2016 Mobile Industry Impact Report: Sustainable Development Goals

The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with almost 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 and the Mobile 360 Series conferences.

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Sam Baker
Partner
Monitor Deloitte, TMT Industry Group
sambaker@deloitte.co.uk
www.deloitte.co.uk

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FOREWORD

Building on the work undertaken through the Millennium Development Goals, in September 2015, United Nations Member States adopted an even more ambitious agenda – the 2030 Agenda for Sustainable Development, including 17 Sustainable Development Goals, or SDGs. The SDGs represent a qualitatively different view of what human society can become. They provide a set of integrated, and indivisible, priorities for people, planet, prosperity, partnership, and peace.

Achieving the SDGs demands new technologies, innovations, and data collection that can integrate and complement traditional statistics. **A driving force behind this data revolution is mobile technology.**

Mobile phone technology has already transformed societies around the globe, even the poorest countries and communities. It is helping to empower women, create jobs, spur financial independence, improve education, boost agriculture production, and promote better health. Mobile phones have enabled communities to monitor elections, hold governments accountable, and save lives in natural disasters.

As we focus on implementing the Sustainable Development Goals, **the mobile industry has a critical role** in working with governments and the international community to expand connectivity, to lower barriers to access, and to ensure that tools and applications are developed with vulnerable communities in mind.

Mobile operators around the world are already working to address the SDGs. The *2016 Mobile Industry Impact Report* offers critical insights into the collective efforts of the mobile industry in helping to achieve the ambitious targets set forth by the Goals. I look forward to working closely with the mobile industry to develop a roadmap to extend its engagement and create significant impact. Together, supporting the Sustainable Development Goals, we can build a future of dignity and opportunity, where no one is left behind.

David Nabarro
Special Adviser of the United Nations Secretary-General on the 2030 Agenda for Sustainable Development

CONNECTING EVERYONE AND EVERYTHING TO A BETTER FUTURE

#betterfuture

It's an ambitious goal and, although we have made significant progress in a short period of time, we still have much more to do to achieve this. Globally, more than 4.7 billion men and women subscribe to a mobile service – almost two-thirds of the world's population – and this is expected to reach 5.6 billion people in 2020.

The mobile industry is also connecting billions of people to the internet – **mobile is the dominant platform for internet access in many parts of the world,** given the lack of alternative infrastructure. By 2020, just under 60 per cent of the global population will be on the mobile internet, but this also means that 40 per cent of the world still will not have access.

We must change this – and it's something our industry is very focused on – extending network coverage to rural areas, improving affordability of mobile services, delivering locally relevant content and increasing digital skills and literacy.

It's not just about connectivity – and that is a very important first step – it's about what this connectivity enables. It really is about *Connecting Everyone and Everything to a Better Future.*

As an industry, we now have an important opportunity to **leverage the mobile networks that we have built and the services we deliver to help achieve the Sustainable Development Goals.** With a far-reaching and ambitious agenda, the Goals truly define what this "better future" will be.

Mobile networks are transforming the world and are a revolutionary force in overturning the status quo – and they **are essential in achieving the Goals,** whether it's ensuring healthy lives and promoting well-being for all; achieving gender equality and empowering women and girls; making cities and settlements inclusive, safe, resilient and sustainable; or helping to combat climate change and its impacts.

In February 2016, the mobile industry became the first sector to commit to the Sustainable Development Goals. With the publication of the *2016 Mobile Industry Impact Report*, we are reaffirming that commitment and creating a framework through which we can assess our success in attaining the Goals.

Working together as an industry, with other sectors, governments and key stakeholders, I do believe **we can make a real difference in people's lives.**

Mats Granryd
Director General
GSMA

QUOTES

The private sector will play an essential role in achieving the Sustainable Development Goals. The most important contribution a company can make is to do business responsibly, and then find opportunities to innovate around these ambitious global goals. Smart companies and industries that readily embrace this new agenda will be the leaders of tomorrow.

Lise Kingo, Executive Director of the United Nations Global Compact

Progress happens by bringing together people who have the drive and the influence to make positive change. The United Nations Sustainable Development Goals provide the opportunity for engagement to address our most pressing global challenges but they cannot be realised without the business community. With digital transformation at the core of our economies and society, mobile connectivity has the potential to transform our lives and help achieve each of the SDGs.

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

By giving people the means to improve their own lives, financial inclusion offers an invaluable tool to strengthen human development and empowerment. Evidence increasingly shows strong links between financial inclusion and the SDGs—for example, helping to reduce extreme poverty, hunger, and gender inequality, and fostering education.

The global community has made significant progress expanding financial services in recent years, but 2 billion people are still excluded from the financial system, most of them poor. The mobile industry holds an important key to expanding financial inclusion and enabling development progress. Mobile network operators have already done much to bring digital financial services to the unbanked in Kenya, Pakistan, and the Philippines. If the industry can work with regulators and others to improve customer adoption, usage, and protection, it will have a formidable impact on financial inclusion and on the Sustainable Development Goals, and will also contribute to the stability and the integrity of the financial sector.

H.M. Queen Máxima of the Netherlands, United Nations Secretary-General's Special Advocate for Inclusive Finance for Development (UNSGSA)

The proliferation of mobile cellular telephony was one of the most important elements in bringing the power of telecommunications to billions of people across the world. Now, with mobile broadband emerging as one of the fastest-growing technologies of all time, we have the potential to empower tremendous advances in critical areas such as education, healthcare, environmental management and poverty reduction. ICTs will be absolutely critical meeting each of the 17 SDGs and mobile technology will continue to be at the very heart of future development.

Houlin Zhao, Secretary-General, International Telecommunication Union (ITU)

The world recognises the power of mobile technology to change lives and improve livelihoods. Our Commission members Safaricom, Ericsson and Vodafone, together with other service providers are opening access to markets, financial services and critical health resources for the most challenged communities. The Sustainable Development Goals provide an opportunity to scale-up this impact, and the GSMA, through this inspiring report, is showing how mobile operators can be at the heart of sustainable, inclusive growth.

Jeremy Oppenheim, Director, Business and Sustainable Development Commission

COMMONWEALTH TELECOMMUNICATIONS ORGANISATION

The immensely positive impact of mobile technology on people's live is ever growing and becoming ever wider. Yet, with the advancement of technology, much more can and should be done to further improve lives in areas such as health, education and the environment as well as to empower people. For this to be possible, other factors come into play beyond technology; among these factors are the national policy and regulatory environments which must be more conducive to investment in broadband access, innovative technology applications and a secure cyberspace which provides the assurance needed for users to maximise the potentials of cyberspace. Our collective efforts must not overlook these factors if we are to make use of technology to achieve the 2030 Agenda for Sustainable Development. GSMA's 2016 Mobile Industry Impact Report: Sustainable Development Goals provides us with an early insight into how mobile technology can support this new agenda.

Shola Taylor, Secretary-General, Commonwealth Telecommunications Organisation (CTO)

Private sector organisations and industries need a way of measuring their impact on the SDGs before they can align their purpose, their strategies and their operating models. I am pleased to see the mobile industry stepping forward and developing this rigorous approach to SDG impact assessment, it's the first of its kind and I hope it will stimulate other industries and organisations to follow a similar approach, catalysing alignment to a common view of a better future for all.

David J O Cruickshank, Global Chairman, Deloitte Touche Tohmatsu Limited

This first-of-its-kind report establishes how the mobile industry impacts the United Nations Sustainable Development Goals, and highlights the opportunities for enhancing this impact moving forward. It provides the foundation for a set of commitments that will ensure that the SDGs are an enduring influence on our industry's roadmap, and will drive us in our ambition to create a better future for all.

Dr Nasser Marafih, GSMA Foundation Board, Member of the Ooredoo Group Board and Advisor to the Chairman, Ooredoo

This year, the mobile industry became the first to commit to supporting the United Nations Sustainable Development Goals. This report establishes a baseline for the industry's contribution to date, and will become an essential reference for all stakeholders to track our progress against the SDGs in the future. We hope that it inspires all partners including governments, civil society and other industries to commit to the achieving the goals and working together to build a better future.

Johan Dennelind, President and Chief Executive Officer, Telia

The SDGs provide companies an opportunity to help meet targets which achieve financial performance and have impact on people and the planet. The mobile industry is taking leadership in this report by publishing an assessment of where it stands today vis-a-vis the goals of the SGDs and how it can accelerate the progress towards impact.

Sonal Shah, Economist and Executive Director, Beeck Center for Social Impact and Innovation, Georgetown University and GSMA Foundation Board Member

This ground-breaking report offers a strong assessment of how the mobile industry is living its purpose to 'Connect Everyone and Everything to a Better Future'. It provides a roadmap for maximising our impact on the United Nations Sustainable Development Goals going forward. We are convinced that mobile operators are playing a crucial role in establishing a sustainable future for all. Connectivity through mobile is ground-breaking for everyone to tap into the digital present and future.

Jon Fredrik Baksaas, Chairman, GSMA

EXECUTIVE SUMMARY

THE MOBILE INDUSTRY AND PURPOSE

This first-of-its-kind report offers critical insights into the transformative impact of the mobile industry on individuals, societies and economies around the world, in developed and developing markets. Importantly, it establishes a benchmark through which the industry will assess its success in contributing to the Sustainable Development Goals (SDGs) and serves as a blueprint for other industries as they commit to achieving the SDGs.
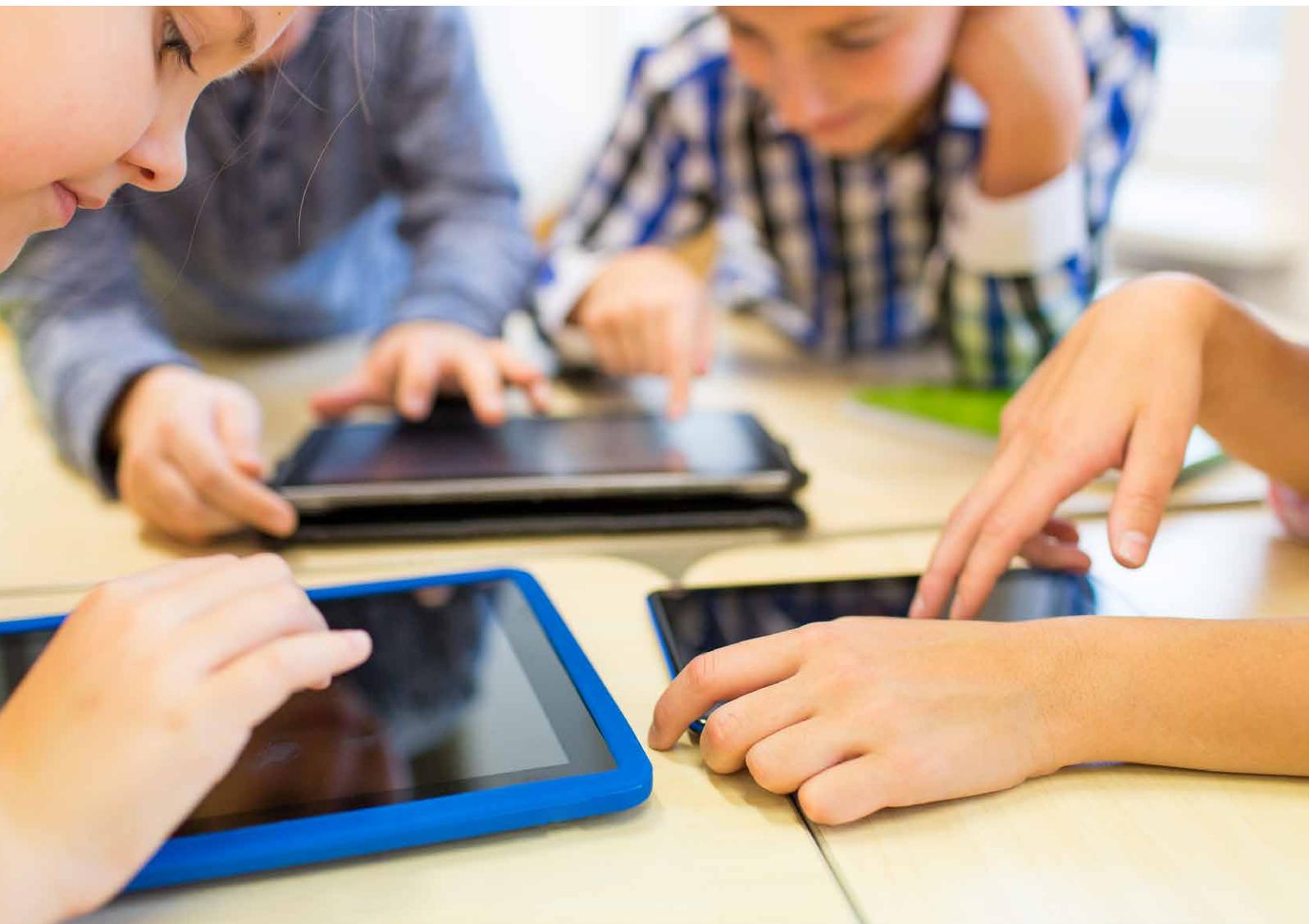
THE MOBILE INDUSTRY

The mobile industry has moved from being a luxury service provider in an analogue economy to providing the foundations of all interactions in the digital world:

- Two thirds of the world, or 4.7 billion unique subscribers[1], are now connected by mobile networks with approximately 200 million additional people being connected each year;

- 2.2 billion people have mobile broadband, enabling them to participate in the digital economy;

- At the end of 2015, there were more than 310 million Internet of Things (IoT) / machine-to-machine (M2M) connections, with growth forecast to drive this to one billion connections by 2020, demonstrating the emerging scale and scope of the digital world and the mobile industry's role within it.[2]

CONNECTING EVERYONE AND EVERYTHING TO A BETTER FUTURE

The mobile industry purpose, "Connecting Everyone and Everything to a Better Future", was launched at Mobile World Congress (MWC) 2016 in Barcelona, and formally acknowledges the responsibility that comes with owning and operating the networks that have such pervasive reach and such influence on our lives. There are three parts to this purpose:

INCLUSION "Connecting Everyone":
Around three billion people remain unconnected and a further 2.4 billion people are connected to voice and simple text services only;

INNOVATION "Connecting Everything":
IoT is developing rapidly, but the level of penetration remains low. A core part of the purpose is to contribute to the development of IoT and the promise it brings;

INFLUENCE "A Better Future":
The industry recognises that connectivity is transformational and that operators have a collective responsibility to influence how this connectivity is used.

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1. Source: GSMA Intelligence, The Mobile Economy 2016 (https://www.gsmaintelligence.com/research/?file=97928efe09cdba2864cdcf1ad1a2f58c&download)
2. Source: GSMA Intelligence data, Deloitte analysis (2016)

THE SUSTAINABLE DEVELOPMENT GOALS

On 25 September 2015, the heads of state, government and High Representatives issued a declaration from the UN headquarters adopting the SDGs and their targets, and committing to work together to change the world.[3]

The SDGs follow the Millennium Development Goals (MDGs), which focused on the challenges of poverty and human development in poorer countries. The MDGs succeeded in demonstrating the power of shared goals. The SDGs are far broader, integrating the economic, social and environmental agendas across all geographies and applying both to developed and developing economies. The SDGs apply to all of us with no exceptions, and provide a universally agreed definition of "a better future".

The 17 SDGs, with 169 associated targets, represent a breath-taking level of ambition in both the scale and scope of change, with timelines for achievement in 2030 or earlier. The SDGs have been developed at a time when the global economic growth of the last decades (which benefited the MDGs) is uncertain, and some key indicators, particularly those relating to equality, inclusion and environmental sustainability, are tracking in the wrong direction[3].

Successful delivery of the SDGs requires major changes to the way different economies and their underlying sectors work together globally, as well as the speed at which innovative ideas and best practice are propagated around the world. The evolving digital economy provides an opportunity to do things very differently and the mobile industry has a foundational position in this evolution.

Governments, sectors, and individual organisations are beginning to formally recognise the SDGs and develop action plans. Sharing approaches, knowledge, and capabilities will be critically important in this phase to ensure that best practice is followed, and that the route to implementation is as efficient and effective as possible. The mobile industry seeks to be an exemplar in terms of its level of commitment and its desire to lead, having first committed to the SDGs in February 2016 at Mobile World Congress in Barcelona.

3. Source: UN, Transforming our world: the 2030 Agenda for Sustainable Development (https://sustainabledevelopment.un.org/post2015/transformingourworld)

THIS REPORT:
THE MOBILE INDUSTRY IMPACT REPORT: SUSTAINABLE DEVELOPMENT GOALS

This report is a critical input into the development of a comprehensive SDG implementation plan for the mobile industry. The report links the mobile industry's activities to the SDGs and their targets, and assesses the impact of these activities on the SDGs. This body of evidence is then used to reflect on the implications of current trends and what the industry can do to enhance impact. The development of the report has created a framework, approach, dataset, model and narrative that can be adopted by other sectors and organisations embarking on this journey.

The development of this report and its associated assets has four main objectives:

1 Facilitate progress reporting through the creation of a common, measureable system that links the industry's activities to their impact on the SDGs and their associated targets;

2 Provide an input into industry decisions on strategy, planning and investment;

3 Allow the mobile industry to engage more effectively with existing or new partners on the basis of the impact on the SDGs;

4 Create a framework that can be shared with others in the mobile communications ecosystem, as well as with other industries.

This is year 1 of the report. As it evolves, improved and more complete data sets will be built, and coverage of specific areas of industry focus will no doubt become more detailed. Nevertheless, it is an important step in establishing a robust framework that quantifies impact. As the first of its type, the impact report will also benefit others as they develop their own approaches. The mobile industry firmly believes that effective measurement and reporting is an important component of driving the necessary change, and as such commits to continuing to develop this approach and to report on a yearly basis.

The approach to developing the impact analysis that underpins the report has four principal stages:

Target filtering: Identifying the SDG targets that the mobile industry can impact in a significant way. Those excluded are typically focused on state intervention or policy (with the exception of specific mobile industry policy that the GSMA and broader industry actively contribute to). Just under half of the 169 targets have been selected.

Driver definition: Describing how industry activity drives the impact against the target. This might be discrete to the industry, or an activity that the industry participates in. Approximately 110 drivers have been defined.

Driver importance assessment: An assessment of the importance of the driver in contributing to the target. This reflects the breadth of each of the targets: in every case, the mobile industry is not the sole contributor as other sectors and types of organisation also contribute.

Metric identification and measurement: Metrics are then developed for each driver, and measures across 90 countries were identified to allow quantification of performance. Metrics are typically proxies rather than precise measures of the driver, and are built up from about 50 variables.

This allows the creation of scores which assess the contribution of the mobile industry against both the targets and SDGs. These scores can be compared and used as a baseline in subsequent years. As the methodology and data sets evolve, 2016 can be updated to ensure a comparable year-on-year story.

The framework is robust, but the population of the framework requires significant judgement, which in turn requires knowledge and understanding both of the industry and of the targets. As such, input has been sought from a wide range of operators and experts, on the industry, on reporting and on sustainability. The support of the 24 operators represented on the GSMA board has been critical to the process, as has GSMA staff expertise.

The most critical inputs have been from a working group of 15 operators, and the GSMA programme teams, comprised of world-leading experts in their own domains, for example, mobile money or cellular infrastructure.

While the report is primarily focused on the assessment of impact across the SDGs, and the forward-looking implications of that analysis, there are three additional topics covered:

Sustainable business policies and practices: Acknowledgement that the mobile industry has a primary responsibility to respect and uphold universal principles of responsible business in areas such as human rights, labour, environment and anti-corruption in the conduct of their business;

The industry's commercial model: Reflections on the strength and sustainability of the commercial model in light of the current and expected impact on the SDGs;

Commitments: A series of commitments by the industry to further promote the SDGs, enhance the industry impact on the SDGs, and advance the capability of other sectors to also contribute.

#betterfuture

KEY FINDINGS: IMPACT ANALYSIS

All SDGs are impacted by the mobile industry to varying degrees, with the greatest impact being felt on: SDG 9: Industry, Innovation and Infrastructure, SDG 1: No Poverty, SDG 4: Quality Education and SDG 13: Climate Action. The way the industry contributes across these four SDGs differs significantly:

- **SDG 9** calls for resilient infrastructure, sustainable and inclusive industrialisation, and innovation. The industry makes a powerful contribution through: extending and upgrading its infrastructure; connecting remote, less-included communities; stimulating economic participation; and supporting IoT-related innovation.

- **SDG 1** focuses on eradicating poverty, providing equal access to economic resources, and building the resilience of the poor. The industry plays its part by stimulating economic participation and activity through voice and data services; providing affordable connectivity; and acting as a provider of financial services to developing economies, including the powerful platform of mobile remittances that is particularly valuable to underserved communities.

- **SDG 4** targets significant improvements in the quality of, and access to, good education across formal and more skills-based categories. The industry primarily impacts this SDG by providing connectivity to schools and learners, giving access to digital resources. The industry also provides educational platforms directly, including content, and facilitates the purchase of school-related services in poorer economies through mobile money.

- **SDG 13** seeks improvements in community resilience to the effects of climate change and improved planning and management. The industry contributes by providing emergency communications systems, connectivity and tailored services, e.g. broadcasts at times of disaster and early warning systems based on data analytics, sensors, and crowd sourcing.

It is important to note that the impact scoring of these four SDGs does not imply prioritisation on behalf of the industry. The scores reflect the number of targets that can currently be materially influenced by what the industry currently does, the importance of the industry to those targets, and a measure of performance using industry metrics. In future years, as progress is tracked against plan, a sense of prioritisation might be inferred.

A key factor in establishing the proportion of the targets selected is the exclusion of those that emphasise policy or state intervention, for example the eighth target (11.a) under SDG 11: Sustainable Cities and Communities is "Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning". Whilst mobile communications will undoubtedly be involved in these processes at some stage, no compelling mobile industry driver was identified with sufficient distinctiveness and impact, so that target is excluded.

The second main influence is the performance of the drivers as measured by the metrics. Drivers that contribute through, for instance, basic connectivity, will be measured by a metric related to penetration and will have a high performance score. Drivers that contribute through the emerging features and capabilities of the industry e.g. M2M investment or IoT, will have a lower performance score.

FIGURE 1
Current and Maximum Potential SDG Impact Scores[4]

		Current	Potential
SDG 1	No Poverty	23	53
SDG 2	Zero Hunger	12	34
SDG 3	Good Health and Well-Being	11	28
SDG 4	Quality Education	23	37
SDG 5	Gender Equality	12	27
SDG 6	Clean Water and Sanitation	5	18
SDG 7	Affordable and Clean Energy	12	26
SDG 8	Decent Work and Economic Growth	9	30
SDG 9	Industry, Innovation and Infrastructure	30	62
SDG 10	Reduced Inequalities	4	17
SDG 11	Sustainable Cities and Communities	4	13
SDG 12	Responsible Consumption and Production	13	25
SDG 13	Climate Action	15	38
SDG 14	Life Below Water	7	16
SDG 15	Life on Land	8	17
SDG 16	Peace, Justice and Strong Institutions	13	30
SDG 17	Partnerships for the Goals	6	23

Current Global Impact

Potential Global Impact

12 Average (Current)

29 Average (Potential)

4. Note: Maximum Potential is based on every country reaching the maximum potential score for each metric used to measure Impact. In this scenario the number of targets impacted, and importance of the industry to those targets remains as current.

Figure 1 above shows the current performance scores and the potential. The potential assumes that the industry maximises performance but does not increase the number of targets it can significantly influence; that is, the core business model stays intact. However, the industry could choose to collaborate in areas outside that model, for example, by playing a leading role in urban planning, in which case the potential could be significantly higher than shown here. Scaling the existing business model alone could deliver over two times the current impact for the higher scoring SDGs and over three times for the lower scoring SDGs: allowing the industry to map out continued evolution against these 2030 targets.

The industry activities that drive impact are spread across the value chain: 30% are operational activities, 27% are related to the primary output of the industry: connectivity, 32% are related to services or content that are based on that connectivity, and 11% are assessed as non-core. Example of drivers by value chain classification include:

- **Mobile Network Operator (MNO) operations:** Increasing the energy efficiency of operating infrastructure such as base stations and data centres (contributes to both SDG 7: Affordable and Clean Energy and SDG 12: Responsible Consumption and Production);

- **Connectivity:** Provide affordable access to basic voice and data services to enable access to primary and secondary e-learning (SDG 4: Quality Education);

- **Service or content platform:** Support low-cost, accessible remittance services in developing areas (SDG 1: No Poverty);

- **Non-core activities:** Actively seek engagement with public and private organisations to promote sustainability (SDG 17: Partnerships for the Goals).

Impact is also influenced by the directness of the relationship between the specific industry activity and the target. There are three categories: direct (no intervening stage or third party required), indirect (requiring third-party collaboration or intervention) and systemic (impact that requires the interaction of multiple parties over time). Whilst there will be significant systemic impact, that impact is much more difficult to attribute. As a result, 90% of the drivers are direct or indirect. Examples of each category includes:

- **Direct:** Provide an affordable mobile service entry point to women in all areas (SDG 5: Gender Equality);

- **Indirect:** Provide communications services to stimulate local business and economic growth in poor communities (SDG 1: No Poverty);

- **Systemic:** Connect remote communities to digital agricultural marketplaces to improve price outcomes and increase the income of farmers (SDG 2: Zero Hunger).

The metrics and measures have been collected at country level, which can be aggregated to provide a view on impact by region or other country grouping. Some of the targets are location-specific, in which case the score pertains only to performance in the target location. The more developed regions typically score better on those drivers driven by core infrastructure roll-out and investment in new technologies, but less well in terms of environmental impact e.g. measures of e-waste. The less developed regions typically score less well on aggregate, reflecting the lower levels of infrastructural investment and inclusion. For instance, the 3G coverage across developed countries is 98% and 1.4 kg of e-waste is generated annually per person, while in developing countries coverage is 74% and e-waste generation is 0.4 kg per person[5]. These are broad generalisations and there are plenty of differences between regions that are explored in the report.

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5.   ITU and UN data, Deloitte analysis: both coverage and e-waste per population calculated as simple averages across all countries in group

Sustainable business policies and practices

The impact analysis maps out the industry drivers that influence the SDGs. It does not comprehensively describe or analyse the company operations and the extent to which they adhere to sustainable business policies and practices. However, that should not be taken as an indication that sustainable business policies and practices are unimportant. The industry recognises that both need to be in place to lead.

Adherence to policy and implementation is implied by the proportion of the industry that signs up to the UN Global Compact ten principles, and the extent to which progress is reported against in sustainability reports. Operators belonging to groups that collectively represent more than 4 billion subscribers globally have signed up so far to the UN Global Compact ten principles, and the industry has a number of operators at the top of the Dow Jones Sustainability Index (DJSI).

However, as the industry develops, there are plenty of challenges to manage, not least privacy and data protection, e-waste and the increasing energy requirements driven in part by the exponential growth in demand for and usage of mobile data. As such, progress in this area forms part of the commitment that the mobile industry is making to the SDGs, the industry purpose, and its place in the world.

The industry's commercial model

Much is expected of the industry, both by itself and others, and this will require continued investment in infrastructure, as well as innovation in areas like IoT. Periods of increased investment have always been a feature of the industry and operators - with the participation of customers, business partners and regulators - have managed to keep profitability at a level that attracts continued funding.

However, this model differs significantly by operator, and by country operations within operators; in aggregate there has been some year-on-year profitability decline. The core participants in the industry and its markets need to continue to work together to ensure the sustainability and affordability of the model, as well as the continued investment and radical improvements in functionality, that have been characteristic of the industry.

To be clear, the industry does not see a trade-off between the delivery of impact against the SDGs and a robust financial model. Quite the opposite: a clear and leading contribution to the broader social, environmental and economic challenges of the world is critical to a sustainable, investable sector of the size and scope of the mobile industry.

OUTLOOK

The impact analysis demonstrates that the core business of the mobile industry impacts all SDGs. The industry is continuing to grow, and as such, it can be expected that the impact made will grow. To meaningfully accelerate progress against the SDGs, there are three main ways that the mobile industry can drive impact in line with its purpose:

CONNECTING EVERYONE AND EVERYTHING TO A BETTER FUTURE

industry Purpose	SDG Impact Accelerator
INCLUSION Connecting Everyone	**Scaling networks and access:** expanding the global mobile network footprint and connecting subscribers to voice and data services.
INNOVATION Connecting Everything	**Innovation:** creating new ways to enhance the quality of connectivity and ease of access; and innovating mobile-enabled platform services to meet sustainable development needs (e.g. mobile identity and M2M).
INFLUENCE A Better Future	**Policy and partnerships:** contributing to sustainable development policy alongside governments and agencies, both as an industry and together with other partners.

However, this ambition to accelerate progress highlights some challenges moving forward:

- Achieving continued growth will be more difficult and require more investment. The unconnected are likely to be harder to reach and less able to afford connectivity than those already connected, and this comes as growth in data places additional demands on the existing networks. Access and affordability are the critical customer-side constraints and will require technical and commercial innovation together with policy changes to address sustainability.

- The current rate of change, particularly given the constraints noted above, may not be sufficient in the light of the radical and transformational demands of the SDGs. The industry needs to challenge itself and its ecosystem to accelerate change in the most important areas.

- The impact analysis, not surprisingly, shows that impact is unevenly distributed across geographies and, where data is available, within geographies. Inclusiveness is a critical principle underlying almost all of the SDGs. The industry needs to engage with broader stakeholders to promote inclusiveness and eliminate the digital divide.

- The reach and utility of the mobile network provides the industry with greater influence than it currently exerts. The number of targets excluded from the impact analysis should be scrutinised, and the industry can come together to influence some of those policy or state interventions that the SDGs require. The digital economy needs steering to avoid the negative outcomes of concentration and inequality, and the industry has a strong role to play here, together with governments and other governing bodies.

Addressing these challenges will accelerate the impact on the SDGs, and through that, their achievement. Many of the challenges listed above are being addressed by individual operators; the key overarching challenge is being able to work together as an industry, together with the right third parties, including the UN, to harness the potential.

THE INDUSTRY COMMITMENT AND A CALL TO ACTION

The mobile industry recognises the challenges and opportunities laid out in this report and is ready to make a series of public commitments that will solidify the next, critical steps. These commitments are wholly in line with our stated industry purpose.

The industry is resolute in its ambition to create to a #betterfuture and commits to:

- Partner with the UN to develop a road map for the mobile industry, with an initial focus on humanitarian assistance;

- Become a lead advocate of SDG impact reporting and sustainability principles, including the UN Global Compact ten principles;

- Utilise the industry's convening power to drive further SDG engagement and commitment.

Each of these commitments will involve mobile network operators, the wider supply chain and also third parties motivated to act in a similar way. The industry firmly believes these commitments lay the foundation for a transformational change of the industry position and impact and, with it, a transformation in the ability of the world to achieve the SDGs.

The industry wants to do this in an open and collaborative way and, as such, challenges all business partners, regulators, customers, governments and other industries to help us shape our plans, engage with us as we execute, challenge us to do more and help us all share in a better future.

01

CONTEXT

INTRODUCTION TO THE MOBILE INDUSTRY SDG IMPACT REPORT

This report underscores the mobile industry's commitment to sustainable development, illustrated by our recently established purpose: "Connecting Everyone and Everything to a Better Future", building on the commitment made by Mats Granryd, Director General of the GSMA, at the 2016 MWC in Barcelona, to the Sustainable Development Goals (SDGs)[1]. The report lays out the way in which the mobile industry contributes to the SDGs, providing a framework that links the industry to the 17 goals, and establishes a baseline measurement of its impact. This framework and baseline provide the foundation for enhanced collaboration within the industry, and between the industry and other sectors on the actions that matter most to the SDGs.

This chapter introduces this seminal report in four sections:

1   A summary of the SDGs themselves;

2   A picture of the shape and scale of the mobile industry;

3   Further reflections on our industry purpose;

4   Details of the scope, objectives, approach, contents and limitations of this report.

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1.   For full keynote see: http://www.mobileworldlive.com/mwc16-videos/mwc16-keynote-gsma/

THE SUSTAINABLE DEVELOPMENT GOALS

On 25 September 2015, a process led by the United Nations (UN) resulted in the 193 member states adopting 17 sustainable development goals seeking to end poverty, protect the planet and ensure prosperity for all. This high level ambition is made more specific by the 169 targets that sit behind the SDGs and provide greater direction, quantification and timing for each goal. The intention is to meet all the targets by 2030, with some requiring earlier attainment. As part of this report, targets that focus on similar outcomes or objectives under each SDG have been grouped together to aid communication and analysis.

Target Grouping
1 NO POVERTY

Reduced poverty outcomes
Targets 1.1 and 1.2

Enablers of poverty reduction:
- **Rights and access to economic resources**
  Target 1.4
- **Resilience of the poor** Target 1.5

Target Grouping
5 GENDER EQUALITY

Gender equality outcomes
Targets 5.4 and 5.5

Gender equality enablers
Targets 5.6 and 5.b

2 ZERO HUNGER

Outcome focused targets to end hunger and malnutrition Target 2.2

Enablers**:**
- **Agricultural productivity and sustainability** Target 2.3 and 2.4
- **Fair and well-functioning markets** Target 2.c

6 CLEAN WATER AND SANITATION

Sustainable water management
Targets 6.3 and 6.4

Community engagement
Target 6.b

3 GOOD HEALTH AND WELL-BEING

Reducing maternal and early childhood mortality Targets 3.1 and 3.2

Reducing preventable deaths
Targets 3.4, 3.6 and 3.9

Access to healthcare Target 3.7

Supporting policy and infrastructure
Target 3.d

7 AFFORDABLE AND CLEAN ENERGY

Clean and efficient energy
Targets 7.2 and 7.3

Engagement and investment
Target 7.b

4 QUALITY EDUCATION

Formal education
Targets 4.1 and 4.3

Skills development
Targets 4.4, 4.6 and 4.7

Appropriate resourcing
Target 4.b

8 DECENT WORK AND ECONOMIC GROWTH

Sustainable growth
Targets 8.2, 8.3 and 8.4

Inclusion
Targets 8.1 and 8.10

Employment and decent work
Target 8.7

Target Grouping

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Building resilient infrastructure
Targets 9.1, 9.a and 9.c

Promoting sustainable and inclusive industrialisation
Targets 9.2, 9.3 and 9.4

Fostering innovation
Target 9.5

10 REDUCED INEQUALITIES

Reducing income inequality
Target 10.c

Empowerment of individuals
Target 10.2

11 SUSTAINABLE CITIES AND COMMUNITIES

Increasing sustainability and resilience
Targets 11.5 and 11.6

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Sustainable use of natural resources
Target 12.2

Reduction of waste
Target 12.5

Building sustainability capability
Targets 12.6, 12.8 and 12.a

13 CLIMATE ACTION

Increasing adaptive capacity
Targets 13.1 and 13.3

Capacity building in developing countries
Target 13.b

Target Grouping

14 LIFE BELOW WATER

Sustainable growth
Targets 14.2 and 14.7

Inclusion
Target 14.b

15 LIFE ON LAND

Protecting natural environments and habitats
Targets 15.2, 15.4 and 15.5

Protecting endangered species
Target 15.7

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Reducing violence and related deaths
Target 16.1

Promoting justice and rule of law
Target 16.3

Inclusive and transparent governance
Target 16.5

Human right and fundamental freedoms
Targets 16.9 and 16.10

Combatting violence and crime
Target 16.a

17 PARTNERSHIPS FOR THE GOALS

Finance
Target 17.1

Environmentally sound technologies
Target 17.7

Mobilising the technology bank and science, technology and innovation
Target 17.8

Capacity building
Target 17.9

Multi-stakeholder partnerships
Target 17.16 and 17.17

Policy and institutional coherence – data, monitoring and accountability
Target 17.18

The SDGs replace the Millennium Development Goals (MDGs)[2], which comprised of eight goals focused on a range of poverty alleviating actions for implementation by 2015. The SDGs are broader, reflecting the breadth of the sustainability agenda, adding specificity, and in many cases, being even more ambitious. Good progress has been made against many of the MDGs, and the value of a common set of goals has been proven. Nevertheless, poverty still abounds and indicators for some central sustainable issues are moving in the wrong direction, for example, water security, air pollution, unequal distribution of wealth and access to resources.

The SDGs are for all of us, in all our roles: for governments, public and private enterprise, society, and as individuals. Unlike the narrower scope of the MDGs, the SDGs create a common language for sustainability and provide a common framework for the ambition to create a better world. Adoption is increasing, with examples of every type of organisation seeking to align their priorities, and the way they express their sustainability agenda, with the SDGs. This report is one such example at the industry level, but individual network operators are also beginning to adopt the framework. Each individual incidence of adoption enhances our collective understanding and interpretation of the goals, and accelerates the critical phase of building understanding and alignment.

THE SHAPE AND SCALE OF THE MOBILE INDUSTRY

The mobile network operators employ three million people, with an additional 15 million people employed in the broader supply chain, generating in excess of $ 1 trillion in revenues in 2015. All material numbers, but representing less than 0.5% of the global working population, and directly contributing less than 1% of global GDP. The operators build and operate mobile networks, transforming the key inputs of network infrastructure and mobile phones into voice and data connectivity. As we consider these outputs, the true scale and influence of the industry becomes apparent: over 4.7 billion unique subscribers are connected to mobile networks, representing two-thirds of the global population[3].

Basic voice connectivity creates many societal, economic and environmental benefits, but the upgrading to mobile broadband, to smartphones, and further, to M2M and IoT, hand-in-hand with the rapid digital transformation of so many aspects of our lives and societies, creates an enormous opportunity for the industry to transform our impact on the world. The role of the industry over the last two decades has moved from serving the few with an additional communications device to providing the infrastructure and services that are at the heart of the work and lives of the majority of the world's population. There are many profound implications of this role but amongst them is the inevitable conclusion that the industry needs to be at the centre of the SDG pursuit, acting as a cohesive and collaborative force.

THE SHAPE AND SCALE OF THE MOBILE INDUSTRY

15m PEOPLE EMPLOYED

$1tn IN REVENUES IN 2015

4.7bn UNIQUE SUBSCRIBERS

REPRESENTING TWO-THIRDS OF THE GLOBAL POPULATION
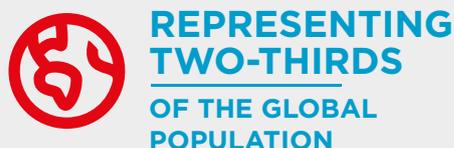
2.   United Nations, Sustainable Development Goals kick off with start of new year. http://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/
3.   GSMA Intelligence, The Mobile Economy 2016. https://www.gsmaintelligence.com/research/?file=97928efe09cdba2864cdcf1ad1a2f58c&download

In this report we have categorised the industry's activities into operations, connectivity, platform services and non-core, to isolate which activities or services in particular are impacting each of the targets within the SDGs:

- Mobile network operator (MNO) operations encompass business activities required to deliver connectivity and related services;

- Connectivity is the provision of voice and data services to enable communication;

- Platform services is the provision of combinations of data, content, standards that enhance the value of connectivity, for example, mobile money;

- Non-core is the provision of services that are not core business, for example some corporate social responsibility (CSR) activity such as providing time off work to volunteer.

Each have an impact on the SDGs, though they impact each of the targets in different ways, to different degrees. The industry's role as a provider of connectivity and as a platform, though less observable than operations, creates a significant impact on the SDGs and targets. As a result, they have become the primary focus of the report.

THE MOBILE INDUSTRY SDG IMPACT REPORT

This report documents the way in which the mobile industry, specifically through the lens of the network operators, impacts each of the 17 SDGs. The development of this report has a number of critical objectives:

- Further knowledge and understanding of the SDGs;

- Create a framework and associated data set that can be used by the industry, and potentially by other industries, on an ongoing basis to assess impact against the SDGs;

- Communicate the industry's impact to all stakeholders and interested parties to stimulate further activity within the industry and between industry participants and other stakeholders.

Whilst all SDGs are impacted in some way by the industry and are therefore covered, just under half of the 169 supporting targets have been identified as targets that the mobile industry impacts significantly; the report focused on this sub-set.

The approach to establishing the report has three linked activities:

- Establishing the nature and materiality of the link between the industry and the SDG targets, identifying the sub-set of targets that are most impacted by the industry;

- Researching both the underlying industry activities and the impact that these activities have on the targets, refining the specification of the linkage and identifying metrics which might help assess the impact;

- Working with the set of activities and metrics to establish a model and a set of data that enables an assessment of impact by target and by SDG.

The report comprises 5 additional chapters and 3 appendices:

CHAPTER 2
The Mobile Industry Impact on the SDGs: the key findings explaining how the industry impacts the SDGs and their targets, and summarising our quantified impact assessment.

CHAPTER 3
Impact by Market: an explanation of how the impact differs by region.

CHAPTER 4
Sustainable Business Policies and Practices: linking the adoption of sustainable business policies to our SDG impact framework.

CHAPTER 5
Commercial Model: a description of the commercial model of the network operators and explanation of the role it has in sustaining the level of impact on the SDGs.

CHAPTER 6
Commitments and Outlook: summary of industry commitments.

Appendices

APPENDIX A
SDG Profiles: a profile for each of the SDGs.

APPENDIX B
Framework Overview: an overview of the framework established to estimate the industry's impact on the SDGs.

APPENDIX C
Framework Detail: a detailed explanation of the framework, along with the key equations used to calculate impact.

Key limitations include the necessary subjectivity of the initial filtering exercise to establish the high priority targets and the weightings used to aggregate impact, the availability and quality of data, and the challenge of interpreting the goals and targets which, due to the complexity of the subject, are heterogeneous, often overlap, and are not easily quantifiable. Limitations are further outlined in Appendix C.

KEY TERMINOLOGY

Throughout this report reference is made to the approach taken to summarise and quantify the industry's impact on the SDGs. Key terminology is summarised below (details available in Appendix A, B and C):

- **Drivers:** a description of the industry activity that drives the impact against the target

- **Importance:** an assessment of the importance of the driver in contributing to the target

- **Performance:** a measure of the extent to which the industry is performing against its potential, as quantified through metrics

- **Metrics:** a set of country level indicators, measuring the level of the industry's contribution (this also includes sub-metrics, where a number of observed indicators are aggregated to estimate an unobserved variable)

- **Impact (or Impact Score):** a measure of the impact which the industry is currently delivering against an SDG or target

- For SDGs, this is based on the number of targets impacted, importance, and performance

- For targets, this is based on importance and performance

Drivers are further classified based on their position within mobile network operator's value chain, and the directness of the industry's contribution to the target.

STAKEHOLDER INPUT TO THE REPORT

Input has been sought from a wide range of operators and experts in the industry, both on reporting and on sustainability. The most critical inputs have been from a working group of 16 operators, representing nearly 30% of mobile cellular connections world-wide, and the GSMA programme teams who are all world-leading experts in their own domains, for example, mobile money or infrastructure.

The operators who contributed to the report are:

02

THE MOBILE INDUSTRY'S IMPACT ON THE SDGs

SUMMARY OF CHAPTER

This chapter lays out the key outcomes of the mobile industry SDG impact assessment by stepping through: an overview of the framework and resulting scores; a summary of the highest and lower scoring SDGs; an analysis of the impact across the mobile value chain and the directness of influence of that impact, and finally, a forward looking view of the industry's impact.

