive payments. The GSMA and mobile industry has committed to support the creation of 500 million new registered mobile money accounts over the course of the UFA initiative.

Mobile money and humanitarian relief

This initiative was launched at the May 2016 World Humanitarian Summit. The GSMA and mobile industry is committed to using digital financial solutions to deliver humanitarian relief. GSMA will offer expertise in mobile money to help address the opportunities and challenges of mobile cash disbursements in disaster-prone countries.

Ecosystem Accelerator

In 2016, the GSMA launched the Ecosystem Accelerator programme, committed to helping start-ups and mobile operators in Africa and Asia Pacific 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. In April 2017 it announced its first cohort of nine start-ups in eight markets, chosen from more than 400 applications. Their innovations are focused on services for SMEs and unlocking assets in the sharing economy. The next cohort will be announced in early 2018.

Humanitarian Connectivity Charter

In March 2015, the GSMA launched the Humanitarian Connectivity Charter, a set of principles adopted by operators on preparedness and response activity. Today, more than 110 operators in nearly 80 countries support the GSMA Humanitarian Connectivity Charter to contribute to humanitarian response, improve access to communication and information for those affected by crisis, reduce loss of life and aid recovery.

GSMA organisational programmes and initiatives

Environmental programme

Since 2008, the GSMA has been committed to reducing the impact of its business on the environment, both in its offices and at events, focusing on minimising waste in printed materials, encouraging re-use and recycling of materials, utilising electronic tools and recycling event waste. Mobile World Congress and Mobile World Congress Shanghai have been carbon neutral every year since 2014 and 2015 respectively. In 2016 all GSMA events as well as the GSMA corporate offices became carbon neutral. In 2017 and beyond, the GSMA will continue to pursue carbon neutrality for all GSMA events as well as the GSMA as a whole, reinforcing its commitment to reduce the environmental impact of all GSMA business activities.

Women4Tech programme

GSMA's Women4Tech programme was launched during MWC 2017. The programme is designed to address and reduce the persistent gender gap in the mobile industry by focusing on industry action for female leadership in the digital age. The programme highlights four focus areas: gender equality and career development; mentoring and youth education; women in communication and vertical sectors; and women entrepreneurs and innovators.

Youth Mobile Festival (YoMo)

Launched at MWC 2017, YoMo is designed to inspire the next generation of scientists, technologists, engineers and designers to succeed in an increasingly mobile world. It demonstrates how people across the STEAM sectors are innovating, transforming how we work and live while improving our world. YoMo events also showcase CSR activities of innovative companies, coming together to create a platform for students to have the chance to learn about these subjects, academic pathways and future career choices.

mSchools Edu_Hack

This initiative promotes collaboration between teachers, researchers and developers to solve learning challenges and design educational experiences that engage and improve study outcomes. It also offers teachers an opportunity to work in teams and design creative and practical proposals for integrating the SDGs in their classrooms, schools and communities with the use of digital learning tools.

The GSMA and the mobile industry will continue to report on its progress each year. We will continue to develop and improve the evidence, indicators and data used to track operators' impact on the SDGs. With this framework in place, both the industry and the international community will be able to understand the impact, progress, challenges and ultimately action needed for the mobile industry to harness its full potential to achieve the SDGs.

APPENDIX

APPENDIX A
FRAMEWORK

INTRODUCTION

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 2016 report[1] but some changes have been made to its implementation. These are also explained in this appendix.

METHODOLOGY

Step 1: Identify drivers

The first step in understanding the industry's impact on the SDGs is to identify the different mechanisms through which operators can contribute to or influence the Goals – these are called 'drivers'. A full list of the drivers is provided in Appendix B but the following provides an illustration of three drivers for SDG 1.

FIGURE A1

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)

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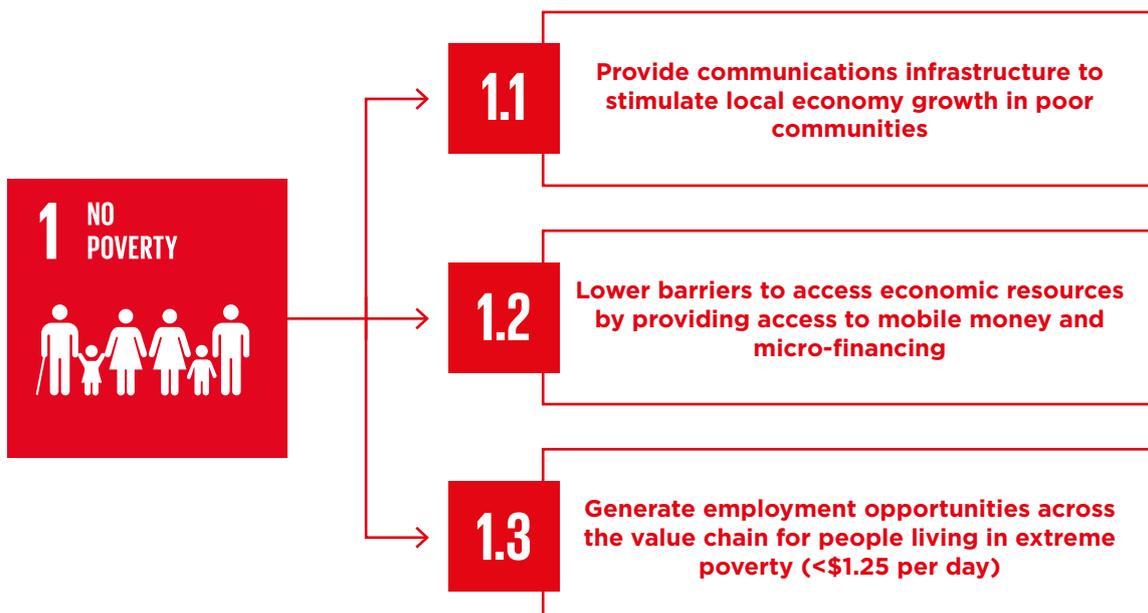
1.   2016 Mobile Industry Impact Report: Sustainable Development Goals, GSMA, 2016

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, by either:
  - fulfilling a necessary condition to achieve the SDG
  - increasing the speed to achieve the SDG
  - improving the economics of reaching the target.

Changes compared to 2016 report: The main difference in Step 1 compared to the 2016 report is that drivers are now directly linked to the overall SDG rather than the individual SDG Targets. This represents a simplification of the framework as many of the drivers are relevant to several Targets.

Step 2: Driver importance

Having identified drivers for each SDG, each is given an importance score of high, medium or low. The criteria for this assessment is as follows:

- **High importance.** 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 importance.** 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.

- **Low importance.** 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 currently assigned as having low importance.

In the above example for SDG 1, drivers 1.1 and 1.2 are assigned as having higher importance 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.[2] On the other hand, driver 1.3 is assigned lower importance because the mobile ecosystem is not able to employ a substantial proportion of individuals living in poverty. The 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 importance, we determine whether the industry has the potential to have a high, medium or low impact with respect to countries achieving each of the Goals. Our current clusters are as follows:

- **high potential:** SDGs 1, 5, 8, 9, 10, 13
- **medium potential:** SDGs 2, 3, 4, 7, 11, 12, 17
- **low potential:** SDGs 6, 14, 15, 16.

Changes compared to 2016 report: The main difference in Step 2 compared to the 2016 report is that the importance scores are based on a qualitative high/medium/low assessment, instead of giving each driver a score out of 10. This change was made to simplify the framework.

2. See, for example, "Economic impacts of Broadband" in Information and Communications for Development: Extending reach and increasing Impact, World Bank, 2009; and The long-run poverty and gender impacts of mobile money, Science Vol. 354 (6317), 1288-1292, American Association for the Advancement of Science, 2016

Step 3: 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.

Where a metric is best described by multiple metrics, underlying sub-metrics are defined. Sub-metrics must have the same characteristics as described above. 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

- World Bank

- UN (including UIS, UN Statistics and UNDP)

- ITU

- Gallup World Poll

- Ookla

- Machina

- We Are Social

- WEF

- ILO

- Strategy Analytics

Figure A2 illustrates how the metrics work for two of the drivers for SDG 1. In order to measure the industry's impact in the provision of communication services in poor communities, we use two metrics: mobile infrastructure and mobile take-up by the poorest 40% in each country. The former comprises sub-metrics that include 2G, 3G and 4G coverage. For the industry to achieve maximum impact for this driver in a given country, it needs to achieve universal coverage for all technologies and needs to provide mobile services to everyone in the two lowest income quintiles.

In order to measure the impact of the mobile industry in providing access to mobile money, we define a metric on mobile money uptake. This comprises three sub-metrics that include take-up (the proportion of adults with an active account), the average number of transactions per account and average transaction values.

FIGURE A2

Example of metrics used to measure drivers
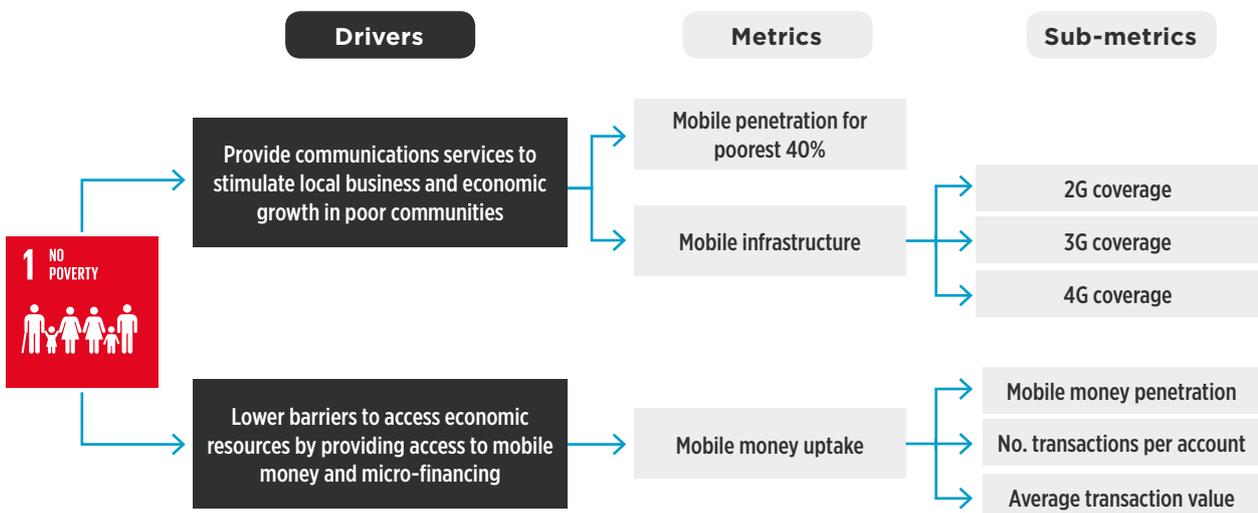
Changes compared to 2016 report: The approach to metric selection is the same as used in the 2016 report. However, a number of metrics have been improved due to the availability of better data. As discussed in the 2016 report, the lack of consistently measured and disaggregated data across countries constrains our ability to accurately measure the industry's impact across each and every driver for the SDGs. For this report, the following improvements have been made:

- Penetration rates of mobile and mobile internet services are now disaggregated using income level, gender and geography using consumer survey data (source: Gallup World Poll).

- Data has been incorporated on specific types of mobile usage using consumer survey data – for example, the proportion of consumers using mobile to improve their health or education, access government services and access information about products. This information can also be disaggregated by gender and geography (source: GSMA Intelligence Consumer Survey).

- Granular data on M2M connections has been incorporated, with breakdowns by segment and application – for example, connected cars, smart energy, smart agriculture and connected industry (source: Machina).

- More granular and regular data has been incorporated on mobile money, including information on the volume, value and type of transactions (source: GSMA Mobile Money).

To ensure that impact scores are consistent over time, we have applied these changes to the 2015 scores as well. As a result, some of the 2015 SDG performance scores are different to those presented in the 2016 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 access basic services (water, sanitation and electricity)

- consistent measures of what operators have done (or are doing) with respect to labour and procurement practices, sustainability reporting, corporate social responsibility, data privacy and security

- the use of mobile to verify individuals' identity

- actions that operators have taken in responding to disasters (natural, conflict and terrorist), as well as KPIs that measure their impact.

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

Step 4: 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 sub-metrics and metrics

To ensure comparability, sub-metrics and metrics are standardised on a 0–100 scale 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.[3] 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/sub-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: Sub-metrics aggregation

Where a metric comprises sub-metrics, the former is calculated by taking a weighted average of the sub-metrics to produce a single 0–100 metric. The weights are calculated using statistical analysis.[4] If a country is missing more than 50% of the underlying sub-metrics, it is assumed to have no data for that metric.

C: Derivation of driver scores

The driver score reflects the current performance of the mobile industry with respect to a driver. Each driver is given a 0–100 score through averaging of the underlying country-level metric scores. If a country is missing more than 50% of the underlying metrics, it is assumed to have no data for that driver.

D: Derivation of SDG impact score

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

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3. Where we have forecasts, we use maximum/minimum value in future years to allow all countries to improve their scores over time.
4. Specifically principal component analysis and factor analysis

E: Regional aggregation

Regional scores for metrics, drivers, targets and SDGs are calculated as a population weighted average of the country-level scores, accounting for missing countries through geo-income based clusters.[5] Some drivers are not applicable to certain countries – for example, those primarily aimed at reducing maternal mortality will not be relevant for countries that have already achieved Target 3.1 (reduce the global maternal mortality ratio to less than 70 per 100,000 live births). Where this is the case, countries that are not applicable are excluded from the driver calculation at the regional and global level.

FIGURE A3

Overview of calculation framework
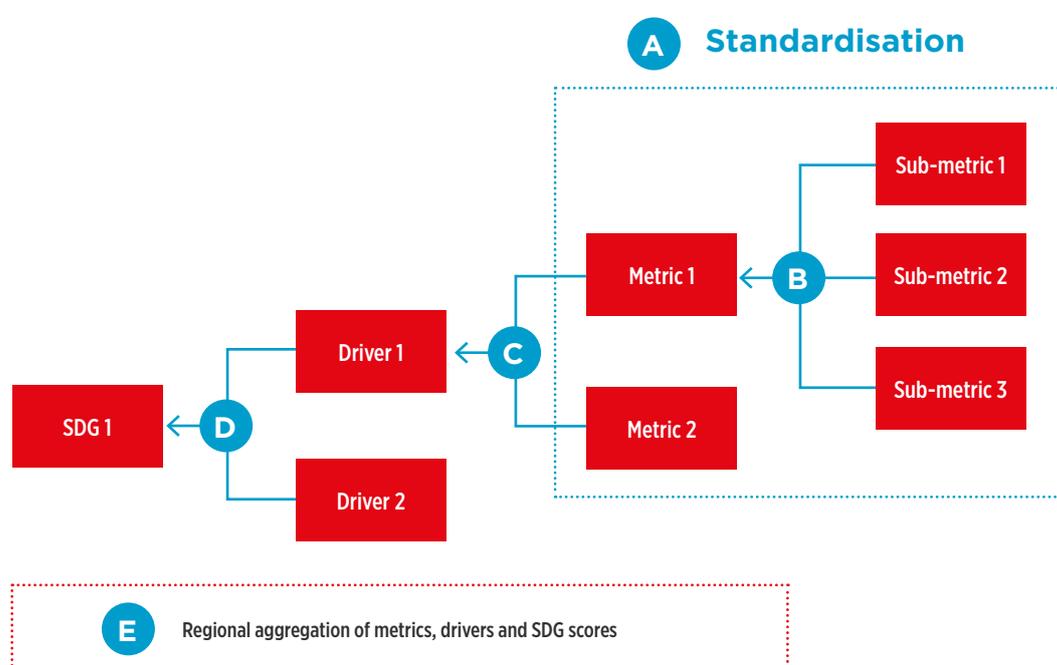
Changes compared to 2016 report: There are three main differences in Step 4 compared to the 2016 report. First, drivers are now equally weighted as they are no longer given an importance score out of 10 (importance is assessed separately). Second, SDG scores are calculated directly using the drivers instead of Target scores. Third, population adjustments are now implemented in a way that countries are either included or excluded in the calculation at the regional or global level. In the 2016 report, each country was given a specific adjustment factor.[6] This change has been made to simplify the methodology and also to avoid a potential scenario where the industry could achieve a maximum score of 100 without achieving its full potential.

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5.   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.
6.   For example, in the case of drivers focused on maternal mortality reduction, each country's score was adjusted by a factor between 0 and 2 depending on what their maternal mortality rate was. See 2016 report (Appendix C) for further details.

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 driver scores. A score of 100 means the mobile industry has achieved everything possible to contribute to that Goal.

Metric, driver and SDG scores are aggregated globally and by region and development status.[7] 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.

Changes compared to 2016 report: The main change compared to the 2016 report is that SDG impact scores now solely measure the performance of the industry with respect to its theoretical maximum performance. In the 2016 report, the SDG Impact score comprised two additional components: the importance of the industry's activities and the proportion of targets scored.[8] This change has been made so that the impact scores are easier to interpret and track over time. The assessment of importance is presented separately by clustering SDGs into three groups based on the potential impact the industry can have (high, medium or low).

7. Development classifications are based on World Bank income groups and the UN Classifications in the World Economic Situation and Prospects.
8. For further details, 2016 Mobile Industry Impact Report: Sustainable Development Goals, GSMA, 2016

APPENDIX B
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 provides some examples of operators initiating new products, services or activities that contribute to the SDG. Further examples are provided on the GSMA website.[9]

9. https://www.gsma.com/betterfuture/

1 NO POVERTY

**SDG1**

NO POVERTY

End poverty in all its forms everywhere

Scores by regional and development status

Normalised score (out of 100)

| 2015 |
| 2016 improvement |

- TRANSITION 42.4 (2.7)
- GLOBAL 34.3 (3.2)
- ASIA PACIFIC 35.6 (3.7)
- SID 42.6 (2.6)
- EUROPE 42.4 (4.3)
- LATIN AMERICA 40.0 (3.6)
- MENA 31.8 (1.7)
- SSA 25.8 (2.3)
- DEVELOPED 69.0 (0.4)
- DEVELOPING 33.9 (3.2)
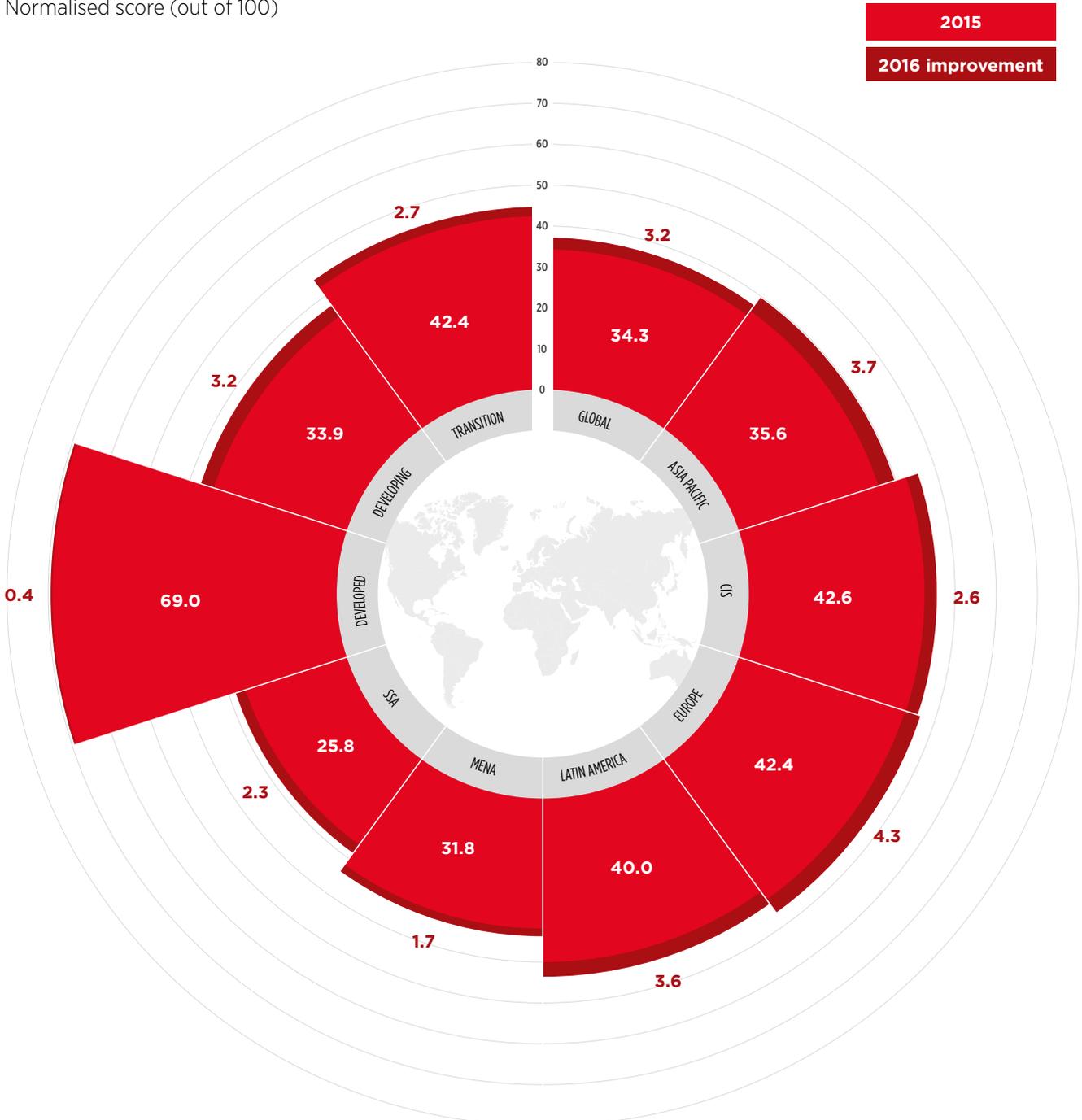
Drivers

- 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

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

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

- 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

Operator services

| OPERATOR	SERVICE OR INITIATIVE
Vodafone (Kenya)	- 10 years of M-Pesa
TIM (Brazil)	- Mobile Broadband
Zain	- Commercial Services for Low-Income Segments
MTN (Nigeria)	- MTN Lumos Affordable Mobile Solar Electricity (PAYG)
Orange	- Essential digital services, tailored to everyone's needs
Far EasTone Telecommunications (Taiwan)	- Save the Abandoned Children, Spread Love Far

2 ZERO HUNGER

SDG2

ZERO HUNGER

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

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement
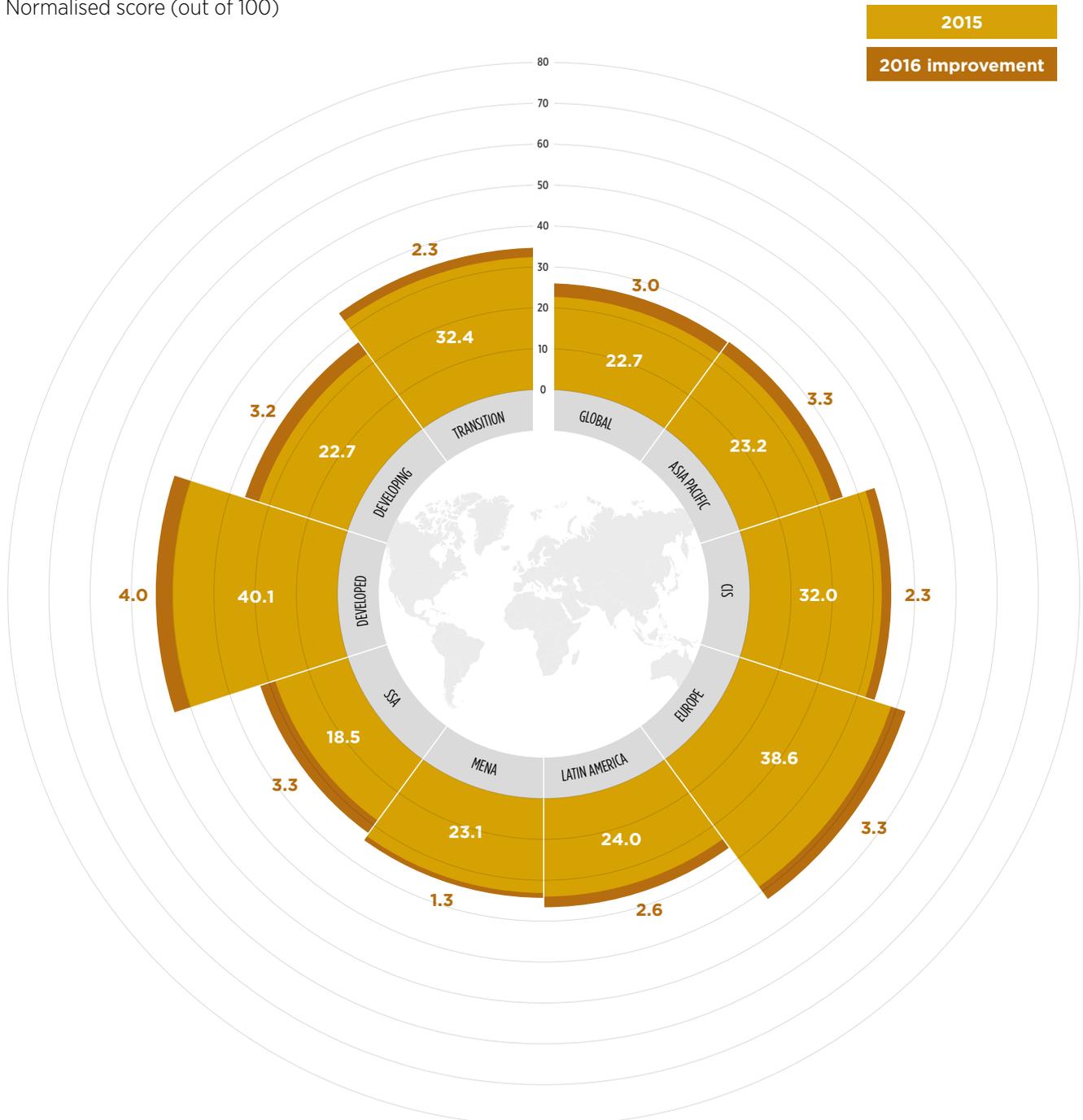
Drivers