MOBILE INDUSTRY SDG IMPACT SUMMARY

All 17 SDGs are impacted by the mobile industry, reflecting the influence of an industry that connects almost two-thirds of the world's population through mobile technology. Impact is primarily driven through connectivity to voice services and the internet and through access to the specific services and content provided by mobile network operators and the broad ecosystem of service providers. The impact scores reflect both how many SDG targets are impacted by the industry, and how the industry performs against those targets. The approach to scoring is summarised below, with a more detailed description provided in Appendix B.

Framework Overview

The following description summarises the framework used to calculate the SDG scores.

The SDG Impact Score is the product of the proportion of targets materially *impacted*, the *importance* of the roles the industry plays in achieving those targets and *performance* against those roles as measured by specific metrics.

SDG targets are selected on the basis of the industry's ability to *impact* them. Those that are excluded typically require government or institutional intervention, for example, Target 17.4 (Policy: Enhance policy coherence for sustainable development), or are too broad, for example, Target 7.1 (By 2030, achieve universal access to affordable, reliable and modern energy services).

Drivers describe the mechanism through which the industry impacts the targets, for example, "Enable access to nutritional information and monitoring through m-health programmes and applications". Each driver is assessed to gauge a) the importance to a target and b) the mobile industry's *importance* to the driver. These two elements combine into a score for importance which provides the basis upon which to include or exclude a target, and the basis for the importance score for the targets that are included. 109 drivers have been identified resulting in 76 Targets prioritised across all SDGs.

Drivers are then classified by the stage in the mobile value chain (operations, provision of connectivity, delivery of services or content, and non-core activity) and by the directness of influence on the target (direct: no intervening stage or actor, indirect: requiring third-party collaboration or intervention and systemic: interaction of multiple parties over time).

Metrics are used to measure the contribution the industry makes through each driver. The industry's *performance* is calculated through analysis of the metrics used to measure each driver. Assessment of the industry's impact draws on a unique dataset comprising 50 indicators across a sample of 90 countries, covering 83% of the world's population.

Impact scores have been determined for all SDGs, showing where the industry is currently making the biggest impact and where there are opportunities for further contribution.

FIGURE 1
Overview of SDG Impact Scores

	SDG		TARGETS IMPACTED		IMPORTANCE		PERFORMANCE		SDG IMPACT SCORE
MOST IMPACTED SDGs	SDG 9	INDUSTRY, INNOVATION AND INFRASTRUCTURE	7 of 8	x	6.6/10	x	52	=	**30**
	SDG 4	QUALITY EDUCATION	6 of 10	x	6.2/10	x	62	=	**23**
	SDG 1	NO POVERTY	4 of 7	x	6.5/10	x	62	=	**23**
	SDG 13	CLIMATE ACTION	3 of 5	x	6.4/10	x	39	=	**15**
LESS IMPACTED SDGs	SDG 16	PEACE, JUSTICE AND STRONG INSTITUTIONS	6 of 12	x	5.3/10	x	49	=	**13**
	SDG 12	RESPONSIBLE CONSUMPTION AND PRODUCTION	5 of 11	x	5.5/10	x	52	=	**13**
	SDG 2	ZERO HUNGER	4 of 8	x	6.6/10	x	36	=	**12**
	SDG 7	AFFORDABLE AND CLEAN ENERGY	3 of 5	x	5.3/10	x	37	=	**12**
	SDG 5	GENDER EQUALITY	4 of 9	x	7/10	x	37	=	**12**
	SDG 3	GOOD HEALTH AND WELL-BEING	7 of 13	x	5.3/10	x	38	=	**11**
	SDG 8	DECENT WORK AND ECONOMIC GROWTH	6 of 12	x	6.3/10	x	28	=	**9**
	SDG 15	LIFE ON LAND	4 of 12	x	5.2/10	x	44	=	**8**
	SDG 14	LIFE BELOW WATER	3 of 10	x	5.4/10	x	45	=	**7**
	SDG 17	PARTNERSHIPS FOR THE GOALS	7 of 19	x	6.1/10	x	26	=	**6**
	SDG 6	CLEAN WATER AND SANITATION	3 of 8	x	5.8/10	x	22	=	**5**
	SDG 11	SUSTAINABLE CITIES AND COMMUNITIES	2 of 10	x	6.8/10	x	31	=	**4**
	SDG 10	REDUCED INEQUALITIES	2 of 10	x	7/10	x	27	=	**4**

KEY Average performance compared to all 17 SDGs   ABOVE EQUAL BELOW

Source: Deloitte Analysis

MOST IMPACTED SDGs

EACH OF THESE SDGs HAVE VERY SIGNIFICANT AND VERY DIFFERENT CHALLENGES.
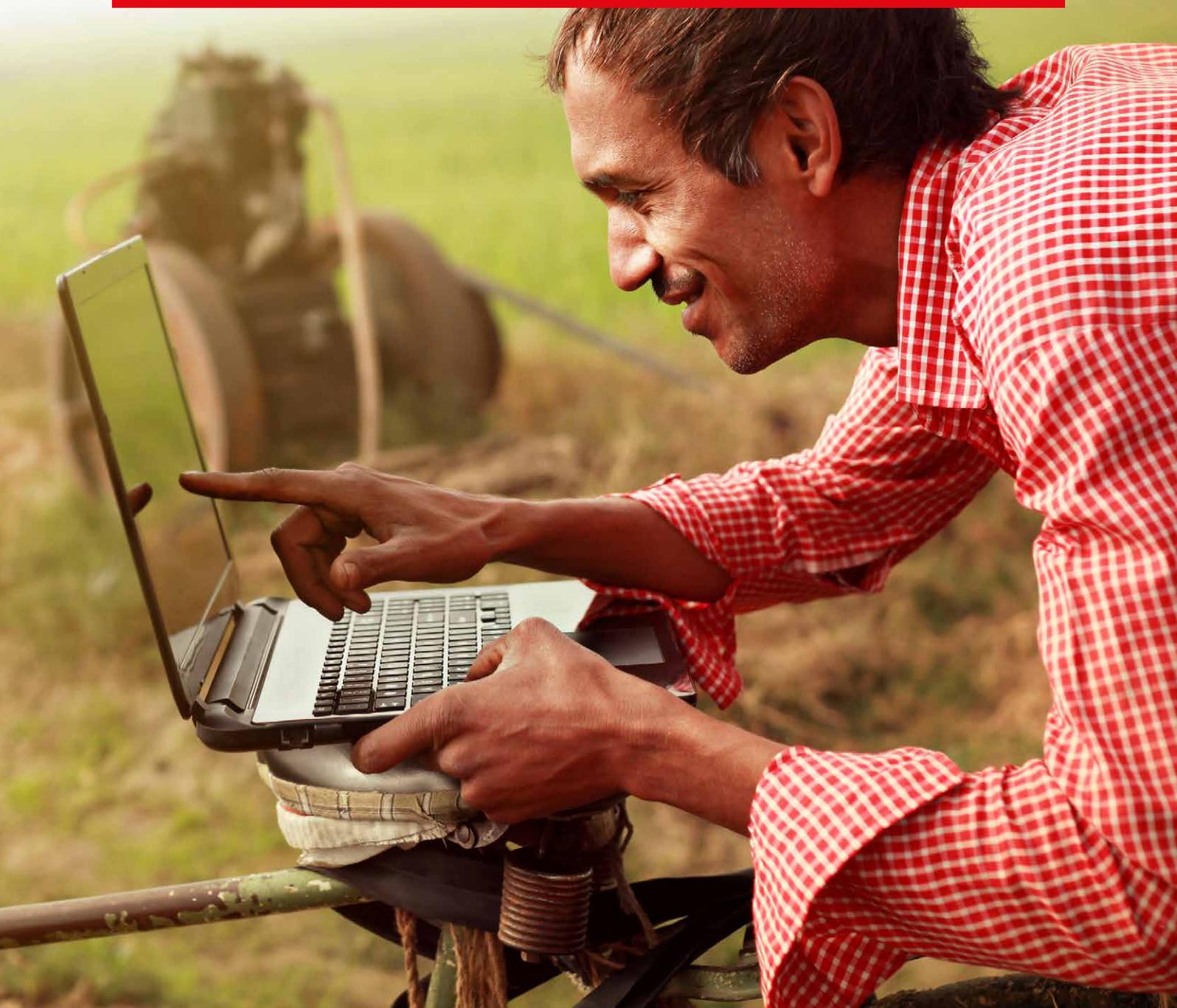
THE SDGS MOST IMPACTED BY THE MOBILE INDUSTRY

SDG 9

INDUSTRY, INNOVATION AND INFRASTRUCTURE

A key challenge for this SDG is to address the rural-urban divide. For example, 3G mobile broadband coverage extends to 89% of the world's urban population, but only 29% of the rural population[1].

SDG 4

QUALITY EDUCATION

A primary focus for this SDG is to ensure that education is inclusive of women and the poor. In 2013, there were still 757 million adults unable to read or write, of which two-thirds were women. Children from the poorest 20% of households in low and middle income countries are more than four times more likely to be out of school than their richer peers.[1]

SDG 1

NO POVERTY

A critical theme for this SDG is the need to reduce the significant disparity in need between geographic regions. Whilst the proportion living in extreme poverty globally fell from 26% to 13%, between 2002 and 2012, more than 40% of people in Sub-Saharan Africa remained below this threshold.

SDG 13

CLIMATE ACTION

This SDG seeks to mitigate the devastating impact of natural disasters: an average of 83,000 people died and 211 million were affected each year as a result of natural disasters between 2000 and 2013.[1]

These challenges are reflected in the targets that define these four goals and hence determine the way and the level to which the industry impacts them. For example, almost all the targets associated with SDG 9: Industry, Innovation and Infrastructure are identified as targets where the industry could make a material contribution; however this is only true for 3 of 5 targets for SDG 13: Climate Action. Whilst there are commonalities in the way impact is delivered, maximising impact will require a bespoke approach by SDG.

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1.   Source: United Nations, The Sustainable Development Goals Report 2016 (http://unstats.un.org/SDGs/report/2016/The%20Sustainable%20Development%20Goals%20Report%202016.pdf)

SDG9

INDUSTRY, INNOVATION AND INFRASTRUCTURE

SCORE: 30

INDUSTRY IMPACT OVERVIEW

The industry clearly has a significant part to play in developing infrastructure, both as a provider of critical infrastructure and as a catalyst for the evolution of other industries, including industrial processes and manufacturing, which are a central part of this SDG. Mobile communications, largely through enhanced information exchange, also play a significant role in providing access to critical services for smaller industrial companies and in fostering research and development ecosystems.

The mobile industry's contribution to this SDG is relatively high with 7 out of 8 targets identified as areas where the industry makes a significant impact. The average driver importance across these 7 targets is high at 6.6 out of 10, reflecting the alignment between the targets and the industry's primary output. The impact analysis shows SDG 9 scoring significantly higher than the SDG average, with plenty of opportunity to increase impact going forward.

TARGETS IMPACTED
Build Resilient Infrastructure

9.1 Development of infrastructure that benefits all;

9.a Enhanced support for less developed economies;

9.c Increase affordable access to ICT.

Promoting Sustainable and Inclusive Industrialisation

9.2 Inclusion and improving the efficiency of manufacturing and industrial processes;

9.3 Improving access to smaller industrial enterprises of key services;

9.4 Conversion and further infrastructural development to better manage the impact on the environment.

Fostering Innovation

9.5 Investing in technology and research and development.

IMPACT DRIVERS
Key drivers include:

- Development and upgrade of infrastructure;

- Geographical expansion of networks to increase coverage of remote/rural communities;

- Support for industrialisation;

- Improvement of energy efficiency;

- Provision of IoT solutions to enable sustainability of manufacturing and industrial services.

METRICS
Example metrics:

- Mobile Infrastructure (including 2G, 3G and 4G network coverage);

- M2M Connections;

- Quality of Service (including average download speed and average latency).

GEOGRAPHIC IMPACT

There is both significant impact and potential opportunity in developing countries, where the need for infrastructure investment and affordability is the highest. Further impact can be driven by network build-up and geographical expansion, while in developed economies the emphasis is more on upgrading infrastructure to reduce environmental impact and increase energy efficiency.

LARGEST IMPACT

Latin America, driven from the impact made on targets 9.1, 9.4 and 9.5. This is due to the improvements in both the quality and resilience of infrastructure, and the high 2G and 3G network coverage.

BIGGEST OPPORTUNITY

Sub-Saharan Africa region, followed by CIS, due to significantly lower levels of investment and lower uptake of IoT and M2M services.

IMPACT STORY: CONNECTED CARS, INDIA - VODAFONE

Mahindra REVA, a world-leading pioneer in electric vehicle technologies, needed to find a reliable way to support data connectivity of a new breed of 'connected' vehicles across India and around the world. Particular challenges included achieving the desired performance over mobile networks under diverse conditions and managing connectivity as the number of vehicles in the network increased.

Mahindra REVA partnered with Vodafone who supplied the connections needed to run tests and the expertise to effectively link platform applications. Vodafone, utilising its own network, was able to draw upon the expertise of an in-house team of M2M specialists who established the required systems architecture to fix any emerging issues.

Telematics enabled a central diagnostics team to remotely monitor vehicle performance data in real time, allowing the maintenance team to understand the root cause of any performance issue and quickly address many issues over-the-air, enabling greater efficiency and lower costs. For consumers, the car automatically provides SMS alerts when a door is left unlocked, a parking brake is not applied or there is a charging point fault, improving both the security and safety of drivers. The partnership between Mahindra REVA and Vodafone demonstrated the capability of mobile networks to support significant technological advances and the immense potential of 'smart' vehicles and cities that can be unlocked when technology and network innovators collaborate.

To see more impact stories that contribute to each of the Sustainable Development Goals, see Appendix A of this report or visit

www.gsma.com/betterfuture

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
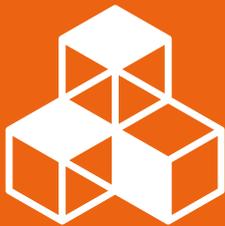
The world is experiencing a rapid transition to connected devices, and mobile networks remain the proven technology. Mobile connectivity is also a key ingredient for innovation driving reductions in communities' environmental footprint.

#betterfuture

CONTINUE TO ROLL OUT INFRASTRUCTURE:
71%
OF THE WORLD'S RURAL POPULATION UNCOVERED BY A **3G** NETWORK

#betterfuture

CONNECT THE UNCONNECTED:

ALMOST3bn

PEOPLE REMAIN UNCONNECTED

7 OUT OF **8**

SDG 9 TARGETS
IMPACTED BY THE
MOBILE INDUSTRY

69% OF THE WORLD'S
POPULATION
COVERED BY A

3G
NETWORK

SDG4

QUALITY EDUCATION

SCORE: 23

INDUSTRY IMPACT OVERVIEW

The impact of ICT on education is well-documented: the OECD cites that improved attitudes to learning, development of teachers' technology skills, as well as, increased access to adult education and literacy, are all driven by the increased use of ICT in education[2]. Use of technology in the classroom has been steadily increasing as digital infrastructure and content have become increasingly available and affordable, and as digital skills are becoming essential to the workforce of the future.

In this context, the mobile industry has a significant role in improving the accessibility, affordability and quality of formal education in both developed and developing regions, largely driven by the reach of mobile internet services to low-socio economic or remote areas.

The contribution to SDG 4 is relatively high, with 6 out of the 10 targets identified as areas where the industry makes a significant impact. The average importance of 6.2 out of 10 across those 6 targets, reflects the significance of ICT infrastructure and digital learning from primary education for children through to technical education for adults.

TARGETS IMPACTED
Formal Education

4.1 Access to primary and secondary education;

4.3 Affordable, quality higher education.

Skills Development

4.4 Relevant skills for work;

4.6 Basic literacy and numeracy;

4.7 Sustainable development skills.

Appropriate Resourcing

4.b Higher education scholarships for developing countries.

IMPACT DRIVERS
Key drivers include:

- Provision of suitable connectivity infrastructure;

- Affordable connectivity;

- Provision of specific schools-related connectivity measures;

- Creation of mobile content.

METRICS
Example metrics:

- Affordability of Basic Services (including average costs for Pre-paid data, Mobile bundles, Voice minutes and Handset price);

- Mobile in schools (including Internet penetration in Schools and Impact of ICTs on access to basic services);

- Availability of local content (including social media penetration, websites accessible and Wikipedia articles in local language).

2.   Avvistati, F. (2013). Review of the Italian Strategy for Digital Schools. OECD. (http://www.oecd.org/edu/ceri/Innovation%20Strategy%20Working%20Paper%2090.pdf)

GEOGRAPHIC IMPACT

The level of impact of the mobile industry varies across regions, with developing countries having higher impact due to the lower levels of traditional education across the population often combined with a greater necessity for providing alternative methods of reaching students.

In North America, where there are higher levels of education, years of schooling and literacy rates, the impact is lower given the lower levels of addressable audience for the goal.
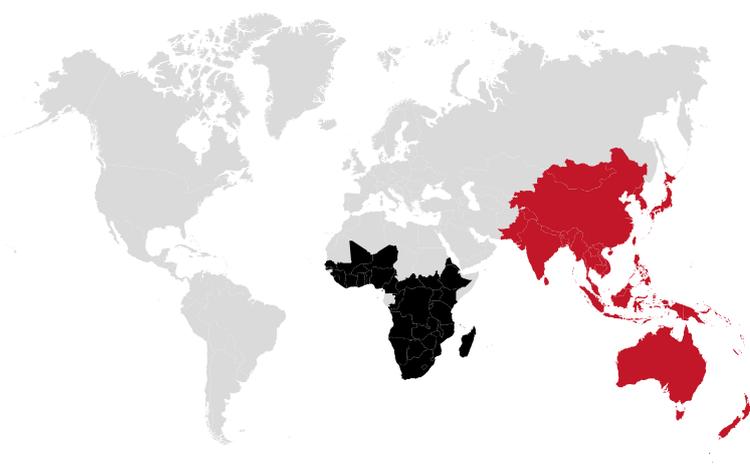
LARGEST IMPACT

Asia-Pacific which has lower average years of schooling and lower literacy rates. This is predominately due to the impact on targets 4.1 and 4.3 as well as the more significant effect internet and SMS-based learning has in enabling education in the region.

BIGGEST OPPORTUNITY

Sub-Saharan Africa, where increased coverage and affordability can extend the reach of digital education services to children in school as well as adult learners.

IMPACT STORY: APRENDE – AMÉRICA MÓVIL

Mexico has one of the smallest proportions of 15 to 19-year olds enrolled in education among virtually all OECD countries, despite currently having the largest population of this age group in the country's history.

In 2016, América Móvil made Aprende available free of charge to all subscribers of Telcel, its Mexican operator. Meaning "learning" in Spanish, Aprende is the mobile learning solution linked to aprende.org that provides access to educational, cultural and job training content. It is aimed at improving people's job opportunities through education and allows users to earn diplomas that are recognised by Mexico's Department of Education, free of charge.

Aprende is managed by a Mexican team of 150 and it enables students, teachers, researchers and others in Mexico to access online learning opportunities. It currently features free courses in the fields of mathematics, history, science and culture, with the content being developed and translated in Spanish by the Khan Academy, a global non-profit educational website.

To see more impact stories that contribute to each of the Sustainable Development Goals, see Appendix A of this report or visit

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4 QUALITY EDUCATION
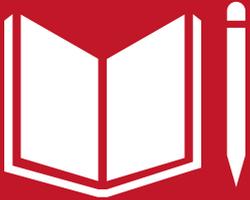
As the global leaders in connectivity, we share a common purpose — to connect everyone and everything to a better future.

#betterfuture

6 OUT OF 10
SDG 4 TARGETS IMPACTED BY THE MOBILE INDUSTRY
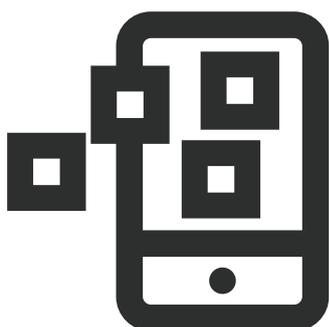
2.2bn
MOBILE BROADBAND USERS
30% PENETRATION RATE

INVEST IN AND SUPPORT CREATION OF MOBILE LEARNING SOLUTIONS

#betterfuture

EXPAND MOBILE BROADBAND TO REMOTE AND UNDERSERVED AREAS TO CONNECT LEARNERS AND STUDENTS

90% OF POPULATION IN LEAST DEVELOPED COUNTRIES ARE NOT CONNECTED TO MOBILE BROADBAND
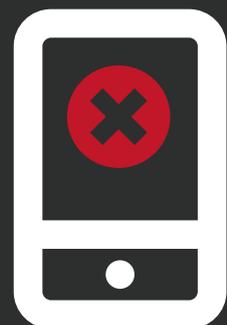
1 NO POVERTY

SDG1

NO POVERTY

SCORE: 23

INDUSTRY IMPACT OVERVIEW

The contribution the mobile industry makes to economic growth has been highlighted in a number of international studies; for example, The World Bank found that a 10% increase in mobile penetration is associated with a 1.35% increase in GDP for developing countries[3].

The impact of the mobile industry on economic growth is primarily the result of developing knowledge of the economy and facilitating the exchange of information, and through that, driving productivity and innovation. In addition, there are wider social impacts such as improved health and educational outcomes through increased access to information and related internet or application delivered services. This impact is delivered through those connected, for whom mobile has become an integral part of their lives, as illustrated by the extent to which people will sacrifice other consumption to sustain phone usage[4], shaping and influencing almost all activity: economic and other.

The mobile industry's contribution to this SDG is relatively high, with 4 out of 7 targets addressing topics where the industry makes a significant impact. The importance of the way in which the mobile industry contributes to these 4 targets is also amongst the highest at 6.5 out of 10, reflecting the strong links between mobile connectivity and economic development.

TARGETS IMPACTED

Reduced Poverty Outcomes

1.1 Eradicating poverty expressed both in absolute, economic terms;

1.2 Reducing relative poverty in all its dimensions.

Enablers of Poverty Reduction

1.4 Access to economic resources and basic services;

1.5 Protecting the poor and vulnerable.

IMPACT DRIVERS

Key drivers include:

• Providing communications services, such as access to mobile internet and mobile-enabled service platforms (e.g. mobile money) to stimulate local business (and economy) growth through increasing competitiveness and improving productivity;

• Enabling access to basic services, as well as to financial services (both mobile money and mobile remittances) that increase the economic status and resilience of poor populations.

METRICS

Example metrics:

• Mobile Money and Mobile Remittances Uptake;

• Business Internet Uptake (including the per centage of businesses having a web presence and using the internet for transactions);

• Mobile Penetration.

3. Qiang and Rossotto (with Kimura) (2009). "Economic impacts of Broadband" in Information and Communications for Development: Extending reach and increasing Impact (World Bank, Washington DC). (http://siteresources.worldbank.org/EXTIC4D/Resources/IC4D_Broadband_35_50.pdf)
4. May,J and Diga,K. (2015). Progress towards resolving the measurement link between ICT and poverty reduction. (http://download.springer.com/static/pdf/175/chp%253A10.1007%252F978-981-287-381-1_5.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Fchapter%2F10.1007%2F978-981-287-381-1_5&token2=exp=1465914704-acl=%2Fstatic%2Fpdf%2F175%2Fchp%25253A10.1007%25252F978-981-287-381-1_5.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Fchapter%252F10.1007%252F978-981-287-381-1_5*-hmac=1720bdcd51a127b7c55710547a02b674f01e230b4a8331452eb2c55daea0d784)

GEOGRAPHIC IMPACT

The level of impact of the mobile industry varies significantly across regions, with high impact scores in regions that are largely developing, and lower impact scores in the developed regions.
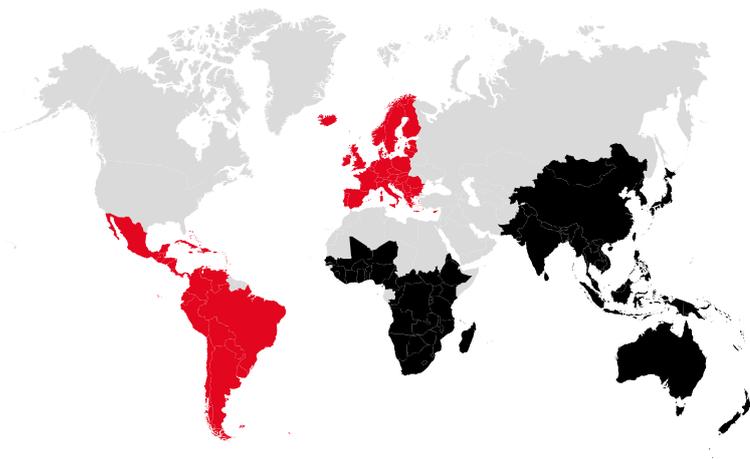
■ LARGEST IMPACT

Latin America, where there is high need due to the proportion of the population living in relative poverty but high network coverage at relative affordability, increases inclusion and the accessibility of communications services.

■ SIGNIFICANT IMPACT

The impact in **Europe** is relatively high as the region includes countries at varying levels of development, and is driven by a combination of the higher levels of penetration and the fact that the industry employs a higher share of the population.

■ BIGGEST OPPORTUNITY

Sub-Saharan Africa and **Asia Pacific** regions, as these combine a significant per centage of people living in poverty with the lowest scores among predominately developing nations.

IMPACT STORY:
ECO CASH – ZIMBABWE

Despite once being a major player in the Southern African economy, Zimbabwe has struggled with hyperinflation, currency collapse and high unemployment. The adoption of the US dollar, in an attempt to stabilise inflation, generated what is known as the "change problem" where the high cost of importing U.S coins led to a shortage of change. In a nation where the average person still lives on less than two dollars a day, the requirement to buy non-essential items to bring their total purchase to a dollar became a significant burden.

To solve the change problem, Zimbabwe's largest telecommunications operator developed EcoCash, a mobile-based payment system for the retail environment. The four million plus customers can transfer money to and from any other existing accounts in the EcoCash network. The impact of EcoCash has been extensive and has become a fundamental part of the Zimbabwean economy, helping to alleviate poverty through financial inclusion. It is estimated that in annual terms, EcoCash transaction volumes represent an amount equivalent to 22% of Zimbabwe's GDP.

To see more impact stories that contribute to each of the Sustainable Development Goals, see Appendix A of this report or visit

www.gsma.com/betterfuture

1 NO POVERTY

The mobile industry uses connectivity to bridge human divides and create socio-economic opportunity. Expanding mobile access to the internet will accelerate economic growth and create new opportunities for every community.

#betterfuture
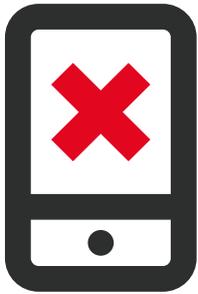
SUPPORT POOREST POPULATIONS TO ACCESS MOBILE AND MOBILE-ENABLED SERVICES

MORE THAN 60% OF HOUSEHOLDS IN DEVELOPING COUNTRIES DO NOT HAVE INTERNET ACCESS

INCREASE ACCESS TO **NEXT GENERATION OF PLATFORM SERVICES** TO MEET BASIC NEEDS OF POOREST POPULATIONS

#betterfuture

MOBILE MONEY AVAILABLE IN **93** COUNTRIES VIA 271 SERVICES

MOBILE INSURANCE **31m** POLICIES ISSUED

SDG13

CLIMATE ACTION

SCORE: 15

INDUSTRY IMPACT OVERVIEW

The mobile industry impacts SDG 13 through contributions both pre and post disaster. The industry supports the development and support of IoT-facilitated environmental monitoring that enables governments and institutions to collect data critical to the management of climate change. The industry also contributes as a provider of emergency broadcasting systems that provide early warning for climate-related events, strengthening resilience to climate-related hazards and natural disasters. As part of this, the industry adds disaster response capacity to a country's infrastructure through connectivity, by enabling response agencies to broadcast emergency messages and track movement of populations, allowing them to better focus their efforts in cases of emergency.

The mobile industry's contribution to this SDG is above the SDG average, with 3 out of 5 targets identified as areas where the industry makes a significant impact, having an average importance of 6.4 out of 10 across the 3 targets, reflecting the direct links between the targets and the industry drivers.

TARGETS IMPACTED

Increasing adaptive capacity

13.1 Resilience to climate-related hazards and natural disasters;

13.3 Mitigation, adaptation, impact reduction and early warning;

Capacity building in developing countries

13.b Planning and management in least developing countries.

IMPACT DRIVERS

Key drivers include:

• Increasing landmass coverage;

• Provision of robust and secure infrastructure;

• Enabling access to government services;

• Enabling technologies for environmental monitoring, based on IoT/M2M or other solutions.

METRICS

Example metrics:

• Mobile Infrastructure;

• M2M Connections;

• Government use of ICT to provide services and access to services (including the UN Online Service Index, ICT use & government efficiency and the Impact of ICTs on access to basic services).

GEOGRAPHIC IMPACT

Mobile industry impact differs between regions. Overall, developed economies score highly due to the resilience of their infrastructure and uptake of M2M services that help to monitor and manage climate change.

However, in developing economies, mobile network operators have a greater opportunity to become part of the monitoring and response fabric of a country, enhancing the capability of local institutions to respond more effectively to climate change challenges.
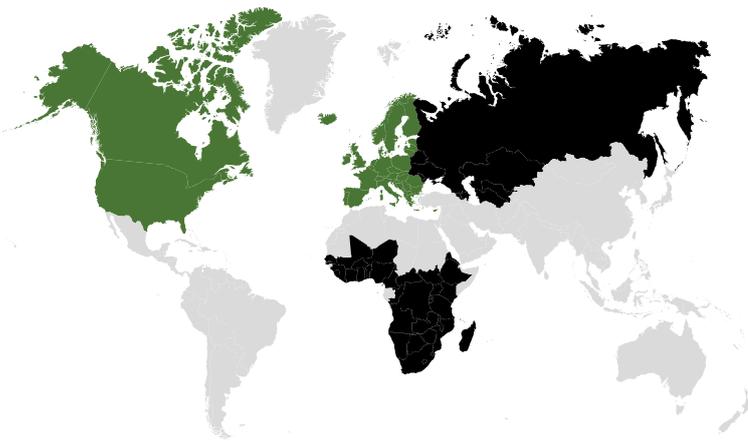
LARGEST IMPACT

Europe and **North America**, driven through targets 13.1 and 13.3 and reflecting the resilience of existing infrastructure and investment in M2M services.

BIGGEST OPPORTUNITY

Sub-Saharan Africa followed by the **Commonwealth of Independent States**, where increasing the uptake of M2M services that address efficiency, combined with higher capital investment in infrastructure, are likely to have a relatively large impact on improving resilience in the face of climate-related disasters.

IMPACT STORY: SOLAR HOME SOLUTION – TELENOR PAKISTAN

A large proportion of Pakistan's rural population lacks access to electricity and depends on expensive, inefficient fuel-based sources. Systemic challenges include lack of energy-related savings and payment solutions where less than a third of the population has bank accounts.

Telenor Pakistan partnered its mobile money solution, Easypaisa, with the Pakistani energy service company Roshan Energy, to launch an innovative solar home solution for marginalised poor communities living in off-grid areas. Developed on pay-as-you-go model, the product enables customers to purchase solar solutions with an upfront payment of 15%, with the remaining payments being paid within 18 months through

Easypaisa. This model allows users to top up their Solar Home Solution from any of the 70,000 Easypaisa shops across the country or directly through their Easypaisa Mobile Accounts.

This unique model has empowered customers to pick whether they want their solar equipment to work for a full month or just for a day. Currently, there are three Solar Solution Models being offered, ranging from 30 to 100 watts solar panels. The Solar Home Solution has been rolled out in Hyderabad, Thatta, Badin, Tharparker and Rahim Yar Khan so far. It is expected that this initiative will empower nearly 40% of the Pakistanis who live off the grid with access to clean and affordable solar energy.

To see more impact stories that contribute to each of the Sustainable Development Goals, see Appendix A of this report or visit

www.gsma.com/betterfuture

A more detailed analysis on each SDG is provided in Appendix A and further explanation of the impact scores is provided in Appendix B.

13 CLIMATE ACTION

Mobile operators are reducing energy use and adopting more energy efficient practices. By shining a light on best practice and sharing knowledge, mobile operators will help communities reduce their climatic and environmental impact.

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3 OUT OF 5
SDG13 TARGETS
IMPACTED BY THE
MOBILE INDUSTRY

310m CELLULAR M2M
CONNECTIONS IN 2015
1bn BY 2020

#betterfuture

DEVELOP IOT/M2M
SOLUTIONS TO MONITOR
ENVIRONMENTAL
CONDITIONS

LESS IMPACTED SDGs

The remaining SDGs can be grouped into three categories of impact score, based on how significant the industry is to the scope of the targets (based on the per centage of targets impacted) and the performance of the industry against the drivers that impact those targets.

FIGURE 2
Targets Impacted vs. Performance

Performance

% of SDG Targets Impacted

Bubble size represents importance
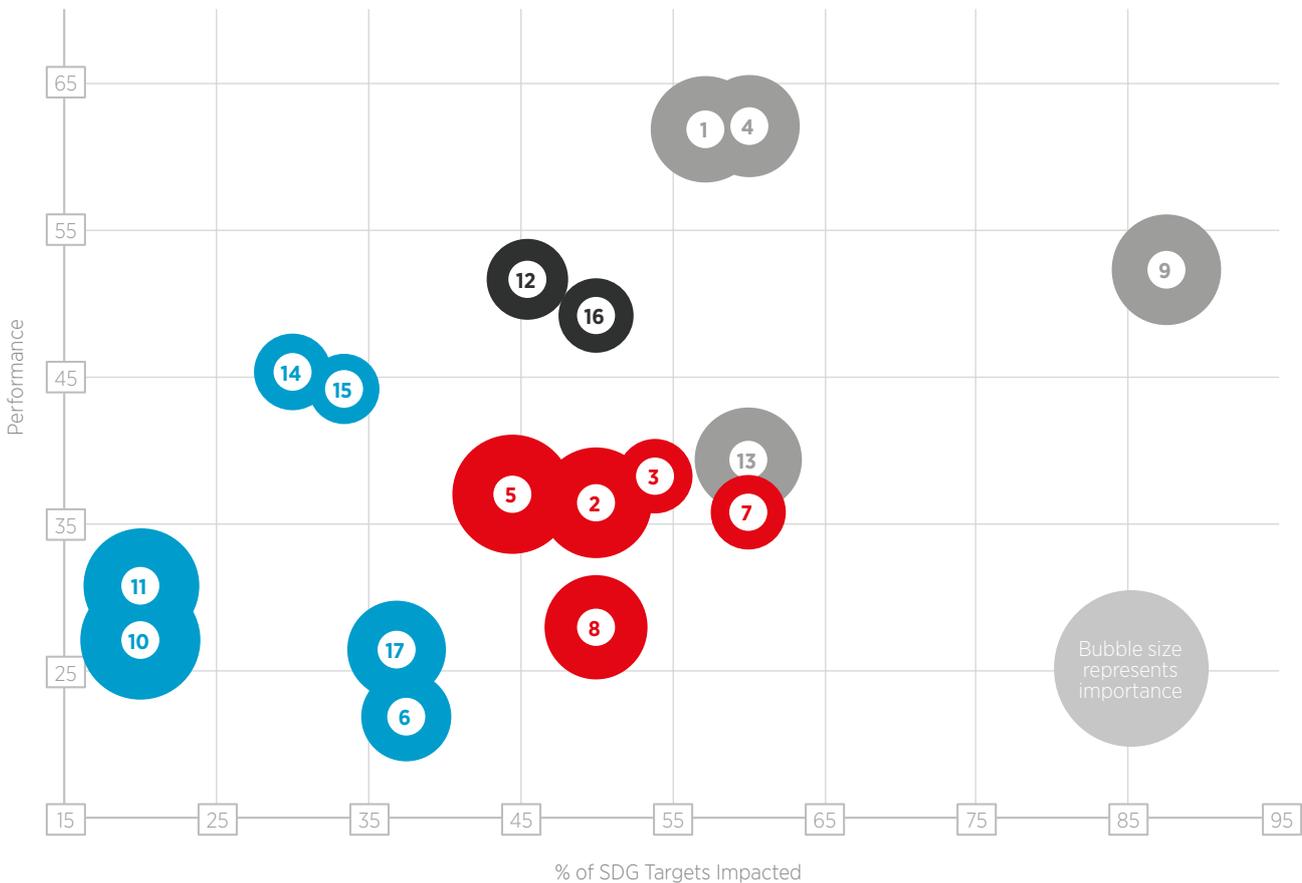
LOW SIGNIFICANCE. LOW PERFORMANCE

SDG 6: Clean Water and Sanitation
SDG 10: Reduced Inequalities
SDG 11: Sustainable Cities and Communities
SDG 14: Life Below Water
SDG 15: Life on Land
SDG 17: Partnerships for the Goals

MODERATE SIGNIFICANCE, LOW PERFORMANCE

SDG 2: Zero Hunger
SDG 3: Good Health and Well-Being
SDG 5: Gender Equality
SDG 7: Affordable and Clean Energy
SDG 8: Decent Work and Economic Growth

MODERATE SIGNIFICANCE, HIGH PERFORMANCE

SDG 12: Responsible Consumption and Production
SDG 16: Peace, Justice and Strong Institutions

MOST IMPACTED SDGs

SDG 1: No Poverty
SDG 4: Quality Education
SDG 9: Industry, Innovation and Infrastructure
SDG 13: Climate Action

Source: Deloitte Analysis

Going forward, each of these SDGs could see significant increases in scores, however, major change in these areas will require a more tailored approach than simply scaling current infrastructure. A more detailed breakdown for each SDG is provided in Appendix A.

MODERATE SIGNIFICANCE, LOW PERFORMANCE

SDG 2: Zero Hunger, **SDG 3:** Good Health and Well-Being, **SDG 5:** Gender Equality, **SDG 8:** Decent Work and Economic Growth, and **SDG 7:** Affordable and Clean Energy, all have a higher than average proportion of prioritised targets but lower demonstrated performance against them. They share some dependence on the development of IoT and the propagation of mobile money, both of which have very significant potential impacts but are at relatively early stages of maturity.

MODERATE SIGNIFICANCE, HIGH PERFORMANCE

SDG 12: Responsible Consumption and Production, **SDG 16:** Peace, Justice and Strong Institutions, both have a lower than average proportion of prioritised targets identified but score comparatively well against them. The drivers and metrics differ significantly by SDG, however, the commonality is that each of the SDGs has a significant requirement for governmental or policy intervention which the mobile industry has less ability to impact. As a result, the industry's role in delivering these targets is less significant.

LOW SIGNIFICANCE, LOW PERFORMANCE

SDG 17: Partnerships for the Goals, **SDG 6:** Clean Water and Sanitation, **SDG 10:** Reduced Inequalities, **SDG 11:** Sustainable Cities and Communities, **SDG 15:** Life On Land and **SDG 14:** Life Below Water, all have a lower than average proportion of targets prioritised, and performance against those targets has been lower. These SDGs experience both the performance challenge of the first group and the target prioritisation challenge of the second.

IMPACT ANALYSIS: DRIVERS BY VALUE CHAIN

The drivers were reviewed to identify which areas of the mobile value chain generated the most impact, providing a deeper understanding of the industry's impact across the SDGs. For this purpose, the mobile value chain has been split into four areas:

MNO Operations
This covers all business operations: front office, back office and supply chain;

Connectivity
The industry's core mission to provide connectivity, as reflected in the industry's purpose: "Connecting Everyone and Everything to a Better Future";

Content or service platforms: forward integration into services or content to catalyse the market and the use of the mobile platform;

Non-core: a feature of all industries, typically reflecting diversification or CSR activities unrelated to core operations, connectivity or connectivity driven platforms.

THE INDUSTRY ACTIVITIES THAT DRIVE IMPACT ARE SPREAD ACROSS THE VALUE CHAIN:

30% Operational activities

27% Related to the primary output of the industry: connectivity

32% Related to services or content that are based on that connectivity

11% Assessed as non-core

MNO Operations
The most prominent operational drivers include: developing resilient infrastructure to support emergency broadcast systems (SDGs 1, 2, 3, 11 and 13), increasing energy efficiency of operating infrastructure (SDGs 7 and 12) and implementing leadership equality programmes (SDG 5). Energy consumption is hugely important to the industry as a cost, and is a challenge to manage in a sustainable way, but it is a fraction of the 23,322 TWh[5] of worldwide energy consumption.

Connectivity
Connectivity is at the heart of the impact for many SDGs, featuring in all but SDGs 6, 7 and 17: each of which require a service or content platform contribution on top of basic connectivity. Connectivity can be voice or data, and the relevant drivers are often assessed through metrics related to overall mobile penetration, as well as affordability in order to address the requirement for inclusion. Example drivers that have connectivity at their core, but contribute specifically to a target, include: providing affordable access to basic voice and data services to enable access to primary and secondary e-learning (SDG 4) and connecting women to the sharing economy infrastructure through mobile internet that enables trading or monetisation of traditionally unpaid care and domestic work (SDG 5).

Platforms
Platforms recognise that mobile network operators often provide services and content on top of connectivity as a means of diversifying their revenue stream and stimulating the market for connectivity. Successful platforms have often evolved as a result of initial market failure, for example, mobile remittances, and may subsequently be exited as the market begins to function effectively. These investments can be transformational for the target audience and include: supporting low-cost, accessible remittance services in developing areas (SDG 1), enabling access to nutritional information and monitoring through mobile health programmes and applications (SDG 2); and developing IoT infrastructure for water efficiency monitoring to increase water use efficiency across all sectors (SDG 6).

Non-core
There are a number of activities that the industry does at scale, that create impact on the SDGs and their targets, but are not core operational activities, nor are they connectivity or platform-related. These include: funding scholarships for higher education / vocational training programmes in information and communications technology, for least developed countries to increase capacity-building in developing countries (SDG 4), and contributing IP to the UN Intellectual Property Bank to enhance capacity-building in developing countries (SDG 17).

5. Source: IEA, Key World Statistics 2015 (http://www.iea.org/publications/freepublications/publication/KeyWorld_Statistics_2015.pdf)

IMPACT ANALYSIS: DRIVERS BY DIRECTNESS OF INFLUENCE

To further assess and understand the impact made by the mobile industry on the SDGs, impact was assessed in terms of the directness of influence on the target, with categories being: direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The following diagram illustrates the proportion of each type of impact within an SDG:

FIGURE 3

Contribution to SDG Impact Score by Directness of Influence

	Overall	12
SDG 1	No Poverty	23
SDG 2	Zero Hunger	12
SDG 3	Good Health and Well-Being	11
SDG 4	Quality Education	23
SDG 5	Gender Equality	12
SDG 6	Clean Water and Sanitation	5
SDG 7	Affordable and Clean Energy	12
SDG 8	Decent Work and Economic Growth	9
SDG 9	Industry, Innovation and Infrastructure	30
SDG 10	Reduced Inequalities	4
SDG 11	Sustainable Cities and Communities	4
SDG 12	Responsible Consumption and Production	13
SDG 13	Climate Action	15
SDG 14	Life Below Water	7
SDG 15	Life on Land	8
SDG 16	Peace, Justice and Strong Institutions	13
SDG 17	Partnerships for the Goals	6

Direct

E.g. Support low-cost accessible remttance services in developing areas

Indirect

E.g. Support the development of infrastructure supporting IoT solutions to improve consumption and production efficiency

Systemic

E.g. Provide access to information to communities through mobile to improve their awareness of sustainable development practices

Direct accounts for 50% of total drivers, indirect drivers account for 41% and systemic drivers account for 9%. Direct drivers are more measurable, but do not benefit from the leverage of third parties that indirect and systemic impacts have. Indirect impacts typically combine a relatively immediate impact with the requirement for one or more partners, and are often associated with connectivity. Systemic drivers typically have a longer implementation time, require more interaction, and are more obviously associated with either the provision of connectivity or platforms.

All of the SDGs (with the exception of SDG 14: Life Below Water) have direct drivers, where the industry activity itself addressed the objectives of the SDG target, for example, enabling access to affordable internet services. However, it is also important to consider the impacts of mobile connectivity, as well as mobile platforms that generate significant indirect and systemic impact. For example:

- **SDG 9: Industry, Innovation and Infrastructure:** where indirect impact is made on Target 9.5 (fostering innovation) through the proliferation of mobile devices and mobile broadband that has enabled wide-spread digital inclusion and fostered further digital innovation;

- **SDG 2: Zero Hunger:** where systemic impact is made on Target 2.c (fair and well-functioning markets) through access to basic voice and data services that has fundamentally changed the way that the small-scale agriculture market operates, enabling access to information and increased transparency of supply, demand and price.

The industry's impact is not limited to the targets that it impacts directly, but extends where its connectivity and platforms empower other people, industries or governments to create their own impact on the SDGs.

LOOKING FORWARD

Accelerating progress against the SDGs

The impact analysis establishes both a baseline level of impact, as well as identifying where the mobile industry can increase its impact.

Impact can be increased either by: increasing performance against the current prioritised targets, for example, increasing penetration in a region, or widening the scope of its activities to impact more targets, for example, through further involvement in shaping research and innovation policy.

There are three ways that the mobile industry can increase its impact on the SDGs in line with its purpose: the first two can drive performance against the existing targets that have been prioritised, and the third has the potential to extend impact to new targets that are not materially impacted by the industry's activities today:

industry Purpose	SDG Impact Accelerator
INCLUSION Connecting Everyone	**Scaling networks and access:** expanding the global mobile network footprint and connecting subscribers to voice and data services
INNOVATION Connecting Everything	**Innovation:** creating new ways to enhance the quality of connectivity and ease of access; and innovating mobile-enabled platform services to meet sustainable development needs (e.g. mobile identity and M2M)
INFLUENCE A Better Future	**Policy and partnerships:** contributing to sustainable development policy alongside governments and agencies both as an industry and together with other partners.

Each of these needs to be underpinned by a sustainable commercial model that balances the critical trade-offs in scaling networks, such as the expense of reaching remote communities and investing in the capability of networks while maintaining or enhancing affordability for consumers. Working with stakeholders, such as regulators and governments, will be essential to ensure that the industry can maintain this balance.

The mobile industry also requires an exemplar commitment to responsible business practice that provides the necessary authority and authenticity that is required as the industry becomes more associated with its SDG impact and focus.

FIGURE 4
Accelerators of Mobile Industry Impact and Foundations

IMPACT ACCELERATORS

SCALING NETWORKS AND ACCESS

Expanding the mobile network footprint to connect subscribers to voice and data services, and increasing the coverage and penetration of mobile broadband to unlock the potential of connectivity and the digital economy.

Closing the digital divide will require creative technical and commercial solutions, together with support from governments and regulators to reach remote and underserved communities, which are the most expensive to reach, and often the least able to afford connectivity.

INNOVATION

Connectivity
Creating new ways to unlock the potential of connectivity by either increasing the capability of networks, through next generation technologies, like 5G, or developing innovative commercial propositions and bundles that make mobile accessible and affordable to vulnerable groups (e.g. women in developing countries).

Platforms
Creating and supporting innovation in value-added platform services that leverage mobile devices or mobile networks to meet sustainable development needs, such as IoT / M2M for utilities, opening APIs to spur innovation in mobile platforms for sustainable development, or the next generation of mobile money and mobile identity.

POLICY AND PARTNERSHIPS

Creating momentum behind the SDGs by creating productive partnerships with governments, global influencers and agencies.

Taking an active role in solving policy issues that impact the SDGs, leading the private sector in contributing to the most important forums for sustainable development.

FOUNDATIONS

SUSTAINABLE COMMERCIAL MODEL

Maintaining a commercial model that can fund the required investment in networks and innovation to maximise the contribution of the industry to the SDGs.

RESPONSIBLE BUSINESS

Being an exemplar of the UN Global Compact ten principles and encouraging the broader mobile ecosystem and other industries to integrate responsible and ethical business values into their operations.

Source: Deloitte Analysis

Increasing performance against the prioritised targets alone has the potential to almost triple the industry's SDG impact scores overall (see Figure 5 below), reflecting the opportunity the mobile industry has to further scale its networks and persist with critical innovations for sustainable development. The additional potential from extending impact into shaping policy and creating partnerships that accelerate sustainable development, could be very significant given the influence connectivity exerts and the number of targets currently excluded, and would do much to position the industry as a leader in SDG focus.

FIGURE 5
Current and Maximum Potential SDG Impact Scores[6]

		Current	Potential
SDG 1	No Poverty	23	53
SDG 2	Zero Hunger	12	34
SDG 3	Good Health and Well-Being	11	28
SDG 4	Quality Education	23	37
SDG 5	Gender Equality	12	27
SDG 6	Clean Water and Sanitation	5	18
SDG 7	Affordable and Clean Energy	12	26
SDG 8	Decent Work and Economic Growth	9	30
SDG 9	Industry, Innovation and Infrastructure	30	62
SDG 10	Reduced Inequalities	4	17
SDG 11	Sustainable Cities and Communities	4	13
SDG 12	Responsible Consumption and Production	13	25
SDG 13	Climate Action	15	38
SDG 14	Life Below Water	7	16
SDG 15	Life on Land	8	17
SDG 16	Peace, Justice and Strong Institutions	13	30
SDG 17	Partnerships for the Goals	6	23

Current Global Impact

Potential Global Impact

12 Average (Current)

29 Average (Potential)

6. Note: Maximum Potential is based on every country reaching the maximum potential score for each metric used to measure Impact. In this scenario the number of targets impacted, and importance of the industry to those targets remains as current.

Figure 5 above shows the potential impact based on the targets that the industry impacts today. Almost three times the impact can be delivered through commitment to scaling mobile networks and persisting with innovation which is critical to sustainable development. SDGs 6 and 8 help to illustrate this:

- **SDG 6: Clean Water and Sanitation,** where supporting connectivity for IoT and M2M technology for smart meters and water monitoring will make a significant contribution to the SDG, despite the current penetration of M2M connections in developing areas being low and pilot projects in water quality and sanitation, while critical to progress, do not have sufficient scale to shift the impact assessment;

- **SDG 8: Decent Work and Economic Growth,** where there is significant potential to increase the penetration of both basic voice services to the unconnected, as well as increase coverage of high-speed data services that generate improvements in business productivity and drive economic growth.

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Opportunities by SDG

While these impact accelerators will increase the impact across the SDGs overall, each SDG (and the impact of the industry on it) is unique. Industry impact on some SDGs is driven by the reach of basic communications services (for example, SDG 1: No Poverty), while others will require technological innovation to make a step-change (for example, SDG 12: Responsible Consumption and Production). The former would benefit most from the scaling of networks, while the latter requires innovation in platform services like IoT and M2M. Outlined below are forward looking opportunities by SDG. These opportunities highlight areas where the industry can amplify its impact based on either improving performance against existing industry drivers (e.g. penetration, M2M connections), or expanding into new roles (e.g. policy) that can impact a higher proportion of targets.

FIGURE 6
Forward Looking Opportunities by SDG

|	Scale	Innovation (Connectivity)	Innovation (Platforms)	Policy		
1 NO POVERTY	🔴	🔴	🔴	🔵	Scale networks and connectivity, with emphasis on supporting the poorest populations to access mobile and mobile-enabled services	Develop and increase access to the next generation of platform services to meet basic needs of the poorest populations (e.g. identity, financial services, education, health)
2 ZERO HUNGER	🔴	⚫	🔴	🔵	Support the development of IoT / M2M solutions to improve agricultural productivity of small-scale farms	Expand mobile broadband to remote and underserved areas to enable access to online marketplaces and m-Agriculture platform services
3 GOOD HEALTH AND WELL-BEING	🔴	🔴	🔴	🔵	Expand mobile broadband to remote and underserved areas to facilitate access to health platform services	Scale networks to facilitate access for remote and underserved communities to emergency communication
4 QUALITY EDUCATION	🔴	🔴	🔴	⚫	Expand mobile broadband to remote and underserved areas to connect learners and students to online education platforms and content	Invest in and support creation of mobile learning solutions (e.g. content platforms, technology solutions) to increase the reach and effectiveness of education
5 GENDER EQUALITY	⚫	🔴	🔵	🔴	Improve the accessibility of connectivity to women through affordable and tailored mobile services, accessible distribution channels, and digital skills to help women feel safe and confident online	Implement progressive gender equality policy and take a leading role on gender equality in the private sector
6 CLEAN WATER AND SANITATION	⚫	⚫	🔴	🔵	Develop IoT / M2M technology to support solutions for improved water efficiency for consumers and businesses (e.g. smart metering)	Develop IoT / M2M technology to support solutions to improve water quality in developing areas (e.g. water quality monitoring and management)
7 AFFORDABLE AND CLEAN ENERGY	🔵	⚫	🔴	🔵	Develop IoT / M2M technology to support solutions to improve energy efficiency for consumers and businesses (e.g. automated building efficiency management)	Increase the proportion of renewable energy used to power mobile infrastructure

Mobile industry Opportunity

🔴 SIGNIFICANT   ⚫ MODERATE   🔵 LOW

SDG	Scale	Innovation (Connectivity)	Innovation (Platforms)	Policy		
8 DECENT WORK AND ECONOMIC GROWTH	● SIGNIFICANT	● SIGNIFICANT	● SIGNIFICANT	● SIGNIFICANT	Scale networks, with an emphasis on high-speed data services, to stimulate economic growth through connectivity to the digital economy for businesses and consumers	Support the connectivity requirements of IoT and M2M innovation to drive the next wave of economic productivity and economic growth, particularly in less developed economies
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	● SIGNIFICANT	● SIGNIFICANT	● SIGNIFICANT	● SIGNIFICANT	Continue to roll out infrastructure and invest in increasing the reach and capabilities of existing network, both connecting the unconnected and driving up the penetration of mobile broadband	Emphasise affordability of mobile services to ensure equitable access across socio-economic groups and improve digital inclusion
10 REDUCED INEQUALITIES	● MODERATE	● SIGNIFICANT	● SIGNIFICANT	● LOW	Tailor mobile service packages to address to barriers to access for vulnerable groups, for example, affordability for the poor, alternative distribution channels for the remote or for women, to improve digital inclusion	Develop the next generation of platform services to provide low-cost remittance solutions in developing countries
11 SUSTAINABLE CITIES AND COMMUNITIES	● MODERATE	● MODERATE	● SIGNIFICANT	● SIGNIFICANT	Improve the resilience of mobile infrastructure to support communication and co-ordination during natural and man-made disasters	Support the connectivity requirements of IoT and M2M innovation, to enable 'smart' and 'connected' cities (e.g. low latency technologies to support faster wireless networks required for automated vehicles)
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	● LOW	● LOW	● SIGNIFICANT	● MODERATE	Develop IoT / M2M solutions to increase the resource efficiency of industrial processes and reduce waste	Develop IoT / M2M technology to support solutions to improve energy efficiency for consumers and businesses (e.g. smart metering)
13 CLIMATE ACTION	● MODERATE	● LOW	● SIGNIFICANT	● LOW	Develop IoT / M2M solutions to monitor environmental conditions and improve adaptive capability for climate change	Increase resilience of mobile infrastructure, particularly in developing countries, to ensure functionality after climate-related disasters
14 LIFE BELOW WATER	● SIGNIFICANT	● SIGNIFICANT	● SIGNIFICANT	● LOW	Expand connectivity to remote, artisanal fishing communities to increase access to market information	Develop IoT / M2M solutions to monitor and manage the marine environment
15 LIFE ON LAND	● MODERATE	● LOW	● SIGNIFICANT	● LOW	Improve management of e-waste across the mobile industry value chain to reduce negative impacts on the environment	Develop IoT / M2M solutions to monitor and manage the land ecosystems
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	● LOW	● MODERATE	● SIGNIFICANT	● SIGNIFICANT	Actively participate in addressing global policy issues (e.g. data privacy) and promote and role model the values of responsible business	Develop mobile-enabled platform services that support government and institutions to serve their citizens (e.g. mobile identity)
17 PARTNERSHIPS FOR THE GOALS	● LOW	● LOW	● SIGNIFICANT	● SIGNIFICANT	Create productive partnerships with global influencers and agencies to generate momentum for sustainable development	Lead the private sector in building environmentally-sound infrastructure in developing countries

Mobile industry Opportunity

● SIGNIFICANT   ● MODERATE   ● LOW

03

IMPACT BY MARKET

INTRODUCTION

As discussed in Chapter 2: Impact on the SDGs, a number of different factors contribute to quantifying the impact of the mobile industry on the SDGs, including the ability of the mobile industry to materially impact the target, the importance of the industry activity contributing to the targets, and the performance against the industry's potential impact.

Differences in both impact scores and areas of future opportunity between economies at different development stages (developed, developing and in transition) and geographic regions reflect the influence of demographics and economic maturity on the mobile industry's impact.

There is significant variation in the highest scoring SDGs between developed countries, developing countries and countries in transition, largely due to significant gaps in infrastructure and technological progress, as well as the maturity of public services such as basic healthcare. There is also variation between SDGs by geographical region, both in terms of the current SDG scores and the future opportunities for improvement, based on the maturity of infrastructure, availability of basic services, and level of poverty in each region.

IMPACT BY DEVELOPMENT STAGE

One of the most significant differences between the SDGs and the former Millennium Development Goals is the inclusiveness of broader objectives for development, presenting challenges in both the developing and the developed world (for example, the acknowledgement of unpaid domestic work and the elimination of discrimination). Nevertheless, given the significant work required to bridge the persistent development gap, it is natural that a number of targets and SDGs are specifically aimed at critical challenges in the developing world, such as extreme poverty and infant mortality.

The following section outlines the headline differences in SDG scores by development stage, a grouping defined by the United Nations that is intended to reflect basic economic country conditions.

Several countries (in particular the economies in transition) have characteristics that could place them in more than one category; however, for purposes of analysis, the groupings have been made mutually exclusive.

TABLE 1

Top four scorings SDGs ranking by development stage

			DEVELOPED	DEVELOPING	COUNTRIES IN TRANSITION
1	SDG 9	Industry, Innovation and Infrastructure	SDG 9	SDG 9	SDG 1
2	SDG 4	Quality Education	SDG 13	SDG 4	SDG 9
3	SDG 1	No Poverty	SDG 16	SDG 1	SDG 4
4	SDG 13	Climate Action	SDG 5	SDG 2	SDG 5
5	SDG 16	Peace, Justice and Strong Institutions	SDG 7	SDG 12	SDG 16
6	SDG 12	Responsible Consumption and Production	SDG 4	SDG 13	SDG 3
7	SDG 2	Zero Hunger	SDG 8	SDG 16	SDG 12
8	SDG 7	Affordable and Clean Energy	SDG 3	SDG 7	SDG 7
9	SDG 5	Gender Equality	SDG 1	SDG 5	SDG 8
10	SDG 3	Good Health and Well-Being	SDG 15	SDG 3	SDG 13
11	SDG 8	Decent Work and Economic Growth	SDG 12	SDG 8	SDG 15
12	SDG 15	Life On Land	SDG 11	SDG 15	SDG 2
13	SDG 14	Life Below Water	SDG 14	SDG 14	SDG 14
14	SDG 17	Partnerships for the Goals	SDG 10	SDG 17	SDG 6
15	SDG 6	Clean Water and Sanitation	SDG 17	SDG 6	SDG 11
16	SDG 11	Sustainable Cities and Communities	SDG 6	SDG 10	SDG 10
17	SDG 10	Reduced Inequalities	SDG 2	SDG 11	SDG 17

DEVELOPED

The mobile industry has a higher level of impact across developed economies than the global average. This performance is largely explained by the maturity of existing infrastructure enabling connectivity and thus access to information, as well as the level of investment in platform innovation, such as IoT and M2M services. Investment in networks and connectivity over a long period of time has led to higher penetration of voice, data and IoT services, increasing the impact of the mobile industry on the SDGs.

COUNTRIES **36**
POPULATION **14%**

Some examples of where the mobile industry has a higher impact in developed economies include:

- **SDG 13: Climate Action,** through the proliferation on IoT / M2M solutions capable of environmental monitoring, and the high resilience and coverage of network infrastructure that can support communications through climate-related disasters;

- **SDG 5: Gender Equality,** both by actively addressing inequality and discrimination in the workforce, as well as equal access to mobile services and connectivity that support the financial, social and political inclusion of women;

- **SDG 8: Decent Work and Economic Growth,** through improving productivity and efficiency of businesses, but more significantly supporting connectivity to the digital economy and open platforms that foster innovation;

- **SDG 11: Sustainable Cities and Communities,** through the enablement of more resilient and efficient cities, with advanced and reliable emergency communications systems, as well as supporting automation and monitoring through IoT platforms.

Areas of potential with opportunity to increase impact in developed economies include:

- **SDG 6: Clean Water and Sanitation,** by supporting further M2M technology development to increase industrial and consumer water efficiency;

- **SDG 17: Partnerships for the Goals,** by taking a leadership role in the private sector to integrate the sustainable development agenda into business activities;

- **SDG 9: Industry, Innovation and Infrastructure,** by promoting new infrastructure development that is environmentally sound and increases energy efficiency.

DEVELOPING

The industry has made progress against the SDGs in developing countries, predominantly through increased connectivity and access to information, as well as through the provision of mobile money and agriculture platforms.

One example of this is SDG 2: No Hunger, where developing countries score higher than the global average, driven by the comparative importance of the agricultural industry to the local economy and, therefore, the higher impact of connectivity and platform solutions that support agricultural productivity.

However, the overall impact scores across developing countries are lower than the global average, largely driven by the limited reach of mobile networks in many developing areas. Network coverage in remote areas and affordability of mobile services to the poorest people in developing economies are two critical factors limiting the impact of the mobile industry, and perpetuating the digital divide.

COUNTRIES **107**
POPULATION **82%**

SDGs that score lower than the global average are:

- **SDG 13: Climate Action,** where resilience of infrastructure is lower and emergency communication solutions are less mature than in developed countries;

- **SDG 7: Affordable and Clean Energy,** where there is a lack of basic, modern energy infrastructure upon which IoT / M2M solutions could be used. This limits the penetration of IoT or M2M-enabled energy solutions in developing areas. As infrastructure develops, the industry can provide the necessary capabilities through IoT and big data to optimise production and consumption across the power grid.

In addition to SDGs where current impact is lower than the global average, there are further areas of potential to increase the impact of the mobile industry in developing economies, including:

- **SDG 2: Zero Hunger,** where impact is expected to grow over time as networks build out and coverage increases, enabling small-scale farms to access information and agriculture-focused mobile platforms that improve their productivity. Operators can also increase impact through focused efforts to improve the proliferation of IoT-based monitoring solutions;

- **SDG 8: Decent Work and Economic Growth,** through business as usual network investment which indirectly contributes to general economic growth, as well as increasing participation in mobile banking and mobile money platforms; all of which help to improve economic inclusion for those who are isolated from traditional financial services channels;

- **SDG 13: Climate Action,** where operators can actively become part of the monitoring and response fabric of a country, enabling local institutions to respond more effectively to climate change challenges.

ECONOMIES IN TRANSITION

The analysis highlights that the mobile industry has made positive contributions on certain SDGs within economies in transition, for example, regions that have an above average proportion of female employees across mobile network operators. Furthermore, the region scores highly with regards to the number of people provided with a digital legal identity. However, the level of impact on economies in transition is lower than the global average. This is predominantly driven by lower coverage and penetration of mobile networks compared to developed economies, limiting the availability of basic mobile services, as well as value-added services, such as mobile money which impacts across a number of the SDGs.

COUNTRIES **17**

POPULATION **4%**

Performance against the SDGs is lower than the global average, which is most pronounced in:

- **SDG 6: Clean Water and Sanitation,** as further investment is required in more advanced services such as IoT to support water and sanitation monitoring systems;

- **SDG 8: Decent Work and Economic Growth,** as advanced connectivity services, such as high speed mobile broadband and platform services, such as IoT are less mature;

- **SDG 4: Quality Education,** as students and learners do not have the same level of accessibility to connectivity or digitally-enabled learning opportunities, largely due to the affordability of mobile internet, or the lack of coverage in more remote areas.

In addition to SDGs where current impact is lower than the global average, there are further areas of potential to increase the impact of the mobile industry in economies in transition, including:

- **SDG 2: Zero Hunger,** there is still potential for further improvement as improved coverage and access to connectivity would increase the information available and improve market accessibility for the small–scale agriculture sector;

- **SDG 5: Gender Equality,** as increased connectivity improves female digital inclusion and access to information, services and opportunities in the workforce;

- **SDG 11: Sustainable Cities and Communities,** primarily through investment in IoT and collaboration with local institutions to help communities improve their resilience to the negative impacts of climate change and rapid urbanisation common in transitioning economies.

IMPACT BY REGION

TABLE 2
Top four scoring SDGs ranking by region

| GLOBAL		ASIA PACIFIC	CIS	EUROPE	LATIN AMERICA	MENA	NORTH AMERICA	SSA
1	SDG 9 Industry, Innovation and Infrastructure	SDG 9	SDG 1	SDG 1	SDG 9	SDG 9	SDG 9	SDG 9
2	SDG 1 No Poverty	SDG 4	SDG 9	SDG 9	SDG 1	SDG 1	SDG 13	SDG 1
3	SDG 4 Quality Education	SDG 1	SDG 4	SDG 4	SDG 4	SDG 4	SDG 16	SDG 2
4	SDG 13 Climate Action	SDG 2	SDG 5	SDG 16	SDG 13	SDG 13	SDG 5	SDG 4
5	SDG 12 Responsible Consumption & Production	SDG 13	SDG 16	SDG 13	SDG 16	SDG 12	SDG 7	SDG 3
6	SDG 16 Peace, Justice and Strong Institutions	SDG 12	SDG 3	SDG 5	SDG 12	SDG 16	SDG 8	SDG 12
7	SDG 2 Zero Hunger	SDG 16	SDG 12	SDG 7	SDG 5	SDG 7	SDG 3	SDG 13
8	SDG 7 Affordable and Clean Energy	SDG 7	SDG 8	SDG 8	SDG 7	SDG 3	SDG 4	SDG 7
9	SDG 5 Gender Equality	SDG 5	SDG 13	SDG 3	SDG 3	SDG 2	SDG 15	SDG 5
10	SDG 3 Good Health and Well-Being	SDG 3	SDG 7	SDG 12	SDG 8	SDG 5	SDG 11	SDG 16
11	SDG 8 Decent Work and Economic Growth	SDG 8	SDG 15	SDG 15	SDG 2	SDG 8	SDG 12	SDG 15
12	SDG 15 Life On Land	SDG 15	SDG 14	SDG 14	SDG 14	SDG 15	SDG 14	SDG 8
13	SDG 14 Life Below Water	SDG 14	SDG 2	SDG 11	SDG 15	SDG 14	SDG 1	SDG 14
14	SDG 17 Partnerships for the Goals	SDG 17	SDG 6	SDG 6	SDG 17	SDG 17	SDG 10	SDG 10
15	SDG 10 Reduced Inequalities	SDG 6	SDG 11	SDG 10	SDG 6	SDG 6	SDG 6	SDG 17
16	SDG 6 Clean Water and Sanitation	SDG 11	SDG 10	SDG 17	SDG 11	SDG 11	SDG 17	SDG 6
17	SDG 11 Sustainable Cities and Communities	SDG 10	SDG 17	SDG 2	SDG 10	SDG 10	SDG 2	SDG 11

ASIA PACIFIC

CURRENT IMPACT

The regional scores for the Asia Pacific area are broadly consistent with the global scores, though there are some variations largely driven by the high proportion of the population that is reliant on the agricultural sector, impacting **SDG 2: Zero Hunger**, and high affordability of mobile services, impacting **SDG 4: Quality Education**.

COUNTRIES **26**
POPULATION **55%**

	Relative impact score	Commentary
2 ZERO HUNGER **SDG 2** Zero Hunger	**HIGHER**	• High concentration of small-scale farming and agriculture compared to other regions, increasing the impact of connectivity and solutions that increase agricultural productivity
13 CLIMATE ACTION **SDG 13** Climate Action	**LOWER**	• Lower coverage of services that can support emergency communication during climate-related disasters • Lower resilience of network infrastructure in the case of climate-related disasters • Lower M2M connections to support climate change monitoring
4 QUALITY EDUCATION **SDG 4** Quality Education	**HIGHER**	• Higher impact of internet and SMS-based learning in developing areas of Asia-Pacific which have lower average years of schooling and lower literacy rates • High affordability of services compared to gross national income per capita, increasing access to online and mobile learning

OPPORTUNITIES TO INCREASE IMPACT

Current performance is limited by the penetration of mobile services in the Asia Pacific region. Therefore, coverage of new areas and connection of new subscribers over time will increase the impact on the SDGs. In particular, impact on **SDG 9: Industry, Innovation and Infrastructure** will improve as network infrastructure is expanded across the least developed countries in Asia, while improvement in **SDG 1: No Poverty** will require specific focus on how to increase the value of services, particularly mobile broadband through a combination of affordability and relevant local content.

CIS (Commonwealth of Independent States)

COUNTRIES **12**
POPULATION **4%**

CURRENT IMPACT

The Commonwealth of Independent States shows the shows the largest variation in SDG ranking. Additionally, the level of impact of the mobile industry across the SDGs in the region is marginally lower than the global average.

The variation is largely driven by the lower resilience of basic network infrastructure, as well as lower uptake of IoT and M2M services that support climate change monitoring and increased infrastructure efficiency.

		Relative impact score	Commentary
2 ZERO HUNGER	**SDG 2** Zero Hunger	**LOWER**	• Lower penetration of basic mobile and mobile agriculture services to support productivity in small-scale farming • Low resilience of infrastructure to support emergency communication before and during natural disaster events, increasing exposure of the agricultural sector
13 CLIMATE ACTION	**SDG 13** Climate Action	**LOWER**	• Lower uptake of M2M and IoT services that would support more efficiency in consumption of natural resources • Lower resilience of network infrastructure that limits the ability to provide emergency communication during climate-related disasters
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	**SDG 9** Industry, Innovation and Infrastructure	**LOWER**	• Significantly less investment and lower uptake of IoT and M2M services

OPPORTUNITIES TO INCREASE IMPACT

Similarly to the Asia-Pacific, there is significant potential to increase the impact on **SDG 1: No Poverty** and **SDG 9: Industry, Innovation and Infrastructure** in the Commonwealth of Independent States by increasing the accessibility of basic mobile services. Additionally, increased multi-stakeholder collaboration to further IoT and M2M services can increase the impact on **SDG 7: Affordable and Clean Energy**, by increasing the efficiency of industrial processes to reduce energy consumption.

EUROPE

CURRENT IMPACT

Europe has a high level of impact across the majority of the SDGs, predominantly due to the maturity and depth of technical and business operations in the region, as well as the level of investment and pace of innovation.

High coverage, the penetration of mobile services and M2M, increases productivity across the broader economy, as well as increasing the capability to monitor and manage energy use.

		Relative impact score	Commentary
11 SUSTAINABLE CITIES AND COMMUNITIES	**SDG 11** Sustainable Cities and Communities	**HIGHER**	• Higher level of investment in IoT and M2M technologies and services • Higher adoption rate of M2M services by businesses • Advanced and resilient mobile infrastructure that supports emergency warning systems
8 DECENT WORK AND ECONOMIC GROWTH	**SDG 8** Decent Work and Economic Growth	**HIGHER**	• High network coverage and mobile broadband penetration • Higher use of internet, generally, increasing economic productivity • Higher use of internet by businesses to engage in e-commerce and mobile commerce
7 AFFORDABLE AND CLEAN ENERGY	**SDG 7** Affordable and Clean Energy	**HIGHER**	• Higher penetration of IoT / M2M services that support the monitoring of resource use and improved efficiency

OPPORTUNITIES TO INCREASE IMPACT

Despite its current performance in comparison to other regions, there is still significant potential to increase impact across Europe, particularly against **SDG 17: Partnerships for the Goals**. The maturity of the region provides a unique opportunity to not only maintain current commitment to sustainable development, but to lead multi-stakeholder partnerships, driving coordination of the sustainable development agenda, as well as continuing to develop and implement the open platforms that enable innovation ecosystems and provide a blueprint for other regions to follow.

LATIN AMERICA

COUNTRIES **22**
POPULATION **9%**

CURRENT IMPACT

The ranking of the industry impact in Latin America is very similar to the global average and, in terms of the current degree of impact of the mobile industry across the regions, Latin America has the highest impact.

High coverage and penetration of services, compared to other developing regions, drives significant impact by enabling access to emergency communication services and well as increasing the productivity of businesses through the use of online channels and services.

		Relative impact score	Commentary
1 NO POVERTY	**SDG 1** No Poverty	**HIGHER**	• High degree of need due to the proportion of the population living in relative poverty • High network coverage able to reach a significant proportion of the population in developing areas • Relatively high affordability increasing inclusion and the accessibility of communications services
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	**SDG 9** Industry, Innovation and Infrastructure	**HIGHER**	• High 2G and 3G network coverage, especially compared to other developing regions
13 CLIMATE ACTION	**SDG 13** Climate Action	**HIGHER**	• High network coverage and infrastructure resilience to support effective communication throughout climate-related disasters and disaster recovery

OPPORTUNITIES TO INCREASE IMPACT

While Latin America scores highly compared to the global average, there are still areas with significant potential for improvement. The two most significant opportunity areas are **SDG 1: No Poverty** and **SDG 9: Industry, Innovation and Infrastructure**. Though there is significant 2G and 3G coverage across Latin America, 4G coverage lags behind all regions except Sub-Saharan Africa. Furthermore, despite high coverage, penetration of voice and mobile broadband services at 68% and 49% respectively is low relative to developed economies. Significant impact could be made in Latin America, firstly by addressing affordability of mobile services for low-income users, as well as further investment in infrastructure.

MENA **(Middle East and North Africa)**

CURRENT IMPACT

The ranking of mobile industry impact across the MENA region is close to the global average, though there are several SDGs that score lower than the global average.

These differences are most pronounced regarding inequality, particularly gender inequality, resulting in lower scores for **SDG 10: Reduced Inequalities** and **SDG 5: Gender Equality.**

COUNTRIES **25**
POPULATION **8%**

	Relative impact score	**Commentary**
10 REDUCED INEQUALITIES **SDG 10** Reduced Inequalities	**LOWER**	• Lower affordability of voice and data services, especially for women where the mobile bundle cost is the least affordable based on gross national income • Lower economic and social participation online indicated by limited local online content generated
5 GENDER EQUALITY **SDG 5** Gender Equality	**LOWER**	• Lower affordability of voice and data services for women: mobile bundle cost is the least affordable, globally • Lowest proportion of female employees globally
2 ZERO HUNGER **SDG 2** Zero Hunger	**LOWER**	• Relatively low proportion of the population supported by the agricultural sector, limiting the overall impact of agricultural connectivity and solutions • Low coverage and penetration limiting access to information and productivity for small-scale farms

OPPORTUNITIES TO INCREASE IMPACT

The industry has the highest potential to increase impact in MENA through **SDG 10: Reduce Inequalities** and **SDG 5: Gender Equality**. For SDG 10, the mobile industry is well positioned to increase impact as it continues the expansion of mobile remittance services as well as strengthening the availability of mobile money services and offering more advanced financial services. This would have to be alongside addressing other barriers such as affordability, in particular for women, and availability of local content that mobile operators could support. For SDG 5, the industry has the opportunity to set an example as an employer of women for the region and increase the availability of internet and telecommunications technology, and mobile health platforms.

NORTH AMERICA

CURRENT IMPACT

In North America, the impact of the industry varies significantly across the SDGs compared to the global average, though the overall impact is higher across the majority of SDGs. Significant investment in mobile networks and IoT and M2M technology is visible across **SDG 11: Sustainable Cities and Communities** and **SDG 8: Decent Work and Economic Growth**, while equal access to services between men and women contributes to a higher score for **SDG 5: Gender Equality.**

COUNTRIES **2**

POPULATION **5%**

	Relative impact score	Commentary
SDG 11 Sustainable Cities and Communities	**HIGHER**	• Higher level of investment in IoT and M2M technologies and services • Higher adoption rate of M2M and IoT services by businesses • Mature emergency broadcast and response systems to enable early warning and effective recovery from climate-related disasters
SDG 5 Gender Equality	**HIGHER**	• Higher proportion of female employees in the workforce • Higher affordability of mobile services for women, indicating better access to connectivity and social inclusion
SDG 8 Decent Work and Economic Growth	**HIGHER**	• High penetration of mobile internet and IoT / M2M services for businesses, driving productivity • Highly developed mobile retail market, generating significant number of transactions

OPPORTUNITIES TO INCREASE IMPACT

The industry has the highest potential to increase its impact on **SDG 17: Partnerships for the Goals** and **SDG 12: Responsible Consumption and Production**. Particularly in the case of SDG 12, where the industry is a contributor to both the problem and the solution. Increasing energy consumption and generation of e-waste needs to be balanced by the efficiency of operations where the industry can be an exemplar, showcasing the use of their own technology as part of the solution.

SUB-SAHARAN AFRICA

CURRENT IMPACT

Although the ranking of SDG impact in Sub-Saharan Africa is very similar to the global average, the current degree of impact of the mobile industry across the region is lower, with nearly all SDGs scoring below the global average, in particular **SDG 10: Reduced Inequalities** and **SDG 8: Decent Work and Economic Growth.**

		Relative impact score	Commentary
2 ZERO HUNGER	**SDG 2** Zero Hunger	**HIGHER**	• High concentration of small-scale farming and agriculture compared to other regions, increasing the impact of connectivity and solutions that increase agricultural productivity • Relatively high uptake of mobile in agricultural communities, supporting access to markets and information that increase productivity
8 DECENT WORK AND ECONOMIC GROWTH	**SDG 8** Decent Work and Economic Growth	**LOWER**	• Lower 3G and 4G coverage and affordability, limiting inclusion in the digital economy for businesses and consumers • Lower proportion of businesses participating in e-commerce and mobile commerce, or engaging with other businesses or consumers using the internet
13 CLIMATE ACTION	**SDG 13** Climate Action	**LOWER**	• Lower coverage of 2G, 3G and 4G services that can support emergency communication during climate-related disasters • Lower resilience of network infrastructure in the case of climate-related disasters • Lower M2M connections to support climate change monitoring

OPPORTUNITIES TO INCREASE IMPACT

Given the lower levels of coverage and penetration in Sub-Saharan Africa, the industry has the potential to significantly increase its contribution through improving the accessibility of its services, in particular to the poor and those in remote areas. The industry can drive significant impact across **SDG 1: No Poverty, SDG 9: Industry, Innovation and Infrastructure** and **SDG 3: Good Health and Well-Being** by expanding network coverage and addressing the barriers to digital inclusion for consumers, such as lack of affordability, digital literacy and local content. Improved connectivity can then facilitate access to basic services delivered through mobile, such as mobile money and mobile health.

In addition to increasing the reach of services, it is equally important for the industry to play a leading role to promote transparency and ethical business practices within its own operations, as well as across the supply chain. This has potential to impact **SDG 16: Peace, Justice and Strong Institutions**, by leveraging the position as a critical investor in local infrastructure to drive positive change in businesses across the region.

04

SUSTAINABLE BUSINESS POLICIES AND PRACTICE

INTRODUCTION

Our report identifies the most significant ways in which the industry impacts the SDGs. As Chapter 2 explains, the source of this impact can come from the industry's operational activities, its role as a provider of connectivity, the content and service platforms it develops and non-core activities.

The bias of drivers, the roles through which the industry impacts the targets towards connectivity and platforms, is not surprising given the relative scale of the number of people connected compared to the amount of business activity; for example subscribers outstrip employees by 1000:1. Nevertheless, the industry's operational activities do account for 36 of the 130 primary drivers identified. These have been highlighted in the report where they had a material impact on a target, for example, implementing leadership equality programmes, or increasing energy efficiency.

Adopting sustainable business policies across all aspects of operations is important to ensure that the broader contribution to the SDGs is not diluted, and to stimulate business partners and others to adopt these policies. Reporting a strong SDG impact, but having sub-optimal internal processes and procedures, wouldn't be sustainable; stakeholders, whether investors, customers or regulators, would eventually force change.

This chapter provides some evidence that, both in intent and action, the mobile industry is seeking to ensure that the way in which it delivers its products and services, its business practices and policies, are aligned to a sustainable future.
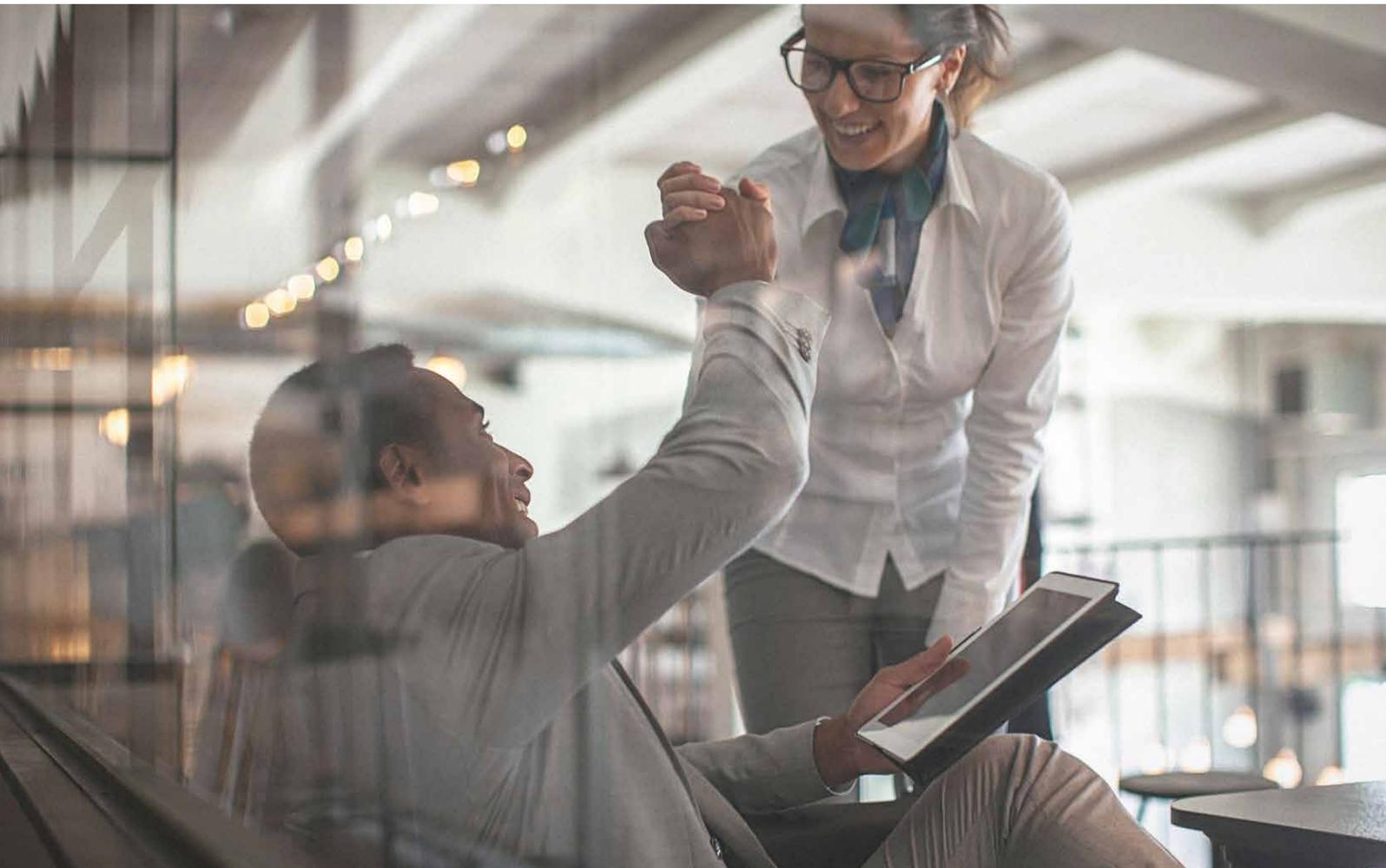
DEFINITION OF SUSTAINABLE BUSINESS PRACTICE

The definition of sustainable business, and associated reporting, is evolving with multiple organisations promoting standards and approaches.

Sustainable business practices stem from companies establishing a deep-rooted system of values that enable the responsible running of their businesses. This value system needs to span its operations and meet fundamental responsibilities in the areas of environment, labour, supply chain, human rights and anti-corruption. These values must form principles that govern the way a company conducts its activities across all its business units, with all its partners and suppliers, and in all geographies. Doing good in one area or one region does not offset doing harm in another. Additionally, a key dimension of the value system is that the horizon for all business decisions needs to be the long term, meeting the needs of the present, while taking into account the ability of the organisation to meet its obligations in the future.

The UN Global Compact, a voluntary UN initiative, has established ten principles that span the four areas above. The Global Compact encourages participation by formal sign up, with participants expected to adhere to, and report on, their progress in each of the areas. The focus of the principles are both on the assets owned by the participant and associated activities, up and down the supply chain, and in some areas (for example, human rights) can extend beyond a company's direct sphere of influence.

The Global Compact, together with the Global Reporting Initiative (GRI) and the World Business Council for Sustainable Development (WBCSD), have published a freely available resource to encourage broader alignment against the SDGs, the SDG Compass. The Compass proposes a five step process to developing and incorporating a focus on SDGs into an organisation, and offers guidance for companies on how to align their reporting with the GRI.

Dow Jones Sustainability Indices (DJSI) also define sustainability across a wide range of business activity KPIs. Participating companies fill in an extensive annual questionnaire which then provides a sustainability perspective used in the financial markets.

IMPACT ON SDGs OF OPERATIONAL ACTIVITY

Our SDG impact analysis has considered operational business activities, but only included them if the impact on the SDGs is assessed to be comparatively material. Whilst there are many more references to impact resulting from activity further up the value chain, examples of operational business activities that have been called out include: the controls and methods applied on the disposal of waste, the employment policies implemented, the checks and transparency demanded from the supply chain and the enforcement of strict labour policies, among others. Overall, how operators run their businesses has an impact on 15 out of the 17 Goals.

This is not to say that the industry is de-prioritising the adoption and application of sustainable business principles in favour of a focus on broader impact against the SDGs. Going forward, impact on the SDGs and the adoption of, and delivery against, sustainable business policies need to be brought together.