- 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

Operator services

OPERATOR	SERVICE OR INITIATIVE
Telenor (Thailand)	- Smart Farmer
Telstra (Australia)	- Transforming the future of farming (AgriWebb and FluroSat)
Vodafone (India)	- Connected Farmers - Vodafone India finding innovative ways to help farmers water their crops in the midst of a serious water crisis
Zain (multiple countries)	- Distributing Iftar Meals
Zain (Sudan)	- The Student Meals Project
Orange	- mAgri solution for farmers
Telefónica	- Smart Agro
Far EasTone Telecommunications (Taiwan)	- Save the Abandoned Children, Spread Love Far

3 GOOD HEALTH AND WELL-BEING

SDG3

GOOD HEALTH AND WELL-BEING

Ensure healthy lives and promote well-being for all

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement

	2015	2016 improvement
GLOBAL	27.3	4.1
ASIA PACIFIC	27.2	4.2
CIS	33.0	3.3
EUROPE	43.1	5.1
LATIN AMERICA	32.0	6.7
MENA	28.0	2.7
NORTH AMERICA	45.7	3.4
SSA	21.1	4.0
DEVELOPED	40.0	7.0
DEVELOPING	25.7	4.2
TRANSITION	33.0	3.3
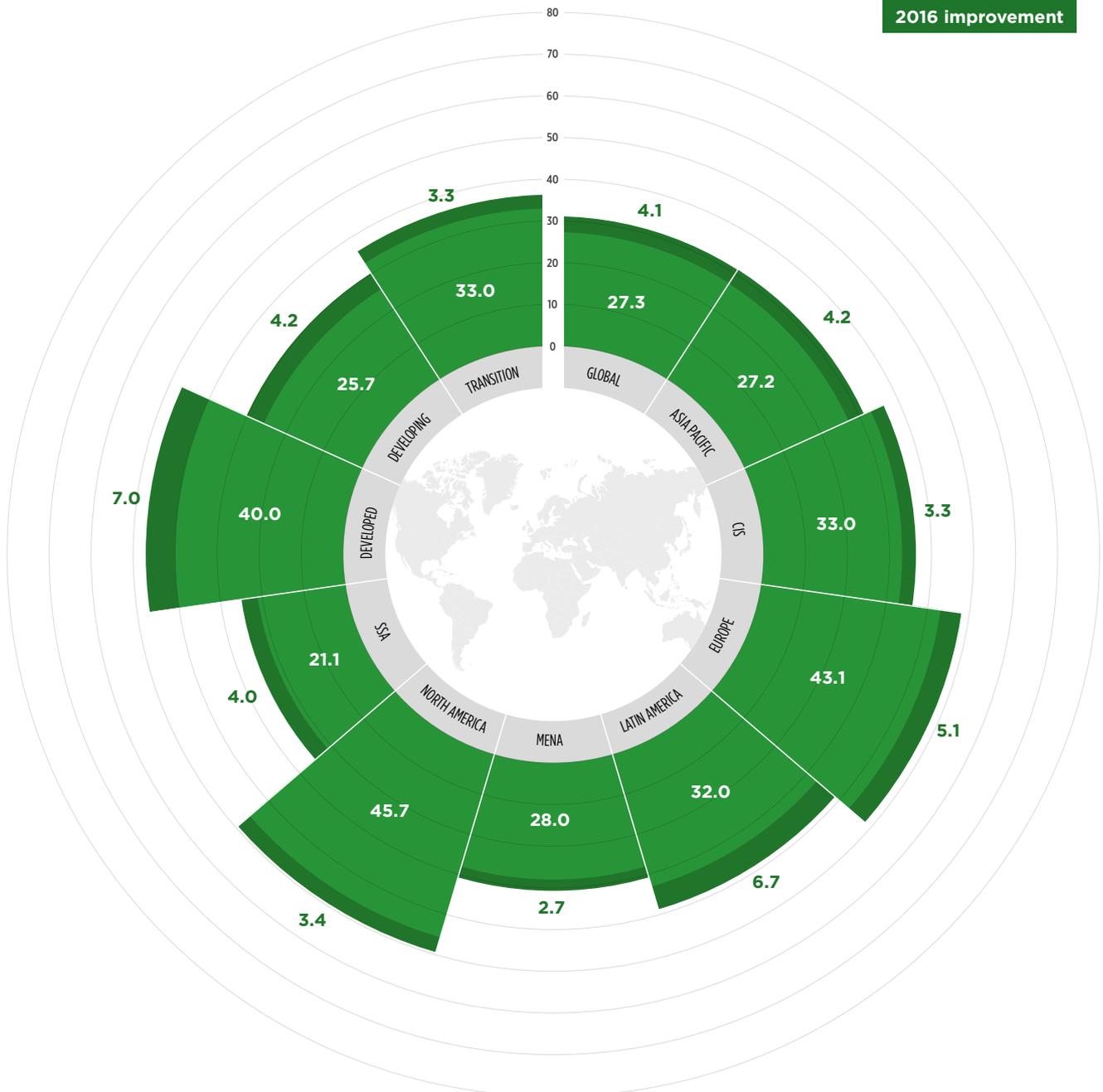
Drivers

- 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

Operator services

OPERATOR	SERVICE OR INITIATIVE
Deutsche Telekom	- Sea Hero Quest
Telenor (Bangladesh)	- Tonic
TIM (Italy)	- Digital healthcare - Digital Security – NUE Solution
Vodafone (Tanzania)	- Maternal Health Ambulance Taxi - Comprehensive Community Based Rehabilitation Tanzania (CCBRT)
Vodafone (Lesotho)	- HIV – mobile testing and treatment
Zain (Kuwait)	- Rijeemy programme
Zain (Sudan)	- Suba Intensive Care Unit
Zain (Lebanon)	- Light a Candle Initiative
Zain (Iraq)	- Partnership with Ammar foundation
Zain (Jordan)	- Mobile Clinic for Children
China Mobile (China)	- Heart Caring Campaign
KT (South Korea)	- Global Epidemic Prevention by Mobile Big Data
Orange (Cameroon)	- My Health Line
Orange (Mali)	- Sini Tonon
Orange (Senegal and Mali)	- Djobi

4 QUALITY EDUCATION

SDG4

QUALITY EDUCATION

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

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement
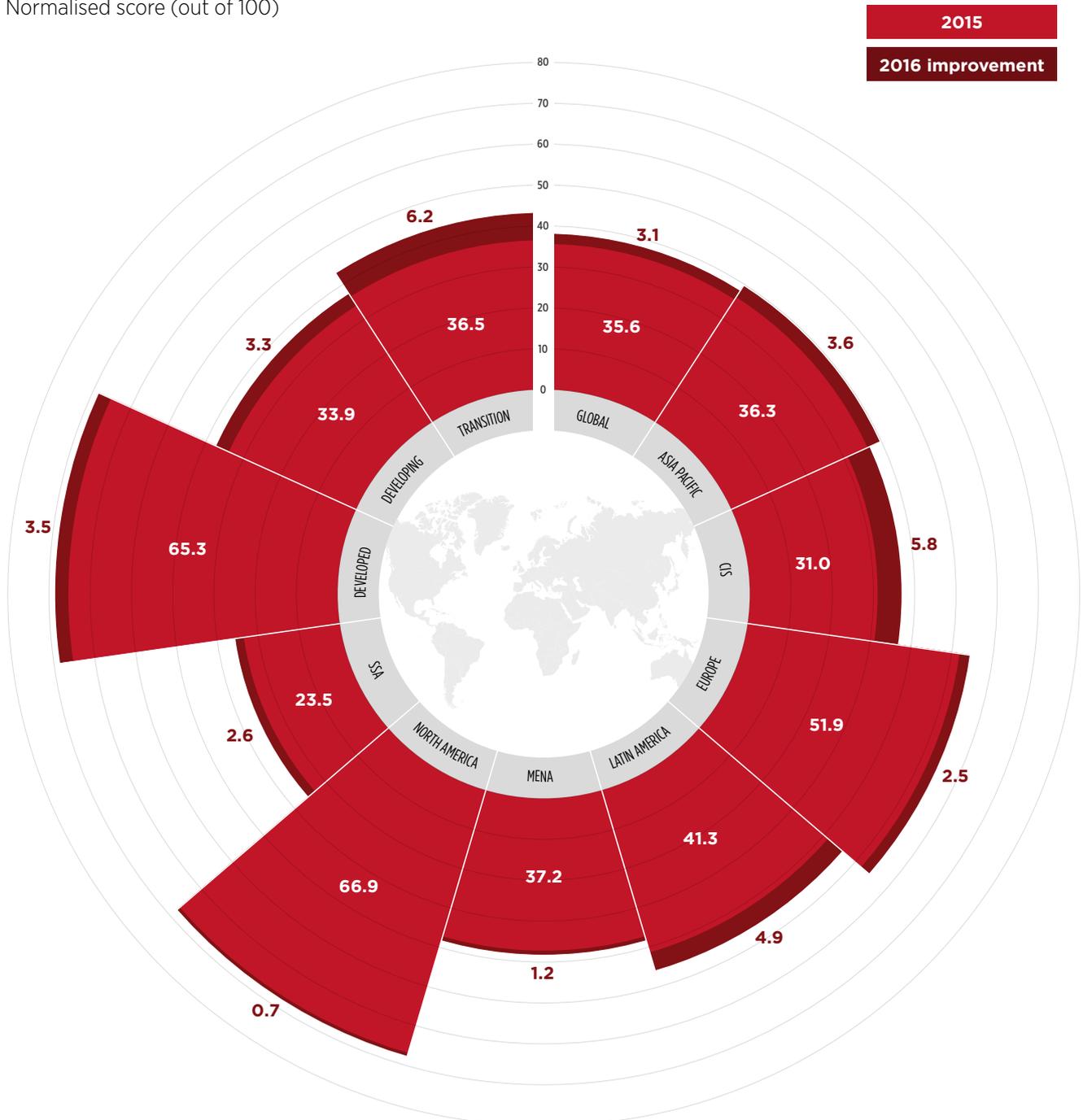
Drivers

- 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

Operator services

OPERATOR	SERVICE OR INITIATIVE
Deutsche Telekom	- Teach today
Telia (Norway)	- Enhancing social inclusion for children with long-term conditions
Turkcell (Turkey)	- Facilitating the integration of Syrian refugees with "Hello Hope" mobile app and Camp project - Education without barriers: supporting kids with disabilities and gifted children
TIM (Italy)	- TIM College - Partnerships with the world of education and academia - Programme the Future - TIM Academy - Using ICT in schools, with TIM
Vodafone (Kenya and DRC)	- Digital school in a box
Zain (Bahrain, Sudan and Iraq)	- Back to School
Zain (Bahrain)	- Knowledge Forums and Scholarships

OPERATOR	SERVICE OR INITIATIVE
Zain (Iraq)	- Partnership with Amar Foundation - Partnership with Widows Development Center - Student Summer Training
Zain (Kuwait)	- Taaleb E-Learning Project
Zain (Jordan)	- Mobile Maintenance Training Centers - Madrasati Initiative - Smart Schools
Zain (Lebanon)	- Ramadan CSR campaign on social media channels - S-miles Partnership
Zain (South Sudan)	- Zain-Huawei Connectivity Project - Whitaker Peace and Development Initiative
Orange	- Better Internet for Kids - #SuperCoders - The Digital Schools programme: actively supporting education for the poorest