EVIDENCE OF COMMITMENT TO SUSTAINABLE BUSINESS POLICIES

As with many sectors, commitment to environmental and socioeconomic issues among mobile network operators is mixed, and is largely dependent on the size and geographic location of individual organisations. This is to a great extent, due to larger companies having to report metrics on material risks and opportunities in their regulatory filings to demonstrate potential impacts that could affect value in the near and long term, providing investors with a more holistic and comparable view of performance. For example, under the UK Companies Act, companies have to report carbon emissions, and within the US, companies are required to disclose material financial information about their exposure to climate change.

Global sector leaders, particularly those headquartered in developed economies, tend to have well-established sustainability strategies to support reporting requirements. For example: Orange, Telefonica and Vodafone base their sustainability approaches on material risks (such as digital inclusion, ethical business practice, environmental impact, talent development, digital trust), to align reporting with the Sustainable Development Goals and other initiatives and attempt to integrate sustainability into their core business model.

The maturity of sustainability approaches reflects the level of exposure to sustainability-related risks, regulatory reporting requirements on transparency around non-financial issues, and stakeholder demand for sustainable products and services. For smaller companies in the mobile industry, particularly those based in developing economies, sustainability is generally less embedded. In these economies,

companies tend to report on the more 'traditional' sustainability impacts, such as environmental management and community investment, as there is typically less guidance from regulatory bodies. However, with policy-makers, regulators and investors around the world becoming increasingly focused on the issue of sustainability risk, broader sustainability reporting is likely to gather momentum. This is particularly true since the launch of the SDGs and the launch of guidance for exchanges from the World Federation of Stock Exchanges, as well as in light of the climate change negotiations in Paris.

The mobile industry has demonstrated its commitment to incorporating sustainable operating principles into strategies, policies and procedures, and establishing a culture of integrity across their footprint. This is illustrated by the number of operators subscribing to the Global Compact ten principles. Mobile operators belonging to groups with more than 4 billion subscribers globally have signed up so far, indicating their commitment in establishing these practices as part of their core value system, some of whom have been members for up to 15 years. Examples of mobile operators who currently subscribe to the Global Compact can be found in Figure 1.

In addition, mobile network operators have been committed to measuring sustainability performance through their participation in the Dow Jones Sustainability Index, with one operator already included in the top 25 companies globally out for the 2,500 companies participating.

FIGURE 1
Mobile Telecommunications Companies Enrolled in UN Global Compact

Cumulative Companies Enrolled

Year labels (bar annotations)
Telenor
Telefonica S.A.
China Unicom
Safaricom / MTN Nigeria / Dialog Axiata
SK Telecom
Tata Teleservices / MTN Syria / Tigo Paraguay
MTN Uganda / Telefonica Brazil
Telstra / Telefonica Mexico / Telefonica Nicaragua
MTN Group / Vodafone Espana / Orange Tunisie / Etisalat
Telekom Austria / Tigo Guatemala / Ooredoo Maldives / VimpelCom
T-Mobile Czech Republic / Airtel Kenya
Vodafone Turkey / Telekom Romania
America Movil / Vodafone Czech Republic / Comcel S.A.

Bar values: 2000: 1, 2001: 3, 2002: 4, 2003: 4, 2004: 6, 2005: 6, 2006: 13, 2007: 24, 2008: 37, 2009: 40, 2010: 46, 2011: 52, 2012: 61, 2013: 69, 2014: 80, 2015: 88, 2016: 91

Year of Enrolment

OUTLOOK

Mobile network operators have demonstrated commitment to driving sustainable business practices into their core values, and aligning how they operate. However, there is a lack of consistency across the industry and some areas, for instance data privacy, that don't yet have clear and established principles to uphold. The industry has an opportunity to lead on this and other digital economy related standards as they evolve.

In addition, the dual focus of adhering to sustainable business principles, and maximising impact on the SDGs needs bringing together.

05

THE COMMERCIAL MODEL

INTRODUCTION

This report has demonstrated the link between the industry and the SDGs and, in Chapter 4, provided some evidence that the industry is committed to operating sustainable business policies and practices. This chapter adds the final, and necessary element: a sustainable commercial model. Much is expected of the industry in the future, and these expectations require investment, which in turn requires an effective commercial model. The way the commercial model plays out is dependent on many factors, both endogenous and exogenous to the network operators. Nevertheless, the commercial model and management to date, which has required the participation and collaboration of customers, regulators and investors, provides some confidence as we face the future.

GROWTH IN DEMAND

Demand for the mobile industry's products and services has been growing rapidly since the inception of the industry, reaching 4.7 billion unique subscribers over 7.3 billion connections today[1]. Communicating and consuming content and information on the move has become a fundamental part of today's social and economic life. This has driven increases in: reach, in terms of coverage and number of subscribers; functionality, illustrated here in terms of device capabilities and available bandwidth; and total voice and data usage.

FIGURE 1
Growth in Smartphone Penetration, 2010 – 2015

CAGR 2010-2015

■ Developed

■ Developing

	2010	2011	2012	2013	2014	2015
Developed	19%	30%	42%	52%	59%	65%
Developing	5%	8%	13%	22%	32%	40%

27.9% DEVELOPED

51.6% DEVELOPING
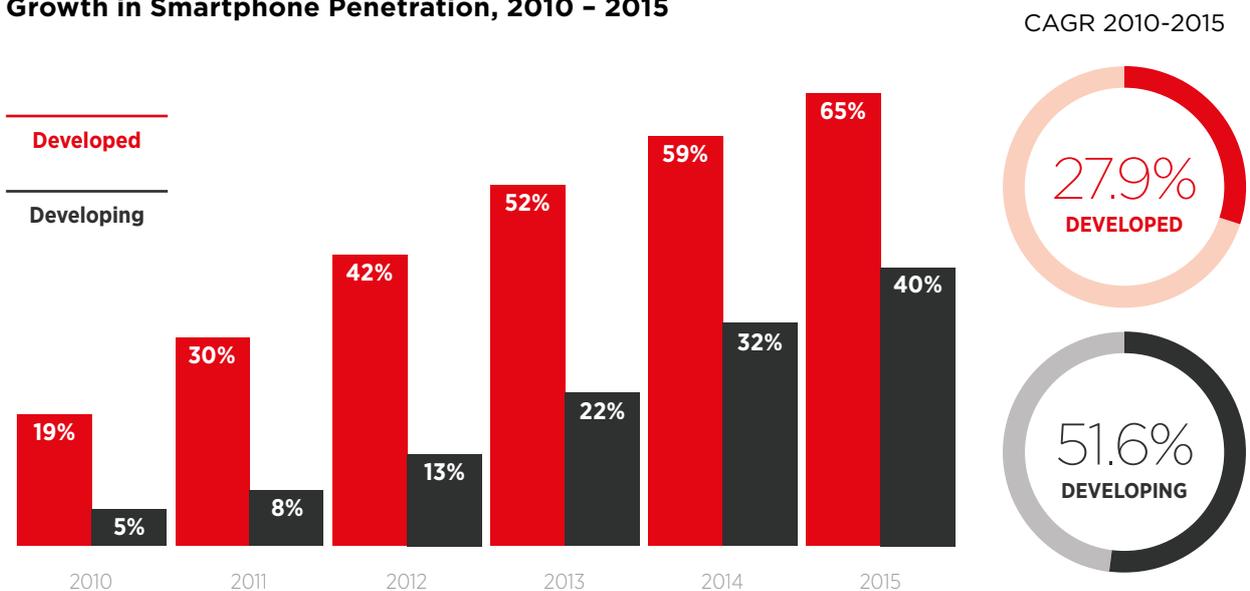
Source: GSMAi

1.   Source: GSMA Intelligence, The Mobile Economy 2016 (https://www.gsmaintelligence.com/research/?file=97928efe09cdba2864cdcf1ad1a2f58c&download)

FIGURE 2
Global trend in data use per Smartphone, 2010 – 2015

MB consumed per smartphone

1281
2015

872
2014

669
2013

498
2012

338
2011

176
2010

CAGR (2010-2015)

49%

Source: Ericsson

INVESTMENT

Operators have had to invest in the capacity and functionality of the networks, operations and service innovation in order to meet the scale and shape of this demand, whilst continuously improving the effectiveness and efficiency of operations. Although ongoing capital investment is part of the business model, each generation of network technologies has required increased investment by operators, resulting in a cycle which is particularly challenging to manage, requiring a longer term view than many industries. The cycles are accentuated where the migration to new standards has required additional spectrum licences. In aggregate, Capital Expenditure (CAPEX) going forward is expected to be relatively stable but at higher than historic levels.

FIGURE 3

Global MNO CAPEX Levels (2005 - 2015)
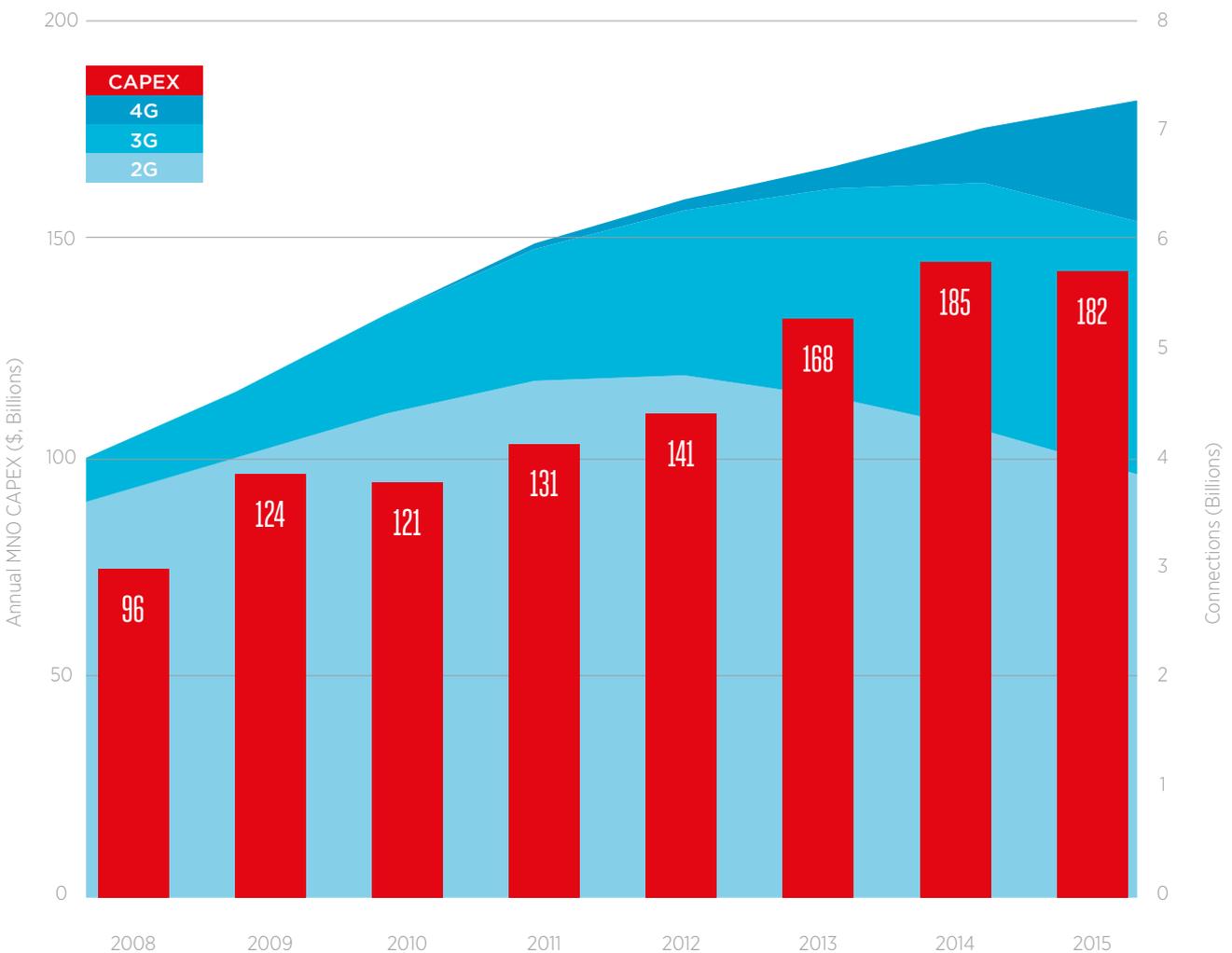
Source: GSMAi

MANAGING THE BOTTOM LINE

Historic performance shows that the industry has managed to balance investment with technical and operational improvements to maintain profitability, thereby delivering the stability increasingly sought by both its customers and the investment community.

Between 2005 and 2015, the industry navigated between two and three investment cycles (depending on region), upgrading from 2G to 3G, HSPA and subsequently to 4G, lowering the cost of 300Mbps to the point where 14Mbps was at the start of the period. By 2015, operators had launched 451 4G networks across 151 countries, with capital investment reaching around $195 billion worldwide in that year[2].

Profitability, measured in Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) levels, has come under pressure in certain regions, with global average EBITDA falling from 36.2% to 33.6% between 2010 and 2015. This can be attributed to factors including competition from over-the-top (OTT) services, a structural shift from high-margin consumer services, and increasing regulatory pressure. Over the last year, EBITDA has shown some signs of stabilisation in five of seven geographic regions, suggesting that operators are successfully adapting to an evolving commercial environment.

FIGURE 4
MNO EBITDA levels, 2010 – 2015, rebased to 2010
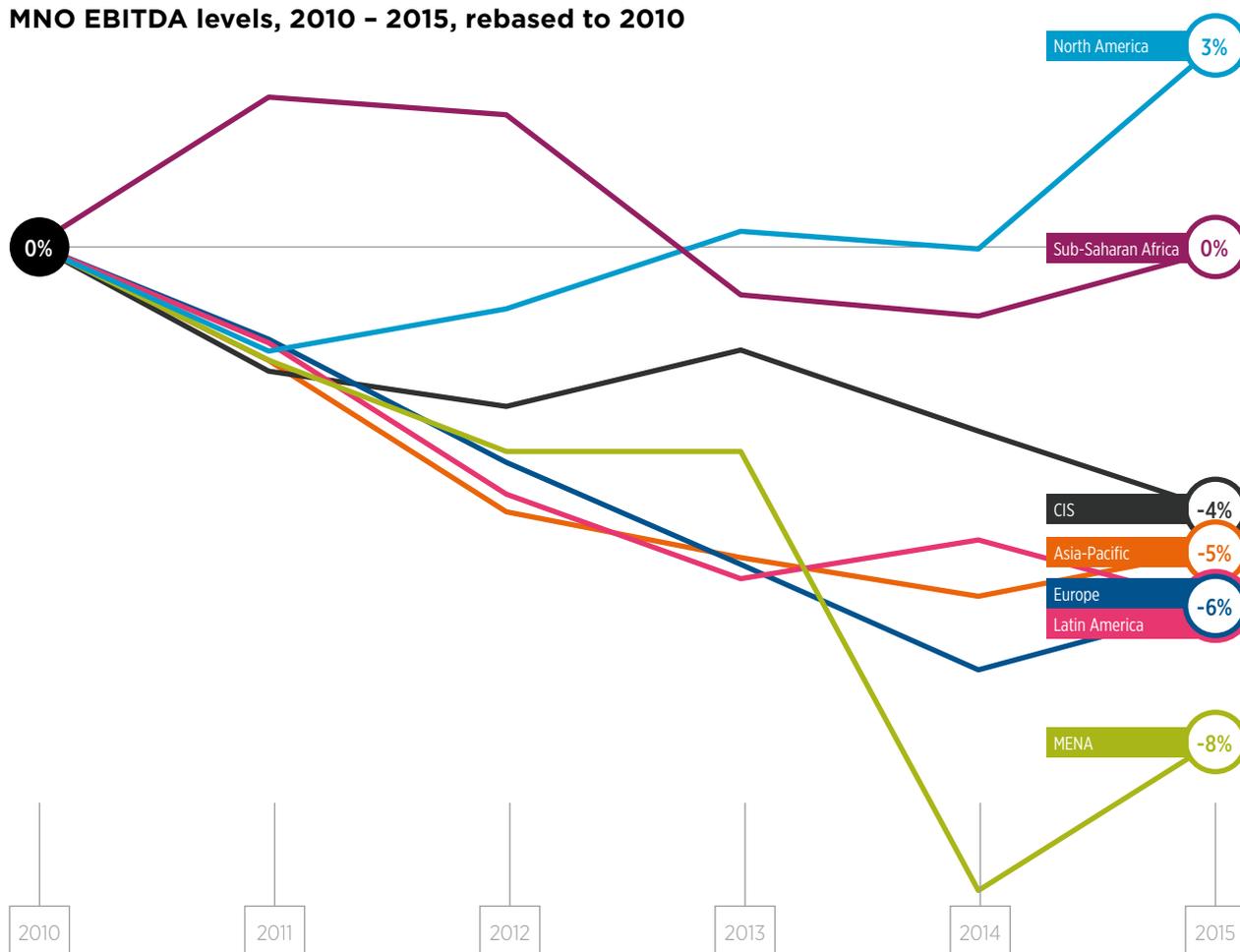
Source: GSMAi, Deloitte Analysis

2. Source: GSMA Intelligence, The Mobile Economy 2016 (https://www.gsmaintelligence.com/research/?file=97928efe09cdba2864cdcf1ad1a2f58c&download)

This level of profitability has been delivered whilst maintaining growth and driving down unit costs for consumers: between 2010 and 2014 the ITU mobile cellular sub-basket (which measures the cost of voice and SMS services) fell by an average of 9% per year in absolute terms, or 14% in %GNI terms[3], across the industry. Over the same period, operators have been driving increasing revenues, largely driven by the increase in connections and subscribers. This trend is expected to continue; GSMA Intelligence projects total global mobile revenues to grow at an average rate of just under 2% through 2020.

FIGURE 5

Global Average ITU Mobile Cellular Sub-Basket Price, 2010 – 2014
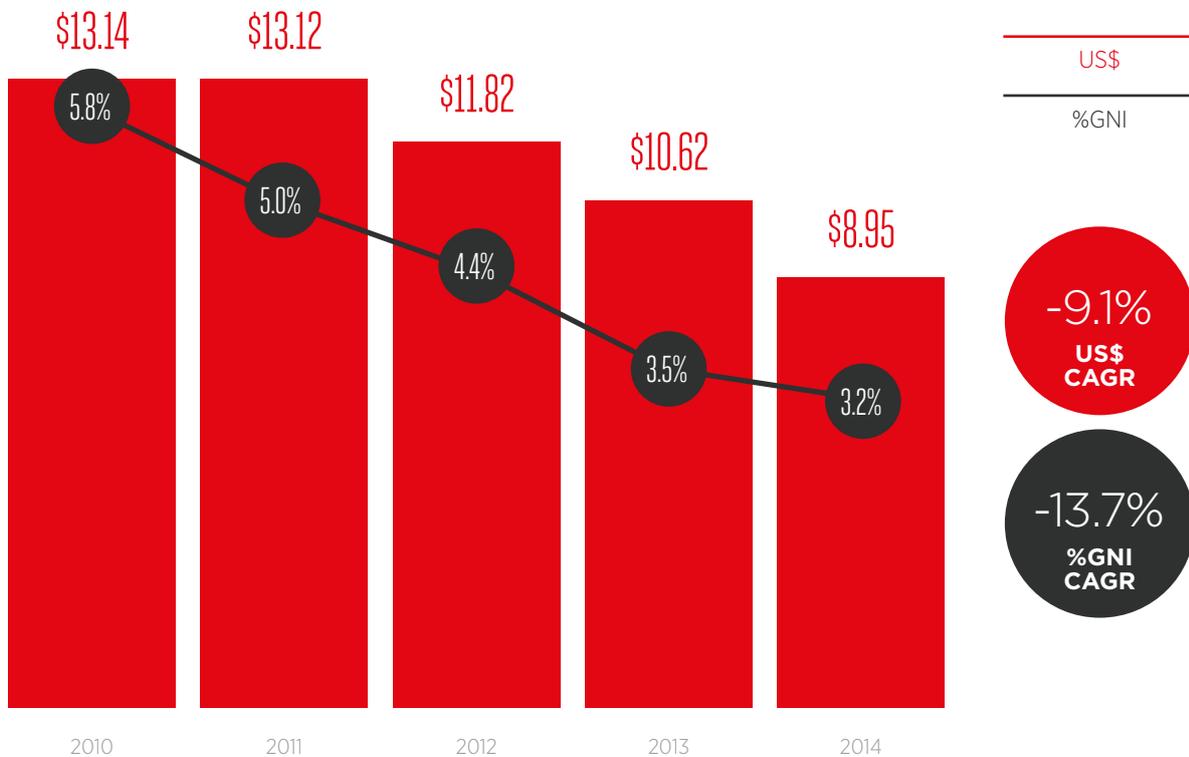
Source: ITU, Deloitte Analysis[4]

This is an aggregate picture. There are inevitably significant departures from this between operators and markets, reflecting the many contributing factors, not least the regulatory and competitive environments. Nevertheless, in aggregate across the globe, the mobile industry has demonstrated that it can manage the investment cycles, grow the market, and provide step changes in functionality whilst maintaining a robust and stable commercial model.

3. Per centage GNI is a per centage of Gross National Income and is a measure of affordability
4. Note: Population weighted average for countries in 150 countries for which data was available, ITU mobile cellular sub-basket based on 30 outgoing calls + 100 SMS messages

OUTLOOK

The future holds significant challenges for operators' network and service products, from a range of businesses, including OTTs, as well as a novel means of providing connectivity, but also holds very significant opportunities as the world seeks to benefit from digitisation and the connectivity that underpins it. IoT creates a massive opportunity for the industry to enhance its contribution to the SDGs, but also represents a very significant investment.

Whilst there are many unknowns, it is clear that continued innovation is needed, which will require significant levels of investment. For this investment to continue to be made, the commercial model needs to be kept in balance which requires ongoing support from regulators, governments, and other stakeholders.

This dialogue should be multi-faceted, covering the impact that the industry can have on the SDGs, its broader responsibilities, as well as its required commercial returns. Coordination and standardisation of the industry's messages globally is critical to achieve optimal results for all stakeholders.

06

OUTLOOK AND COMMITMENTS

OUTLOOK

The impact analysis demonstrates that the core business of the mobile industry impacts all SDGs. The industry is continuing to grow and, as such, it can be expected that the impact made will grow. To accelerate progress against the SDGs, there are three main ways that the mobile industry can drive impact in line with its purpose:

CONNECTING EVERYONE AND EVERYTHING TO A BETTER FUTURE

Industry Purpose　　　　　**SDG Impact Accelerator**

INCLUSION
Connecting
Everyone

Scaling networks and access: expanding the global mobile network footprint and connecting subscribers to voice and data services.

INNOVATION
Connecting
Everything

Innovation: creating new ways to enhance the quality of connectivity and ease of access; and innovating mobile-enabled platform services to meet sustainable development needs (e.g. mobile identity and M2M).

INFLUENCE
A Better
Future

Policy and partnerships: contributing to sustainable development policy alongside governments and agencies both, as an industry and together with other partners.

The sustainability of the commercial model needs to be protected as these accelerators are deployed. This will require ongoing management, particularly given the need to reach remote communities, to invest in the capability of networks whilst maintaining or enhancing affordability for consumers. Working with stakeholders, such as regulators and governments, will be critical to ensure that the industry can maintain sustainability whilst further contributing to the SDGs.

The mobile industry also needs to demonstrate strong commitment to responsible business that provides the necessary authority and authenticity, that is required as the industry becomes more associated with its SDG impact.

The potential of the industry to increase its impact is immense. As demonstrated in the report, increasing performance against the prioritised targets alone has the potential to almost triple the industry's SDG impact scores overall, let alone the additional contribution the industry could make by helping to shape policy around connectivity.

While the industry overall can achieve this by scaling networks, innovation and contributing to policy, the specific forward looking opportunities differ by development stage, by region and by SDG. In developed countries, the largest opportunities are in supporting the proliferation of IoT and M2M connectivity and in shaping policy that increases the reach of connectivity. In developing countries, extending coverage of existing technologies, especially mobile broadband, and working with governments and other stakeholders on affordability, can unlock the enormous potential of inclusion in the digital economy. Further detail on opportunity by SDG, and by region, can be found in Chapter 2 and Chapter 3, respectively.

This ambition to accelerate progress also highlights some challenges that require collaboration, both within the industry, and with its broader stakeholders:

• Achieving continued growth will be more difficult and require more investment. The unconnected are likely to be harder to reach and less able to afford connectivity than those already connected, and this comes as growth in data places additional demands on the existing networks. Access and affordability are the critical customer-side constraints and will require technical and commercial innovation, together with policy changes to address sustainably.

• The current rate of change, particularly given the constraints noted above, may not be sufficient in the light of the radical and transformational demands of the SDGs. The industry needs to challenge itself and its eco-system to accelerate change in the most important areas.

• The impact analysis, not surprisingly, shows that impact is unevenly distributed across geographies and, to the extent to which there is data, within geographies. Inclusiveness is a critical principle underlying almost all of the SDGs. The industry needs to engage with broader stakeholders to promote inclusiveness and eliminate the digital divide.

• The reach and utility of the mobile network provides the industry with greater influence than it currently exerts. The number of targets excluded from the impact analysis should be scrutinised, and the industry can come together to influence some of those policy, or state interventions, that the SDGs require. The digital economy needs steering to avoid the negative outcomes of concentration and inequality, and the industry has a strong role to play here, together with governments and other governing bodies.

Addressing these challenges will accelerate the impact on the SDGs, and through that, their achievement. Many of the challenges listed above are being addressed by individual operators; the key, overarching challenge is, being able to work together as an industry and together with the right partners, including the UN, to harness the potential.

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CONNECTING EVERYONE AND EVERYTHING TO A BETTER FUTURE

COMMITMENTS

At Mobile World Congress 2016, the mobile industry committed to rally behind all 17 SDGs in line with our purpose: "Connecting Everyone and Everything to a Better Future". To deliver on our commitment, we undertook two foundational pieces of work:

A mobile app that will galvanise the mobile industry around the SDGs by celebrating mobile innovation and sharing global best practice. Produced by the GSMA in collaboration with Project Everyone, this app forms the foundation of a rich citizen engagement strategy to motivate participation and support of the SDGs.

This SDG Impact Report that is the first of its kind to measure the mobile industry's contribution to the SDGs, thereby providing a blueprint for other industries to follow suit and establish a cohesive strategy across their socioeconomic initiatives.

Now, with a deeper understanding of the impact of the mobile industry, we are ready to reinforce our commitment to the SDGs as the industry delivering connectivity by:

- Partnering with the UN Secretary-General's Special Advisor to generate a rolling 'road map' for engagement in the SDGs that identifies the most critical areas for mobile industry action, chronicles new commitments from individual operators, and frames cross-industry initiatives.

- Elevating our focus as an industry on Humanitarian assistance, in parallel with the development of the road map, and in recognition that this particular area requires immediate intervention. This elevated focus has three parts:

  1. The announcement of new signatories increases the total number of MNOs who are committed to the GSMA's Humanitarian Connectivity Charter ('The Charter') community from 73 to 103. Now with its signatory operators present in a total of 76 countries, the Charter provides an umbrella for the mobile industry to leverage technology and expertise to ensure that citizens can prepare and communication in the most difficult of times.

  2. GSMA development of best practice on how mobile money can be used to improve the delivery of humanitarian assistance and provide autonomy and dignity to those affected. For refugees, forcibly displaced and migrant groups, remittances can be a lifeline; mobile technology can enable this, providing choice, convenience and more targeted aid.

  3. In recognition of the importance of mobile technology for refugees, the GSMA has also launched a platform to curate the best examples and provide tools for how our industry, and its partners, can use mobile to best reach these populations to facilitate reconnection and ease integration. Turkcell, for example, reaches over 1.5 million of the 2 million refugees in Turkey, enabling them to reconnect with their families, and has set-up an Arabic-speaking call centre to support its Syrian customers[1].

- Implementing a programme, in cooperation with the UN Global Compact, to advocate sustainability principles and support mobile operators in advancing sustainability reporting linked to the SDGs;

- Becoming a lead advocate of measurement and reporting on the SDGs, and promoting the incorporation of sustainability principles into business strategies and operations;

- Utilising the mobile industry's reach and convening power, to encourage further commitment to the SDGs by mobile operators, other industry sectors, and individual citizens.

1. Turkcell Represents the Telecommunications Community in the World Humanitarian Summit, Meets UN Secretary General. BusinessWire [online]. Available at: http://www.businesswire.com/news/home/20160524005900/en/Turkcell-Represents-Telecommunications-Community-World-Humanitarian-Summit

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APPENDIX A
SDG
PROFILES

1 NO POVERTY

SDG1

NO POVERTY

End poverty in all its forms everywhere.

SDG SUMMARY

PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE		SDG SCORE	KEY
4/7	×	**6.5/10**	×	**62**	=	**23**	Average performance compared to all 17 SDGs

ABOVE EQUAL BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 1 at 23; this is higher than the average across the SDGs. The current impact on SDG 1 is driven by:

- A relatively high proportion of targets identified as those where the industry can make a significant impact (4 out of 7 targets);

- An above average level of importance of the industry's activities in achieving these targets (6.5/10);

- A relatively high performance of the industry against the metrics that contribute to these targets (62/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 1 is 53. There are more than 20 underlying metrics used to develop this score, including broad metrics, measuring mobile penetration, and more specific metrics measuring the development of different mobile financial services, including mobile money and mobile remittances.

INDUSTRY IMPACT OVERVIEW

The mobile industry makes a significant contribution to economic growth, particularly in less developed countries, thereby helping to reduce the levels of poverty which this SDG is seeking to address. This has been highlighted in a number of international studies; for example, the World Bank has found that a 10% increase in mobile penetration is correlated with a 1.35% increase in GDP for developing countries and a 1.19% increase in GDP for developed countries.[1]

The impact of the mobile industry on economic growth is primarily through the development of the knowledge economy and facilitating the exchange of information which drives productivity and innovation. In addition, there are wider social impacts, such as improved health and educational outcomes through increased access to information and related internet or application delivered services. This impact is delivered through those connected, for whom mobile has become an integral part of life, as illustrated by the extent to which people will sacrifice other consumables to sustain phone usage[2]. This highlights mobile's role in shaping and influencing almost all activity: economic and other.

1. Qiang and Rossotto (with Kimura) (2009). "Economic impacts of Broadband" in Information and Communications for Development: Extending reach and increasing Impact (World Bank, Washington DC). (http://siteresources.worldbank.org/EXTIC4D/Resources/IC4D_Broadband_35_50.pdf)

2. May, J and Diga, K. (2015). Progress towards resolving the measurement link between ICT and poverty reduction. (http://download.springer.com/static/pdf/175/chp%253A10.1007%252F978-981-287-381-1_5.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Fchapter%2F10.1007%2F978-981-287-381-1_5&token2=exp=1465914704-acl=%2Fstatic%2Fpdf%2F175%2Fchp%25253A10.1007%25252F978-981-287-381-1_5.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Fchapter%252F10.1007%252F978-981-287-381-1_5*-hmac=1720bdcd51a127b7c55710547a02b674f01e230b4a8331452eb2c55daea0d784)

In terms of the targets that support this SDG, the mobile industry's contribution is focused on a direct link to the outcomes sought in Target 1.1 (reduction in absolute poverty) and Target 1.2 (reduction in relative poverty in all its forms), as well as links to both Target 1.4 (rights to resources) and Target 1.5 (resilience of the poor).

The industry has a lesser impact on Targets 1.3 and 1.b that deal with broader policy questions, and Target 1.a that calls for enhanced international governmental resource allocation.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Reduced Poverty Outcomes			
1.1	By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day.	**37**	**Biggest Impact: Latin America** The mobile industry has the greatest impact on this target in Latin America by providing connectivity to support local businesses and social enterprises. The highest opportunity is in Sub-Saharan Africa where there is a larger share of the population living in extreme poverty.
1.2	By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.	**46**	**Biggest Impact: Latin America** The mobile industry has had the largest impact towards this goal in Latin America given the combination of need, higher levels of connectivity, through infrastructure and provision of more affordable basic mobile services. The largest area of opportunity is in Sub-Saharan Africa due to lower levels of penetration and greater need.
Category 2: Enablers of Poverty Reduction			
1.4	By 2030, ensure all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, access to basic services, ownership and control over property, appropriate new technology and financial services, including microfinance.	**26**	**Biggest Impact: Latin America** The impact in Latin America has been largest because of the higher provision of mobile-enabled services, comparable to many developed countries, driven by relatively high coverage and affordability. The largest opportunities lie in both MENA and Sub-Saharan Africa where socioeconomic and cultural barriers are high.
1.5	By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.	**51**	**Biggest Impact: Latin America** The mobile industry has had the largest impact towards this goal in Latin America. Large opportunities lie within MENA where a lack of mobile-enabled financial services has constrained impact.

TARGET-BY-TARGET IMPACT

Reduced Poverty Outcomes (Targets 1.1 and 1.2)

The industry contributes to Target 1.1 (reduce absolute poverty) in its role as an employer, its role in catalysing local business and social enterprise, and in its role in facilitating remittances:

- **As an employer:** the mobile industry directly employed 3 million people across the world, as well as indirectly supporting 15 million jobs.[3] The proportion of those hired out of extreme poverty is likely to be small, but there are many informal opportunities along the mobile supply chain, e.g. re-selling top-up cards, and re-selling mobile phone usage. In India alone, an estimated 1.9 million people were employed in the informal sector through the retail and distribution of mobile technology;[4]

- **As a catalyst for local business and social enterprise:** connectivity, whether 2G (voice and text) or mobile broadband, reduces transactional friction, driving down the costs of accessing information, as well as creating or expanding markets by enabling the mechanisms for buyers and sellers to discover each other, understand each other, and conduct transactions;[5] and

- **As a facilitator of remittances:** the mobile industry facilitates formal mechanisms for remittance through mobile money services, either as the lead provider or by connecting a third-party. In all cases, the immediacy, security and low cost of these remittances results in higher volumes of remittance which disproportionately benefits the poorer populations that are more reliant on them.

Target 1.2 (reduction in relative poverty in all its forms) can be seen as a super-set of Target 1.1, and, as such, all of the activities listed above also impact Target 1.2. In addition, the industry contributes by addressing other dimensions of poverty through the provision of communications and through access to e-services:

- **As a provider of communications and connectivity:** affordable mobile voice and data services provide the poor with communication, a critical dimension of poverty in itself. Handset prices are falling, assisted by a burgeoning second hand market, and comparatively cheap "last mile" alternatives. This, together with innovative propositions for poorer segments, e.g. micro-prepayment, all contribute to the provision of an increasingly affordable communications solution;

- **As a facilitator of access to e-services:** mobile network operators can, and often do, play a critical role in facilitating access to either private or public e-services; sometimes in close and active cooperation with service providers and sometimes simply as the connectivity provider.

Enablers of Poverty Reduction - Rights and Access to Economic Resources (Target 1.4)

The industry helps achieve Target 1.4 (rights and access) by reducing barriers to participation in the economy and broader society, through the facilitation of access to microfinance services, as a provider of digital identity, and by providing access to new technologies:

- **Facilitating access to financial services:** mobile network operators have facilitated access to mobile money and microfinance to previously unbanked and underbanked people, through bespoke and integrated solutions. They are now increasingly providing core connectivity and security for third party financial services and payment providers;

- **Providing digital identity:** effective e-services in part rely on identification, which can be challenging for poorer populations. Mobile network operators are offering digital identity services, directly unlocking access to e-services of many types including core public service;

3. GSMA (2016). The Mobile Economy Report. (https://www.gsmaintelligence.com/research/?file=97928efe09cdba2864cdcf1ad1a2f58c&download)
4. GSMA (2015). The Mobile Economy: India. (https://www.gsmaintelligence.com/research/?file=4113a57d43a9e93968e7ed00123ba4b2&download)
5. Bhavani, A. (2008). The role of mobile phones in sustainable rural poverty reduction. ICT Policy Division;World Bank. p1-25. (http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/The_Role_of_Mobile_Phones_in_Sustainable_Rural_Poverty_Reduction_June_2008.pdf)

- **Providing access to new technologies:** the roll out of mobile broadband can be seen as a critical technology in itself, addressing one of the dimensions of poverty, but also providing a cost-effective channel for new technologies and services.

Enablers of Poverty Reduction – Resilience of the Poor (Target 1.5)

Finally, the industry helps improve resilience in the face of disaster, natural or otherwise (Target 1.5). This contribution is driven through:

- **The provision of emergency calls:** communications during any form of disaster is critical to its management and to the safety of those involved. The industry plays a significant role by the sustained provision of emergency calls;

- **The provision of emergency infrastructure:** rapid deployment of temporary infrastructure may be required

in disaster situations, and the mobile industry, together with its suppliers, plays a key role in ensuring continuity of service;

- **As a source of critical, location specific data:** mobile network operators can play a critical role in disaster relief by providing access to data on phone usage, either in aggregate, showing how populations are responding to specific situations, or interventions, or at an individual level, e.g. used in tracking missing people;

- **As a provider of mobile financial services, including micro-insurance:** this can build resilience and reduce vulnerability to environmental and economic shocks. Operators help provide access to these services (e.g. micro-insurance), both through integrated platforms and by providing the required connectivity to facilitate third-party offerings. By June 2015, more than 31 million policies had been issued through mobile insurance.[6]

IMPACT STORY: ECO CASH – ZIMBABWE

Despite once being a major player in the Southern African economy, Zimbabwe has struggled with hyperinflation, currency collapse and high unemployment. The collapse of the Zimbabwean currency caused inflation to rise by 231,000,000% which led to the adoption of the US dollar in 2009, in an attempt to stabilise inflation. However, this in itself generated what is known as the "change problem" where the high cost of importing U.S coins led to a shortage of change, resulting in goods that used to cost 99 cents or less costing a dollar. In a nation where the average person still lives on less than two dollars a day, the requirement to buy non-essential items to bring their total purchase to a dollar is a significant burden.

EcoCash, provided by Zimbabwe's largest telecommunications operator, aims to solve the change problem by replacing cash in the retail environment. The four million plus customers can transfer money to and from any other existing accounts in the EcoCash

network. There is no sign up or minimum balance, nor is there a monthly service charge, but instead EcoCash charges users on a pay-as-you-go basis every time a transaction is carried out over one dollar. Transactions are initiated on the customer's phone, which then communicates with a merchant's point-of-sale terminal via the EcoCash network to print a receipt and therefore, process the purchase. Thus far, EcoCash has distributed more than 10,000 point-of-sale terminals to large merchants, which are Unstructured Supplementary Service Data (USSD) and SMS enabled, meaning that users can transact using minimal data.

The impact of EcoCash has been extensive and has become a fundamental part of the Zimbabwean economy helping to alleviate poverty through financial inclusion. It is estimated that the $200 million in monthly EcoCash transaction volumes, in annual terms, represents an amount equivalent to 22% of Zimbabwe's GDP.

Source information available here.
To see more impact stories that contribute to each of the Sustainable Development Goals, visit
www.gsma.com/betterfuture

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6.   GSMA (2015) – Mobile Insurance, Savings and Credit Report (http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/05/Mobile-Insurance-Savings-Credit-Report-2015.pdf)

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted by the industry's role as a provider of connectivity and platforms:

- **Connectivity:** establishing basic communications facilitates the information flows essential to the functioning of markets that underpin wealth creation. Base level connections have given way to data and now to fast broadband, further stimulating the market participants and creating the wealth that underpins this SDG. As our economies become more digitised, mobile connectivity becomes the medium for more and more of our economic activity, and our innovation as both customers and suppliers. This impact is felt in different ways across all the high impact Targets 1.1, 1.2, 1.4 and 1.5;

- **Platforms:** 3rd parties are using mobile connectivity to provide e-services across all sectors. At times, these services, or the platforms that create the environments for them, are developed by the operators which catalyse market growth. The platforms, developed by the operators have a significant impact on this SDG, not only cover financial services (mobile money and micro-insurance) but also broader platforms providing content. This impact is also felt across the four high priority targets.

This SDG is also impacted by the way the MNOs operate, e.g. their employment volumes and policies, which scores lower, given the scale of the industry as an employer, but still makes a material contribution both in itself and as a signal to other industries.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is primarily direct and indirect.

- **Direct impact:** including through employment (Targets 1.1 and 1.2), remittances (Target 1.2), and mobile calls and infrastructure in crisis situations (Target 1.4);

- **Indirect impact:** including the stimulation of local business (Target 1.1), identity management (Target 1.4), and the provision of location data in emergency situations (Target 1.5).

Fewer targets are impacted systemically by mobile activities, i.e.; these include the enhancement of competitiveness (Target 1.2).

GEOGRAPHIC IMPACT

The level of impact of the mobile industry varies significantly across regions, with SDG 1 having the second largest difference between highest and lowest impact. Further geographic analysis highlights:

- In North America, the impact is lower given the lower levels of need

- Interestingly, the impact of the industry on Europe is relatively high, driven through a combination of the significant contribution, given that it employs a higher share of the population, the higher levels of penetration, and comparatively higher need, as the

region includes countries at varying levels of development

- The largest impact overall is in Latin America, through the impact on Targets 1.1, 1.2 and 1.5. The region combines both higher need, due to the proportion of the population living in relative poverty, and high presence of the key drivers of industry impact: high network coverage able to reach a significant proportion of the population in developing areas; and high degree of affordability increasing inclusion and the accessibility of communications services.

FIGURE 1
AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
41	47	39	50	39	14	38
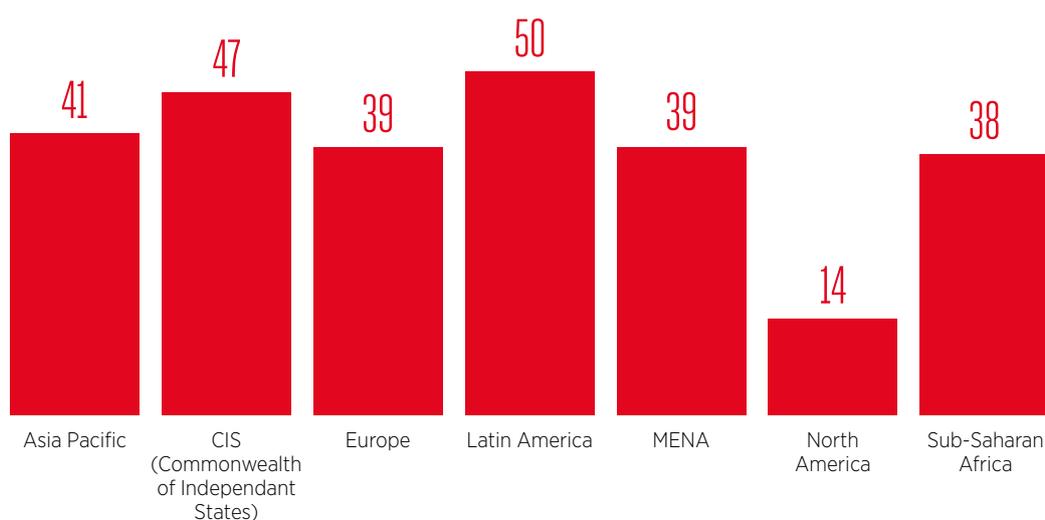
LOOKING FORWARD

The industry will continue to facilitate the economic empowerment of the economically marginalised, through network expansion and the improvement of affordability of services. The magnitude of the impact made by connectivity is correlated to the level of poverty: as wealth increases the incremental benefit of improved connectivity reduces. To sustain impact, the industry needs to continue to invest in programmes such as mobile money, and innovate to increase connectivity and access to information and platforms. As it does so, appropriate strategies, management and controls need to be in place to ensure that this continues to align with the targets set out by the SDG, with emphasis on supporting the poorest population to access mobile and mobile-enabled services.

2 ZERO HUNGER

The mobile industry aims to advance the productivity and profitability of smallholder farmers and the agriculture industry at large through scalable and commercial mobile services.

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SUPPORT THE DEVELOPMENT OF
IoT/M2M SOLUTIONS
TO IMPROVE AGRICULTURAL PRODUCTIVITY
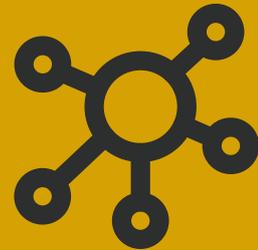
EXPAND MOBILE BROADBAND TO REMOTE AND UNDERSERVED AREAS TO ENABLE ACCESS TO ONLINE MARKETPLACES AND M-AGRICULTURE PLATFORM SERVICES

MOBILE AGRICULTURAL SERVICES

22m USERS

ACROSS 185 SERVICES

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2 ZERO HUNGER

SDG2

ZERO HUNGER

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

SDG SUMMARY

PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE		SDG SCORE	KEY
4/8	×	**6.6/10**	×	**36**	=	**12**	Average performance compared to all 17 SDGs

ABOVE   EQUAL   BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 2 at 12; this is equivalent to the average across the SDGs. The current impact on SDG 2 is driven by:

- An average proportion of targets identified as those where the industry can make a significant impact (4 out of 8 targets);

- An above average level of importance of the industry's activities in achieving these targets (6.6/10);

- A relatively low performance of the industry against the metrics that contribute to these targets (36/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 2 is 34. There are 10 underlying metrics used to develop this score across the 4 Targets, including specific measures of the availability of mobile health, mobile agriculture and mobile money services, as well as broader measures of infrastructure and quality of services.

INDUSTRY IMPACT OVERVIEW

The mobile industry contributes to SDG 2 through its impact on sustainable agriculture, as a provider of access to information and technology, and also by providing access to education about nutrition. The agriculture sector is the single largest employer in the world and the largest source of income and jobs for poor rural households, underscoring the importance of agricultural productivity and markets to the broader SDG 2 goal of zero hunger. In 2015, 795 million (or 1 in 9) people globally were undernourished, with significant inter-dependency on the 500 million small farms worldwide; most of which are still dependent on rainfall, and which provide over 80% of food consumed in a large part of the developing world.[1]

Considerable improvements can be made to agriculture through technological innovation; for example, the upskilling of developing market agricultural communities and increasing the efficiency of agricultural markets. The mobile industry can contribute to each of these areas through its provision of connectivity, and through direct support of mobile provided education and IoT platforms. The mobile industry further supports the development of agriculture through its role as a provider of financial services platforms, and as a provider of emergency broadcasting via mobile networks.

The industry impact falls primarily on four of the eight targets that underpin SDG 2. The impact is concentrated on combatting

---

1.   United Nations. (e). Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture. (http://www.un.org/sustainabledevelopment/wp-content/uploads/2016/08/2_Why-it-Matters_ZeroHunger_2p.pdf)

malnutrition (Target 2.2); improving productivity of small-scale producers (Target 2.3); supporting sustainable production systems (Target 2.4); and facilitating transparent and efficient markets (Target 2.c). The remaining four targets are less impacted by the mobile industry due to the breadth of the target, such as ending hunger, or the governmental or the institution-led role required to impact the target, such as increased international cooperation.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Ending Hunger Outcomes			
2.2	By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.	**3**	**Biggest Impact: Sub-Saharan Africa** Children in Asia-Pacific and Sub-Saharan Africa suffer from similar rates of stunting and malnutrition[2], however, the deployment of mobile health services targeted at children is more developed in Sub-Saharan Africa. Asia-Pacific could adopt a similar model to deliver significant impact.
Category 2: Agricultural Productivity and Sustainability			
2.3	By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.	**27**	**Biggest Impact: Sub-Saharan Africa** The highest impact is delivered in Sub-Saharan Africa, as a result of a developing mobile market, which enables small scale farmers to access information, financial services and commodity markets. However, while a number of mobile agriculture applications have been successfully launched in developing countries, they are not yet sufficiently ubiquitous to significantly impact regional scores.
2.4	By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality.	**38**	**Biggest Impact: Asia-Pacific** The biggest impact is in Asia-Pacific where resilience is primarily achieved through education on best practice, delivered through general connectivity as well as targeted mobile agriculture applications.
Category 3: Fair and Well-Functioning Markets			
2.c	Adopt measures to ensure the proper functioning of food commodity markets, and their derivatives, and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.	**28**	**Biggest Impact: Sub-Saharan Africa** The biggest impact is in Sub-Saharan Africa, based on the need. However, the region also presents the biggest opportunity as internet use by businesses is still limited, followed by Asia-Pacific and MENA respectively.

2.   JME Dataset 2015, % Children Under 5 Underweight or Stunted

TARGET-BY-TARGET IMPACT

Outcome Focused Targets to End Hunger and Malnutrition (Target 2.2)

The industry contributes to Target 2.2 (ending malnutrition) by providing connectivity that enables access to mobile health programmes to improve health monitoring and nutritional education:

- Lack of information is a key barrier to good nutrition. Mobile health offers an effective method of providing the most relevant information to the appropriate group. Moreover, mobile health has emerged as a viable solution to addressing healthcare needs through its high reach and low cost solutions. Mobile technology is perceived to be an enabler of change in the healthcare sector by ensuring the right information reaches the right person on time.[3]

- Mobile health creates a channel to deliver educational content on improved nutritional practices, such as balanced diets, and the improved use of locally available foods, to ensure increased intake of important nutrients, effective breastfeeding of infants, and safe and appropriate feeding of infants and young children. The mobile health Tanzania Public Private Partnership, led by the Centres for Disease Control and Prevention Foundation and the Ministry of Health and Social Welfare, successfully secured partnerships with all four leading mobile operators in Tanzania (Airtel, Tigo, Vodafone and Zantel) to offer zero-rating of the service and so stimulate take up of service.[4]

FIGURE 1

MOBILE AGRICULTURE SERVICES AND USERS IN KEY REGIONS

GSMA mAgri Tracker, June 2016

Region	Number of Mobile Agriculture Services 2016	Number of Reported Users (Millions)
Asia-Pacific	58	7.69
Latin America	17	0.03
MENA	8	0.91
Sub-Saharan Africa	99	13.41

Number of Reported Users (Millions)

Number of Mobile Agriculture Services 2016
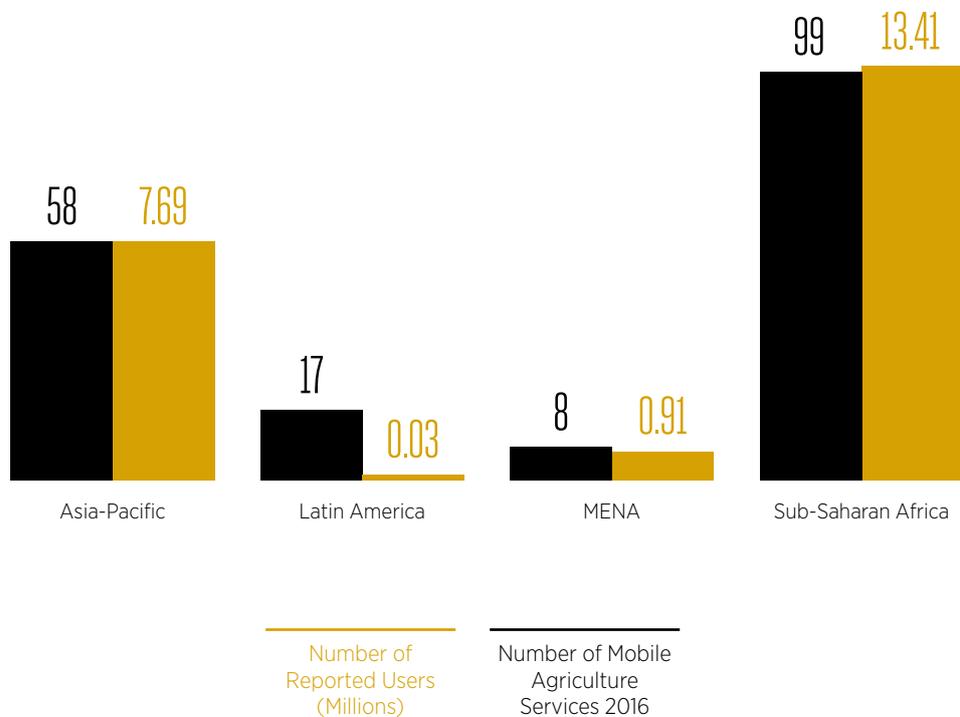
3.   GSMA. (2012). Cell broadcast emergency alerts. (http://gsma.com/mobilefordevelopment/wp-content/uploads/2013/01/One2Many-Cell-Broadcast-Emergency-Alerts.pdf)
4.   GSMA. (2015). Mobile for development mHealth. (http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/04/M4D-mHealth-improved-nutrition_R1_web.pdf)

Enablers – Agricultural Productivity and Sustainability (Target 2.3 and 2.4)

The industry contributes to Target 2.3 (productivity of small-scale producers) by enabling agricultural information and education, especially to isolated communities, providing access to financial services, particularly through mobile money, and connecting communities to agricultural marketplaces through mobile in the following ways:

- Mobile agriculture apps can help farmers and small producers to increase productivity by advising them about weather conditions, pest outbreaks and new farming techniques. Mobile agriculture apps also provide users with access to information on agricultural production, marketing, technology, food security and nutrition.[5]

- Mobile financial services, such as mobile money, can help small producers to increase the productivity of crops by allowing them to purchase equipment, agricultural inputs, or upgrade to more productive practices, which can be difficult for small producers in remote locations that do not have access to financial services through traditional channels. Mobile money providers are beginning to recognise the large untapped segment that farmers and the agricultural industry represent. MNOs, operating in countries where the agriculture sector is dominated by a few large value chains, such as cocoa, are looking to expand their mobile money service by replacing inefficient cash payments for farmers.

- A barrier to agricultural productivity is a lack of market information about locations with demand, supply and pricing. Typically, rural farmers incur significant wastage by taking produce to a market with over supply, or incurring losses by realising low prices. The rural poor are often constrained by information asymmetries, compounded by a lack of business knowledge. This, compounded with their limited exposure to business and associated skills, such as negotiation, inhibits productive agricultural practices. Mobile technology can alleviate these problems by enhancing communication and education. Example initiatives include, setting up mobile marketplaces connecting buyers and sellers, and providing up-to-date information on market dynamics.[6]

The industry contributes to Target 2.4 (sustainable production systems) by improving the resilience of farming communities in the face of climate change and extreme weather, and supporting the development of IoT solutions to inform better farming systems and decisions:

- Providing emergency broadcast systems for extreme weather can help farming communities prepare for, and mitigate, the damage caused by extreme weather events, which can significantly disrupt food production systems. The importance of mobile technology is reflected in agricultural producers' increased emphasis on proactive surveillance of pest and disease incidence and collaborative early warning systems.[7]

- In terms of sustainability of production, IoT and sensor technology can contribute significantly to improved harvesting output. For crop farming, these advancements impact the preparation of soil and the timing of planting and harvesting, while for livestock, monitoring the conditions of animals to provide appropriate intervention at the right time.[8] Moreover, these systems generate higher harvest yields while reducing the use of resources, such as seeds, water, fertilisers and energy. The mobile industry is critical in developing the IoT infrastructure to facilitate these improvements, particularly Low Power Wide Area technology that can support geographically dispersed sensors covering large land masses.

Enablers – Fair and Well-Functioning Markets (Target 2.c)

The industry contributes to Target 2.c (transparent and efficient markets) by enabling digital agricultural marketplaces, connecting suppliers to customers, both online and via voice services, in less developed or smaller, remote agricultural markets:

- Lack of timely and reliable information on food commodity demand and supply, can result in ill-functioning markets characterised by high price volatility. By connecting agricultural communities to digital marketplaces, timely information on crop yields can be reflected in agricultural commodity markets and food reserve information; this can have a particularly significant impact in immature agricultural markets.

5. World Bank. Mobile Applications for Agriculture and Rural Development (http://siteresources.worldbank.org/INFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/MobileApplications_for_ARD. pdf) ** Note that user data is not available for every service, hence values for number of users only accounts for services for which this information is captured. Number of users data has not been independently verified

6. Devex Impact. (2015). The state of mobile payments in agriculture.(https://www.devex.com/news/the-state-of-mobile-payments-in-agriculture-86621)

7. IICA / CATIE (2006). Managing Hazards, Reducing Risks and Increasing Investments in Agriculture. Port of Spain: Orton IICA / CATIE.(http://orton.catie.ac.cr/repdoc/A9909i/A9909i.pdf)

8. Computer Weekly. (2015). IoT could be key to farming, says Beecham Research. (http://www.computerweekly.com/news/2240239484/IoT-could-be-key-to-farming-says-Beecham-Research)

IMPACT STORY: DELIVERING IOT BASED FARM MANAGEMENT SYSTEM IN SOUTH KOREA – SK TELECOM

SK Telecom and the Sejong Metropolitan Autonomous City in Korea have developed a smart farming town based in Sejong city, to set a benchmark for productive and profitable farming.

The smart farming solution operates using 50 IoT-based security monitoring systems, built by SK Telecom, that are installed in areas around the smart greenhouses. This monitoring and control system allows farmers to remotely control devices within a grow room environment, via a smartphone application. The application provides farmers with an easy way to automate irrigation operations and environmental conditions, such as temperature and humidity, in a greenhouse. This has allowed farmers to manage their operations away from their farms, and significantly reduced the time and effort required to measure and optimise the conditions in their greenhouses.

In addition, SK Telecom and Sejong city are developing a smart farm composed of several large greenhouses, where farmers can generate stable earnings through a 'Smart Local Food System'. This system enables farmers to monitor and control the quantity of their thereby avoiding surplus and waste. This feedback between the demand of the market and farmers planning their harvests is a significant step forward in the productivity of small-scale farming.

The smart town is also set to be powered by solar facilities. SK Telecom and Sejong city are planning to jointly develop a 300KW solar plant in Yeondong-myeon. The electricity produced will power homes and farms in the smart town, and the surplus will be sold to power exchange stations. Profit from the sale of the extra electricity is expected to reach 70 million won ($ 64,000), which will be spent on maintenance for the smart town.

Source: http://koreabizwire.com/smart-farms-and-solar-plants-sk-to-build-ict-based-smart-town-in-sejong/29846
To see more impact stories that contribute to each of the Sustainable Development Goals, visit
www.gsma.com/betterfuture

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. The most notable impacts of the mobile industry on this SDG are delivered through connectivity and platforms:

Connectivity: Increasing penetration facilitates access to information on health by reducing barriers such as transport and cost. This impact is felt in different ways across Targets 2.2 and 2.c.

Platforms: Mobile agriculture and microfinance apps provide the rural poor with the tools needed to increase productivity. This impact is felt in different ways across Targets 2.3 and 2.4.

The future impact of platform solutions is likely to be significant, particularly with respect to developing effective infrastructure for Low Power Wide Area agricultural monitoring devices to enable a more data-driven approach to farming.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is primarily indirect, and to a lesser extent, systemic as increased information improves market transparency.

GEOGRAPHIC IMPACT

The level of impact of the mobile industry varies significantly across all regions, with SDG 2 having the largest difference between highest and lowest levels. While the largest impact is currently found in developed countries (driven by the proliferation on IoT solutions that can contribute significantly to improved agricultural harvesting output), the largest opportunity clearly lies with those in the midst of development. Further geographic analysis highlights:

- Mobile agriculture services, in particular, have been deployed successfully in a number of developing countries (e.g. Kenya) however, their impact could be significantly greater if availability and penetration of mobile money are extended.

- Asia Pacific and Sub-Saharan Africa have the lowest level of impact due to having low penetration of mobile services, indicating limited access to information (such as weather forecasts and market prices) that can increase agricultural productivity and alternate marketplaces

that can increase the distribution of benefit from agriculture.

- In Latin American, there is a high degree of need compared to other developed economies due to the proportion of the population that are considered undernourished. At the same time, the mobile industry has higher levels of impact due to comparatively high investment in technology and communications infrastructure and agriculture-related mobile services, with high penetration in farming communities (e.g. weather, best practices and advice, farmer networks etc.) increasing agricultural productivity.

- In CIS, there is significantly higher need than developed countries due to lower life expectancy and high proportion of employment in agriculture. The level of impact is above the global average, due to moderate network coverage and business uptake of internet, enabling access to information to increase agricultural productivity.

FIGURE 2

AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
28	11	5	17	18	2	41
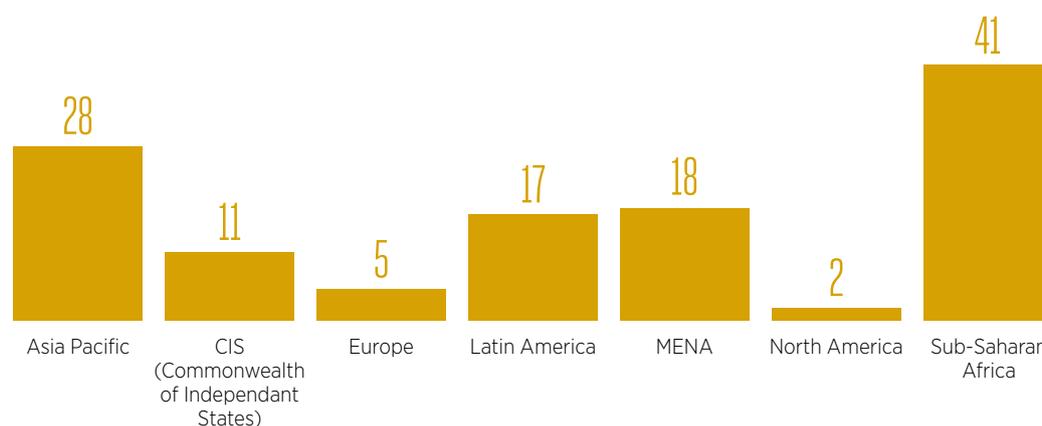
LOOKING FORWARD

The industry could further drive its impact on SDG 2 by investing in technological upgrades, by enabling a standardised approach to sensor technology, as well as by facilitating access to new marketplaces for producers. As an example, crop monitoring sensors could drive productivity through data-driven planting, harvesting and crop protection.

This will impact less mature producers, particularly small-scale and more remote producers, as well as those in more developed markets. Increasing basic mobile connectivity in unconnected communities will promote access to online marketplaces, and platforms, and continue to drive development for the medium term.

3 GOOD HEALTH AND WELL-BEING

Our goal is to extend access to advanced and innovative healthcare with mobile-enabled solutions. Mobile connectivity can increase the quality, reduce the cost and extend the reach of healthcare.

#betterfuture

7 OUT OF 13

SDG3 TARGETS IMPACTED BY THE MOBILE INDUSTRY
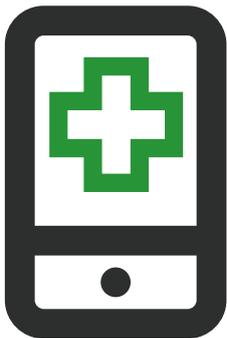
1,086 MOBILE HEALTH APPLICATIONS AVAILABLE GLOBALLY

224 mHEALTH SERVICES TARGETED TOWARDS CHILDREN

#betterfuture
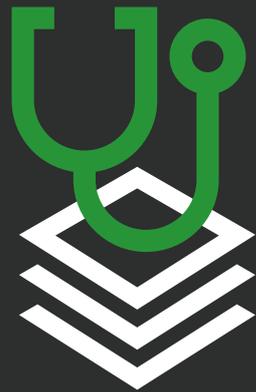
EXPAND MOBILE BROADBAND TO REMOTE AND UNDERSERVED AREAS TO ENABLE ACCESS TO **FACILITATE ACCESS TO HEALTH PLATFORM SERVICES**

SCALE NETWORKS TO FACILITATE ACCESS FOR REMOTE AND UNDERSERVED COMMUNITIES TO **EMERGENCY COMMUNICATION**

3 GOOD HEALTH AND WELL-BEING

SDG3

GOOD HEALTH AND WELLBEING

Ensure healthy lives and promote well-being for all

SDG SUMMARY

PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE		SDG SCORE	KEY
7/13	×	**5.3/10**	×	**38**	=	**11**	Average performance compared to all 17 SDGs

KEY: ABOVE EQUAL BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 3 at 11; this is equivalent to the average across the SDGs. The current impact on SDG 3 is driven by:

- An average proportion of targets identified as those where the industry can make a significant impact (7 out of 13 targets);

- A below average level of importance of the industry's activities in achieving these targets (5.3/10);

- A relatively low performance of the industry against the metrics that contribute to these targets (38/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 3 is 28. There are more than 15 underlying metrics used to develop this score, including broad metrics measuring mobile infrastructure and more specific metrics measuring the development of different services including mobile health.

INDUSTRY IMPACT OVERVIEW

The industry contributes to SDG 3 through its role as a provider of connectivity: enabling access to formal and informal medical advice via mobile and SMS, as well as emergency broadcast systems during health emergencies. In addition, the mobile industry has enabled a variety of mobile health and money services, helping remove some of the physical barriers to healthcare for the underserved while facilitating easier payment methods. Operationally, mobile network operators are working to reduce negative health outcomes across the value chain, particularly through the responsible management of hazardous chemical and waste.

The mobile industry contributes to seven of the thirteen targets associated with this SDG. The seven cover each of the four categories of target: reducing maternal and early childhood mortality; reducing preventable deaths; access to healthcare; and supporting policy and infrastructure. The industry has limited impact on the remaining targets due to their broad nature as well as the primarily scientific, governmental and institutional roles required.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Reducing Maternal and Early Childhood Mortality			
3.1	By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births.	**6**	**Biggest Impact: Sub-Saharan Africa** The mobile industry has had the largest contribution on this target in Sub-Saharan Africa where incremental improvements in the provision of healthcare services have a marginally higher impact compared to other regions. Such is the need for healthcare services; the highest opportunity is likely to remain in this region.
3.2	By 2030, end preventable deaths of new-borns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births.	**11**	**Biggest Impact: Sub-Saharan Africa** The mobile industry has had the largest impact on this target in Sub-Saharan Africa where mobile health services dedicated to neonatal mortality have had significant uptake.
Category 2: Reducing Preventable Deaths			
3.4	By 2030, reduce by one third premature mortality from non communicable diseases through prevention and treatment and promote mental health and well-being.	**24**	**Biggest Impact: Sub-Saharan Africa** The industry has had the largest impact on this target in Sub-Saharan Africa, where the greatest population in need lies. The highest opportunity is likely to remain in this region.
3.6	By 2020, halve the number of global deaths and injuries from road traffic accidents.	**5**	**Biggest Impact: North America** The industry has had the biggest impact on this target in North America, through M2M connectivity combined with a proportionately higher density of road vehicles.
3.9	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	**35**	**Biggest Impact: North America** The industry has the highest impact in North America where implementation of M2M solutions to improve monitoring and decision-making has been significant guided by increased regulation.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 3: Access to Healthcare			
3.7	By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and 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	**27**	Biggest Impact: North America The biggest impact has been in North America where the penetration, and thus provision of, information on sustainability in relatively high. Sub-Saharan Africa has the highest need for action and so presents the greatest opportunity for the mobile industry to make an impact.
Category 4: Supporting Policy and Infrastructure			
3.d	Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.	**34**	Biggest Impact: Europe The industry has had the greatest impact in Europe through developing quality infrastructure. The biggest opportunity lies in Sub-Saharan Africa where the provision and quality of network infrastructure is low.

TARGET-BY-TARGET IMPACT

Reducing Maternal and Early Childhood Mortality (Target 3.1 and 3.2)

The industry contributes to Target 3.1 (reducing maternal mortality) by providing connectivity to enable communication with medical practitioners, access to mobile health programmes and improved payment methods through mobile money:

- Access to basic voice and SMS services can enable pregnant women and new mothers to communicate with medical practitioners, which can be critical in remote, isolated and underserved communities. In some cases, mobile provides an efficient means to access tertiary care advice, particularly in underserved areas. This facilitates those in need to seek treatment earlier and better adhere to their prescribed treatments[1]. Etisalat's "Mobile Baby" services enables midwives to register pregnant women's ultrasounds, pregnancy status, and danger signs via an online application that enables doctors to monitor progress remotely. The program also enables continuous communication with a doctor on-call during in-home labour, specifically on the status of delivery, symptoms and any complications.[2]

- Access to mobile health programmes that provide education and monitoring during pregnancy can support healthy pregnancy and early intervention when there is a medical issue. For example, Zero Mothers Die is a global partnership to reduce maternal mortality by putting mobile technology in the hands of women to ensure a healthy pregnancy and childbirth.[3]

1.   World Health Organisation. (2009). Telemedicine: Opportunities and developments in Member States. Global Observatory for eHealth series. (http://www.who.int/goe/publications/goe_telemedicine_2010.pdf)
2.   GSMA (2012). Etisalat Mobile Baby. (http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/08/6-Etisalat-Mobile-Baby-WG-presentation_Nov-2012.pdf)
3.   Zero Mothers Die. A Global Initiative to Save the Lives of Pregnant Women & their Newborns Using Mobile Technologies. (http://www.zeromothersdie.org/about.html)

- Lack of funds can also be a barrier to critical health services, especially in countries with under developed health systems. Mobile financial services, such as mobile money can lower financial barriers by increasing access to funds at crucial times, through either increasing formal savings, or enabling transfers from remote friends and family when funds are needed for urgent care.[4]

The industry contributes to Target 3.2 (ending preventable deaths of new-borns and children under 5) in largely the same way as Target 3.1, by providing connectivity to enable communication with medical practitioners, access to mobile health programmes, and to mobile money:

- Mobile connectivity can improve the ability to monitor the health of children, via communication with doctors or more advanced technology solutions. Parents can access professional medical information quicker and at lower cost, for example, using a camera-enabled computer or smart phone, to get diagnoses and understand whether medical attention is required.[5]

- Access to mobile health programmes also supports the reduction of preventable deaths of children by increasing immunisation awareness; for example, programmes to remind parents to have their children vaccinated through SMS are running in Albania, Bangladesh, the Congo, Ethiopia, the Syrian Arab Republic, and Yemen.[6]

- As above, mobile financial services, such as mobile money, can lower financial barriers by increasing access to funds at crucial times through either increasing formal savings, or enabling transfers from remote friends and family when funds are needed for urgent care.[4]

FIGURE 1

NUMBER OF MOBILE HEALTH APPLICATIONS BY TARGET GROUP

GSMA mHealth Tracker, June 2016

Services Targetted to Women's Health Issues — Services Targetted to Children's Health Issues — Other
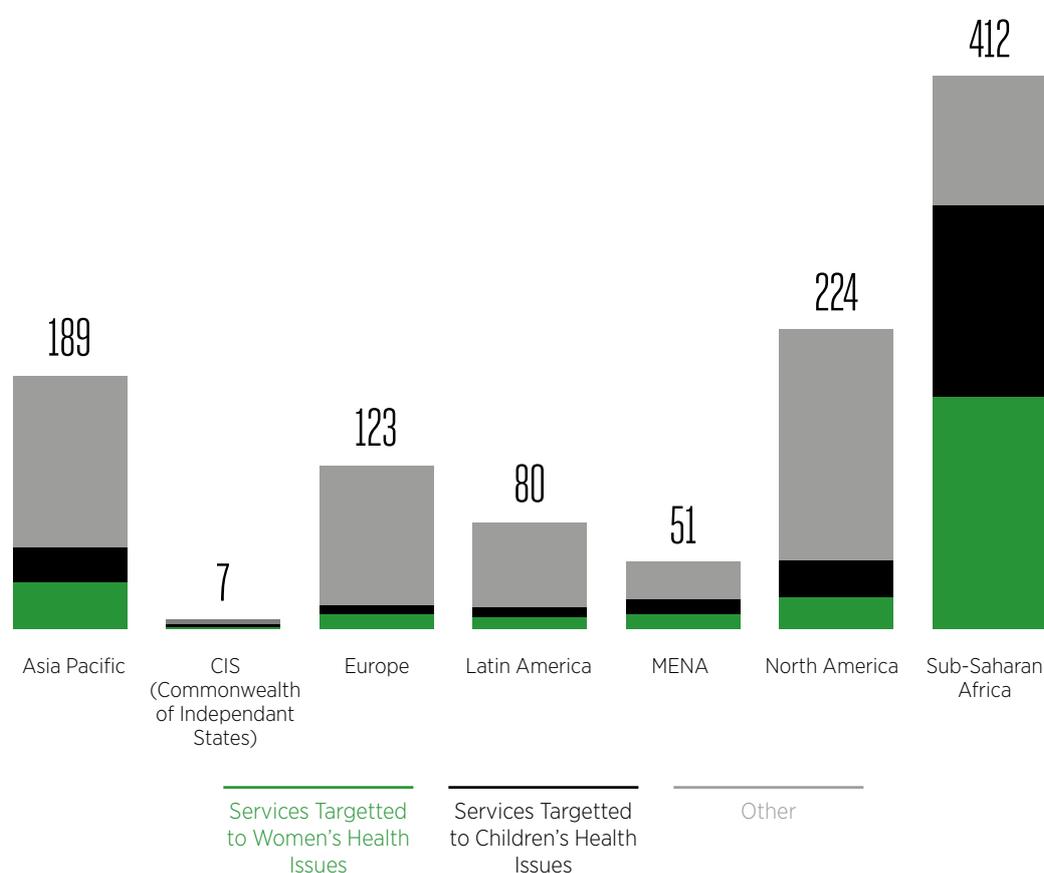
4. US AID from the American people. (2013). Mobile Money for Health. (https://www.hfgproject.org/wp-content/uploads/2013/12/Mobile-Money-for-Health-Case-Study.pdf)
5. Loop. (2016). Telemedicine can save time, money for families with children on the autism spectrum. (https://medcom.uiowa.edu/theloop/news/telemedicine-can-save-time-money-for-families-with-children-on-the-autism-spectrum)
6. World Health Organisation (2011). MHealth: New horizons for health through mobile technologies, Global Observatory for eHealth series - Volume 3.(http://www.who.int/goe/publications/goe_mhealth_web.pdf)

TARGET-BY-TARGET IMPACT

Reducing Preventable Deaths (Target 3.4, 3.6 and 3.9)

The industry contributes to Target 3.4 (non communicable diseases) by supporting access to mobile health programmes:

- While treatment of non communicable diseases is rooted in scientific research, management of diseases can be aided by mobile health programmes. In 2015, mobile operator Orange led a field trial of a diabetes monitoring system that operated through a wearable device, reviewing blood glucose levels, sleep, weight, blood pressure and heart rate, sending data directly to health professionals and alerting the wearer to any health issues.[7]

- Big Data is emerging as an important source of information, particularly for disease prevention. Mobile network operators such as KT Corporation, are aggregating roaming data to track how diseases are spread, as part of their disease diffusion mapping initiative.

The industry contributes to Target 3.6 (road and traffic accidents) by supporting the development of M2M technology to enable 'smart' vehicles:

- Current generations of mobile-enabled M2M technology have significantly changed the safety profile of cars. Deutsche Telekom has developed a 'Connected Car Solutions Suite' for Original Equipment Manufacturers (OEMs). The solutions range from "Eco-drive," a coaching system that aims to optimise drive behaviour, to "E-Call," an automated emergency contact system.[8] This could significantly reduce the chance of collisions and, therefore, road and traffic accidents, an outcome that has been predicted by insurers. The insurer Swiss Re anticipates that automatic crash-avoidance systems and related technologies are likely to cause a decrease in car insurance premiums in the coming years.[9]

The industry contributes to Target 3.9 (pollution and contamination) through risk management of hazardous chemicals and the provision of emergency broadcasting systems:

- Whilst the mobile industry is not a primary consumer or producer of hazardous chemicals, it is still responsible for managing the disposal of all waste to minimise the impact on the environment and reduce the likelihood of hazardous chemicals polluting or contaminating natural environments. Mobile network operators can also amplify their impact by ensuring that all suppliers also adopt sound waste management protocols and by publicising any best practice.

- Emergency broadcasting systems are an effective means of reaching rural poor and wide populations at speed. This is particularly important in disaster situations, such as fires, hurricanes or chemical pollution, or to enforce citizen protection. Government institutions have the ability to quickly broadcast messages to handset users in an area.[10]

Access to healthcare (Target 3.7)

The industry contributes to Target 3.7 (sexual and reproductive health) by enabling access to healthcare through mobile health platforms:

- In rural communities, women are less likely to be able to travel to obtain specialised healthcare services. E-Health can overcome key barriers to reproductive rights through access to:

- Pregnancy health programmes (SMS programmes). Platforms such as 'GiftedMom' use mobile phones to send pregnant women and new mothers information on topics such as antenatal care, nutrition, and postpartum family planning, so they can keep themselves and their babies healthy;[11] and

7.   GSMA (2015). GSMA Connected Living Report: mHealth Grand Tour. (http://www.gsma.com/connectedliving/wp-content/uploads/2015/10/GSMA-Grand-Tour-report-2mb.pdf)
8.   GeSI (2015). #Smarter2030: ICT Solutions for 21st Century Challenges (http://gesi.org/assets/js/lib/tinymce/jscripts/tiny_mce/plugins/ajaxfilemanager/uploaded/SMARTer2030%20presentation_Australia_ DRAFT_20160420.pdf)
9.   Menon, C, (2016). Smart cars: how technology is putting the brakes on insurance premiums. The Guardian, 16 May 2016. (https://www.theguardian.com/money/2016/may/16/smart-technology-cars-insurance- premiums-safer-cheaper)
10. Cell Broadcast Forum. (2002). "Reaching Millions in a Matter of Seconds" Advantages and Services Using Cell Broadcast. (http://www.cellbroadcastforum.org/downloads/pdfs/AdvantagesServices.pdf)
11. GiftedMom. SMS & Voice notification application for maternal engagement. (http://www.giftedmom.org/)

- Online information about safe sex/family planning that is not openly available in communities. The UN Population Fund states that: "Universal access to accurate sexual and reproductive health information" is a critical part of a package of services that can help to improve the sexual and reproductive health of adolescents.[12]

Supporting Policy and Infrastructure (Target 3.d)

The industry contributes to Target 3.d (capacity to manage health risk) similarly to Target 3.9, by supporting emergency broadcasts in the case of health epidemics:

- The mobile industry can effectively communicate with populations that are typically difficult to reach in terms of transmitting information. Cell Broadcast has proved to be the most effective method of issuing public warning alerts in emergency situations. Messages can be dispersed instantly to targeted devices, based on the subscribers' location to selected telephone cells. This enables location-specific emergency alerts and removes the need to register or track devices. Further, this also means that individuals who are visiting from abroad will also receive alerts in their own language.[13]

IMPACT STORY: MEDIC MOBILE

The lack of accessibility to healthcare in the developing world is the primary inhibitor of individuals receiving adequate healthcare. Josh Nesbit, cofounder of Medic Mobile, witnessed this first hand when he was a premedical undergraduate student volunteering at a rural hospital in Malawi. He observed that some patients had to walk up to 100 miles to see the only doctor in the area, whilst community health workers sometimes had to walk more than 30 miles to deliver reports by hand. This problem led to the creation of Medic Mobile.

Medic Mobile provides community health workers (CHWs) and those involved with other aspects of healthcare with an accessible platform for storing and sharing important and up-to-date information on pregnancies, disease outbreaks, medicine stocks, and updates about emergencies. Using mobile, patients and community health workers collect data which they can submit via SMS to a centralised computer or laptop at a clinic, hospital or NGO. Healthcare workers can also make direct calls to receive advice on how to care for those within their community.

Additional benefits of the programme include the ability to register new pregnancies and births and schedule appointment reminders. Aside from the SMS function, Medic Mobile offers an alternate SIM that can be inserted under an existing SIM to run as an information and communication centre, without requiring connection to the internet or a remote server.

The results of this programme have been significant in improving healthcare information and access in rural areas. In 2014, just five years after its creation, Medic Mobile was working with more than 9,000 community health workers, a 71% increase since 2012. Additionally, it was working with 39 partners across 21 countries, to deploy its tools. The scale of this programme is immense, with its impact estimated to have affected 5 million people. Whilst the results are impressive, there are significant future plans in place that aim to increase the number of affected people. By 2020 the organisation has set a goal of supporting 200,000 health workers covering 100 million people.

Source: http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/Case_Study_-Medic_Mobile.pdf
To see more impact stories that contribute to each of the Sustainable Development Goals, visit
www.gsma.com/betterfuture

12. United Nations Population Fund. (2014). Adolescent sexual and reproductive health. (http://www.unfpa.org/resources/adolescent-sexual-and-reproductive-health)
13. GSMA. (2012). Cell Broadcast Emergency Alerts. (http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/01/One2Many-Cell-Broadcast-Emergency-Alerts.pdf)

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted by the industry's role as a provider of connectivity and platforms:

- **Connectivity:** by improving health outcomes through connecting individuals and communities to medical practitioners over mobile phone or SMS where physical services are unavailable, and helping to identify health risks proactively and prompting escalation of treatment in a timely manner. In addition, mobile connectivity also provides a means of emergency communication and warning in a health disaster to ensure communities are best prepared and armed with information to help reduce casualties. This impact is felt in different magnitudes across all of the high priority Targets (3.1, 3.2, 3.4, 3.6, 3.7, 3.9 and 3.d);

- **Platforms:** mobile platforms such as mobile health and mobile money significantly reduce barriers to healthcare, particularly for those who are underserved due to physical remoteness or poverty, by creating a channel for health education, monitoring, and greater access to savings and emergency cash transfers from family or friends to help access medical treatment. This impact is also felt across the high priority targets.

The industry contributes on a more limited basis to this SDG through its own operations e.g. managing waste safely to reduce the risk of causing injury and death through contamination disasters.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is primarily indirect.

- **Indirect impact:** through reducing maternal and early childhood mortality (Targets 3.1 and 3.2) preventing non communicable diseases (Target 3.4), improving access to healthcare (Target 3.7) and reducing road traffic accidents (Target 3.6);

- **Direct impact:** reducing pollution and contamination (Target 3.9), and mobile calls and infrastructure, in crisis situations (Target 3.d).

GEOGRAPHIC IMPACT

The industry's level of impact has less variability than average across regions and economy types.

- The largest overall impacts are in North America, owing to high penetration, and Sub-Saharan Africa, based on the need in the region. This impact is largely felt on Targets 3.1, 3.2 and 3.4 and is predominantly based on the relatively high importance of mobile as a tool for health information

- Asia-Pacific, CIS, Latin America and MENA have the highest opportunity for the mobile industry to improve general health and wellbeing.

FIGURE 2

AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
20	22	20	20	18	24	23
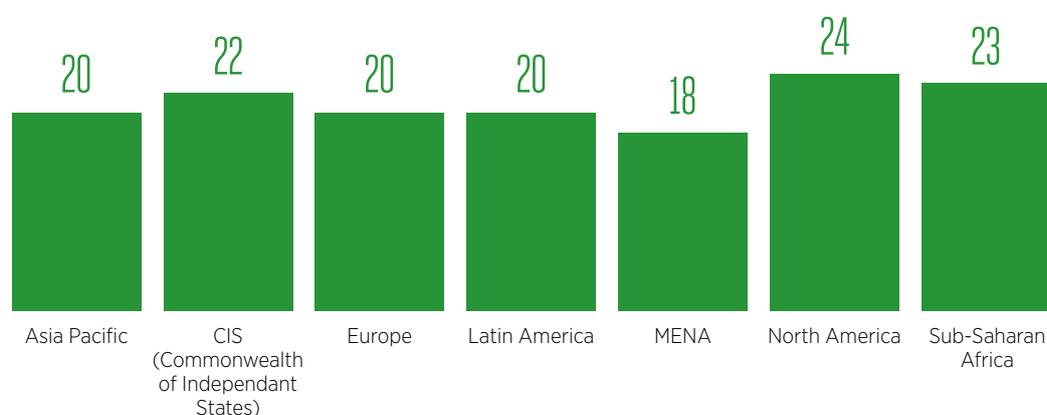
LOOKING FORWARD

The achievement of the targets in SDG 3, particularly the overarching targets for maternal and early childhood mortality, will be substantially dependent on the development of health systems around the world, particularly in developing countries. Whilst this highlights a leading role for governments and institutions, there is nevertheless a significant supporting role for mobile to increase accessibility of these services, particularly in connecting those in underserved communities that may be physically isolated from services but which can be connected to medical practitioners and health information through mobile services.

In order to increase the impact of the mobile industry, partnership with health bodies is required to ensure that services delivered through mobile are locally relevant and target the most vulnerable sections of the population, and that those sections are able to access them. The operators can also further progress by catalysing mobile health services in both developed and developing countries.

SDG4

QUALITY EDUCATION

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

SDG SUMMARY

PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE		SDG SCORE
6/10	×	**6.2/10**	×	**62**	=	**23**

KEY
Average performance compared to all 17 SDGs

ABOVE EQUAL BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 4 at 23; this is higher than the average across the SDGs. The current impact on SDG 4 is driven by:

- A relatively high proportion of targets identified as those where the industry can make a significant impact (6 out of 10 targets);

- An above average level of importance of the industry's activities in achieving these targets (6.2/10);

- A relatively high performance of the industry against the metrics that contribute to these targets (62/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 4 is 37. The underlying metrics used to create these scores include both broad measures of mobile penetration, quality and affordability as well as specific schools and content related metrics.

INDUSTRY IMPACT OVERVIEW

The broader impacts of ICT on education are well documented; the OECD cites that improved attitudes to learning, development of teachers' technology skills, and increased access of the community to adult education and literacy are all driven by increased use of ICT in education[1]. Use of technology in the classroom has been steadily increasing as digital infrastructure and content has become more readily available and affordable, and as curricula to build digital skills is required by the workforce of the future. The mobile industry has a significant role in improving the accessibility, affordability and quality of formal education, largely driven by the reach of mobile internet services to low-socioeconomic or remote areas.

The industry makes a significant contribution to six of the ten targets that underpin

SDG 4. The impact is concentrated on supporting formal education, particularly Target 4.1 (primary and secondary education) and Target 4.3 (tertiary education). The industry also contributes to skills development through Target 4.4 (supporting skills development for the workforce), Target 4.6 (for basic literacy and numeracy) and Target 4.7 (sustainable living). The industry can also make a direct impact on Target 4.4 (funding of scholarships in developing countries).

The remaining four targets were found to be less impacted by the mobile industry. This was due to the governmental or institution-led roles required to make progress or the largely physical requirements of the target, e.g. early childhood care, limiting the impact of the mobile industry.