**5 GENDER EQUALITY**

SDG5

GENDER EQUALITY

Achieve gender equality and empower all women and girls

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement
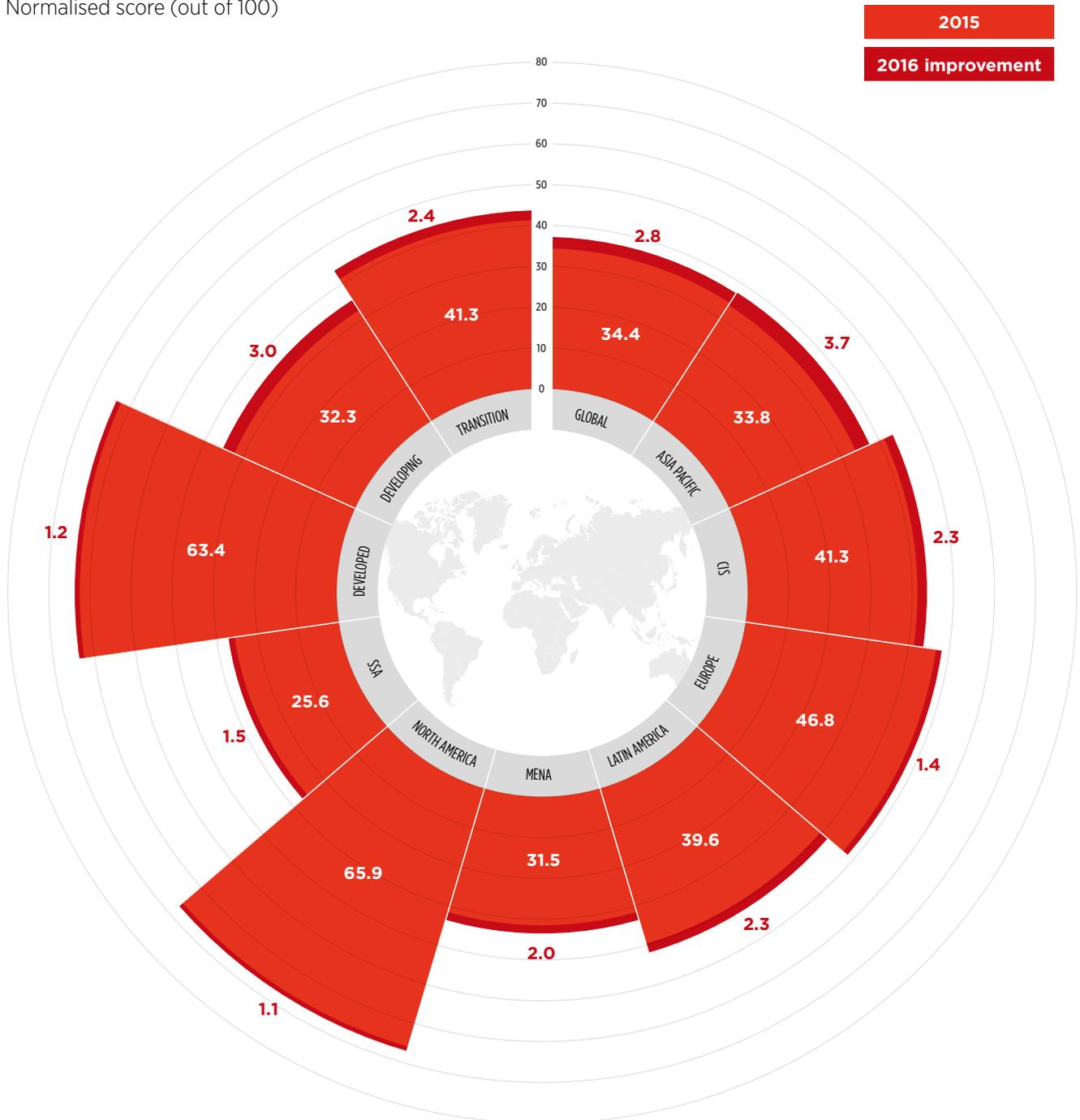
Drivers

- Connect women to sharing economy infrastructure through mobile internet that enables 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

Operator services

OPERATOR	SERVICE OR INITIATIVE
TIM (Italy)	- TIMGIRLSHACKATHON - Nurseries
Vodafone (Multiple countries)	- ReConnect - Global maternity policy
Zain (Iraq)	- Partnership with Widows Development Center
Orange	- Women's Digital Entrepreneurship Prize - Sooretul

6 CLEAN WATER AND SANITATION

SDG6

CLEAN WATER AND SANITATION

Ensure access to water and sanitation for all

Scores by regional and development status

Normalised score (out of 100)

	2015	2016 improvement
GLOBAL	25.5	2.7
ASIA PACIFIC	26.2	3.1
SD	30.5	2.2
EUROPE	35.8	2.2
LATIN AMERICA	27.2	4.5
MENA	23.7	0.9
NORTH AMERICA	27.6	4.2
SSA	17.9	1.4
DEVELOPED	31.0	4.4
DEVELOPING	24.5	2.7
TRANSITION	30.6	2.2
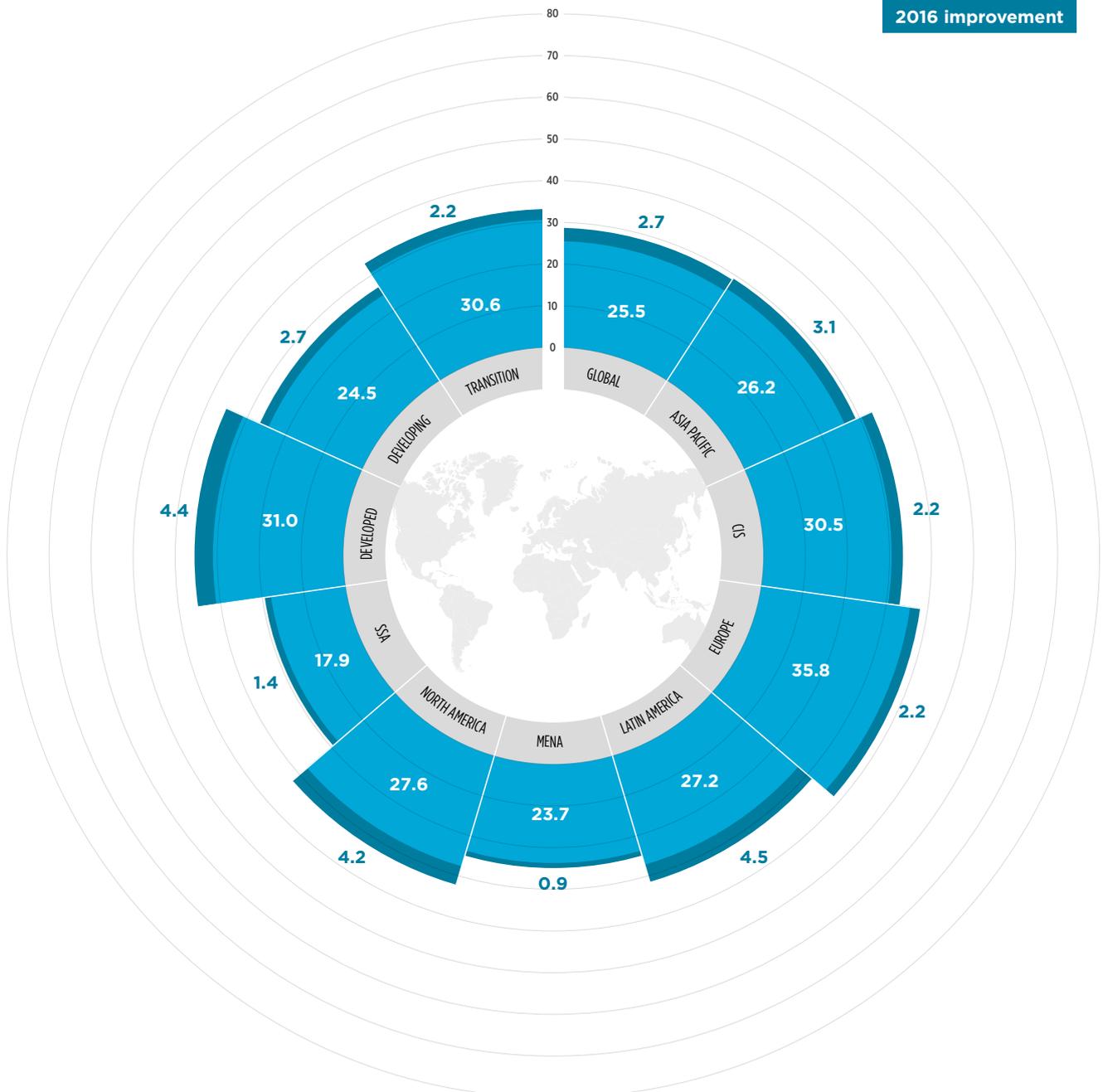
Drivers

- 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

Operator services

OPERATOR	SERVICE OR INITIATIVE
Zain (Sudan)	- AlJafeel Water Project
Orange	- Orange Data for Development

7 AFFORDABLE AND CLEAN ENERGY

SDG7

AFFORDABLE AND CLEAN ENERGY

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

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement

80		
70		
60		
50		
40		
30		
20		
10		
0		

3.8

2.9

31.9 TRANSITION

30.0 GLOBAL 2.9

28.0 DEVELOPING

31.4 ASIA PACIFIC 3.4

3.0 54.6 DEVELOPED

SD 31.9 3.8

19.1 SSA

EUROPE 40.7

2.2

2.8

54.4 NORTH AMERICA

LATIN AMERICA 27.6

2.6

MENA 29.0

4.7

1.1
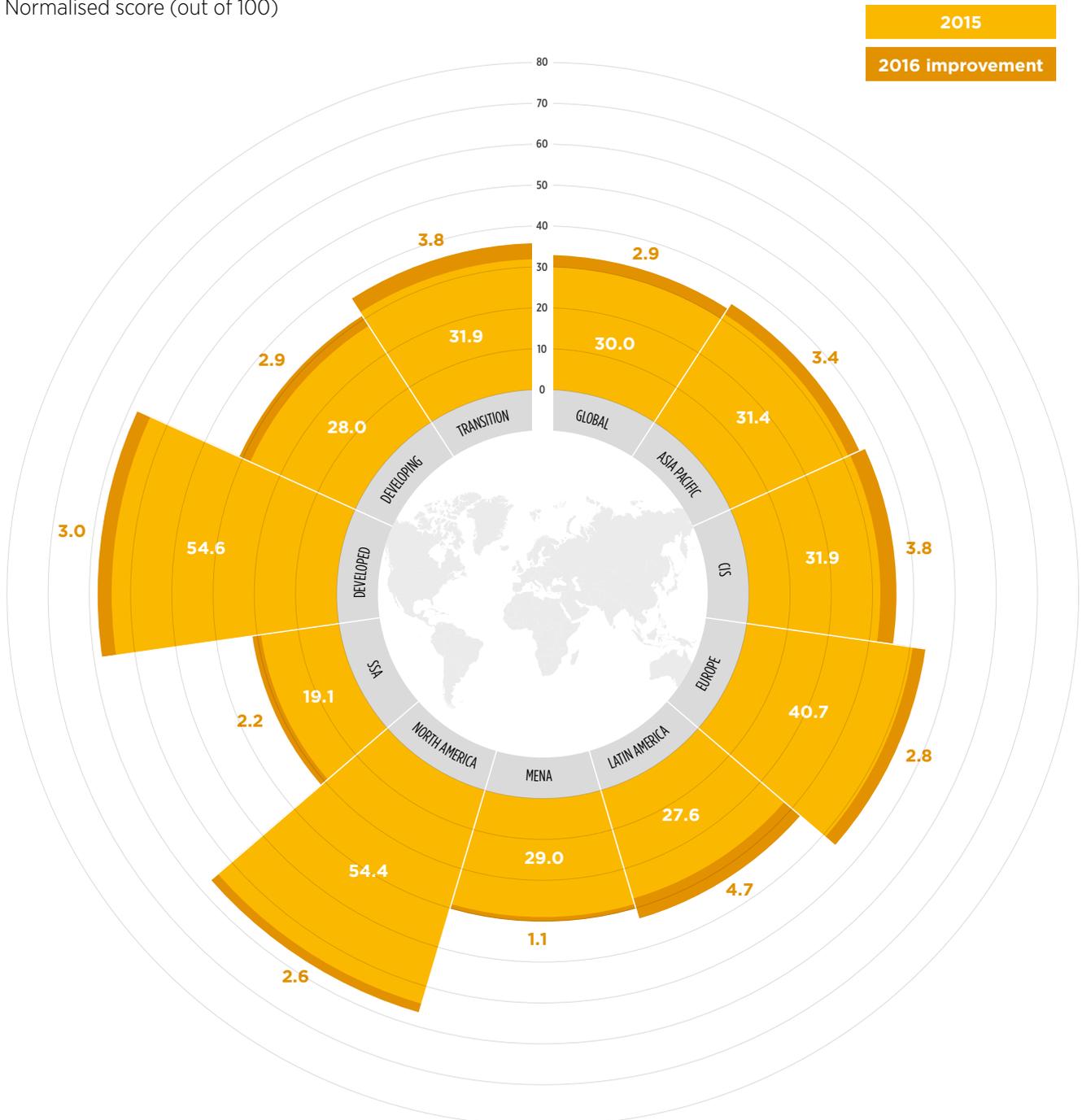
Drivers

- 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

Operator services

| OPERATOR	SERVICE OR INITIATIVE
MTN (Nigeria)	- MTN Lumos Affordable Mobile Solar Electricity (PAYG)
Zain (Saudi Arabia)	- Zain KSA HQ Smart and Sustainable Building
Orange (Senegal, Côte d'Ivoire and Cameroon)	- Orange and ENGIE