1. Avvistati, F. (2013). Review of the Italian Strategy for Digital Schools. OECD. http://www.oecd.org/edu/ceri/Innovation%20Strategy%20Working%20Paper%2090.pdf

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Formal Education			
4.1	By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.	**25**	**Biggest Impact: Asia-Pacific** The mobile industry has the greatest impact on this target in Asia-Pacific through the provision of mobile-enabled learning services. The highest opportunity is in Sub-Saharan Africa (SSA), where resources for learning are inadequate in relation to the need, presenting an opportunity for mobile.
4.3	By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.	**58**	**Biggest Impact: Asia-Pacific** The mobile industry has the greatest impact on this target in Asia-Pacific through the increased affordability of basic services. The biggest opportunity is in Sub-Saharan Africa, where increased efforts to improve affordability is likely to have a substantial impact.
Category 2: Skills Development			
4.4	By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.	**49**	**Biggest Impact: Europe** The mobile industry has the greatest impact on this target in Europe, where there is adequate infrastructure to support and increase the supply of vocational skills programmes. The biggest opportunity is in Sub-Saharan Africa where employment is relatively low, creating demand for skills-based training.
4.6	By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy.	**30**	**Biggest Impact: Sub-Saharan Africa** The mobile industry has the greatest impact in Sub-Saharan Africa where mobile has become a primary source of learning, particularly for the rural poor.
4.7	By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and 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.	**32**	**Biggest Impact: Europe** The biggest impact is in Europe, where access to information on sustainable development is high. The industry has the highest opportunity in Sub-Saharan Africa where barriers to sustainable development are high, predominately through poor access to information.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 3: Appropriate Resourcing			
4.b	By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries.	36	**Biggest Impact: CIS (Commonwealth of Independent States)** The biggest impact is in CIS (Commonwealth of Independent States), where improvements in infrastructure have enabled greater access to scholarships and training programmes. The highest opportunity is in Sub-Sahara Africa where enrolment in higher education and training programmes is particularly low.

TARGET-BY-TARGET IMPACT

Formal Education (Targets 4.1 and 4.3)
The industry contributes to Target 4.1 (access to primary and secondary education) by providing connectivity, and, additionally, as a creator of digital content and mobile technology solutions for the classroom:

• **As a provider of connectivity:**

- Improving the financial accessibility of primary and secondary education, especially in remote or rural areas, by connecting schools to mobile internet. Affordability of data services can be driven in part by the mobile industry, e.g. Zero Rating programmes like Vodacom e-school enable access to online educational content without any data charge;

- Improving the physical accessibility to content by enabling access to remote e-learning options. In many rural areas of developing countries the reliability of electricity is uncertain. Mobile phones have been highlighted as a suitable device for e-learning, as they require low energy consumption and little infrastructure[2];

- Improving the quality of education through access to the latest materials and by connecting teachers to teaching networks that can enable their continued professional development. Access to the internet also gives access to teacher networks which not only allows teachers to teach remotely, but also to expand their learning outside of their own schools, improve professional development and continuous education, and create a support and mentoring network[3].

2. Gopalan, A. Smartphone Based E-learning. http://www.doc.ic.ac.uk/~axgopala/papers/csedu11.pdf
3. Vuorikari, A (2012). Teacher Networks: Today's and Tomorrow's challenges and opportunities for the teaching profession. Belgium: European Schoolnet. http://service.eun.org/teachers-newsletter/TellNet_Teacher_Networks_web.pdf

- **As a content creator:** reducing the digital skills gap that prevents access to quality education for many, by creating relevant digital content for primary and secondary education. The need to address the digital skills gap has grown in importance, as economies have become increasingly digitised:

- "Education has to adapt to the digital era"[4]. Less than half of children in the EU are in schools that are highly digitally equipped, curricula need to be redesigned to integrate digital skills and learning;

- Governments risk producing irrelevant skills for their economy if they keep education policies and systems unchanged.[5]

- **As a technology provider:** mobile technology education tools can also improve the quality of engagement in the learning experience, and build relevant digital skills in children, for example:

- Tablets: Mwabu provides an interactive educational tablet based on national curriculum content[6];

- Smart boards / interactive whiteboards used across schools; and

- Smartphone mini-projectors.

The industry contributes to Target 4.3 (affordable, quality higher education) by enabling access to Massive Open Online Courses (MOOCs), supporting the formal education for youths and adults seeking higher qualification. Affordable access to mobile internet can enable a much larger proportion of adults to access quality higher education without the associated expense or travel required to attend traditional institutions.

- **MOOCs provide education benefits across both developed and developing countries:**

- The majority of those who complete MOOCs do so for career opportunities, with approximately one-third receiving a more direct benefit, such as getting a new job[7].

- Moreover, especially in developing countries, MOOCs remove the inequality in educational outcomes associated with socioeconomic status:

- In developed countries, individuals with low socioeconomic status and lower levels of education who use MOOCs report tangible career benefits at about the same rate as those with high status and education. In developing countries, those with lower levels of socioeconomic status and education are significantly more likely to report tangible career benefits[8].

Skills Development (Targets 4.4, 4.6 and 4.7)

The mobile industry also has a significant impact on the skills development targets in SDG 4, from those seeking highly technical or vocational skills, to those lacking basic literacy. The mobile industry contributes to Target 4.4 (skills development for work) by enabling access to MOOCs and it also has the opportunity to contribute as an employer:

- Access to training and information support for community health and agriculture workers, increasing productivity and income;

- **Access to MOOCs:** MOOCs provide an opportunity to acquire relevant skills for employment, with online education proving to provide tangible career benefits across both developed and developing countries.

- **As an employer:** establishing vocational ICT training placements to increase access to relevant skills training for youths and adults:

- In Sweden, the main outcomes of VET (vocational education and training) programmes include a higher rate of labour-market participation, coupled with lower unemployment. Two-year programmes at the upper-secondary level registered lower unemployment rates than comprehensive education (nine years of schooling)[9].

4.   European Commission. (2015). A Digital Europe needs Digital Skills. http://www.eun.org/c/document_library/get_file?groupId=43887&uuid=d5f47be2-6d3b-4d8a-82d1-5f37ed9c7366
5.   World Economic Forum. (2015). 4 Reasons developing countries need digital. https://www.weforum.org/agenda/2015/03/4-reasons-developing-countries-need-digital/
6.   Mwabu. (2016). Mwabu Interactive Education Tablet. http://www.mwabu.com/
7.   Zhenghao, C. (2015). Harvard Business Review. Who's Benefiting from MOOCs, and Why. https://hbr.org/2015/09/whos-benefiting-from-moocs-and-why
8.   Zhenghao, C. (2015). Harvard Business Review. Who's benefitting from MOOCs and why? https://hbr.org/2015/09/whos-benefiting-from-moocs-and-why
9.   European Centre for the Development of Vocational Training. (2011). The benefits of vocational education and training. http://www.cedefop.europa.eu/files/5510_en.pdf

The industry also helps to achieve Target 4.6 (basic literacy and numeracy) by deploying basic literacy and numeracy programmes through mobile to users:

- Basic literacy is a critical skills gap for developing nations and for women in particular: the illiteracy rate across sub-Saharan Africa is 38%, and across South Asia 39% with critical ties to systemic gender inequality. In comparison to the overall statistics, 46% of adult women in sub-Saharan Africa are illiterate, while 50% of South Asian women are unable to read[10]; and

- Mobile education can play a significant role: mobile learning can be exclusively implemented via MMS, reducing women's

need to rely on literate men to understand the content.[11]

- Mobile has proven to be an effective tool in improving literacy and numeracy, due to its high penetration in low socioeconomic and remote communities with lower access to formal education and to the flexible and independent learning environment that a mobile phone provides.

The mobile industry contributes to Target 4.7 (skills for sustainable living) by providing a channel through which individuals can seek information on human rights, healthy lifestyles etc., and through which organisations can reach communities with specific development programmes.

FIGURE 1
MBB PENETRATION VS. PRE-PAID DATA COST, 2014

Source: GSMAi, ITU

Asia Pacific   CIS   Europe   Latin America   MENA   North America   Sub-Saharan Africa
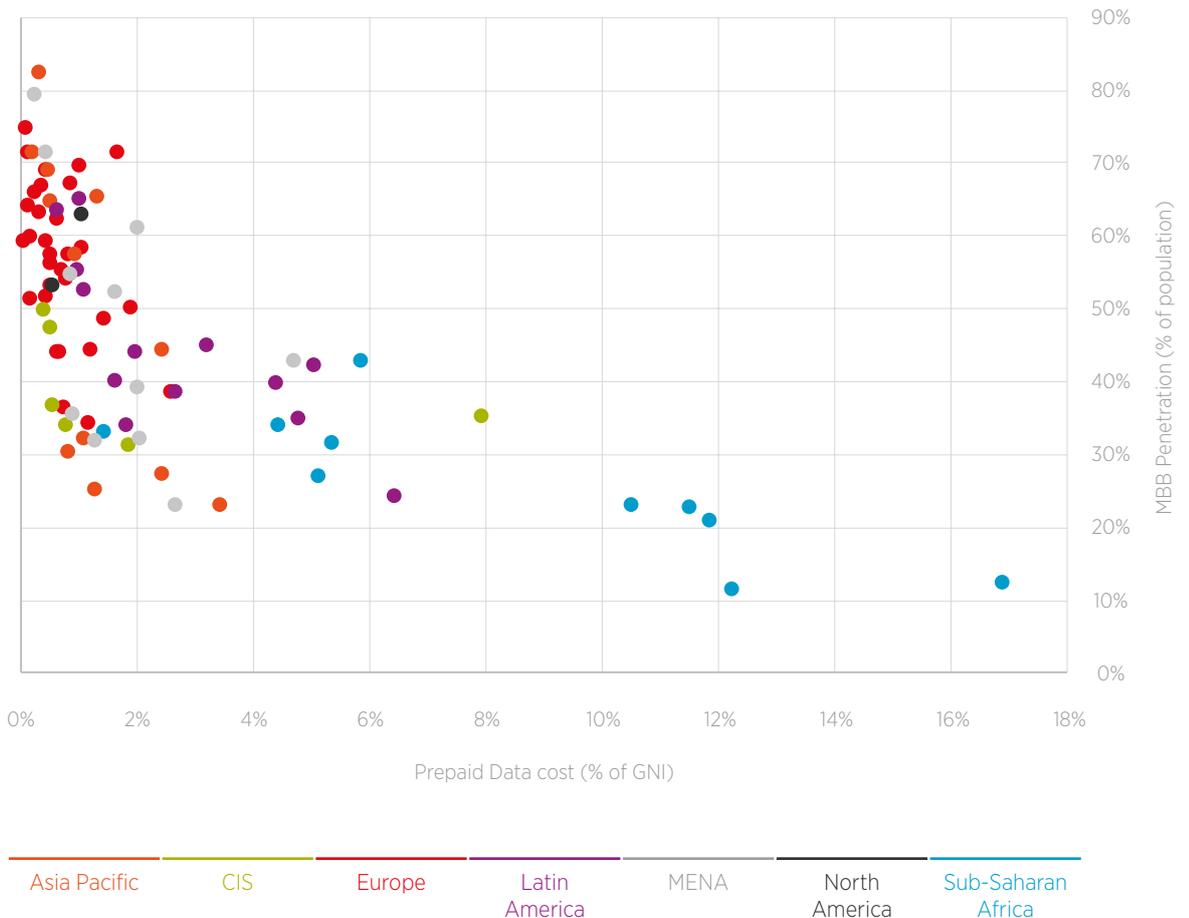
10. UNESCO (September 2015). Adult and Youth Literacy. http://www.uis.unesco.org/literacy/Documents/fs32-2015-literacy.pdf
11. Engage Spark. (2013). Is SMS Really the Solution for Change? Not for Most Poor People. https://www.engagespark.com/blog/sms-really-solution-change-voice-calls-are-for-most-poor-people/

Appropriate Resourcing (Target 4.b)

SDG 4 seeks to address the lack of financial support for education that is prevalent in developing countries. There is potential for the industry to have a direct impact on Target 4.b (higher education scholarships for developing countries) by sponsoring ICT scholarships as an industry initiative and by providing convenient payment solutions for registration fees:

- **Scholarships and sponsorships:** Universities, governments and other institutions may typically set up scholarships for students from developing countries, and have the appropriate infrastructure to manage scholarships; however, this does not preclude the mobile industry from providing a source of funding from a corporate social responsibility perspective.

- **Finance:** Financing solutions for registration fees. In several markets, operators are working with primary and secondary schools, as well as universities (either directly or through the Ministry of Education), to digitise the payments of school registration fees, school fees and exam fees, using their mobile money services:

- This year, 99.3% of Côte d'Ivoire's 1.7 million secondary school students paid their annual school registration fee via mobile money. This initiative has results in cost and operational efficiency and transparency for all beneficiaries. Mobile money has helped to reduce both cash handling costs and associated risks[12].

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted by the industry's role as a provider of connectivity and platforms:

- **Connectivity:** providing affordable access to learning resources to both learner and teacher in both the developed and developing countries.

- **Platforms:** fostering the educational benefit of this connectivity by developing, or contributing to the development of content and other learning platforms.

Operational policies for employees to undertake vocational education can also contribute, as can the many non-core CSR-related activities that are school based.

12. GSMA. (2016). Mobile money facilitates 1.7 million school fee payments in Côte d'Ivoire. http://www.gsma.com/mobilefordevelopment/programme/mobile-money/mobile-money-facilitates-1-7-million-school-fee-payments-cote-divoire

IMPACT STORY: TELMEX – AMÉRICA MÓVIL

América Móvil's TELMEX Digital Education and Culture Programme in Mexico is one of the many programmes in place that capitalises on the mobile phone's ability to aid the provision of quality, equitable and free education for all. It aims to promote free education to all through the use of digital learning tools.

The Programme is made up of six initiatives:

1. Telmex Digital Libraries – a free of charge space where users can learn all about digital programmes such as web design, with 380 educational workshops developed since inception;

2. Académica – a Spanish-language digital community where students, teachers, researchers and higher-education institutions can create, exchange and share knowledge, with more than 60,000 users and 300,000 monthly visits. More than 5,000 university students and instructors were trained as a result of the initiative;

3. Telmex Hub – a freely-accessible online space where young people can collaborate on new projects through the sharing of knowledge. Users also have access to the workshops, courses and lecturers that are promoted by the Telemex community;

4. Technological Institute of Teléfonos de México (Inttelmex IT) – a specialised training centre for information technology aiming to develop the education of professional executives and specialists. From May 2010 until the end of 2013, 6,436 have been trained and certified as well as 1,224 companies;

5. Telmex Technology and Innovation Centre (CTIN) – the centre supports young people in developing ideas looking to benefit society through technology. In 2013, 167 grants were awarded, of which 78% were awarded to the public sector and 22% to the private sector; and

6. Early Education Programme – this targets children, and encourages the integrated development of both genders through working together with their families, educational and health institutions, communities and society as a whole. It has benefited nearly 750,000 people through training and more than 2 million through its practical guides.

It is estimated that in the 3 years since its launch in 2010, more than 3.5 million people throughout the country have benefited from the programme.

Source information available here: http://www.americamovil.com/investors/reporte2014/DS2ENG.html
To see more impact stories that contribute to each of the Sustainable Development Goals, visit
www.gsma.com/betterfuture

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is primarily indirect, requiring the active involvement both of others in the digital chain and very often some physical intervention i.e. a teacher.

GEOGRAPHIC IMPACT

The mobile industry's level of impact varies across regions with the range of impact having above-average variation between higher and lower levels.

- In North America, for example, where there are higher levels of education, years of schooling and literacy rates, the impact is lower given the lower levels of addressable audience for the goal.

- The largest overall impact is in Asia-Pacific, which has lower-average years of schooling and lower literacy rates. This is predominately due to the impact on Targets 4.1 and 4.3 and the higher impact of internet and SMS-based learning.

FIGURE 2
AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
43	29	33	38	37	22	34
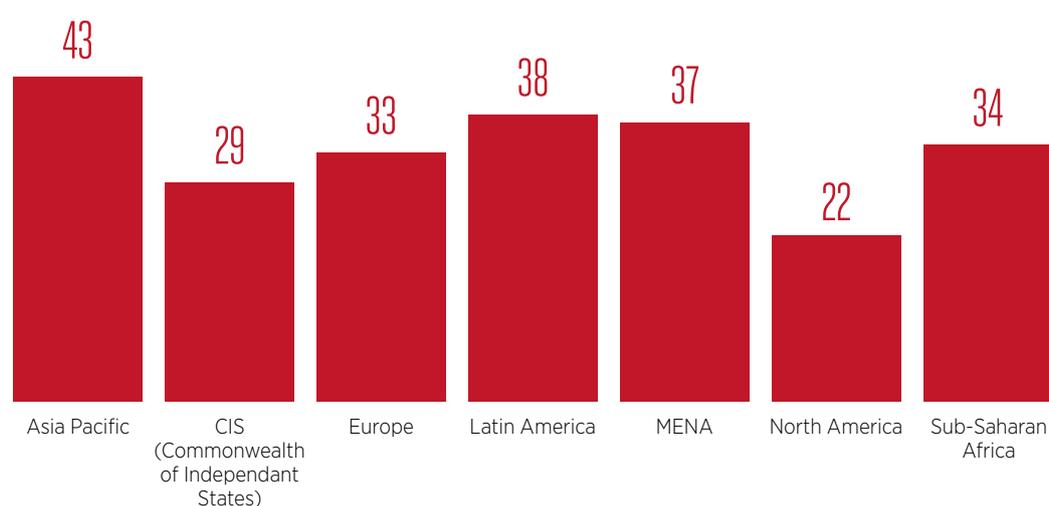
LOOKING FORWARD

As learning will increasingly digitise, the industry clearly has a significant role to play. Connectivity, whether for remote schools without broadband or enabling students in developed economies to access content outside of school, is critical. However, given the relative immaturity of the digital learning market, the mobile industry can catalyse its development by investing in or supporting the creation of content platforms and technology solutions, and possibly by developing other roles, e.g. as a source of information on learner activity and learning efficacy. Digital has a huge role to play in ensuring the skills learned are relevant and more accessible. The industry needs to continue to invest and innovate if it is going to maximise its contribution.

The industry aims to reduce the gender gap in mobile internet and mobile money services, and unlock significant commercial and socio-economic opportunities for women.

#betterfuture

5 GENDER EQUALITY

SAFETY AT LEAST **68%** OF WOMEN IN EVERY COUNTRY FEEL SAFER WITH A MOBILE PHONE

271 mHEALTH SERVICES TARGETED TOWARDS WOMEN SPECIFICALLY

EMPOWERMENT

AT LEAST
58%
OF WOMEN IN EVERY COUNTRY FEELMORE AUTONOMOUS AND INDEPENDENT WITH A MOBILE PHONE

#betterfuture

IMPROVE ACCESSIBILITY OF CONNECTIVITY TO WOMEN THROUGH

AFFORDABLE AND TAILORED MOBILE SERVICES

Implement progressive gender equality policy and take a leading role on gender equality in the private sector

5 GENDER EQUALITY

SDG5

GENDER EQUALITY

Achieve gender equality and empower all women and girls

SDG SUMMARY

PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE		SDG SCORE	KEY
4/9	×	**7.0/10**	×	**37**	=	**12**	Average performance compared to all 17 SDGs

KEY: ABOVE EQUAL BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 5 at 12; this is equal to the average across the SDGs. The current impact on SDG 5 is driven by:

- An average proportion of targets identified as those where the industry can make a significant impact (4 out of 9 targets);

- An above-average level of importance of the industry's activities in achieving these targets (7.0/10);

- A relatively low performance of the industry against the metrics that contribute to these targets (37/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 5 is 27. Underlying metrics used include gender-specific measures of mobile internet access, mobile affordability, access to mobile financial services and employment in the industry.

INDUSTRY IMPACT OVERVIEW

The industry has a significant impact on SDG 5 through its role as an employer, as a provider of internet and telecommunications technology, as well as an enabler of access to services delivered through mobile. These include financial services, mobile health, access to online content and a broad range of other services. Each of these roles provide opportunities to reduce gender inequalities.

In terms of the targets that support this SDG, the mobile industry contributes to four of the nine targets in SDG 5, across the targets that focus on gender equality outcomes, as well as targets that are enablers of gender equality: Target 5.5 (the full and effective participation of women in leadership), Target 5.6 (ensuring universal access to sexual and reproductive health), Target 5.4 (recognising unpaid work) and Target 5.b (increase social, political and economic empowerment of women). Of these, the industry makes the highest contribution to Target 5.b, specifically in its role as a provider of affordable enabling technology. The industry has a lesser impact on Targets 5.1, 5.2, 5.3, 5.a and 5.c, which call for enhanced governmental and institutional action.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Gender Equality Outcomes			
5.4	Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.	**35**	**Biggest Impact: Europe** The industry has made the biggest impact in Europe, where connectivity has empowered women. Mobile network operators in Sub-Saharan Africa have the highest opportunity to impact this target.
5.5	Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision making in political, economic and public life.	**25**	**Biggest Impact: Commonwealth of Independent States (CIS)** The mobile industry has made the biggest impact in CIS where the need to improve levels of female employment within the industry has been effectively met. The largest opportunity is in MENA, where there are significant cultural and social barriers to equal opportunities for females.
Category 2: Gender Equality Enablers			
5.6	Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences.	**3**	**Biggest Impact: Sub-Saharan Africa** The development and promotion of mobile health solutions by the mobile industry has had the largest impact in Sub-Saharan Africa.
5.b	Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women.	**41**	**Biggest Impact: North America** Mobile penetration, affordability and access to mobile financial services are the key underlying metrics for this target, which are well developed in North America. Mobile network operators in Sub-Saharan Africa have the largest opportunity to impact this target.

TARGET-BY-TARGET IMPACT

Outcome-orientated Targets (Target 5.4 and 5.5)

The industry supports the outcome-focused targets, particularly around recognition at work. It supports the targets through its role as a connectivity provider, connecting women to the sharing economy (Target 5.4) and as an employer of women. Furthermore, the industry promotes equality by enabling equal access to leadership opportunities internally and promoting equal opportunity externally (Target 5.5).

The mobile industry impacts Target 5.4 (recognising unpaid work) by enabling access to the sharing economy which, can introduce market forces into this part of the economy, improving transparency, valuation and efficiency of unpaid and domestic work.

- The sharing economy and its application to this part of the world is comparatively immature, but platforms such as Helpling, Kaodim, Facebook's Chore Market and various service exchanges on Gumtree are all examples of the types of platform that are moving the sector into the open.

The mobile industry contributes to Target 5.5 (the full and effective participation of women in leadership), in its role as an employer of women, as well as an influencer of other industries' women-focused employment and leadership programmes:

- Equal leadership opportunity programmes that ensure equal opportunity and representation of women in senior leadership positions and result in greater representation of women in senior management, executive and Board roles:

  - Operators implementing equal leadership programmes: Internal studies at Telenor showed that, while women represent 36% of the labour force, only 22% of the executive positions are held by females. Their mission is to see this figure grow to 30% by 2020[1].

- Promoting the benefits of these initiatives to encourage the broader value chain and other industries to implement similar programmes.

	Female	Male
Asia-Pacific	42%	58%
CIS (Commonwealth of Independent States)	40%	60%
Latin America	37%	63%
Europe	36%	64%
North America	36%	64%
Sub-Saharan Africa	32%	68%
MENA	25%	75%
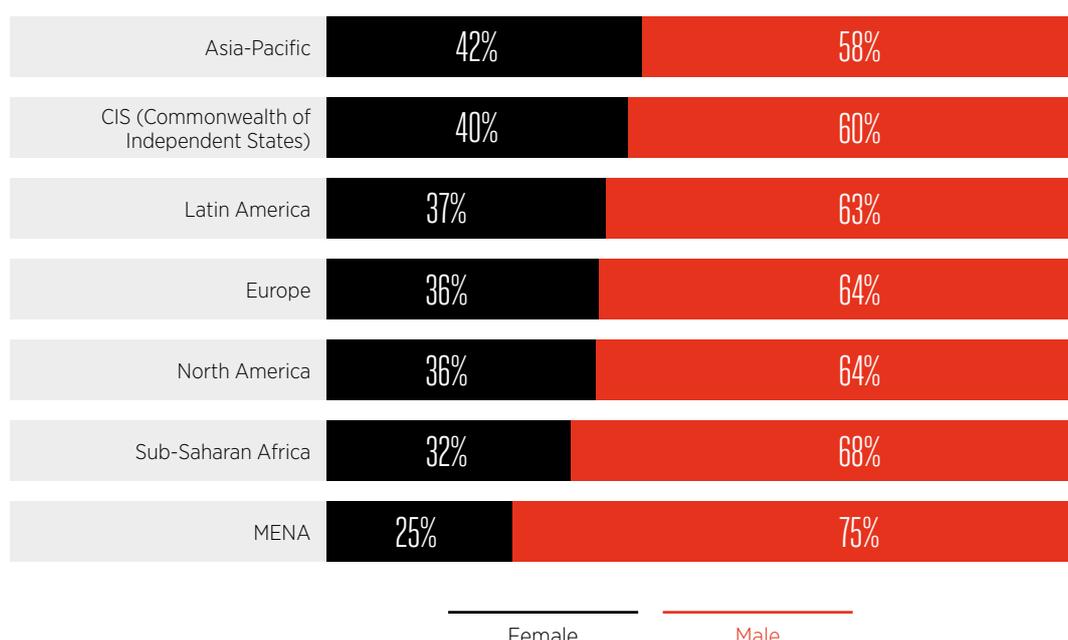
1. GSMA. (2016). Connected Women recognising women in industry in the digital age. http://www.gsma.com/mobilefordevelopment/programme/connected-women/connected-women-recognising-women-in-industry-in-the-digital-age

Supporting Targets (Targets 5.6 and 5.b)

The mobile industry also contributes to targets that are considered enablers of gender equality supporting the outcomes. In its role of providing both basic mobile and internet connectivity, the mobile industry supports access to reproductive health care, especially in remote areas (Target 5.6) and access to information, social connectivity and financial services that increase empowerment (Target 5.b).

The mobile industry contributes to Target 5.6 (ensuring universal access to sexual and reproductive health) by promoting equal access to healthcare through mobile platform services, such as mobile health. Enabling access to e-health, specifically to women, can improve control over, and access to, health services:

- In rural communities women are less likely to be able to travel to obtain specialised healthcare services. E-health can remove this barrier, e.g. by providing pregnancy health programmes via SMS, such as Unicef's 'RapidSMS' initiative, created in 2009, a medical monitoring programme for pregnancies and tracking babies development during their first two years[2].

- By providing access to online information about safe sex and family planning that is not openly available in communities. The UN Population Fund states that "universal access to accurate sexual and reproductive health information" is a critical part of a package of services that can enable improved sexual and reproductive health of adolescents[3].

The industry also contributes to Target 5.b (empowerment through access to technology). Access to mobile services and mobile internet enables women to participate in a multitude of online forums; moreover, access to information improves their well being, and access to financial services in their own right, increases their independence:

- Social empowerment is significantly enhanced when women can maintain and dictate their own access to social networks. At least 89% of the 35 countries assessed as part of the GSMA's study on women's access to and use of mobile phones said mobile phones help stay in touch with friends and family. At least 58% of women in every country said they felt more (or would feel more) autonomous and independent. At least 68 per cent of women in every country reported that they feel safer (or would feel safer) with a mobile phone[4];

- Exposure to political content and networks through mobile also increases civic participation and activism[5];

- Access to financial services drives greater economic empowerment through increased control over finances, lower risk of confiscation of money from a spouse, and an increased ability to start and expand businesses via a source of credit. In the least developed countries, where women tend to be restricted in travelling long distances compared to men, mobile money helps address this issue by removing the need to travel[6];

- Additionally, formal identity documentation can be a barrier to women's economic empowerment. Lack of identity is a barrier, particularly for women accessing financial services, as without identification documents they are unable to open accounts, meaning government and benefits are transferred into a household account, compromising payment confidentiality and control[7].

2. Bheksisa. Simple SMS system keeps a close watch on Rwanda's babies. http://www.mobilemamaalliance.org/mobile-messages
    *Population weighted average of countries within our 90 country sample for which data is available
3. United Nations Population Fund. (2014). Adolescent sexual and reproductive health. http://www.unfpa.org/resources/adolescent-sexual-and-reproductive-health
4. GSMA; Connected Women. (2015). Bridging the gender gap: Mobile access and usage in low-and middle-income countries. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/Connected-Women-Gender-Gap.pdf
5. US State Department; Bureau of Public Affairs. (2010). Empowering Women through Mobile Technology. http://www.state.gov/r/pa/scp/fs/2010/149597.htm
6. GSMA; Connected Women. (2015). Bridging the gender gap: Mobile access and usage in low-and middle-income countries. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/Connected-Women-Gender-Gap.pdf
7. World Bank Development Research Group. (2015). Digital Financial Solutions to advance women's economic participation. http://www.uncdf.org/sites/default/files/Documents/womens_economic_participation_report_16_november_2015.pdf

IMPACT STORY: WOMEN IN MANAGEMENT – DEUTSCHE TELEKOM

Starting in 2010, Deutsche Telekom set the goal of having 30 per cent of its management positions filled by women across its Group. This target has already been achieved in the Group's Supervisory Board, where women make up 35 per cent. Significant progress has also been made across the Group, where the proportion of women has risen by one-third in middle and senior management in this period, making up almost 26 per cent of current managers at a global level.

The operator has not only been proactive in its efforts to increase the proportion of women in management, but has also been active in encouraging other corporations to follow its initiative; for example, four years before the legal regulation came into force the Group co-initiated a joint initiative of 30 DAX companies to tackle the issue.

The Group is going one step further from local law requirements on equal participation in leadership positions. Deutsche Telekom is aiming to achieve its women's quota of 30 per cent by 2020 for both levels below the Board of Management and for the management of the affected legal units, as well as for the internal supervisory boards in Germany.

To achieve this target, a series of measures have been taken: Creating a high degree of transparency for identifying talented individuals within the Group, women are being approached and considered when jobs are filled. The second round of Deutsche Telekom's Supervisory Board Readiness Programme began in November 2015, in which women in particular are being trained up for Supervisory Board positions. In addition, Deutsche Telekom has an extensive work-life portfolio for parents, allowing flexible work and, hence, a good balance between career and family.

As at 31 December, Deutsche Telekom AG's current figures are as follows:

- **Supervisory Board:**
  35 per cent women;

- **Board of Management:**
  1/7 women;

- **Management level (n-1):**
  21.7 per cent women;

- **Management level (n-2):**
  23.0 per cent women.

Source information available here: https://www.telekom.com/company/human-resources/diversity/news/304722
To see more impact stories that contribute to each of the Sustainable Development Goals, visit
www.gsma.com/betterfuture

TARGET-BY-TARGET IMPACT

Lack of affordability and access to network coverage are exacerbated by poor levels of technical and digital literacy and a low trust in services. Moreover, suitable offerings and distribution channels are particularly an issue for women in developing countries, who are the most likely to benefit from access to mobile services:

- Cost and network quality and coverage are cited as key inhibitors to women accessing mobile phones.[6] The GSMA reports that "cost is the most important barrier overall to owning and using a mobile phone, particularly for women" and that in 10 out of 11 sample countries fewer women than men reported using their own money to pay for their handset of credit recharge[8]. The industry can address this through creative pricing targeted to women, developing clear and transparent pricing, and by targeting men as a means to reach women (in countries where men commonly make decisions related to women's access to mobile).

- Trust is also a barrier that needs to be addressed: perceived unreliability of the mobile operator and/or agent network and the consequent fear of being deceived. In order to build trust, operators can ensure the agents they hire are helpful and trustworthy, as well as providing sufficient training, and promoting the recruitment of female agents. Furthermore, the industry can encourage products and services that are relevant to women to increase penetration amongst this gender group.[6]

- To alleviate the barrier of technical literacy and confidence the GSMA Digital Literacy Team works with the industry and external stakeholder groups to develop and deliver best-in-class digital skills training programmes and campaigns to raise awareness about the benefits of getting online[9].

8. GSMA. Bridging the gender gap: Mobile access and usage in low and middle-income countries. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/GSM0001_03232015_GSMAReport_NEWGRAYS-Web.pdf
9. GSMA. (2016). Consumer Barriers Mobile for Development. http://www.gsma.com/mobilefordevelopment/programmes/connected-society/digital-literacy

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms and non-core activity. This SDG is most impacted by the industry's role as an employer and provider of connectivity.

Operations: The industry's role in providing equal opportunities for all female employees and ensuring female representation in senior leadership positions.

Connectivity: Lowering the cost and enabling access to information to empower women by providing the necessary tools to improve financial inclusion, access to healthcare and overall digital inclusion.

Furthermore, operators' involvement in related content and service platforms, as well as non-core activity, e.g. digital literacy for women can also make a material contribution to this SDG.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time).

The mobile industry's most far-reaching impact on gender equality is through the provision of enabling technology to empower women. Whilst this can have some impact on more liberal societies, the impact on the social and financial independence of women in the developing world or in communities where

gender equality is constrained by cultural norms is pivotal.

The mobile industry has an opportunity to lead other industries in promoting equal leadership opportunities for women as global business leaders. While the direct impact of leadership programmes is limited by the size of the industry as an employer and the number of leadership positions it creates, impact can be amplified either by encouraging key partners or suppliers to follow suit or by setting the standard as a role model for other industries.

GEOGRAPHIC IMPACT

In developed economies the impact has been above the global average, as the industry is actively addressing inequality and discrimination in the workforce, as well as equal access to mobile services and connectivity that support the financial, social and political inclusion of women. In economies in transition, the industry has the largest opportunity to make a difference both by actively addressing inequality and discrimination in the workforce, as well as equal access to mobile services and connectivity that support the financial, social and political inclusion of women. Further geographic analysis highlights:

• The largest impacts overall are in North America, Europe and CIS through the impact on Targets 5.4 and 5.b, driven by the higher proportion of female employees in the workforce and the higher affordability of mobile services for women, indicating better access to connectivity and social inclusion.

• Both MENA and Sub-Saharan Africa have the highest opportunity for the mobile industry to bridge the gender gap and promote equality, primarily through improving the accessibility of voice and data services for women (mobile bundle cost is the least affordable, globally) and helping to raise what is the lowest proportion of female employees globally.

FIGURE 2
AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
26	32	32	26	20	34	21
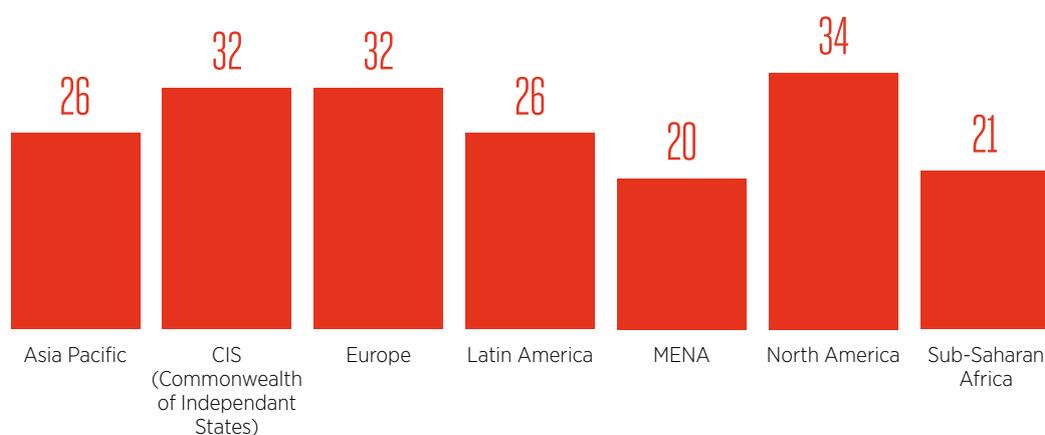
LOOKING FORWARD

In order to maximise the industry's impact on SDG 5, mobile network operators should work together with key partners to align gender equality programmes and initiatives to include the most impactful ways that the industry can contribute in that country. This might be through further development of platforms such as mobile money and mobile health, non-core activities to directly support women, or operational programmes to ensure equal leadership opportunities for women.

In developing nations, removing barriers to mobile phone ownership for women has been, and should continue to be, a focus to increase female empowerment. In developed countries, the mobile industry might look towards its own gender equality initiatives and its pipeline of female talent in order to contribute directly, but also become the role model that the private sector needs.

6 CLEAN WATER AND SANITATION

SDG6

CLEAN WATER AND SANITATION

Ensure access to water and sanitation for all

SDG SUMMARY

PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE		SDG SCORE	KEY
3/8	×	**5.8/10**	×	**22**	=	**5**	Average performance compared to all 17 SDGs

ABOVE EQUAL BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 6 at 5; this is lower than the average across the SDGs. The current impact on SDG 6 is driven by:

- A relatively low proportion of targets identified as those where the industry can make a significant impact (3 out of 8 targets);

- A low level of importance of the industry's activities in achieving these targets (5.8/10);

- A relatively low performance of the industry against the metrics that contribute to these targets (22/100),

The potential impact of the industry, if performance was maximised (to 100), on SDG 6 is 18. There are six primary metrics used to develop this score across the three targets, including broad measures of mobile penetration, as well as specific details on the industry's commitment to sustainable business practices.

INDUSTRY IMPACT OVERVIEW

The mobile industry impacts SDG 6 through:

- The responsible and efficient management of water and waste in its operations;

- Mobile platforms that enable water authorities or other bodies to engage communities with water and sanitation education and collect feedback on community outcomes; and

- The development of Internet of Things (IoT) and supporting infrastructure that underpins water network sensors and usage meters which drive both supply and demand side efficiency.

The mobile industry significantly contributes to three of the seven targets in SDG 6, across the three categories of water quality; sustainable water management; and community engagement. The industry has limited impact on the remaining targets due to their broad nature (provide universal access to water and sanitation), as well as their emphasis on governmental intervention.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Sustainable Water Management			
6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	**4**	**Biggest Impact: Sub-Saharan Africa** The mobile industry has made the greatest contribution to this target in Sub-Saharan Africa where commitments to sustainable business practices have a proportionately higher impact on this region in particular. The biggest opportunity lies in North America due the high levels of waste produced in the region.
6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.	**6**	**Biggest Impact: North America** The biggest impact is in North America, where M2M solutions have been implemented to improve water-use efficiency. The biggest opportunity is in Sub-Saharan Africa, by providing connectivity for, and promoting the development of, context-appropriate IoT solutions to monitor water networks.
Category 2: Community Engagement			
6.b	Support and strengthen the participation of local communities in improving water and sanitation management.	**28**	**Biggest Impact: Europe** The industry has had the largest impact on this target in Europe, where connectivity and quality of infrastructure is high and deployment of consumer smart meters is in early stage of roll-out. In Sub-Saharan Africa improvements to connectivity provide an opportunity to engage local communities, even if it does this in a less technologically advanced fashion.

TARGET-BY-TARGET IMPACT

Sustainable Water Management (Targets 6.3 and 6.4)

The industry contributes to Target 6.3 (improve water quality) by implementing best-practice management of pollution and waste water recycling, both within its own operations and by influencing the broader supply chain:

- The mobile industry can directly contribute by increasing recycling and safe reuse of waste water. Careful selection of materials, suppliers and process redesign for disassembly, and reverse logistics, can reduce the amount of waste and pollution.[1]

The industry contributes to Target 6.4 (increase water-use efficiency) by providing connectivity to monitoring systems:

- A lack of data about water quality, usage and performance of water management systems is a barrier to improving water efficiency. Smart sensor technology, and the use of smart meters, can help to identify leaks, suboptimal water pressure and record timely consumption data, which will help to drive both supply and demand side efficiencies.[2]

Community Engagement (Target 6.b)

The industry contributes to Target 6.b (engaging local communities) by connecting communities to water and sanitation management programmes, providing a channel for communities to report on water quality and sanitation issues, and developing IoT solutions to enable water monitoring:

- Poor and remote communities often have limited understanding of water and sanitation, and can be the hardest to reach through educational programmes.[3] Mobile provides a channel not only to provide education, but also to monitor outcomes. In Nakuru, Kenya, for example, SeeSaw developed a customised app allowing community-based organisations to record progress in remote villages[4].

- The introduction of IoT solutions, such as smart metering, can also engage communities in improving consumption behaviour. Studies show that using water meters to bill customers, based on their actual consumption, cuts water use by 15% or more. When water suppliers add meter-reading automation to the mix, the conservation impact is even more significant.[5]

1. CIPS Knowledge Works. (2007). How to develop a waste management and disposal strategy. https://www.cips.org/Documents/About%20CIPS/Develop%20Waste%20v3%20-%2020.11.07.pdf
2. ITU (2016). Harnessing the Internet of Things for Global Development. https://www.itu.int/en/action/broadband/Documents/Harnessing-IoT-Global-Development.pdf
3. Boakya, M & Akpor, O. (2012). The Journal of Environmental Science and Development. Community participation in water resources management in South Africa.
4. GSMA. (2015). Mobile for Development Utilities Programme: The role of mobile in improved sanitation access. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/08/GSMA_Utilities_Sanitation_Report.pdf
5. Pike Research. (2010). Executive Summary: Smart Water Meters http://www.navigantresearch.com/wordpress/wp-content/uploads/2010/07/SWAT-10-Executive-Summary.pdf

IMPACT STORY: HYDROPOINT WATER WASTE PREVENTION – AT&T

An industry leader in the field of smart water management solutions for urban areas, HydroPoint, had developed a smart water management system, which analyses multiple atmospheric and geological factors to calculate exactly how much water is needed. The solution helps organisations from all sectors to maximise water savings, in this way reducing operating costs and minimising risks. However, for the system to be most effective, one of the biggest limitations was that it lacked a network which allowed different components to share and react to information.

In response to this, AT&T created an IoT solution, enabling HydroPoint to connect individual irrigation control points and sensors to its national system. Using a custom-built solution utilising its network,

AT&T enabled HydroPoint to collect and transmit precise information to and from every component installed. Unique subscriber identification module (SIM) cards allow each device to be individually contactable and controllable. The resulting system operates in real time and can react to changes in the local environment around each irrigation control point.

The reduction in water wastage has been significant. HydroPoint estimates that the IoT solution helped customers to save more than 15 billion gallons of water and $137 million in expenses in 2014 alone, with an estimated 62 million kilowatt hours of energy-saving per year. The mobile industry can play a large role in creating similar systems across the globe, resulting in a significant impact on global water scarcity and energy efficiency.

Source information available at https://www.business.att.com/content/customertestimonial/hydropoint-internet-of-things-case-study.pdf
To see more impact stories that contribute to each of the Sustainable Development Goals, visit
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IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted through the industry's own operations as well as platforms:

Operations: Through active efforts to improve water sustainability across all

activities. Water management is typically monitored and reported by many mobile network operators to improve efficiencies across operations.

Platforms: Deliver community education and engagement, and will eventually support IoT monitoring, primarily contributing to Target 6.4 and 6.b.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is both direct, through the management of its own water usage, as well as indirect, where third-party providers are typically involved, e.g. sensor-based water management systems.

GEOGRAPHIC IMPACT

The variance in levels of impact in SDG 6 across different regions is below average. In developed economies the opportunity lies in supporting further M2M technology development to increase industrial and consumer water efficiency, while in developing economies this extends to monitoring quality through crowdsourcing as well. Further geographic analysis highlights:

- The largest impact overall is in Europe, through Target 6.b. This is primarily due to the quality of infrastructure put in place across the region, which enables greater community engagement and is likely to provide the connectivity for a number of upcoming smart-meter deployments.