SDG8

8 DECENT WORK AND ECONOMIC GROWTH
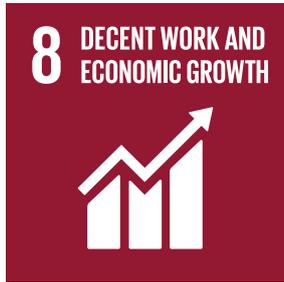
DECENT WORK AND ECONOMIC GROWTH

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

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement
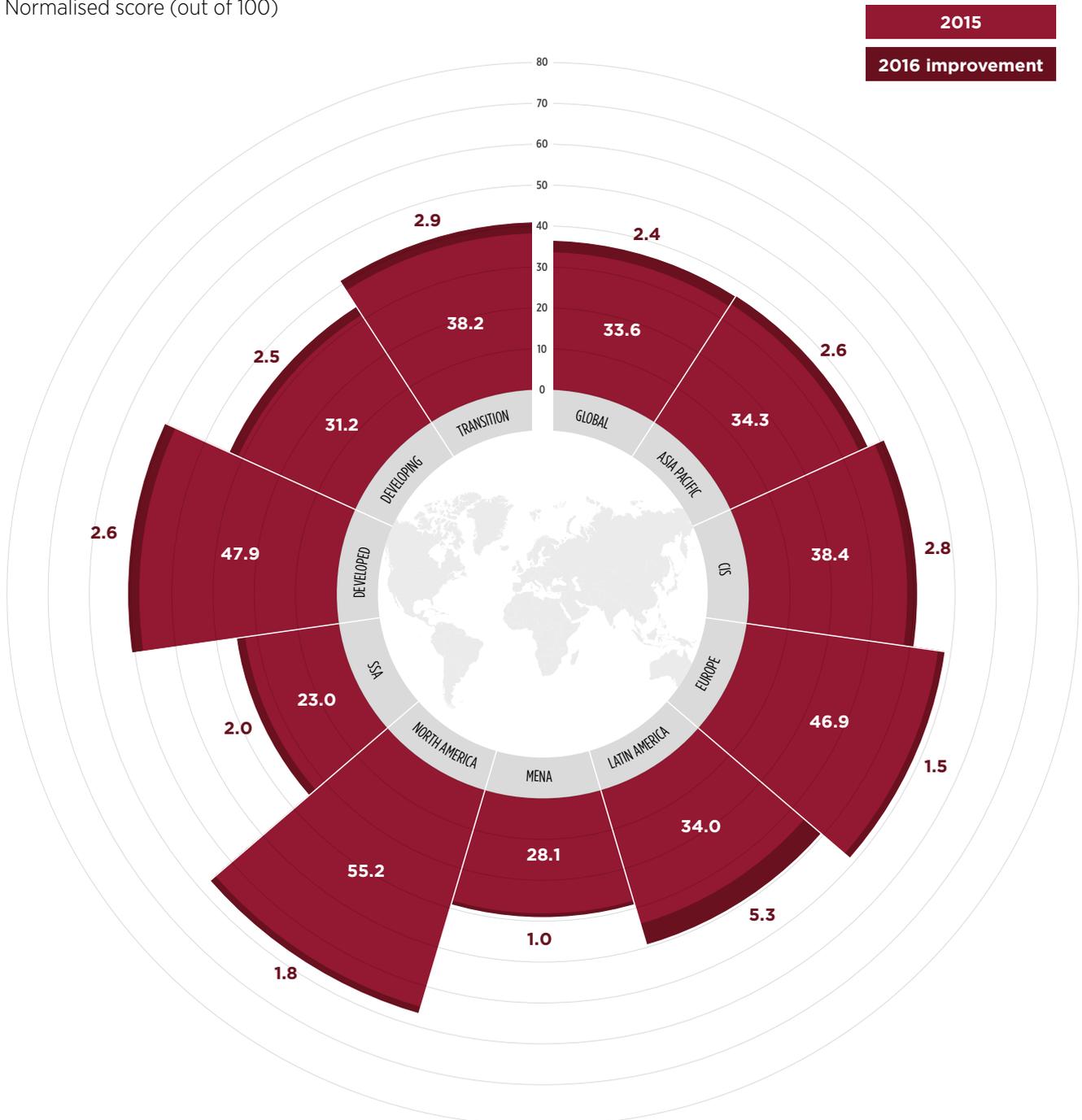
Drivers

- 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)

Operator services

OPERATOR	SERVICE OR INITIATIVE
TIM (Italy)	- Employment impact - TIM #Wcap and TIM Ventures
TIM (Brazil)	- Citizen without borders - Mobile Broadband
Zain (Kuwait, Jordan and Iraq)	- Zain Great Idea - Zain Innovation Campus - Innovation for Development Initiative
Zain (Bahrain)	- 5ameesna Zain
Zain (Iraq)	- Partnership with Widows Development Center - Startup Weekend
Zain (Kuwait)	- Partnership between Zain and Loyac - Zain-Injaz partnership
Zain (Jordan)	- Mobile Maintenance Training - ReBootKAMP
Zain (Lebanon)	- Touch and Youth Energy for Development joint project
Zain (Sudan)	- Kiosks Project
Telefónica	- Smart Agro

**9** INDUSTRY, INNOVATION AND INFRASTRUCTURE

SDG9

INDUSTRY, INNOVATION AND INFRASTRUCTURE

Build resilient infrastructure, promote sustainable industrialisation and foster innovation

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement
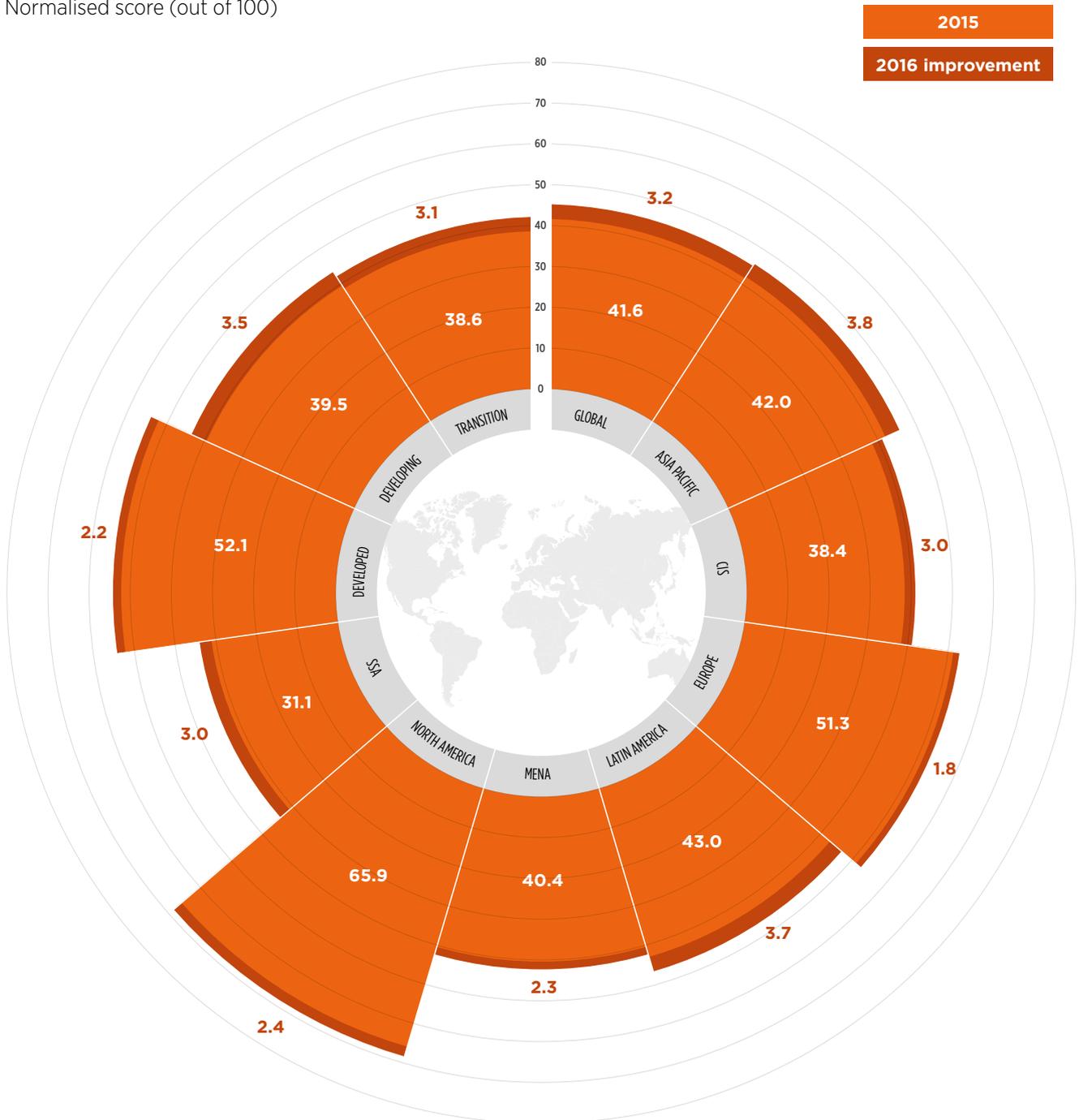
Drivers

- 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. solar pay as you go)

- 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

Operator services

| OPERATOR	SERVICE OR INITIATIVE
Telstra (Australia)	- Network investment in rural and regional Australia - Invest in startups (e.g. FluroSat and AgriWebb) to support innovation
TIM (Italy)	- Digitisation of the Country - Patents - Joint Open Lab (JOL) - WithYouWeDo
Vodacom (South Africa)	- Innovative solution allowing mobile base stations to be retrofitted to shipping container shops, allowing for the rapid rollout of coverage
Vodafone (Fiji)	- Vodafone Foundation Instant Network
Zain	- MIT Enterprise Forum (MITEF) Pan Arab Startup Competition Partnership - Competition Partnership 'Innovate for Refugees' Stream
Orange	- The Joint Audit Cooperation - Orange Prize for Social Entrepreneurship in Africa - Teranga Capital - The incubator boom
Telefónica	- Internet4All
China Telecom	- Universal service
China Mobile	- Village connected project
China Unicom	- Connecting rural areas

10 REDUCED INEQUALITIES

SDG10

REDUCED INEQUALITIES

Reduce inequality within and among countries

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement
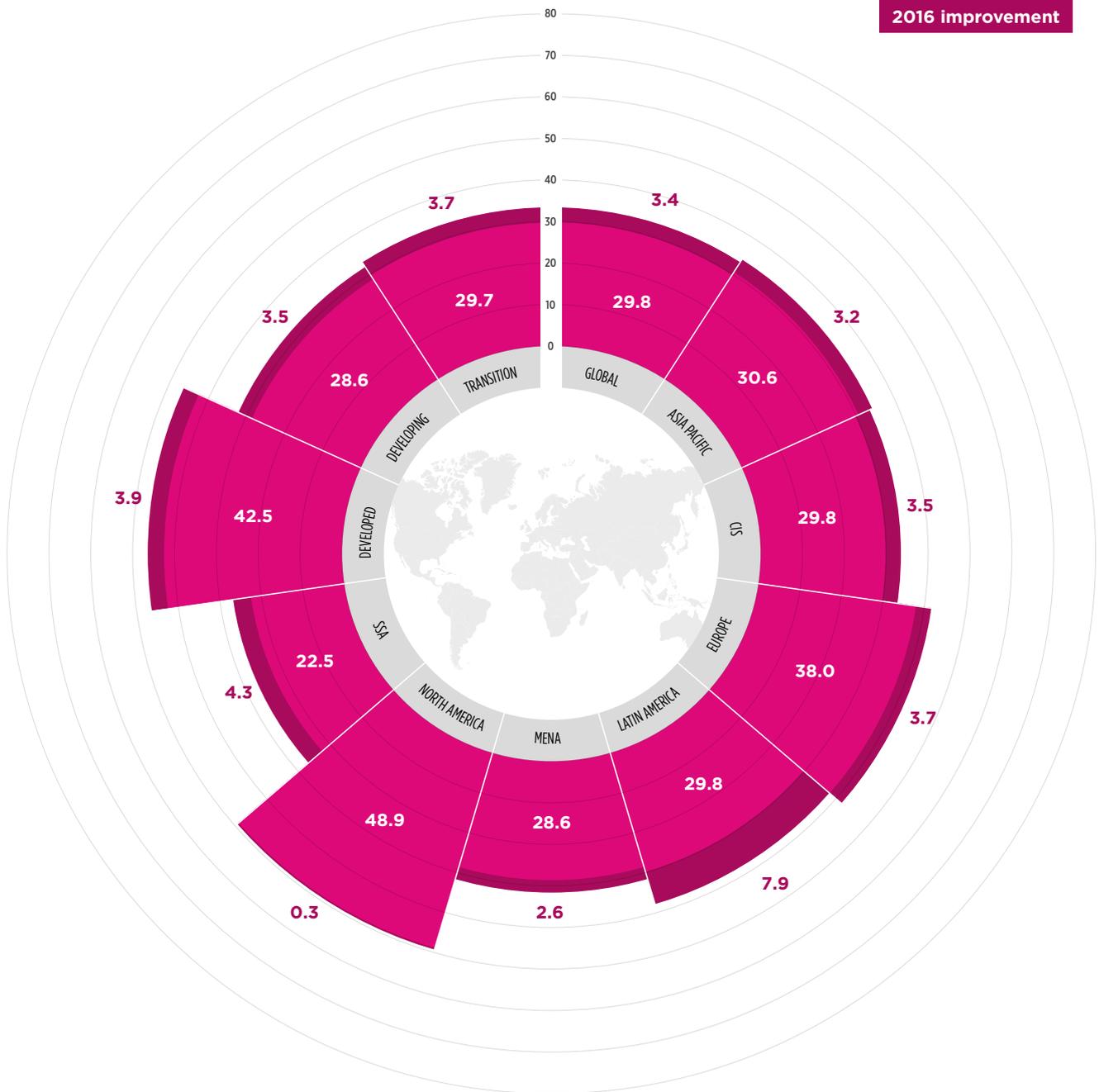
Drivers

- 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

Operator services

OPERATOR	SERVICE OR INITIATIVE
Telia (Norway)	- Enhancing social inclusion for children with long-term conditions
Telenor (Pakistan)	- Digital birth registration
Telenor (Thailand)	- Smart Farmer
Telenor (Bangladesh)	- Tonic
Turkcell (Turkey)	- Facilitating the integration of Syrian refugees with "Hello Hope" mobile app and Camp project - My Dream Companion: helping visually disabled individuals lead more autonomous lives
Zain (Bahrain and Sudan)	- Call center training for the physically impaired
Zain (Iraq)	- Widows Development Center
Zain (Jordan)	- Mobile Maintenance Training Centers - Mobile Clinic for Children
Orange	- Respecting human rights in the digital world - Industry dialogue - Orange Money, banking on your mobile
Far EasTone Telecommunications (Taiwan)	- Save the Abandoned Children, Spread Love Far

11 SUSTAINABLE CITIES AND COMMUNITIES

SDG11

SUSTAINABLE CITIES AND COMMUNITIES

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

Scores by regional and development status

Normalised score (out of 100)

Legend:
- 2015
- 2016 improvement

Chart values:
- TRANSITION: 41.1 — 3.8
- GLOBAL: 36.5 — 3.9
- ASIA PACIFIC: 37.0 — 4.6
- DEVELOPING: 32.7 — 4.1
- SD: 40.9 — 3.8
- DEVELOPED: 56.6 — 3.5
- EUROPE: 55.7 — 2.9
- SSA: 20.8 — 2.8
- LATIN AMERICA: 35.2 — 4.8
- NORTH AMERICA: 57.8 — 3.0
- MENA: 32.3 — 2.7
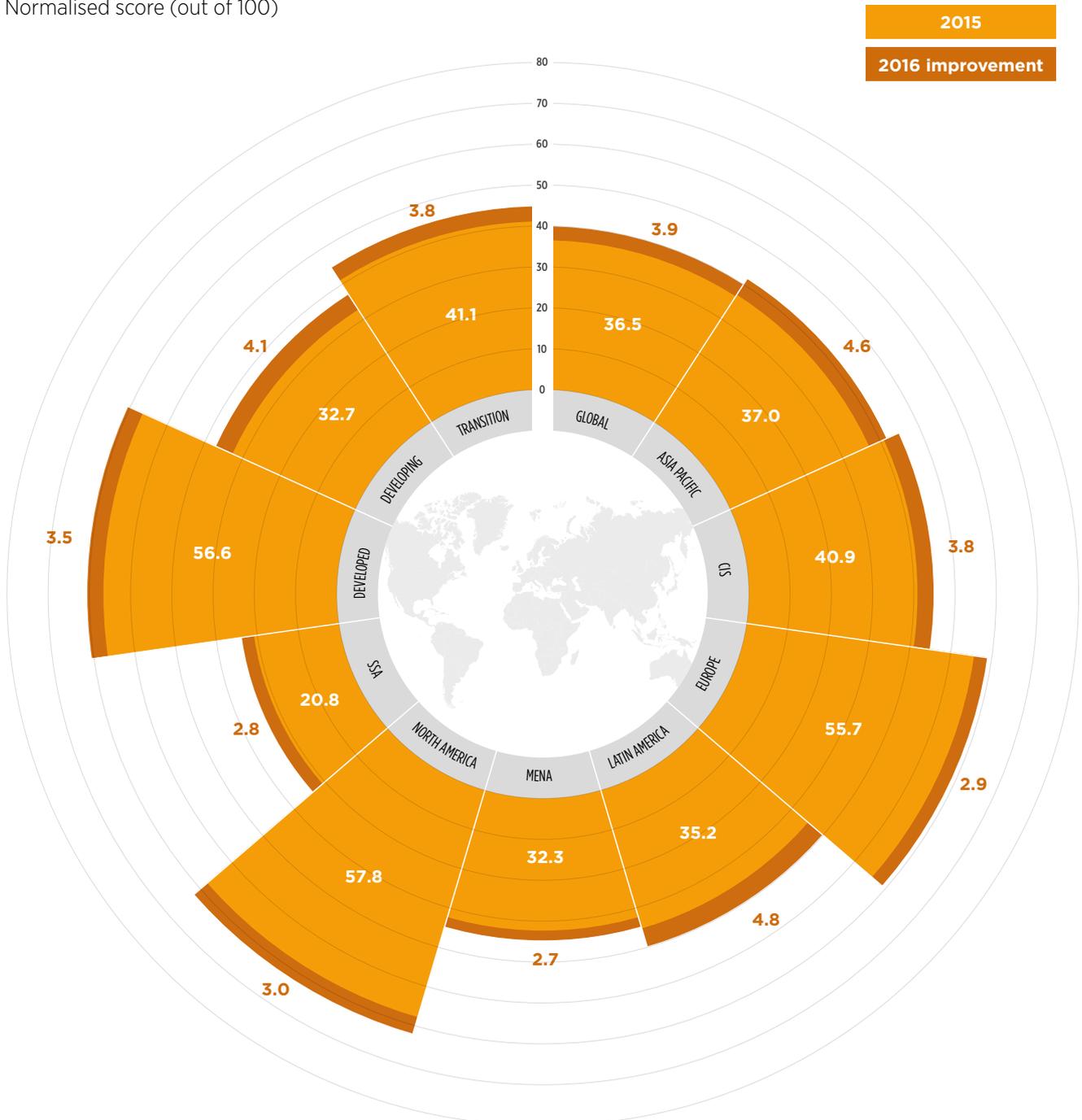
Drivers

- 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

Operator services

OPERATOR	SERVICE OR INITIATIVE
NTT Docomo (Japan)	- Resilient Large Zone Mobile Base Stations
Chunghwa Telecom (Taiwan)	- A Smart City for All
TIM (Italy)	- SMARTWORKING (TIM people) - Smart Services - Infomobility and Smart Cities
Zain (Iraq)	- IDP Assistance Project
Zain (South Sudan)	- Yida and Ajuangthok Refugee Camp
Orange	- Smart cities - Big Data: a tool to support development and the environment

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

SDG12

RESPONSIBLE PRODUCTION AND CONSUMPTION

Ensure sustainable production and consumption patterns

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement

	Score	Improvement
GLOBAL	30.8	2.4
ASIA PACIFIC	33.5	1.8
SD	34.8	1.7
EUROPE	40.3	1.6
LATIN AMERICA	30.5	8.6
MENA	23.3	1.4
NORTH AMERICA	37.4	1.7
SSA	15.2	2.7
DEVELOPED	38.4	2.6
DEVELOPING	28.9	2.5
TRANSITION	34.7	1.7
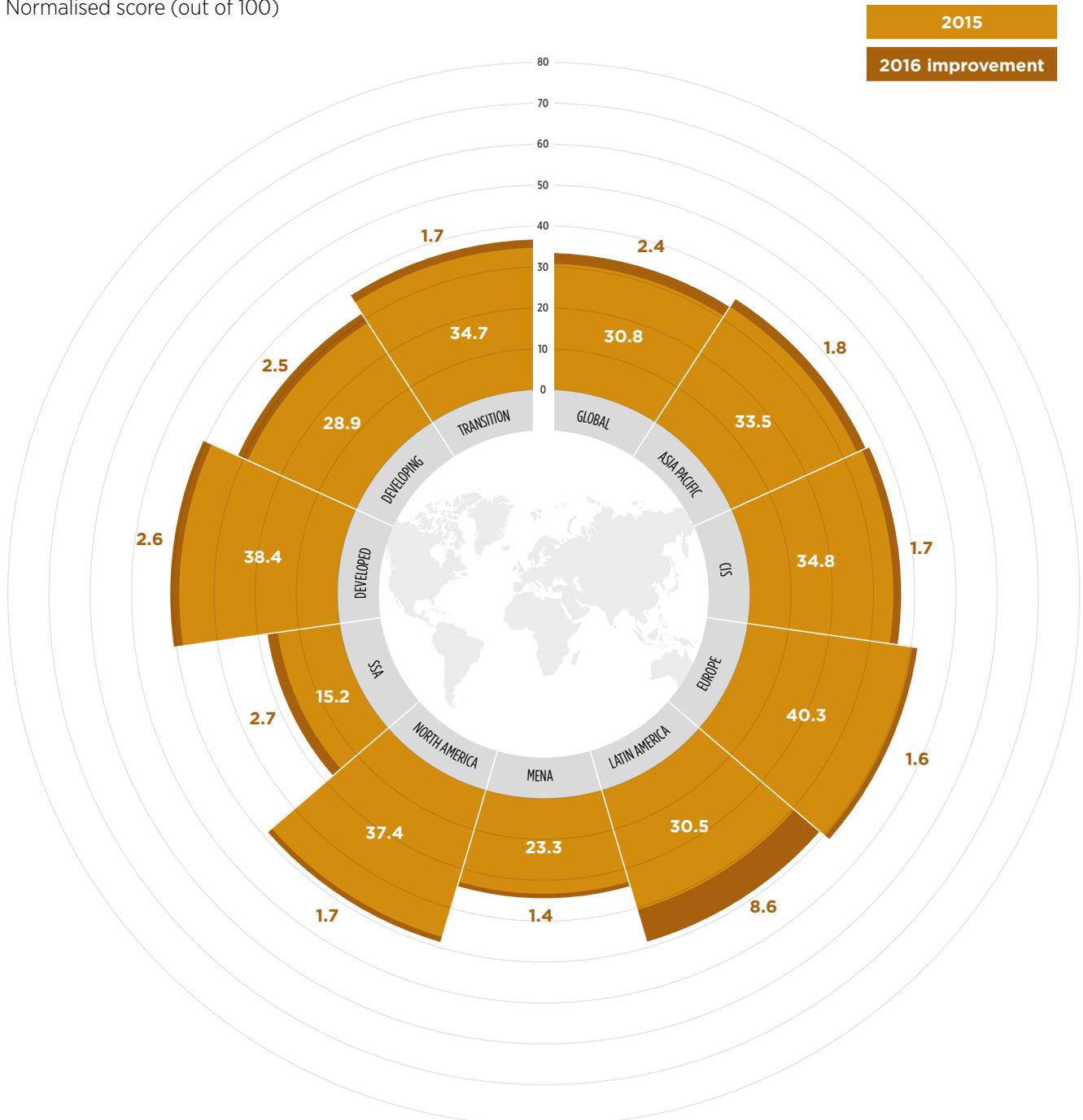
Drivers