- North America has a lower need for action compared to Sub-Saharan Africa hence scores are lower.

- Improving connectivity in regions such as Sub-Saharan Africa where access to an improved water source is low will lead to a greater impact in this region against some of the targets.

- MENA has the lowest score as it has similar characteristics to Sub-Saharan Africa, while having lower penetration of M2M services to support clean water and water efficiency.

- There are many small-scale initiatives across a range of developing countries which deliver material impact within local communities. Data on these are not captured systemically, and so their impact is not captured here, but this provides a clear opportunity for the industry to continue and improve its contribution.

FIGURE 1

AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
13	14	17	14	10	11	10
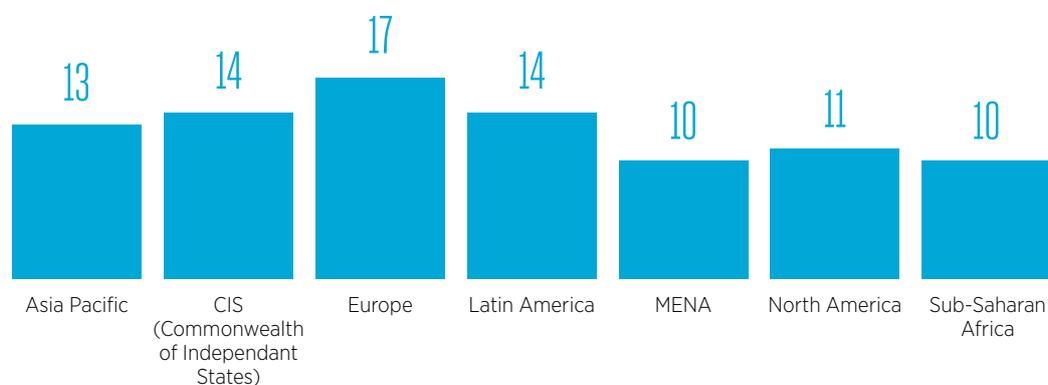
LOOKING FORWARD

The current impact on SDG 6 is largely focused on the engagement that can be enabled through mobile services, such as through education and reporting, as well as the direct action that operators can take to improve water management within their operations and supply chain.

However, given the proliferation of IoT technology, particularly smart monitoring of utilities, the role of technology in providing access to safe and affordable drinking water and sanitation will inevitably grow. In light of the often poor condition of water and sanitation infrastructure in developing countries that can lead to contamination, developing countries have the most to gain from advances in technology that can monitor the performance of water networks. This information can be used to more efficiently allocate water, or to hold water utilities to account for their service delivery.

Whilst developing countries may have the most to gain, climate change is affecting all geographies which has an impact on the secure capture and delivery of water.

In order for the mobile industry to maximise its impact on SDG 6, consideration will need to be given to further developing IoT or other technology for water and sanitation outcomes, and how best to deliver these technologies in a cost-effective way to warrant implementation across both developed and developing countries.

7 AFFORDABLE AND CLEAN ENERGY

SDG7
AFFORDABLE AND CLEAN ENERGY

Revitalise the global partnership for sustainable development

SDG SUMMARY	PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE		SDG SCORE	KEY
	3/5	×	**5.3/10**	×	**37**	=	**12**	Average performance compared to all 17 SDGs

KEY: ABOVE EQUAL BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 7 at 12; this is equivalent to the average across the SDGs. The current impact on SDG 7 is driven by:

- A relatively high proportion of targets identified as those where the industry can make a significant impact (3 out of 5 targets);

- A low level of importance of the industry's activities in achieving these targets (5.3/10); and

- A relatively low performance of the industry against the metrics that contribute to these targets (37/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 7 is 26. There are multiple metrics used to develop this score across the three targets, including specific measures of energy use, as well as the adoption of M2M connections, a measure of development of the IoT market, including devices which enable consumers and businesses to monitor and save energy use.

INDUSTRY IMPACT OVERVIEW

The industry can contribute to SDG 7 through the more efficient and more sustainable management of its own energy use, as well as by developing mobile platforms and solutions for energy efficiency monitoring through IoT.

The mobile industry is a significant energy user on a global scale, and that use is increasing as networks expand and usage becomes more data-intensive, requiring energy-hungry data centres as well as additional base stations to meet increasing capacity requirements. There are also some offsetting trends, for example, network sharing, data centre and network function virtualisation and the move from hardware to software defined networks (NFV and SDN). Ongoing activity to drive efficiency and sustainability into the management of this usage will directly contribute to this SDG, and, indirectly, by promoting awareness of both the importance of energy efficiency and the

mechanisms available to improve energy management.

IoT holds significant promise, providing consumers with their own management solutions and critically facilitating the collection and analysis of usage data that can form the foundation for commercial activity, as well as public sector decisions and policy.

The mobile industry, through these mechanisms, contributes primarily to three out of the five targets in SDG 7 across two categories: clean and efficient energy, and engagement and investment. The industry has limited impact on the remaining targets due to the overarching nature of the targets, for example, 'universal access to energy' and the governmental and institution-focused roles required, such as, enhancing international cooperation to provide access to energy research.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Clean and Efficient Energy			
7.2	By 2030, increase substantially the share of renewable energy in the global energy mix.	**43**	**Biggest Impact: Sub-Saharan Africa** The industry is currently delivering a significant impact in Sub-Saharan Africa, where mobile operators are developing renewable energy solutions (such as solar, as opposed to diesel generators) to power infrastructure in remote areas off the traditional power grid.
7.3	By 2030, double the global rate of improvement in energy efficiency.	**11**	**Biggest Impact: North America** The mobile industry has had the largest impact on this target in North America, a region that has traditionally exhibited high per capita emissions. Investing in more efficiency network technology at cell sites, and in data centres has increased energy efficiency in this region.
Category 2: Engagement and Investment			
7.b	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.	**4**	**Biggest Impact: Impact is similar across all regions with predominately developing economies.** Energy efficiency technology utilising IoT and connectivity is a critical contribution of the mobile industry; however, current penetration, particularly in developing countries, is low. This is due both to the lack of basic energy infrastructure in many areas, as well as the development cycle stage of energy-related IoT solutions.

TARGET-BY-TARGET IMPACT

Clean and Efficient Energy (Target 7.2)

The industry contributes to Target 7.2 (renewable sources) by deploying renewable energy solutions to power its network, which represents the majority of its energy consumption:

- The ability to power infrastructure with renewable energy has been demonstrated through the roll-out of 'green' base stations. Ericsson, for example, to date has installed more than 200 photovoltaic solar-powered base stations to date across Morocco, Mexico and Ethiopia.

However, high-capacity sites requiring significantly more energy are harder to supply effectively from renewable energy solutions: as the demands on the networks intensify, emphasis on, and development of, renewable energy solutions that can meet high network demand need to be amplified.[1]

IMPACT STORY: KT-MEG (MICRO ENERGY GRID) – KT CORPORATION

In order to address increasing energy consumption and global climate change, utilisation of renewable energy sources and more efficient electricity management is becoming progressively more important. The volatility of production of renewable energy sources, combined with the shift from centrally-based generation focused on suppliers to eco-friendly dispersed generation focused on consumers, has created the need for smart energy grids. These require increased sophistication in the management of energy supply and demand.

Based on communications infrastructure and IT technology, KT has developed KT-MEG (Micro Energy Grid), a total energy management solution. In 2015, KT implemented the KT-MEG platform and opened the KT-MEG Center as part of KT's energy efficiency business under the Smart Energy Business Group. The platform combines a number of technologies such as an energy-focused Internet of Things (IoT) implementation, cloud and big data based analytics, along with the core telecom skillset in monitoring, operation and maintenance to control and manage energy consumption. To ensure more efficient energy management, the platform controls all relevant processes including production, consumption, and transaction of energy, such as electricity, heat and gas, etc. Through this solution, KT manages the energy utilisation of major buildings in 12 countries including Korea, Finland, and the U.S.

The "KT-MEG" system has 1,700 client sites along with 1,400 electric car charging sites across Korea. On the supply side, the KT-MEG monitoring centre has managed to increase generation efficiency by 20% through an integrated system that enhances the efficiency of various energy sources. On the demand side, the system has helped domestic hospitals save up to 72% of energy costs. By 2018, KT aims to expand into providing a total smart energy management service: new renewable energy solutions, an energy efficiency management business for industrial sites, and an electric car charging businesses.

To see more impact stories that contribute to each of the Sustainable Development Goals, visit
www.gsma.com/betterfuture

1. Borcoci, E. (2015). Network Function Virtualisation and Software Defined Networking Cooperation. http://www.iaria.org/conferences2015/filesICNS15/InfoSys_2015_NFV_SDN_v2.1.pdf

TARGET-BY-TARGET IMPACT

Efficiency (Target 7.3)

The industry contributes to Target 7.3 (efficiency) by optimising energy efficiency within its own operations, as well as developing IoT energy-monitoring solutions to support energy efficiency in other sectors and directly for consumers.

Network Efficiency:

- The mobile industry is a significant energy user and, overall, energy consumption in mobile is increasing, largely because mobile network operators require more energy-intensive equipment to serve increasing data demands and networks are expanding. Increased demands on data use stem primarily from social media and entertainment use.[2]

- The industry has a number of opportunities to improve the energy efficiency of its infrastructure, while continuing to meet this increased demand. Operators can reduce the number of base stations required due to technology-driven productivity improvements: the number of sites required by traditional 2G/3G networks can be reduced by up to 30% through managing output power, optimising network design and expanding the range of radio coverage.[3] Operators can also share infrastructure: reducing equipment duplication; providing radio coverage with less infrastructure by optimising site selection; and reducing the absolute number of sites required.

- Many, if not all, mobile network operators have invested materially in energy efficiencies and sustainability, not least because of its contribution to costs. The GSMA has launched a Mobile Energy Efficiency (MME) network benchmarking service which helps educate and incentivise action under this SDG. The service measures the relative efficiency of an MNO's radio access network, identifying under-performing networks and quantifying potential efficiency gains, which are typically 10-25 per cent across a portfolio. To date 40 MNOs have participated in the service accounting for over 200 networks in 160 countries and more than half of global mobile subscribers. The latest MEE Optimisation project identified annual savings of US$6.2 million in energy costs and 19,700 tonnes of carbon dioxide, with 14 to 18-month financial paybacks for the mobile network operator involved.[4]

Enabling Consumer and Business Energy Efficiency:

- Introducing IoT solutions to capture usage information and even directly manage usage has huge potential to drive both consumption and production efficiencies, and provide platforms to allow new and innovative service propositions that promote the efficient and sustainable use of energy. The dynamic monitoring of consumption provides organisations with the knowledge to introduce immediate responses, as well as more systemic changes as the drivers of energy consumption become better understood. Immediate responses include turning off equipment or lights. More systemic changes might include scheduling consumption when energy rates are lower, and incentivising workers to lower their energy usage.[5]

- There are multiple examples across operators of the use of IoT solutions for energy management, for example, Verizon's LTE network is used in the USA to provide each participating building manager with confidential, detailed information on their energy usage on a near-real-time basis. Part of the service also includes additional insights on 'what can I do with all this usage information.[6]

2. UNDP. (2015). SDG number 7: Ensure access to affordable, reliable and sustainable energy for all. http://www.undp.org/content/undp/en/home/sdgoverview/post-2015-development-agenda/goal-7.html
3. Little, A (2009). Telecoms Operators in a Carbon Constrained World. http://www.arthurdlittle.com/uploads/tx_extthoughtleadership/ADL_Telecom_Operators_in_a_Carbon_Constrained_World_01.pdf
4. Thollander, P. & Rodin, P. (2014). Barriers to and driving forces for energy efficiency in the non-energy intensive manufacturing industry in Sweden. https://www.researchgate.net/publication/222395513_Barriers_to_and_driving_forces_for_energy_efficiency_in_the_non-energy_intensive_manufacturing_industry_in_Sweden
5. Borcoci, E. (2015). Network Function Virtualisation and Software Defined Networking Cooperation. http://www.iaria.org/conferences2015/filesICNS15/InfoSys_2015_NFV_SDN_v2.1.pdf
6. Energy Manager Today. (2015). Energy Management: The Internet of Things Changes Everything. http://www.energymanagertoday.com/energy-management-the-internet-of-things-changes-everything-0120273/

TARGET-BY-TARGET IMPACT

Engagement and investment (Target 7.b)
The industry contributes to Target 7.b (infrastructure and technology) by developing IoT solutions for energy monitoring to increase the sustainability of energy usage in developing countries:

- As described above, deployment of IoT systems and solutions holds plenty of promise, but the impact in developing countries is likely to be longer term, due to the broader lack of basic supporting infrastructure.

- Nevertheless, with high levels of mobile industry infrastructural investment in many emerging markets, networks can be designed and built with market-leading energy efficiency practices.

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted, firstly, through the industry's operations and platforms.

Operations: Through mobile network operators' efforts to utilise renewable energy solutions across networks, as well as optimising energy efficiency, within core operational activities.

Platforms: Developing IoT solutions for improved energy efficiency monitoring both for the industry to improve overall energy consumption and across other Industries and sectors.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time).

The impact made by the industry on this SDG is primarily direct across all relevant targets. The industry will also have an indirect impact to the targets through the development and enablement of IoT technologies which will then be deployed by third parties: important, but evolving.

GEOGRAPHIC IMPACT

Variance on the impact of the industry on SDG 7 across regions is below the average. The biggest opportunity is in developing economies, where the industry can increase impact by improving network energy efficiency, but also in providing the necessary capabilities through IoT and big data to optimise production and consumption across the power grid.

- The biggest overall impact on this SDG has come from North America, through the impact on Target 7.3. This is due to the increased efforts to improve energy efficiency by operators and regulators.

- Outside of North America and Europe, there is a significant opportunity to increase the share of renewable energy, as well as expand infrastructure to support sustainable energy sources.

FIGURE 1

AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
19	14	23	19	18	35	18
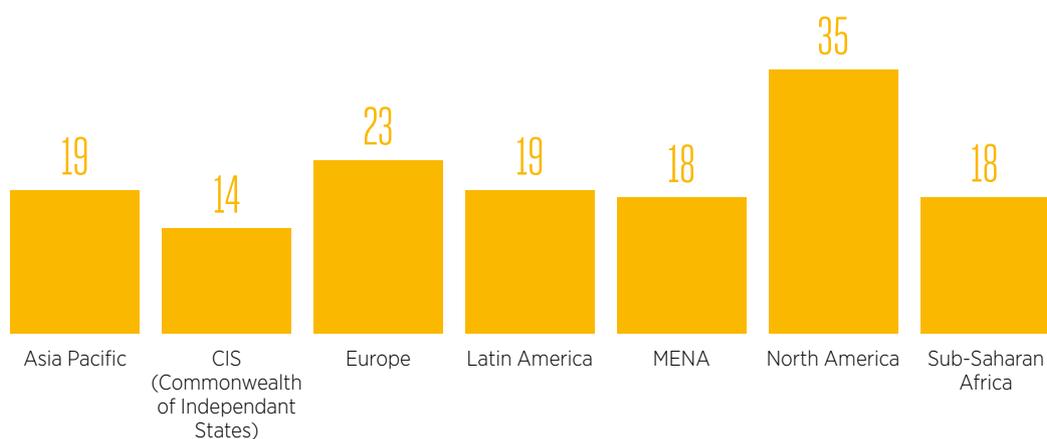
LOOKING FORWARD

Mobile network operators have been focusing on improving the energy efficiency of their networks, with at least one example where energy is entirely supplied from renewable sources. Operators have also been leading the development of IoT solutions for optimising energy consumption in their own networks, with some already providing these as products to businesses that are looking to do the same. The combination of these two factors, combined with the consumerisation of IoT are a strong indicator that the impact of the industry on the SDG will continue to increase as energy management becomes central to societies, but will need the continued focus of the industry and a willingness to develop the broader ecosystem or subsector around this.

8 DECENT WORK AND ECONOMIC GROWTH
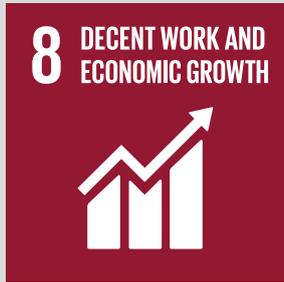
SDG8

DECENT WORK AND ECONOMIC GROWTH

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

SDG SUMMARY

	PROPORTION OF TARGETS SCORED	IMPORTANCE	PERFORMANCE		SDG SCORE	KEY
	6/12 ×	**6.3/10** ×	**28** =		**9**	Average performance compared to all 17 SDGs

KEY — ABOVE EQUAL BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 8 at 9; this is lower than the average across the SDGs. The current impact on SDG 8 is driven by:

• An average number of targets identified as those where the industry can make a significant impact (6 out of 12 targets);

• An average level of importance of the industry's activities in achieving these targets (6.3/10); and

• A relatively low performance of the industry against the metrics that contribute to these targets (28/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 8 is 30. Metrics contributing to this SDG include broad measures of connectivity but also mobile broadband, and measures of emerging areas such as IoT.

INDUSTRY IMPACT OVERVIEW

The 12 targets can be categorised as: sustainable growth, inclusion, and employment and decent work. The mobile industry impacts targets in each of these areas. In terms of sustainable growth, the industry directly contributes to GDP, whilst also driving indirect GDP growth through improved productivity, development of infrastructure and support of technological advances to improve production and consumption efficiency[1]. Access to the internet and mobile-based services across developed and developing countries, and urban and rural communities, improves the inclusiveness of economic development and, underpinned by responsible business practice, contribute to achieving employment and decent work for all.

Through these roles the industry makes a significant contribution to 6 of the 12 targets in SDG 8. The impact is concentrated on sustainable growth through productivity

(Targets 8.2, 8.3 and 8.4), inclusion (Targets 8.1 and 8.10), and employment and decent work (Target 8.7).

Whilst the industry will impact the other targets in some way, the impact is limited due to either the broad scope of the target, or the emphasis on governmental intervention or other institutional intervention.

The broad impact of ICT, generally, on the level of productivity and innovation in an economy is well documented. An EU commissioned study on the impact of broadband on growth and productivity highlights the role of broadband as an enabler for technology-based information, both in the services and manufacturing sectors. The study also cites mobile-enabled innovation as an important factor for economic growth in developed countries, especially service innovation and process innovation in knowledge-intensive activities.[2]

1.   World Bank. (2015). World Development Report 2016: Digital Dividends http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2016/01/13/090224b08405ea05/2_0/Rendered/PDF/World0developm0000digital0dividends.pdf
2.   Fornefield, M, Delaunay, G, Elixmann, D. (2008). The Impact of broadband on growth and productivity http://wik-consult.com/uploads/media/FinalReport-MICUS-BroadbandImpact.pdf

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Sustainable Growth			
8.2	Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors.	**11**	**Biggest Impact: Europe** The industry has had the largest impact towards this goal in Europe, where increased use of innovative mobile technology, such as IoT, has been relatively high. The highest opportunity is in Sub-Saharan Africa due to a lack of basic technological infrastructure and labour-intensive production methods.
8.3	Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.	**23**	**Biggest Impact: North America** The industry has had the largest impact towards this goal in North America, where financial services are highly accessible and entrepreneurship and small business are supported by government policy (e.g. tax breaks, grants). The highest opportunity is in Sub-Saharan Africa due to the emergence of SMEs and a lack of a formal structure surrounding job opportunity and creation.
8.4	Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead.	**6**	**Biggest Impact: North America** The industry has had the largest impact towards this goal in North America, due to the take-up of M2M connections, whilst the highest opportunity is in Sub-Saharan Africa where technology-enabled sustainable energy solutions are relatively less mature than other regions.
Category 2: Inclusion			
8.1	Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries.	**40**	**Biggest Impact: North America** The biggest impact is in North America where penetration is high and business use of the internet is mature. Asia-Pacific has the greatest opportunity for the mobile industry to improve impact on the target, given the increasing emergence of new markets and increasing maturity of markets in the region.
8.10	Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all.	**16**	**Biggest Impact: Sub-Saharan Africa** The industry has had the largest impact in Sub-Saharan Africa where there is a material proportion of the population that is unbanked but a significant level of mobile broadband penetration that can enable access to mobile financial services. There is significant opportunity to improve impact in the Middle East and North Africa, where mobile can play a significant role in expanding access to financial services to the unbanked, through increased penetration in developing areas.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 3: Employment and Decent work			
8.7	Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms.	**10**	**Biggest Impact: MENA, Latin America, Europe and Asia-Pacific** The mobile industry has had an impact across many regions, where a significant proportion of mobile network operators have committed to ethical business practices. The highest opportunity is in CIS, where child exploitation remains an endemic problem in some areas, requiring coordinated effort from private sector, institutions and governments.

TARGET-BY-TARGET IMPACT

Sustainable growth (Targets 8.2, 8.3 and 8.4)

The mobile industry contributes to Target 8.2 (achieve higher levels of economic productivity through diversification, technological upgrading and innovation) through:

- Access to mobile internet and mobile-enabled platforms such as mobile money to reduce information, search and transportation costs, and enabling the use of online business tools to increase efficiency. Improved communication and information processing typically improves supply chain management and enterprise resource planning, thus improving productivity.[3]

- Development of IoT infrastructure (e.g. software upgrading, remote SIM provisioning) to support sensor connectivity and innovations that increase productivity for businesses, individuals and cities (e.g. driverless cars, self-monitoring energy-efficient buildings and crop monitoring). The GSMA Connected Living Programme is progressing the creation of fully interoperable specifications for remote SIM provisioning of M2M devices, and the evaluation of convergence between M2M and smartphone/tablet solutions to support the proliferation of M2M technology.[4]

- Innovation: industry-led initiatives, such as the GSMA Ecosystem Accelerator which will fund start-ups in Africa and Asia, provides a mechanism through which mobile network operators can contribute their assets and expertise to the most promising mobile solutions, aimed at improving socioeconomic conditions.

Similarly, this contribution to IoT infrastructure also impacts Target 8.4 (improving global resource efficiency in consumption and production to decouple economic growth from environmental degradation) by developing the connectivity infrastructure for smart meters and other smart sensor technology, which enables consumption of resources to be optimised and managed more efficiently by both producers and consumers.

3. World Bank. (2015). World Development Report 2016: Digital Dividends http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2016/01/13/090224b08405ea05/2_0/Rendered/PDF/World0developm0000digital0dividends.pdf
4. GSMA. (2015). How China is scaling the internet of things. http://www.gsma.com/connectedliving/wp-content/uploads/2015/07/16531-China-IoT-Report-eng.pdf
   *Population weighted average of countries within our 90 country sample for which data is available

FIGURE 1

BUSINESS INTERNET UPTAKE, 2015

Source: UN

Europe	95%
North America	95%
Latin America	87%
Sub-Saharan Africa	84%
CIS (Commonwealth of Independent States)	73%
MENA	68%
Asia-Pacific	52%

% of Businesses using the Internet
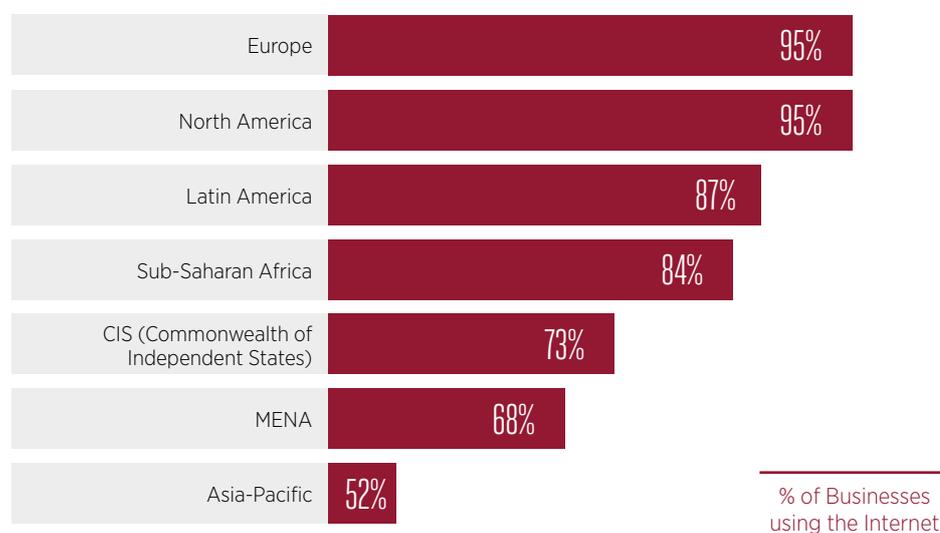
- Smart water meters are playing a critical role in improving the efficiency of water use for both producers and consumers. They have the capacity to manage inefficiencies in water use through analysing water flows in near-real time, which enables consumers to understand their consumption patterns. Together with pricing incentives from suppliers, this can motivate consumers to reduce consumption. Smart meters also provide a system through which water utility companies can better understand and maintain their infrastructure network, using data on water flow and volume to identify leaks or other faults in the network.[5]

The mobile industry also has a significant impact on Target 8.3 (promote development oriented policies, job creation, entrepreneurship and encourage formalisation and growth of small enterprise, including through access to financial services).

- In developing markets, formal SMEs contribute up to 45% of employment and 33% of GDP. Opening a mobile money account is the first time many use a formal financial services, representing a key step for them to join the formal economy. Macroeconomic benefits have already been reported in markets where mobile money

penetration is high. In Uganda for example, the Central Bank has noted that allowing B2G as well as P2G payments through mobile money has led to an increase in the country's overall tax collection. Mobile financial services also play a key role in access to credit. In Kenya 14% of M-Shwari users report borrowing money to make business related investments.[6]

- Mobile financial services can play a critical role in boosting access to credit services in developing countries. In the Kopo Kopo Grow model in Kenya, any business accepting Lipa Na M-PESA or credit card payments is eligible to apply for an unsecured cash advance. Also in Kenya, research shows that 14% of M-Shwari users said they borrowed money to make business-related investments as the second most popular reason after the need to manage short-term ups and downs in cash flow. This clearly indicates that this mass-market product has been effectively serving the needs of micro and small business owners. In that context, the Central Bank of Kenya has already publicly recognised the importance of such mobile financial services to expand access to credit and their impact on the country's economic growth.

5. Water and Wastewater International (2015). How efficient can water management become in the future using smart meters? http://www.waterworld.com/articles/wwi/print/volume-28/issue-3/regulars/executive-tech-comparison-smart-meters/how-efficient-can-water-management-become.html
6. GSMA (2016) Mobile Financial Services and MSMEs: What are the benefits of encouraging the use of mobile financial services among MSMEs? http://www.gsma.com/mobilefordevelopment/programme/mobile-money/mobile-financial-services-msmes-part-1

TARGET-BY-TARGET IMPACT

Inclusive Growth (Targets 8.1 and 8.10)
The second group of targets addresses inclusiveness of economic growth across countries, as well as economic inclusion within countries, through the expansion of financial services.

At a macro-economic level, the impact of mobile penetration on economic growth is well documented and this directly contributes to Target 8.1. In addition, the mobile industry also significantly impacts inclusive economic growth by:

- Increasing the addressable market through access to mobile internet: Connecting previously unconnected consumers and businesses through mobile and online channels to drive greater volume and value of transactions. This is critical, particularly in developing countries, to expose businesses to a national or global marketplace. According to recent census and survey data from Mexico, Turkey and Vietnam, there is a direct correlation between internet use and the productivity of firms. In Turkey, for example, firms which opted to use the web for online orders or reservations were found to be 11% more productive, 25% larger, and twice as likely to export. Similarly, those who have a website are twice as productive, large and more than twice as likely to export compared to companies that do not have a website[7];

- Improving the productivity of businesses by enabling them to access online marketplaces, reducing transaction costs and transportation costs associated with physical transactions with customers and suppliers. This is particularly important to reduce the inequality of business opportunities between rural and urban areas, where information asymmetry and price distortion limit the benefits of national economic growth for those in remote areas. Dongfeng Village located in the Jiangsu Province of China was one of the first farming villages to take up e-commerce on a large scale. More than 1,000 households had joined the digital economy by getting involved in furniture production and selling their finished goods online. At the end of 2014, there were 211 such Villages in China, with 70,000 merchants selling their products online that have created an estimated 280,000 direct job opportunities[8];

- At the individual level, inclusion in economic growth can be limited by access to formal financial services to save, borrow and secure insurance services. The mobile industry can play a significant enabling role in the economic inclusion of the poor, vulnerable and remotely-located through its impact on Target 8.10. In particular, the mobile industry can play a role in:

  - Increasing access to mobile money and enabling access to financial services and credit to those who are underbanked or unbanked. In 2015 the number of mobile money services increased to 271 in 93 countries with 3.2 million agents globally.[9] There is a significant opportunity for the mobile industry to leverage the near ubiquity of mobile penetration to compete with cash transactions by tapping into rural locations where typically there is a lack of easy access to infrastructure, as is the case across many emerging markets[10];

  - Providing a solution for formal identity through mobile phone records where lack of formal identity prevents people, specifically in developing countries, from accessing financial services. According to the World Bank, nearly 2.4 billion people lack a formal identity, meaning they are excluded from a range of rights and services including health care and social welfare.[6]

7. World Bank. (2015). World Development Report 2016: Digital Dividends http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2016/01/13/090224b08405ea05/2_0/Rendered/PDF/World0developm0000digital0dividends.pdf
8. The Journal of Commerce (2015). China's e-commerce giants target inland. http://www.joc.com/international-logistics/rural-merchants-thrive-china%E2%80%99s-e-commerce-giants-target-inland-areas_20150807.html
9. GSMA (2015). State of the industry Report – Mobile money. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/04/SOTIR_2015.pdf
10. GSMA (2014). Extending reach: Mobile money in rural areas. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/10/2014_DI_Extending-reach_Mobile-money-in-rural-areas.pdf

TARGET-BY-TARGET IMPACT

Employment and Decent Work (Target 8.7)
The final grouping of targets addresses employment and decent work. The industry's primary opportunity for impact here is by the development and enforcement of robust labour policies across owned operations, and supply and distribution chains to prevent the use of forced labour or child labour. While the industry has the most direct control over its own operations, its impact can be significantly amplified by extending responsible business practices to upstream suppliers, such as mobile component suppliers, as well as downstream retailers and distributors, and also by being seen as a role model, innovator and advocate of responsible business practice.

IMPACT STORY: M-PESA FOR SMES - KENYA – SAFARICOM AND VODAFONE

Kenya has one of the most advanced mobile money markets in the world, with Safaricom's M-PESA service accounting for approximately 34% of transactions in 2013 in terms of value. However, despite over 48% of the adult population using the service on a monthly basis by September 2013, only 0.01% of business in Kenya had an M-PESA merchant account. Through its partnership with Safaricom, the Kopo Kopo team set out, using M-PESA as a platform, to provide tools to enable small and medium businesses to accept mobile money payments and receive credit, thus helping them grow and prosper.

The scheme gives registered merchants a new SIM card that works with any phone, turning the device into a simple point-of-sale system. A five-digit number is assigned to the merchant, and customers can pay for goods the same way they would buy more airtime or send money to a loved one. Since launching the core platform in Kenya in 2012, many different types of businesses, from salons to restaurants to office supply stores, have signed up.

The initiative has been successful thus far, attracting 12,500 merchants in the East African countries of Kenya, Tanzania and Rwanda. Since the Kenya launch in 2012 and up until March 2014, more than $3 million in transaction volumes were being generated each month, with merchants experiencing around two to three times more transactions per month when compared to traditional card payments. Demand side research in Naivasha, Kenya, has shown that mobile money helps MSMEs grow their productivity and revenues. On the back of this success, the team is preparing to roll out the platform to more markets in the region.

Source information available here http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/Case_Study_-Kopo_Kopo_04_2014.pdf and http://www.journalcra.com/article/does-mobile-money-services-have-any-impact-smes-perfomance-naivasha
To see more impact stories that contribute to each of the Sustainable Development Goals, visit
www.gsma.com/betterfuture

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is primarily impacted through operations and platforms.

Operations: Through core operations as an employer and provider of critical infrastructure, through its connectivity services that facilitate information exchange and productivity, and through platform services such as mobile money that extend the access of financial services across communities.

Platforms: Through supporting the development of IoT technology, in two different capacities: as a platform role, for example, operators in China have integrated IoT businesses into their core connectivity business, and as a specification development role, for example, the GSMA is creating specifications for remote SIM provisioning.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time).

The industry's direct impact is limited by its size and influence over global development issues; however, its indirect impact makes a significant contribution to SDG 8 through the increased productivity, technological upgrade and innovation that connectivity provides.

The mobile phone as a channel for communication and consumption has also led to a systemic impact on economies, fundamentally changing how people interact with each other socially and economically. While this has already played out in developed economies across the world, developing countries will see this transformation accelerate, as mobile phone ownership and connectivity increases over time.

GEOGRAPHIC IMPACT

The level of impact of the mobile industry has an average variance across regions. In developed economies the impact is higher through improving productivity and efficiency of businesses, but, more significantly, supporting connectivity to the digital economy and open platforms that foster innovation. In developing economies, and in economies in transition, there is opportunity to improve impact through business as usual network investment, which indirectly contributes to general economic growth, as well as by increasing participation in mobile banking and mobile money platforms that help improve economic inclusion for those who are isolated from traditional financial services channels. Differences in geographic impact can be simplified to two regional groupings:

• The largest impact overall is in North America and Europe through the impact on Target 8.1. Impact is driven by high network coverage and mobile broadband penetration, generally higher use of internet, increasing economic productivity and higher use of internet by businesses to engage in e-commerce and mobile commerce.

• Asia-Pacific and Sub-Saharan Africa have the potential to see the greatest economic growth from further development to improve regional infrastructure. Lower levels of 3G and 4G coverage are currently limiting the benefit in inclusion in the digital economy for businesses and consumers. Improving the low proportion of businesses participating in e-commerce and mobile commerce, or engaging with other businesses or consumers using the internet, would significantly increase impact across both regions.

FIGURE 2
AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
16	18	27	21	17	27	12
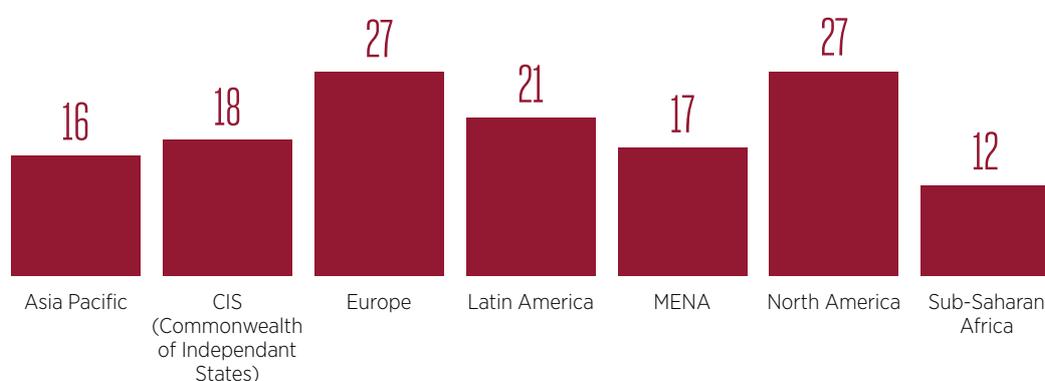
LOOKING FORWARD

The mobile industry is already making a significant impact on economic inclusion; however, as connectivity increases globally the mobile industry will begin to exhaust its potential impact, which is driven purely by connectivity. In order to support further progress against SDG 8, the industry needs to innovate, particularly around mobile money and IoT, to support the next waves of technological innovation that will drive inclusive and sustainable economic growth, employment and decent work for all. The industry has already started on this path by acknowledging its role in supporting the underlying connectivity infrastructure for smart sensor technology. Given the pace of technologic change there are likely to be many more roles for the industry to play in aiding both the creation and distribution of wealth.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

SDG9

INDUSTRY, INNOVATION AND INFRASTRUCTURE

Build resilient infrastructure, promote sustainable industrialisation and foster innovation

SDG SUMMARY

PROPORTION OF TARGETS SCORED	IMPORTANCE	PERFORMANCE		SDG SCORE
7/8	× **6.6/10**	× **52**	=	**30**

KEY
Average performance compared to all 17 SDGs

ABOVE   EQUAL   BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 9 at 30; this is the highest score across the SDGs. The current impact on SDG 9 is driven by:

- A relatively high proportion of targets identified as those where the industry can make a significant impact (7 out of 8 targets);
- An above average level of importance of the industry's activities in achieving these targets (6.6/10); and

- A relatively high performance of the industry against the metrics that contribute to these targets (52/100).

If performance was maximised (to 100), the potential impact of the industry on SDG 9 is 62. There are more than 25 underlying metrics used to develop this score across the 7 targets, including broad metrics, measuring mobile penetration, as well as specific metrics, relating to IoT and broadband infrastructure: some of these are specific to developing countries as required by the specificity of the target.

INDUSTRY IMPACT OVERVIEW

The industry clearly has a significant part to play in SDG 9, both as a provider of critical infrastructure and as a catalyst for the evolution of other industries, including industrial processes and manufacturing, which are a central part of this SDG. Largely through enhanced information exchange, mobile communication also plays a significant role in providing access to critical services to smaller industrial companies and in fostering research and development environments.

In terms of the targets that will help achieve this SDG, the industry has a significant impact on 7 of the 8 targets, spanning three categories across the targets: resilient infrastructure, sustainable and inclusive industrialisation, and innovation. The remaining targets are focused on governmental and institutional intervention, presenting a smaller opportunity for the industry to have a material impact.

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TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Building Resilient Infrastructure			
9.1	Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.	**63**	**Biggest Impact: North America** The relatively higher quality of infrastructure in North America, coupled with that region's higher incomes, have supported equitable access to services, and resulted in the biggest impact being in this region. Sub-Saharan Africa has the greatest potential for improvement in impact through further infrastructure development and a focus on affordability of services to improve coverage and penetration, respectively.
9.a	Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States.	**26**	**Biggest Impact: Sub-Saharan Africa** As the region to which this target is most relevant, the biggest impact has been in Sub-Saharan Africa, which is home to the vast majority of least developed countries and landlocked developing countries.
9.c	Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.	**77**	**Biggest Impact: Sub-Saharan Africa** The biggest impact has been in Sub-Saharan Africa, where there is significant need for affordable access to the internet and connectivity is relatively high. The industry has also had a significant impact in a number of LDCs, notably Bangladesh, where mobile penetration (unique subscribers) reached 55% in 2015, up from just 34% in 2011.
Category 2: Promoting Sustainable and Inclusive Industrialisation			
9.2	Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries.	**27**	**Biggest Impact: Latin America** The industry has greatly contributed towards this target in Latin America through improvements in infrastructure that support relatively high usage of internet by businesses. Asia-Pacific has the largest opportunity for improvement in impact as development of the market continues to drive infrastructure investment in the region.
9.3	Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.	**11**	**Biggest Impact: Sub-Saharan Africa** The industry's provision of mobile financial services, such as mobile money, in Sub-Saharan Africa has resulted in a large impact on this target. MENA has been highlighted as the region with the highest potential for improvement, where mobile money has the potential to reduce the unbanked population.

TARGET SUMMARY

Target	Description	Target Score	Commentary
9.4	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.	**19**	**Biggest Impact: North America** North America has seen the largest contribution towards this target by the industry, due to the uptake of M2M services that can be used to improve the sustainability of industries. Sub-Saharan Africa has the largest opportunity for improvement, as currently underdeveloped infrastructure has significant potential to be upgraded to improve resource efficiency.
Category 1: Ending Hunger Outcomes			
9.5	Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research, and development spending.	**19**	**Biggest Impact: North America** The industry's impact on this target has been greatest in North America, where the overall uptake of connectivity and use of connectivity by businesses is the highest. Asia-Pacific has been identified as the region with the highest potential for improvement in impact, as development of the market continues to drive penetration of mobile broadband and technology use.

TARGET-BY-TARGET IMPACT

Building Resilient Infrastructure (Targets 9.1 and 9.c)

The mobile industry contributes to Target 9.1 (development of infrastructure that benefits all) through its impact on economic development and its distinctive ability to provide 'affordable and equitable access' to communications services:

- The impact of mobile penetration on economic development for business is well documented. In a report by Deloitte, it was noted that 75% of emerging-market SMEs surveyed report that mobile has helped them grow revenue, become more efficient and be more innovative, while 50% of SMEs in developed markets shared the same view[1];

- Mobile also promotes equitable access: the reach of mobile enabled by flexible infrastructure can more economically cover large, less-densely populated areas, promoting more equitable access to

services even in the more remote physical locations and helping to reduce unequal service provision between rural and urban areas.

The mobile industry also contributes to Target 9.c (ICT infrastructure and internet access) through its core business of providing data connectivity:

- Access to the internet is a critical first step for developing countries, providing a gateway to increased use of other information and communication technologies. The per centage of households with internet in developed nations is 81.3%, compared to 34.1% in developing countries and only 6.7% in least developed countries.[2] Closing the connectivity gap using mobile can stimulate increased access to, and use of, information and communications technology; and

1. Deloitte. (2012). What is the impact of mobile telephony on economic growth? A Report for the GSM Association. http://www2.deloitte.com/content/dam/Deloitte/uk/Documents/technology-media-telecommunications/deloitte-uk-tmt-impact-of-mobile-telephony-on-economic-growth.pdf
2. ITU. (2015). Global ICT data. https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2015.pdf

- Progress has been made to increase coverage with 69% of the world's population covered by 3G networks as at 2015.[3] However, there is still significant work to be done to provide remote communities with coverage, and to improve affordability of services and handsets to support uptake of services.

Promoting Sustainable and Inclusive Industrialisation (Targets 9.2, 9.3 and 9.4)

The industry contributes to the targets focused on sustainable and inclusive industrialisation by improving the efficiency of manufacturing and industrial processes, enabling economic inclusion of remote communities, and by supporting IoT infrastructure to improve sustainability.

The mobile industry contributes to Target 9.2 (inclusion and improving the efficiency of manufacturing and industrial processes), firstly, by enabling access to the internet to promote inclusiveness of economic development and, secondly, by supporting the development of IoT connectivity infrastructure that can drive improved production efficiency in industrial processes:

- Access to the internet promotes inclusion of remote communities, enabling them to be economic participants where they might not otherwise benefit from urban industrialisation due to physical distance;

- Mobile services and, increasingly, mobile internet create a channel by which more remote communities, who would usually be marginalised from urban industrialisation, can access employment and business opportunities to reap the benefits of economic development in a way that more closely aligns to their urban counterparts;

- Mobile plays a critical role in ensuring that devices and sensors are connected and can relay data about production efficiency or asset condition; the GSMA

Connected Living Programme is active in supporting IoT, with the stated aim to accelerate the delivery of new connected devices and services in the M2M market through; industry collaboration, appropriate regulation, optimising networks and developing key enablers, such as Remote SIM Provisioning, to support the growth of M2M in the immediate future[4]; and

- In some cases, mobile operators can also build on their core proposition of providing connectivity by vertically integrating into the M2M market: China's mobile operators are taking steps to move up the value chain into connectivity management services and systems integration. China Telecom is investing heavily in IoT, focusing in particular on the Internet of Vehicles, as well as video surveillance and smart homes[4].