- 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)

Operator services

| OPERATOR	SERVICE OR INITIATIVE
Deutsche Telekom	- Fairphone
Zain	- Zain Promotes a Sustainable Supply Chain
Zain (Bahrain)	- Zain Encourages Sustainable Consumption
Orange	- Mobile recycling - Joint Audit Cooperation
Telefónica	- Smart Agro
MTN (South Africa)	- eWaste programme with GIZ

13 CLIMATE ACTION

SDG13

CLIMATE ACTION

Take urgent action to combat climate change and its impacts

Scores by regional and development status

Normalised score (out of 100)

	2015
	2016 improvement

Radial chart values:

- TRANSITION: 40.9 — 3.2
- GLOBAL: 37.4 — 4.1
- ASIA PACIFIC: 38.8 — 4.6
- SD: 40.6 — 3.2
- EUROPE: 54.7 — 3.4
- LATIN AMERICA: 33.6 — 3.7
- MENA: 30.2 — 3.8
- NORTH AMERICA: 57.2 — 3.3
- SSA: 19.9 — 3.6
- DEVELOPED: 54.1 — 4.5
- DEVELOPING: 33.5 — 4.3
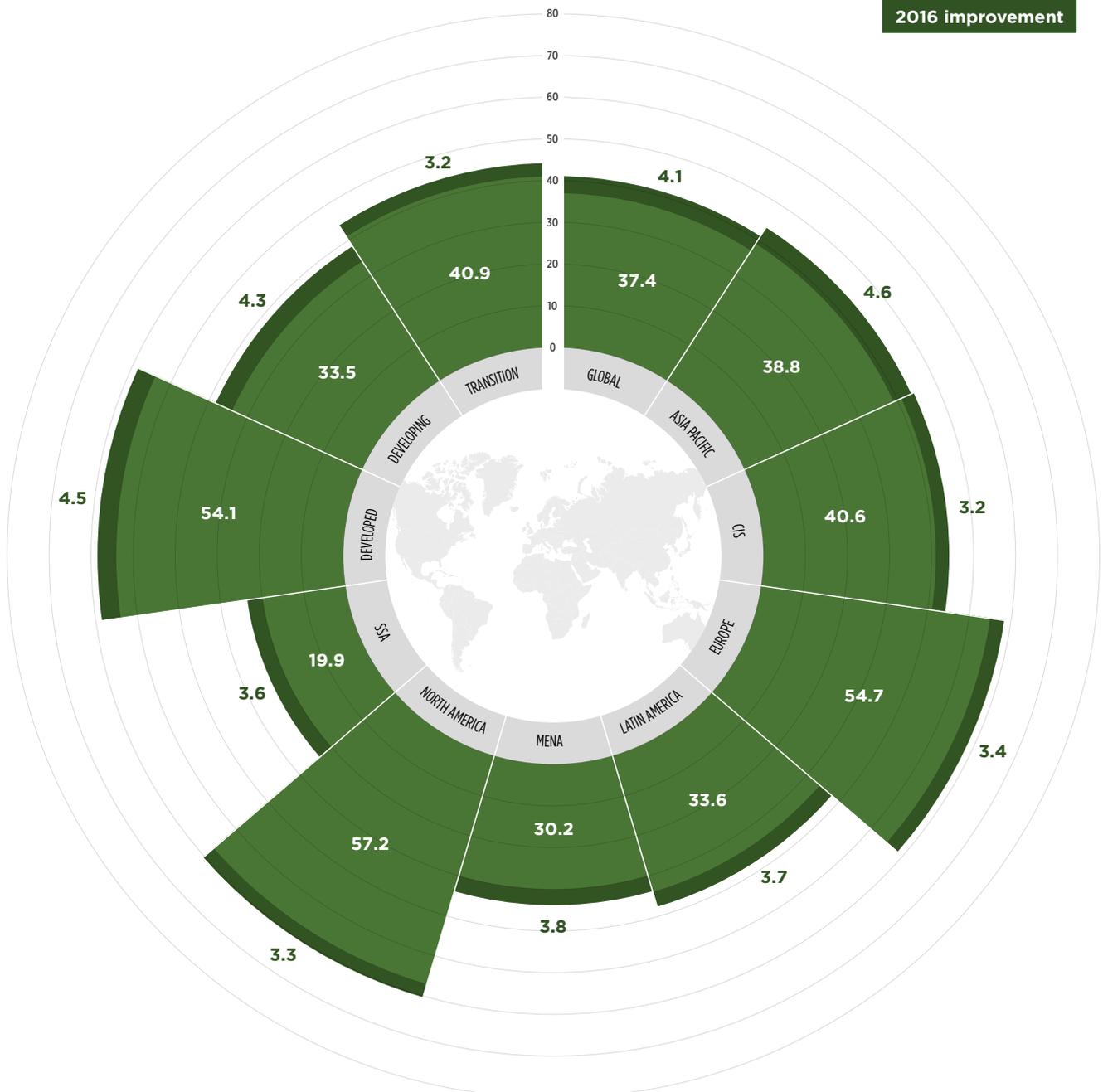
Drivers

- 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

Operator services

| OPERATOR	SERVICE OR INITIATIVE
NTT Docomo (Japan)	- Resilient Large Zone Mobile Base Stations
TIM (Brazil)	- Biosite Brazil
TIM (Italy)	- TIM's Digital Life Programme - Olivetti solutions
Zain (multiple countries)	- Reduce carbon footprint
Orange	- Encouraging energy and environmental transition
Telefónica	- Smart Agro
Far EasTone Telecommunications (Taiwan)	- Tainan 4G Smart City Project

SDG14

LIFE BELOW WATER

Conserve and sustainably use the oceans, seas and marine resources

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement

TRANSITION 29.3 — 2.1
DEVELOPING 19.4 — 3.4
DEVELOPED 47.9 — 6.0
SSA 11.6 — 3.5
NORTH AMERICA 50.7 — 3.8
MENA 16.1 — 2.1
LATIN AMERICA 21.6 — 1.1
EUROPE 46.4 — 2.8
SD 29.7 — 2.0
ASIA PACIFIC 21.4 — 3.7
GLOBAL 21.2 — 3.3
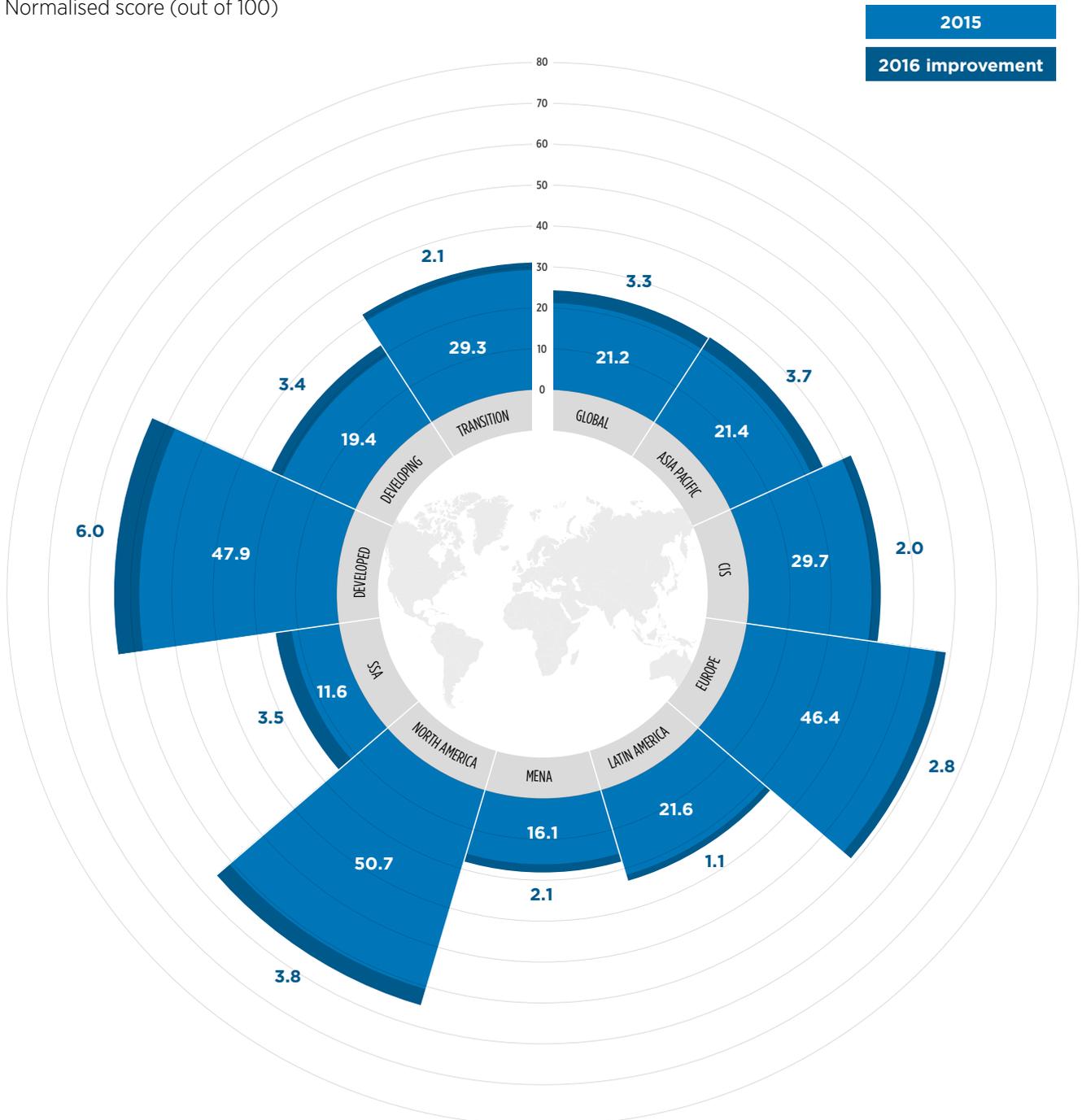
Drivers

- 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

Operator services

| OPERATOR	SERVICE OR INITIATIVE
Vodafone	- Vodafone connects the first marine mammals to the Internet of Things
Orange	- Orange Marine, protecting whales with the NGO Souffleurs d'Ecume

SDG15

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

Scores by regional and development status

Normalised score (out of 100)

2015	
2016 improvement	
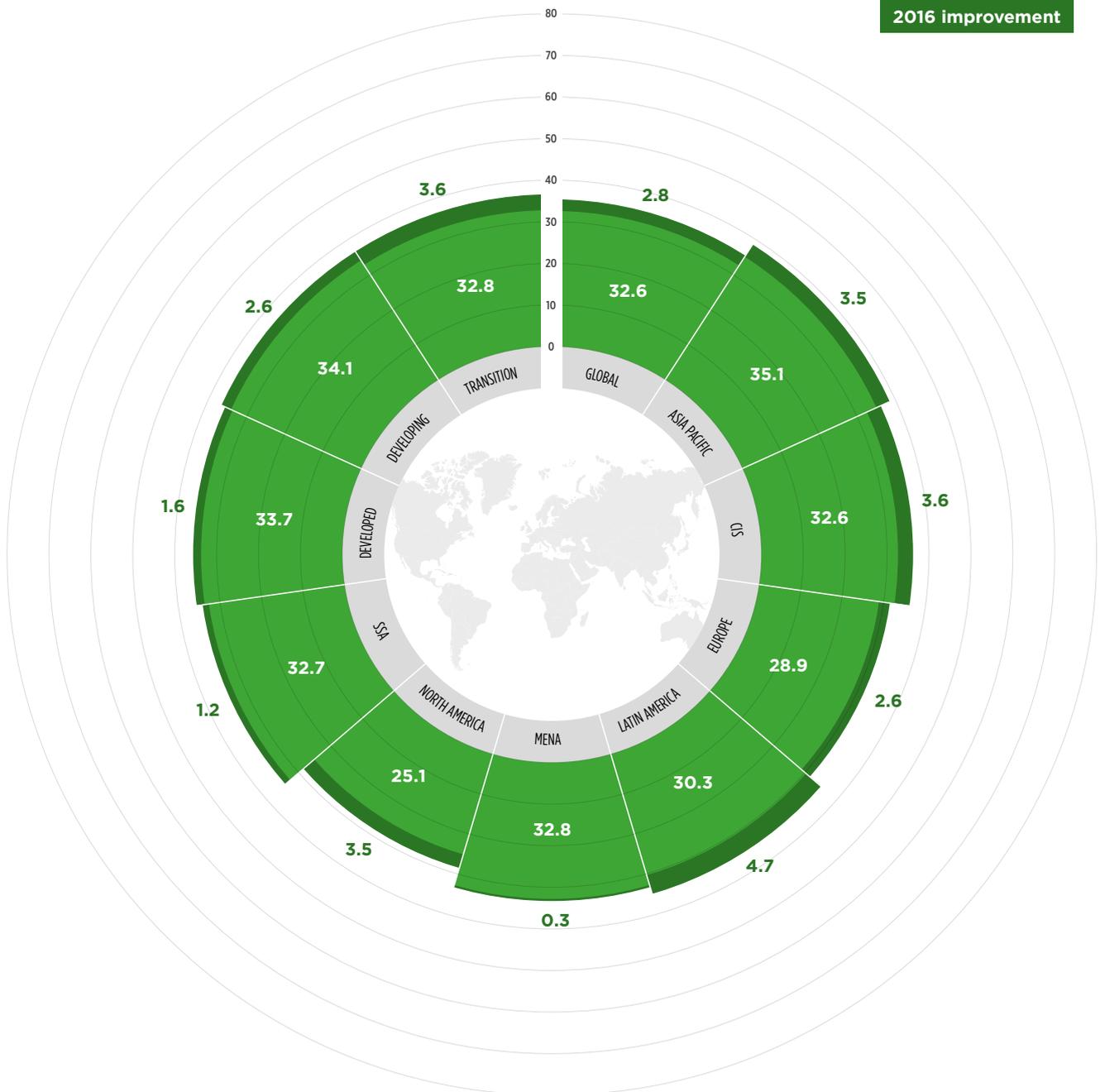
Drivers

- 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

Operator services

OPERATOR	SERVICE OR INITIATIVE
Vodafone	- Moocall - Vodafone works with Keenan to connect cows, driving efficiencies and improving animal welfare
Zain (Jordan, Lebanon and Sudan)	- Reforestation projects
Orange	- Protecting biodiversity: 4G antennas playing their part on Mont Blanc

# 16 PEACE, JUSTICE AND STRONG INSTITUTIONS

SDG16

PEACE, JUSTICE AND STRONG INSTITUTIONS

Promote just, peaceful and inclusive societies

Scores by regional and development status

Normalised score (out of 100)

| 2015 |
| 2016 improvement |
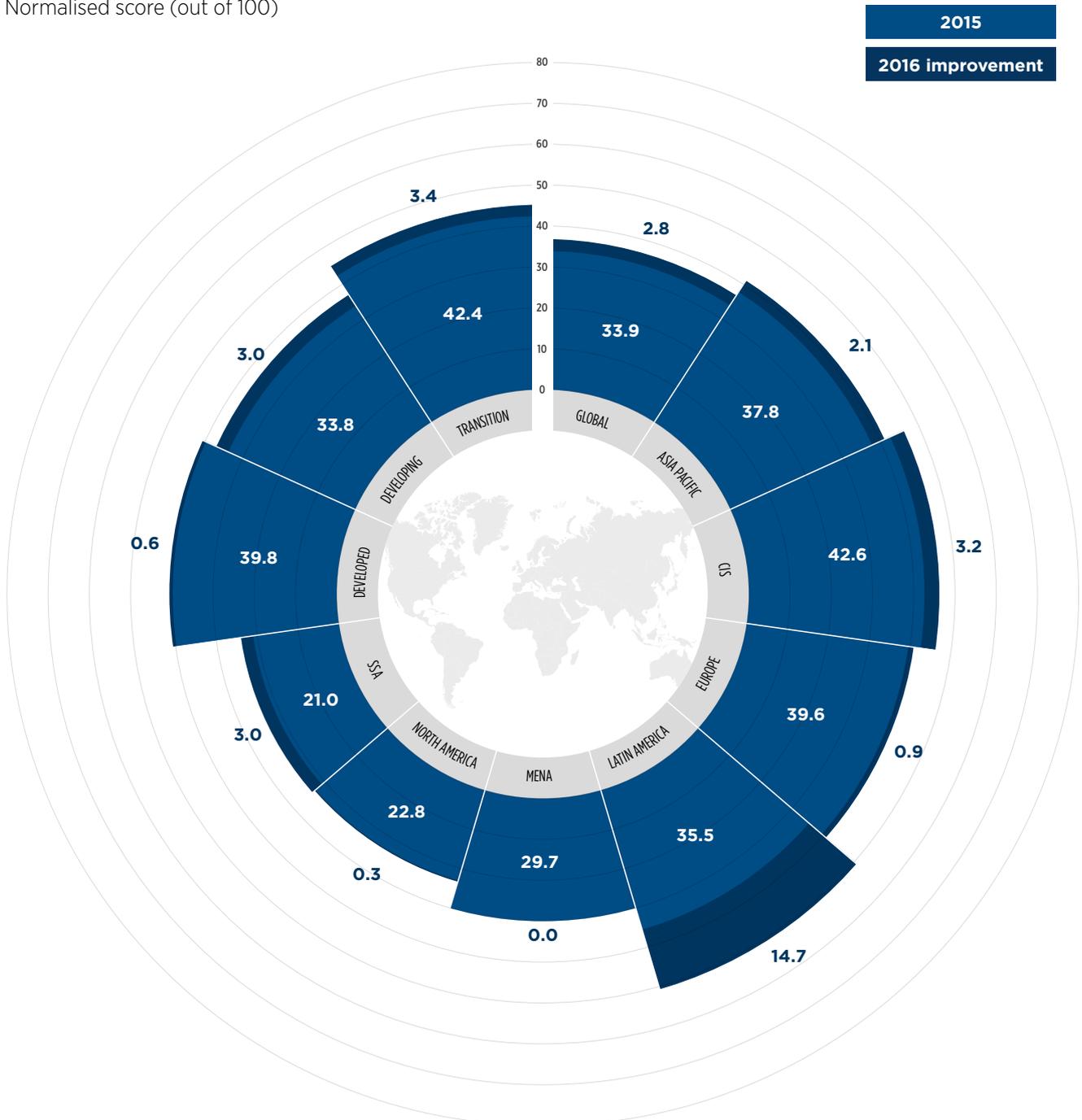
Drivers

- 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

Operator services

| OPERATOR	SERVICE OR INITIATIVE
Telenor (Pakistan)	- Digital birth registration
TIM (Italy)	- Joint Audit Cooperation (JAC)
Zain (South Sudan)	- Whitaker Peace and Development Initiative - Yida and Ajuangthok Refugee Camp
Zain (Iraq)	- IDP Information Centre
Zain (Kuwait)	- Kuwait Lebanon – Syrian Refugees
Zain (Jordan)	- ReBootKAMP
Orange	- Stakeholder dialogues - Declaring births by mobile phone

17 PARTNERSHIPS FOR THE GOALS

SDG17

PARTNERSHIPS FOR THE GOALS

Revitalise the global partnership for sustainable development

Scores by regional and development status

Normalised score (out of 100)

2015

2016 improvement

Segment	2015	2016 improvement
GLOBAL	28.7	3.5
ASIA PACIFIC	31.0	3.8
SD	27.1	4.6
EUROPE	36.4	4.8
LATIN AMERICA	27.3	6.8
MENA	28.4	1.9
NORTH AMERICA	29.2	3.3
SSA	17.9	3.4
DEVELOPED	40.4	5.4
DEVELOPING	27.8	3.5
TRANSITION	27.3	4.6
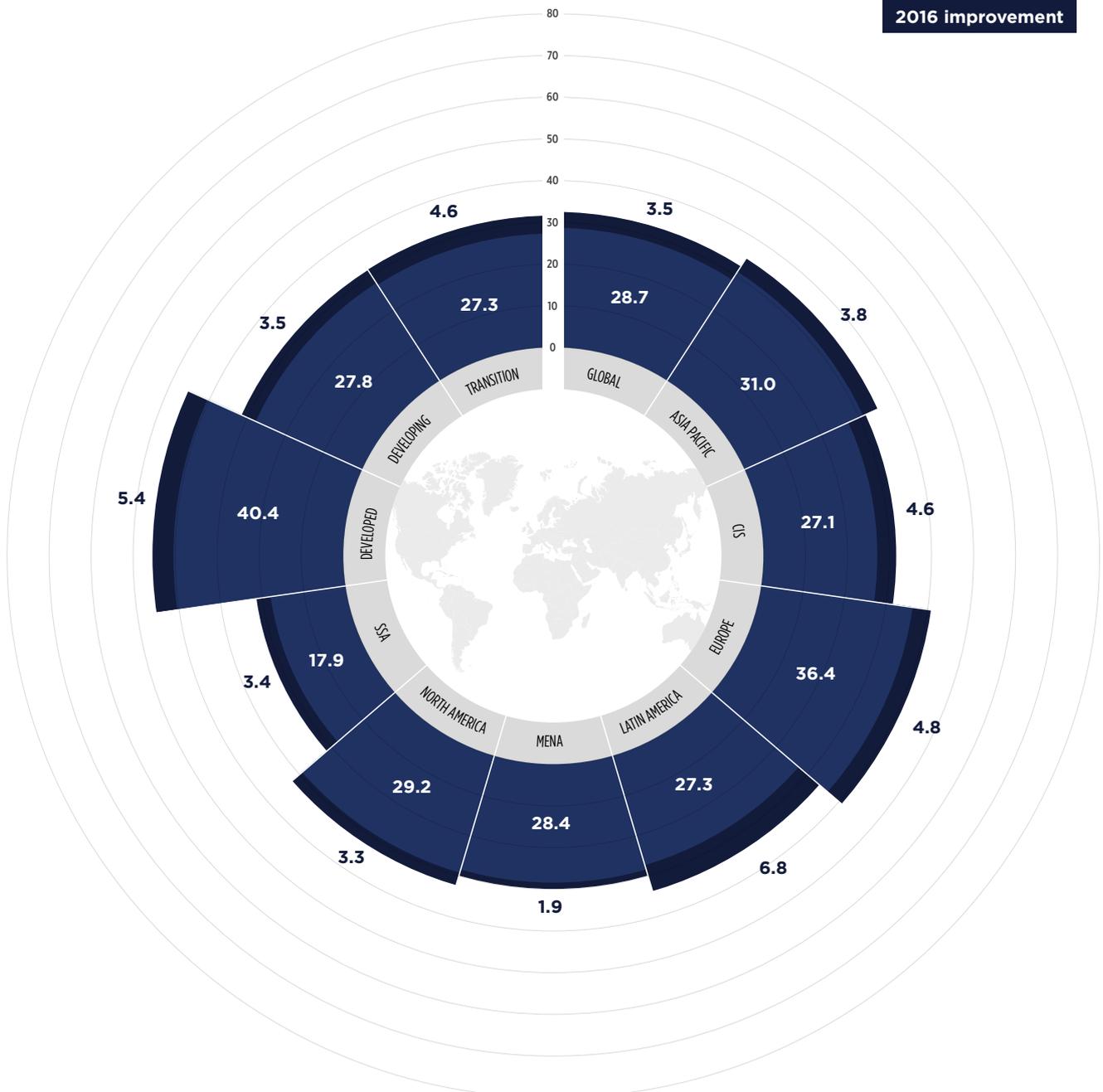
Drivers

- 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

Operator services

Operator	SERVICE OR INITIATIVE
Zain	- Zain, UNHCR and Facebook Partnership - Child Abuse – Child Helpline International - World Economic Forum Partnership

CONNECTING EVERYONE AND EVERYTHING TO A BETTER FUTURE

gsma.com/betterfuture