The mobile industry contributes to Target 9.3 (improving access to smaller industrial enterprises of key services) by enabling greater access to financial services, through:

- Access to mobile financial services such as mobile money and micro-finance that can help small and medium-scale enterprises to formalise their operations and access credit required to expand. In least developed countries, one of the main barriers to the growth of small businesses has been a lack of access to finance, both for buyers and sellers, subsequently resulting in the inability to productively mobilise resources[5]; and

- Through mobile money and digital education provided to small enterprises and entrepreneurs, increasing the potential to formalise their operations and access new markets.

3. ICT Facts and Figures. (2015). The World in 2015. https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2015.pdf
4. GSMA. (2015). How China is scaling the internet of things. http://www.gsma.com/connectedliving/wp-content/uploads/2015/07/16531-China-IoT-Report-eng.pdf
5. Song, S. (2016). Africa's Telecoms Infrastructure: 2015 at a Glance. https://itu4u.wordpress.com/2016/02/15/africas-telecoms-infrastructure-2015-at-a-glance/

The mobile industry's contribution to Target 9.4 (upgrading and further infrastructural development to better manage the impact on the environment) is through infrastructural upgrade to increase sustainability and resource efficiency. The two primary drivers of this are:

- Upgrading mobile infrastructure specifically to increase the use of clean energy sources and improve energy efficiency; Green Power for Mobile, a GSMA initiative, turned the commercial challenge of operating in areas with unreliable power grids into an opportunity to power mobile infrastructure with green energy solutions. Green Power for Mobile is currently running a joint project with Sunlabob, a Laos-based renewable energy company, to power mobile towers in Myanmar[6]; and

- Supporting the development of IoT focused on energy and industrial process efficiency to enable resource-intensive sectors to improve the sustainability of their processes. The adoption of IoT is increasing among major industries, with logistics companies, utilities and manufacturers being the key users of this new technology. The connectivity provided by mobile operators enables increased efficiency, lower costs and better infrastructure management[4].

IMPACT STORY:
CONNECTED CARS, INDIA – VODAFONE

Mahindra REVA is a world-leading pioneer in electric vehicle technologies and manufacturing, based in India. The company has worked extensively to make major technological advances in the automotive market. After coming up with the concept of a new breed of 'connected' car there was a need to find a reliable way to provide data connectivity to vehicles across India and around the world. Particular challenges included achieving the desired performance over mobile networks under diverse conditions and managing the connectivity as the number of vehicles in the network increase.

To tackle these issues Mahindra REVA partnered with Vodafone who demonstrated a long term vision and roadmap of M2M technology whilst also having an existing dedicated M2M service platform in India. Vodafone initially supplied Mahinda REVA with connections needed to run tests and effectively link platform applications that were in development. A major concern was whether the service was going to be robust and reliable, for example, there were initial issues with connections in a factory at a remote location. Vodafone, utilising its own netwok, was able to draw upon the expertise of an in-house team of M2M specialists who established the required systems architecture to fix any emerging issues.

Whilst the adoption of connected cars is still in its infancy, the potential benefits to consumers are vast. Mahindra REVA uses a telematics platform, enabling a central diagnostics team to remotely monitor vehicle performance data in real time. This allows the maintenance team to understand the root cause of the performance issue and quickly address many issues over-the-air, enabling greater efficiency and lower costs. For consumers, the car automatically provides SMS alerts when a door is left unlocked, a parking brake is not applied or there is a charging point fault, improving both the security and safety for drivers. Further, by using a smartphone app, owners can check the state of charge in the battery of their car, control its air-conditioning, lock or unlock doors and find the nearest charging station.

6. GSMA. (2014). Green Power for Mobile: Energy outsourcing: Sunlabob, Myanmar. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/11/Sunlabob-Case-Study_FINAL_sm.pdf

TARGET-BY-TARGET IMPACT

Fostering innovation (Target 9.5)
The industry contribution to enabling IoT technology also impacts the Innovation aspect of SDG 9. The mobile industry contributes to Target 9.5 (investing in technology and research and development) by driving technological upgrading across sectors that promotes innovation in traditional industrial processes:

- The mobile industry can drive significant innovation and introduction of new technologies into resource-intensive sectors. China's largest mobile operator, China Mobile, launched M2M services in 2007. Since then, it has developed industry-specific solutions for logistics, electricity, finance and other sectors, as well as launching three M2M products: Car Service Link, elevator Guardian, and fire Control System. It has also established an "Internet of Vehicles" (IoV) company, driving innovation in the automotive sector including establishing a joint venture with Deutsche Telekom[4].

FIGURE 1
R&D SPEND, % OF GDP, 2013

Source: World Bank
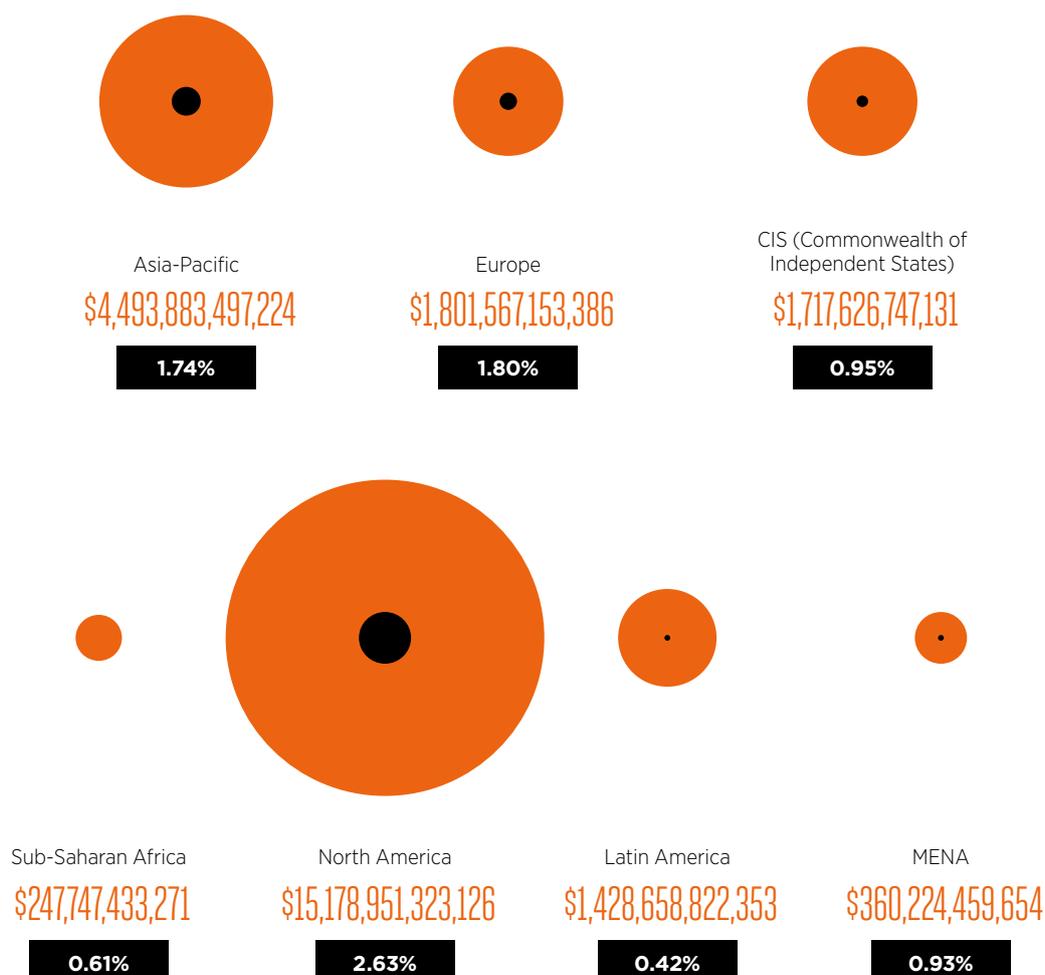
Asia-Pacific
$4,493,883,497,224
1.74%

Europe
$1,801,567,153,386
1.80%

CIS (Commonwealth of Independent States)
$1,717,626,747,131
0.95%

Sub-Saharan Africa
$247,747,433,271
0.61%

North America
$15,178,951,323,126
2.63%

Latin America
$1,428,658,822,353
0.42%

MENA
$360,224,459,654
0.93%

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity.

The mobile industry has a mix of roles that impact SDG 9. Some roles are part of the core operations of a mobile operator, such as building and operating infrastructure, while the provision of mobile connectivity also results in significant impact on SDG 9. The role in supporting IoT varies across the industry. For some operators, IoT infrastructure development, such as developing standards for remote SIM provisioning, appears to be viewed as non core, while others have identified significant commercial opportunity in integrating IoT offerings into their core business.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time):

- The industry has a direct impact on infrastructure creation – the physical mobile infrastructure that forms a critical part of a country's overall infrastructure network, including roads, electricity, water and sewage.

- However, the indirect and systemic impacts on economic development and sustainable and inclusive industrialisation, of providing communications services, is far larger. Communications infrastructure, both fixed and mobile, has been shown to contribute to economic development; however, mobile has a distinct advantage in being able to provide affordable and equitable access to internet and communication services, critical to the inclusion of the poor and physically remote. Furthermore, mobile connectivity supports the proliferation of IoT to drive sustainability and innovation in all sectors.

GEOGRAPHIC IMPACT

The industry has above average variance on the level of impact across the regions. The industry can increase its impact on SDG 9 in developed economies by promoting new infrastructure development that is environmentally-sound and increases energy efficiency:

- The largest impact overall is in Latin America, through the impact on Targets

9.1, 9.4 and 9.5. This is due to the improvements in both the quality and resilience of infrastructure in place, the high 2G and 3G network coverage, especially compared with more developed regions.

- Sub-Saharan Africa has the lowest level of impact, due to significantly lower levels of investment and lower uptake of IoT and M2M services.

FIGURE 2

AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
34	32	35	41	36	32	28
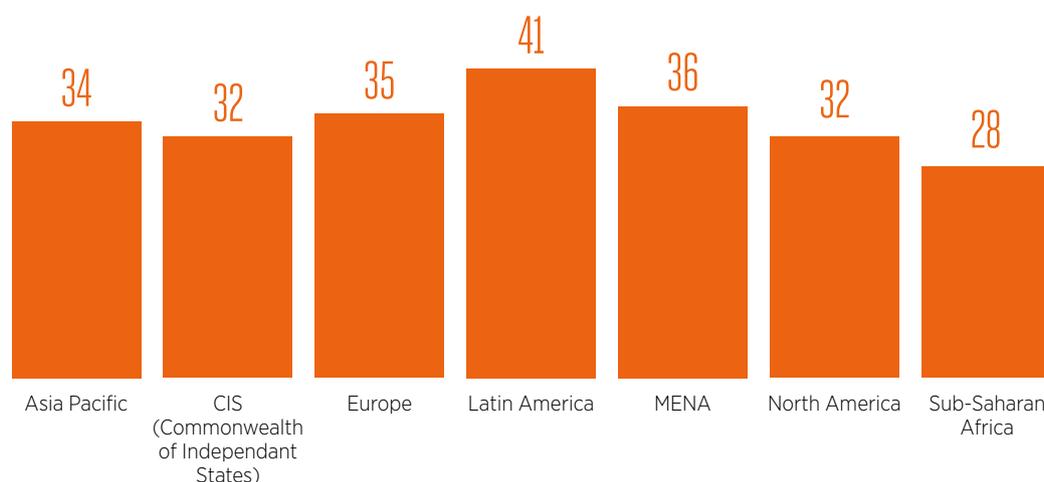
LOOKING FORWARD

To maximise the impact against this SDG, the industry needs to continue to roll out infrastructure to connect the unconnected to mobile broadband. National governments and regulators are key enablers for this. The industry is keen to collaborate with policy makers and others to find solutions for providing affordable access to mobile broadband infrastructure for the harder to reach populations. The greatest contribution of such developments can be made in the developing world. IoT is a nascent market, and, as part of the wider ecosystem, there is great potential for the industry to take a lead in developing this infrastructure which will foster innovation across a wide range of sectors in both developed and developing economies.

10 REDUCED INEQUALITIES

SDG10

REDUCE INEQUALITIES

Reduce inequality within and among countries

SDG SUMMARY	PROPORTION OF TARGETS SCORED	IMPORTANCE	PERFORMANCE	SDG SCORE	KEY
	2/10	**7.0/10**	**27**	**4**	Average performance compared to all 17 SDGs

× × =

KEY: ABOVE · EQUAL · BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 10 at 4; this is lower than the average across the SDGs. The current impact on SDG 10 is driven by:

- A relatively low proportion of targets identified as those where the industry can make a significant impact (2 out of 10 targets);

- An above average level of importance of the industry's activities in achieving these targets (7/10); and

- A relatively low performance of the industry against the metrics that contribute to these targets (27/100).

If performance was maximised (to 100), the potential impact of the industry on SDG 10 is 17. Metrics contributing to this outcome include broad measures of internet coverage, as well as more specific measures of internet uptake in businesses and the availability of local content.

INDUSTRY IMPACT OVERVIEW

The industry primarily impacts SDG 10 through its roles as a provider of connectivity and of mobile money. As a provider of connectivity, the industry enables access to contextually appropriate and affordable information, social networks and marketplaces. This promotes the social, political and economic inclusion irrespective of the age, sex, disability, race, ethnicity, origin, religion or economic status of those who access it. As a provider of mobile money (and financial services), the industry increases financial inclusion and facilitates remittances that are affordable and widely accessible.

The mobile industry contributes most significantly to the two targets that focus on equality for individuals, particularly related to reducing income inequality and promoting empowerment. The industry has a limited impact on the majority of the targets, due to the broad and general nature of their ambition, as well as the specific calls for government and relevant institutions to create policy and interventions aimed at reducing inequality between countries.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Reducing Income Inequality			
10.c	By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent.	**8**	**Biggest Impact: Sub-Saharan Africa** The largest impact is in Sub-Saharan Africa, where mobile, as an alternative channel for remittances has experienced the highest take-up relative to other regions. The biggest opportunity is also still in Sub-Saharan Africa, where there is significant need due to the reliance on migrant remittances from overseas and the high cost of existing remittance corridors.
Category 2: Empowerment of Individuals			
10.2	By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.	**30**	**Biggest Impact: North America** The industry has had the largest impact towards this goal in North America, where access to connectivity enabling people to participate socially, economically and politically is equitable. The biggest opportunity is in Sub-Saharan Africa, where expansion of infrastructure and improvement in affordability of services could reduce barriers to access and increase inclusion.

TARGET-BY-TARGET IMPACT

Reducing income inequality (Target 10.c)
The industry contributes to Target 10.c (access to affordable remittances) by providing remittance services through mobile money, reducing the cost of remittances and increasing ease of use, particularly in developing countries:

- In remote communities the trip to collect remittances from family members working in major cities can be prohibitive in terms of both cost and time. The expansion of remittance services through mobile money can remove this physical barrier by allowing customers to send and receive remittances using their mobile phones.

- Provision of remittance services can also contribute to reducing transaction costs for users. On average the cost per transaction is typically 7.6%[1]. Mobile technology reduces the cost of remittance, for example, by removing the need for physical points of presence, ensuring a timely and secure method of transaction[2], and also by introducing competition.

- Reducing the cost of remittance services is likely to enhance the flow of capital. Estimates by The World Bank suggest that reducing commission charges to 5% would result in an addition $4 billion reaching Africa's migrants, thereby boosting capital flows and stimulating economies[3].

1. World Bank (June 2016) Remittance prices worldwide. https://remittanceprices.worldbank.org/sites/default/files/rpw_report_june_2016.pdf
2. GSMA: Mobile Money Transfer. (2010). International Remittance Service Providers: An overview of mobile International Remittance Service Provider service offerings. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/03/gsmaremittanceserviceproviderwhitepaper182.pdf
3. World Bank (January 2013) African Migrants Could Save US$4 Billion Annually On Remittance Fees, Finds World Bank. http://www.worldbank.org/en/news/press-release/2013/01/28/african-migrants-could-save-US4-billion-annually-remittance-fees-finds-world-bank

TARGET-BY-TARGET IMPACT

Empowerment of individuals (Target 10.2)

The industry contributes to Target 10.2 (Social, economic and political inclusion) by providing affordable access to the internet and social networks, online marketplaces, mobile money and information:

- Access to the internet is a powerful source of inclusion, connecting people, information, networks and services, regardless of age, sex, disability, race, ethnicity, origin, religion or economic or other status. However, affordability of access can be a barrier, especially for the most vulnerable. Mobile has a significant role to play as an innovator of more flexibly priced services than fixed line (for example micro prepayment).[4]

- The networks opened through mobile internet can have a significant impact on social and political inclusion by providing a channel for users to stay in touch despite physical distance. Networks also empower people to advocate for their political and social rights: social networks help to address poverty and inequality by enabling "mutual support, collective action and campaigning".[5]

- Mobile connectivity also promotes economic inclusion by enabling access to marketplaces, lowering the barriers to engaging in commercial activities. Access to markets was cited as a critical barrier to entry for small-scale food producers who operate in markets with low population densities and have limited access to other markets. Mobile can be used to setup trade fair or market days, providing an opportunity for buyers and sellers to meet and broker trades.[6]

- Mobile money has also significantly impacted the economic inclusion of its users, giving substantially greater financial independence to previously underserved individuals and communities. The earliest applications of mobile money enabled users to send and receive money, increasing financial inclusion. Furthermore, as mobile money has matured, additional financial services have been built on top of existing platforms, further amplifying the impact on economic inclusion: Commercial Bank of Africa (CBA) and Safaricom have partnered up to offer M-Shwari, a bank account that offers a combination of savings and loans, which in just three years is used by 1 in 5 adults in Kenya. A further benefit includes the ability of individuals to build a financial history and therefore establish credit scores.[7]

4. Bhavani, A. (2008). The role of mobile phones in sustainable rural poverty reduction. ICT Policy Division; World Bank. http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/The_Role_of_Mobile_Phones_in_Sustainable_Rural_Poverty_Reduction_June_2008.pdf
5. Afridi, A. (2011). Social networks: their role in addressing poverty. JRF programme paper: Poverty and ethnicity. https://www.jrf.org.uk/sites/default/files/jrf/migrated/files/poverty-social-networks-full.pdf
6. IFAD. (2003). Promoting Market Access: for the Rural Poor in Order to Achieve the Millennium Development Goals. https://www.ifad.org/documents/10180/79e82056-a4be-44d2-9362-9cc093b9176d
7. CGAP (2015). Top 10 Things to Know About M-Shwari. https://www.cgap.org/blog/top-10-things-know-about-m-shwari

IMPACT STORY: GIGA ISLAND PROJECT – KT CORPORATION

Even in developed nations, geographical characteristics can isolate parts of a country creating a sense of exclusion and reducing opportunities for the population. One such example is the Imja-do Island, one of the many islands that surround the Korean Peninsula, which with no bridge linking it to the mainland, is at least four hours from the nearest city for a round trip.

KT Corporation started the GiGA Island project on Imja-do Island, aiming to improve the fundamental quality of life of local communities in terms of education, healthcare, safety, productivity and more. The project is based on cooperation between KT Corporation, local government and residents to facilitate ICT infrastructure and solutions to help solve local problems. The GiGA network has helped to overcome the physical barrier with a 'virtual bridge', which transformed the overall quality of life on the island.

Since its inception in 2014, the project has been a success with observable improvements across four key dimensions:

- **Education:** Using a video conferencing system, students can interact with teachers in Seoul, 350km away;

- **Culture:** Residents can listen to cultural lectures from a culture centre in Mokpo, 66 km away, using a direct line;

- **Healthcare:** Using mobile devices, the elder generation can receive health check-ups and send the results to medical institutions; and

- **Farming:** With the majority of the young adults living on the mainland because of work, and the island's main source of income (70%) being from agriculture, this can pose a problem for family inclusion. However, using the GiGA network, farmers can check on their crops condition in real-time and also control their facilities whilst being away from the island.

To see more impact stories that contribute to each of the Sustainable Development Goals, visit
www.gsma.com/betterfuture

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted by the industry's role as a provider of connectivity and platforms:

- **Connectivity and Platforms:** In both cases mobile creates an effective, comparatively cheap and secure channel into the more marginalised parts of society that the SDG focus upon. Once established, the channel then provides information and services

that drives financial inclusion both directly and indirectly. Connectivity primarily drives the impact on Target 10.2, and platforms, specifically m-Money, drives the impact on Target 10.c.

- The impact that stems from MNO operations is comparatively small and therefore not a focus here, as the absolute numbers of people directly employed by MNOs limits the impact in comparison to the size of the connected population.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time).

The impact made by the industry on this SDG is primarily direct for both priority targets, as mobile operators can create alternative mobile remittance channels that provide a low-cost alternative, directly impacting Target 10.c, and access to connectivity promotes digital inclusion, making a direct contribution to Target 10.2.

GEOGRAPHIC IMPACT

The level of impact of the mobile industry varies across regions. The largest overall impact is in North America, through the impact on Target 10.2, driven predominately by the affordability and availability of services. Further geographic analysis highlights:

• Sub-Saharan Africa, CIS and Latin America scored somewhat similarly across SDG 10; however, the balance of impact between income inequality and economic empowerment differs between these regions, suggesting different approaches are required to increase impact across these regions.

• The regions where the industry has the greatest potential to increase its impact is Asia-Pacific and MENA, particularly on addressing empowerment of individuals. These regions have lower affordability of voice and data services, especially for women, where the mobile bundle cost is the least affordable globally.

FIGURE 1
AVERAGE TARGET SCORE ACROSS REGIONS
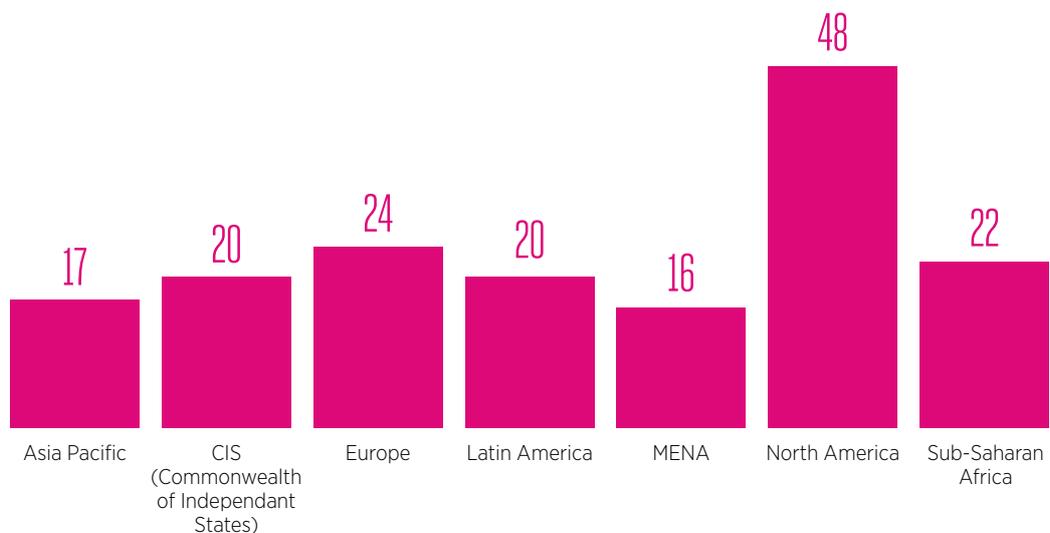
LOOKING FORWARD

Although only significantly impacting 2 out of the 10 targets of SDG 10, the mobile industry makes a considerable contribution to those targets, especially in remote areas or developing countries where lack of access to information, networks, markets and financial services have represented a barrier to inclusion.

Ways of furthering this impact might include the reduction of socioeconomic barriers to connectivity, the creation of tariffs and service bundles focused on increasing affordability for marginalised segments,

and the expansion of m-money platforms to offer more advanced financial services. Improving affordability would be particularly impactful in Sub-Saharan Africa, MENA and Latin America where high levels of income inequality means that the cost of a data subscription remains unaffordable for the bottom 20%, as illustrated in Figure 1. Advancing mobile money services will require greater collaboration amongst operators and regulators, particularly in establishing greater enabling regulatory frameworks required to accelerate service availability across more regions.

FIGURE 2

ANNUAL COST OF 500MB DATA PER MONTH TO LOWEST INCOME QUINTILE

ITU, World Bank,
Deloitte Analysis
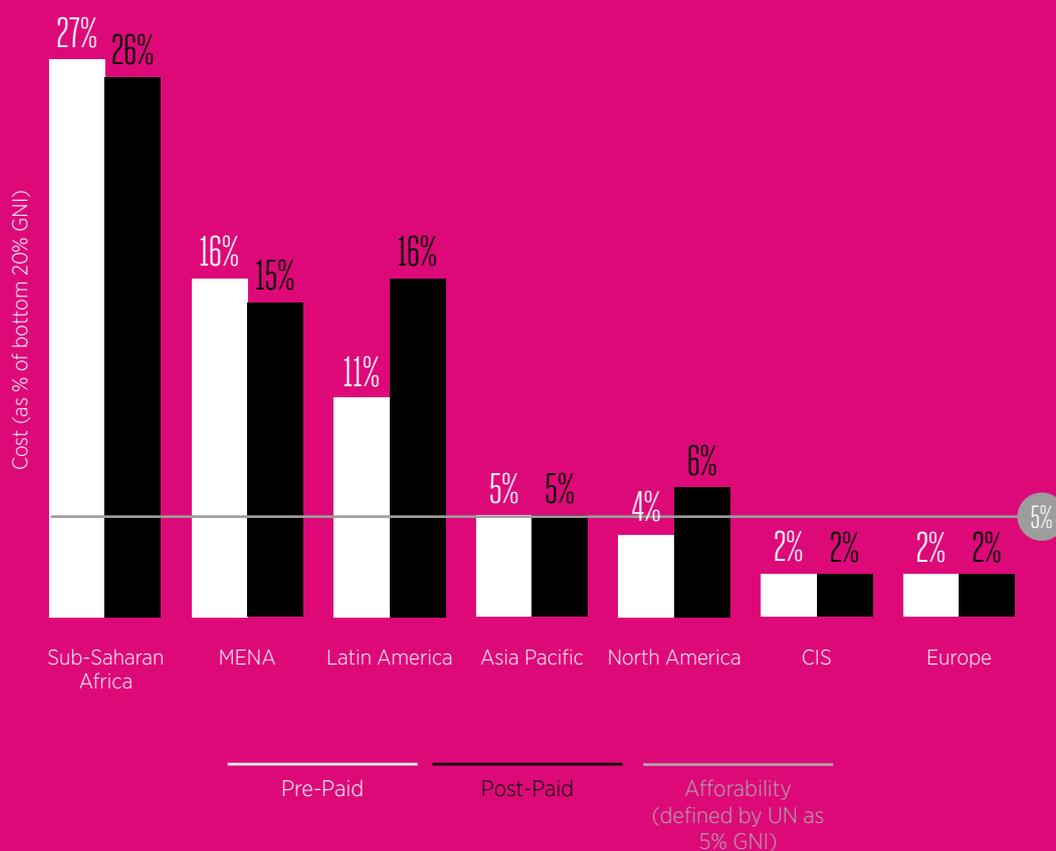
Cost (as % of bottom 20% GNI)

Region	Pre-Paid	Post-Paid
Sub-Saharan Africa	27%	26%
MENA	16%	15%
Latin America	11%	16%
Asia Pacific	5%	5%
North America	4%	6%
CIS	2%	2%
Europe	2%	2%

Afforability (defined by UN as 5% GNI) — 5%

Pre-Paid   Post-Paid   Afforability (defined by UN as 5% GNI)

*Population weighted average of countries in our 90 country sample for which data is available

11 SUSTAINABLE CITIES AND COMMUNITIES

SDG11

SUSTAINABLE CITIES AND COMMUNITIES

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

SDG SUMMARY

PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE			SDG SCORE
2/10	×	**6.8/10**	×	**31**	=		**4**

KEY
Average performance compared to all 17 SDGs

ABOVE　EQUAL　BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 11 at 4; this is lower than the average across the SDGs. The current impact on SDG 11 is driven by:

- A low proportion of targets identified as those where the industry can make a significant impact (2 out of 10 targets);

- An above average level of importance of the industry's activities in achieving these targets (6.8/10); and

- A relatively low performance of the industry against the metrics that contribute to these targets (31/100).

If performance was maximised (to 100), the potential impact of the industry on SDG 11 is 13. The low scores reflect both the specific nature of the targets which focus on intervention by major governing bodies and the evolving nature of the contribution that mobile and, indeed broader ICT, makes in this area.

INDUSTRY IMPACT OVERVIEW

The mobile industry contributes to SDG 11 primarily through:

- Provision of emergency broadcasting systems and basic connectivity that can reduce loss in the face of natural disaster;

- Development of IoT monitoring solutions which can help change citizen behaviour and provide critical inputs into city-planning and management; and

- Provision of direct channels to report crime and facilitate policing; for example by streaming video from the field that can improve the level of safety in cities.

Through these mechanisms, the mobile industry contributes to 2 out of the 10 targets in SDG 11, both focused on increasing sustainability and resilience of cities and communities. The industry has a limited impact on the remaining targets, which focus on national and regional planning and policies, as well as the broad nature of the targets within the "access to housing and basic services" category.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Increasing Sustainability and Resilience			
11.5	By 2030, significantly reduce the number of deaths and the number of people affected, and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.	**34**	**Biggest Impact: North America** The industry has had the greatest impact in North America, through the development of resilient infrastructure and advanced emergency communication systems. The highest opportunity is in Asia-Pacific, where the coverage and penetration limit the effectiveness of emergency warning systems for the significant proportion of the population without access to communication services.
11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.	**8**	**Biggest Impact: North America** The biggest impact has been in North America where M2M solutions are being implemented for improved environmental monitoring. Sub-Saharan Africa presents the greatest opportunity for the industry to impact this target, by promoting IoT-enabled environmental monitoring.

TARGET-BY-TARGET IMPACT

Increasing Sustainability and Resilience (Target 11.5 and 11.6)

The industry contributes to Target 11.5 (reducing deaths and other losses from disasters) by providing emergency broadcast systems and emergency-calling capability during disasters, as well as increasing network resilience to reduce network downtime during critical disaster periods:

• Communication is critical to the mitigation of loss and to the coordination of disaster recovery. In particular, effective humanitarian response to natural disasters is limited by the lack of accurate and timely information about movement and communications of affected populations.[1] Mobile enables push-notifications for emergency broadcasting, and emergency calls that alert emergency responders to areas of critical need. Typically the window of time when emergency responders are most able to save lives is 72 hours, a period where swift assessments of damage also need to be undertaken. Communication in this period is vital to facilitate the flow of information between governments, communities and humanitarian organisations.[2] Mobile also plays a key role in organic dissemination of news, providing those connected with the ability to receive updates about the disaster in question and notify their neighbours, relatives and friends through messages on various platforms.[3]

• Reducing downtime of networks due to infrastructure damage from natural disasters is crucial to the ability of the industry to deliver this impact. Typically, telecommunications infrastructure is among the most damaged during a disaster, rendering afflicted communities incapable of reaching out for help.[4] The industry can take several steps, particularly in disaster-prone areas, to increase the resilience of infrastructure. An increasing number of mobile network operators

1. UN Global Pulse. Using Mobile Phone Activity for Disaster Management during Flood. http://www.unglobalpulse.org/sites/default/files/UNGP_ProjectSeries_Tabasco_Flooding_2014_0.pdf
2. GSMA. (2012). Dealing with Disasters: Technical Challenges for Mobile Operators. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/06/Dealing-with-Disasters_Final.pdf
3. International Journal of Science and Research. Early Warning Systems and Disaster Management using Mobile Crowdsourcing. http://www.ijsr.net/archive/v3i4/MDIwMTMxNDI5.pdf
4. Microsoft Citizenship Asia Pacific. (2016). How Has Technology Improved Disaster Response? https://blogs.technet.microsoft.com/microsoft_citizenship_asia_pacific/2016/05/31/how-has-technology-improved-disaster-response/

are improving base stations to ensure functionality during natural disasters. China Mobile, for example, have designed 'Super Base-Stations' which have their own power supply and satellite transmission equipment.[5]

The industry contributes to Target 11.6 (reducing the environmental impact of cities) by developing IoT solutions for environment monitoring to improve air quality, waste and reduce the negative environmental impact of cities:

• Socioeconomic impacts of improving environmental conditions are material; more than three million people die prematurely each year because of ambient air pollution. Effective monitoring solutions using IoT can deliver greater societal benefits both in terms of quality of life, reducing health care costs and working days lost to illness.[6] Low cost IoT solutions are already creating impact in the market, allowing individuals to contribute to

monitoring efforts: kits like the 'Smart Citizen Kit' measure air pollution and upload the data to create crowdsourced maps. This data could be used to supplement professional sensing networks.[7]

• This approach also extends to other environmental applications such as waste management. For example, 'Sintelur' is a sensor that can determine the level of waste within containers. The data is then used to calculate the most efficient waste-collection route, which reduces CO_2 emissions.[8]

• More broadly, the rich data sets created by IoT monitoring solutions can enable authorities to build smarter cities that are more efficient at delivering services, and, hence, reduce the impact of urban growth on the environment, for example, the emergence of intelligent traffic management and driverless cars, and IoT emergency broadcast systems.[9]

FIGURE 1

DEATHS ATTRIBUTED TO INDOOR AND OUTDOOR POLLUTION

Source: UN, 2012

Region	Deaths, per 100,000
North America	11
Latin America	24
Europe	38
MENA	46
Sub-Saharan Africa	68
CIS (Commonwealth of Independent States)	110
Asia-Pacific	125

Deaths, per 100,000
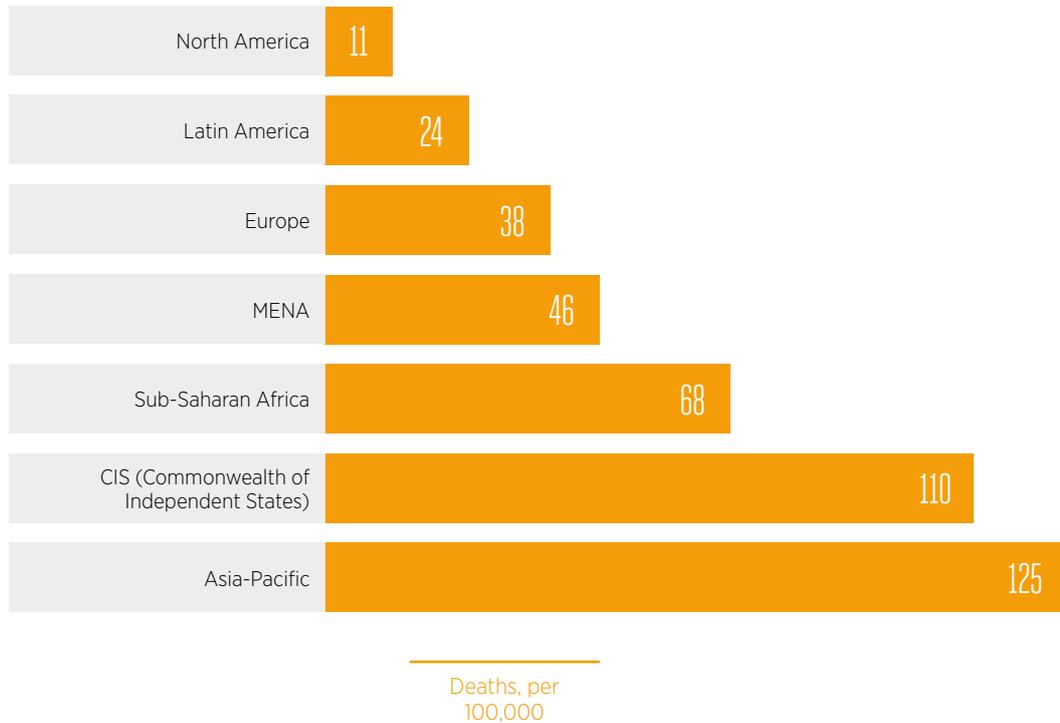
5. ITU- D; Study Group 2. (2014). Question 22-1/2; Utilisation of Telecommunications/ICTs for Disaster Preparedness Mitigation and Response. (link)
6. 5gworldnews (2016).Time for smart cities to prioritise air pollution https://5gworldnews.com/2016/06/06/time-for-smart-cities-to-prioritize-air-pollution/
7. Nesta (2015). Re-thinking smart cities from the ground up. https://www.nesta.org.uk/sites/default/files/rethinking_smart_cities_from_the_ground_up_2015.pdf
8. Wairbut. SINTELR: An intelligent system for the recollection of urban waste. http://www.wairbut.com/_adj_ed/productsheet_sintelur.pdf
9. GSMA Connected Living. (2014). Mobile Smart City Benchmarking Report: Summary of mobile smart city best practice for partnerships between operators, vendors and government. http://www.gsma.com/connectedliving/wp-content/uploads/2014/02/2649_GSMA_benchmarking_Report_Web.pdf

IMPACT STORY: SMART CITY, VALENCIA – TELEFONICA

The city of Valencia set out its vision to transform itself into a Smart City, utilising technology to enhance the lifestyles of the citizens of Valencia. The city enabled companies, entrepreneurs, universities, and researchers to work together in a joint initiative to improve Valencia through innovation and technology, offering citizens simple digital solutions to their daily problems.

Partnering with Telefonica on the technology side, the city merged 45 different services into its centrally managed, open-standard digital platform called VLCi, which is now keeping citizens informed through one single always-available access point. The Valencia smartphone app provides geo-located real-time information on public transport, parking, waste management, alerts (for example, for traffic, emergencies, etc.) and access to registry services (for example, appointments, fee payments, etc.). The platform also provides the city council and other civil services such as the police, with a unique and integrated vision of all the

information on the state of the city, enabling the management and improvement of the operational efficiency of its urban services:

- 90% of all citizen interactions with city services are done online no longer requiring any paper;

- Smart lighting and smart water management provide resource efficient systems that reduced consumption up to 35%;

- 3,900 preexistent traffic density sensors and 1,000 intelligent traffic lights that have been connected to monitor traffic and relay information in real time to drivers;

- Available parking information is provided in real time, with handicapped parking spaces managed through a smartphone app;

- Law enforcement and Fire Fighting services have a new rapid alert service that decreases response time; and

- Noise pollution, rubbish collection, water management, air quality and all other core indicators that a big city must regulate are now centralised and streamlined.

Source: https://iot.telefonica.com/blog/valencia-on-the-smart-city-fast-track
To see more impact stories that contribute to each of the Sustainable Development Goals, visit

www.gsma.com/betterfuture

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted by core operations and platforms:

- **Operations:** Impact is delivered through the provision of emergency, the maintenance of critical infrastructure as detailed above with the impact falling primarily in Target 11.5.

- **Platforms:** The industry's contribution to the application of smart sensors in environmental monitoring, and the building of associated data sets, goes beyond the provision of connectivity and as such is identified as an important "Platform" activity. This impact is felt predominantly in Target 11.6.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is primarily direct, which covers both the impacts on increasing sustainability and resistance (Target 11.5) and reducing the environmental impacts of cities (Target 11.6).

GEOGRAPHIC IMPACT

The level of impact of the mobile industry varies across regions reflecting both need and industry performance. The largest overall impact is in North America, through the impact on both targets. Sub-Saharan Africa, Asia-Pacific and MENA have the highest opportunity for the industry to aid sustainability initiatives in this area. Further geographic analysis highlights:

- Developed economies have a significant opportunity to utilise existing infrastructure and machine ecosystems, which can enable more resilient and efficient cities, with advanced and reliable emergency communications systems, as well as supporting automation and monitoring through IoT platforms.

- Transitioning economies can increase impact on SDG 11, primarily through investment in IoT and collaboration with local institutions to help communities improve their resilience to the negative impacts of climate change and rapid urbanisation common in transitioning economies.

At a regional level, Asia-Pacific has a low score compared to North America and Europe, due to a lower coverage of 3G and 4G services that support M2M and IoT services, and a lower resilience of network infrastructure in the case of natural disasters.

FIGURE 2
AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
18	21	36	24	18	46	15
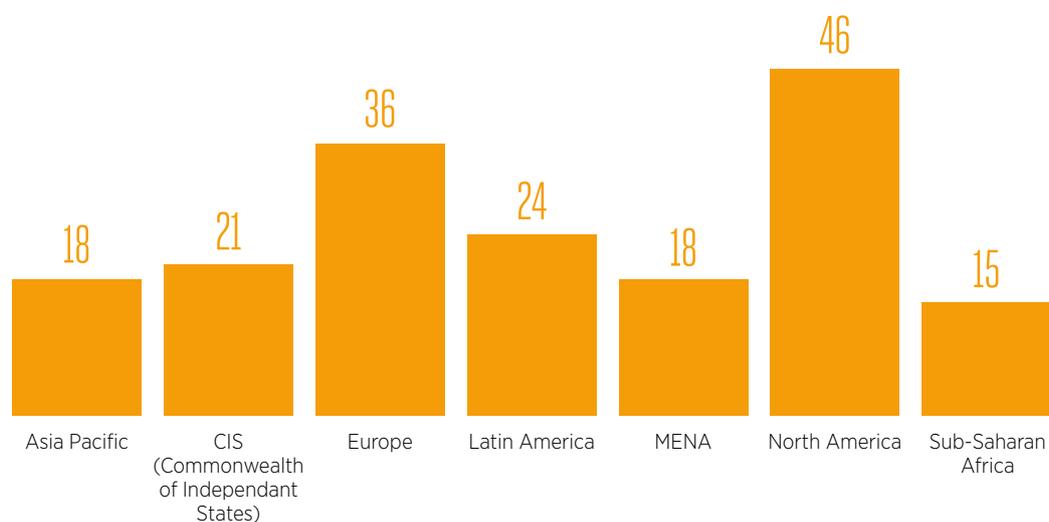
LOOKING FORWARD

The mobile industry already plays a significant role in supporting cities and communities in times of disaster, enabling effective communication for governments, authorities, and individuals to provide warnings for natural disasters and make emergency calls to direct relief to the worst-affected areas. Despite this, many communities still lack the infrastructure to reduce the impact of natural and man-made disasters, warranting a more cohesive industry-level response as well as investment in platforms that could help predict disasters and then manage the implications.

While the current impact of environmental monitoring IoT is limited by the current proliferation of IoT technology, the rise of the 'smart' or 'connected' city through advances in technology will likely bring with it an increased use of environmental monitoring through the mobile platform, improving cities' and communities' ability to reduce the per capita environmental impact of cities. The Smart City space is crowded with potential participants and there are few examples of comprehensive schemes, requiring the mobile industry, together with others, to invest in the design and development of the standards and infrastructure that will have maximal impact on this SDG.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

The connectivity the mobile industry provides enables intelligent insight to help people improve their consumption patterns and reduce their environmental impact.

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5 OUT OF 11 SDG12 TARGETS IMPACTED BY THE MOBILE INDUSTRY

DEVELOP IOT/M2M SOLUTIONS TO SUPPORT SOLUTIONS TO IMPROVE ENERGY EFFICIENCY

91

MOBILE OPERATORS
SUBSCRIBING TO THE
GLOBAL COMPACT
TEN PRINCIPALS

#betterfuture

DEVELOP IOT/M2M
SOLUTIONS TO
INCREASE THE
RESOURCE EFFICIENCY
OF INDUSTRIAL
PROCESSES AND

**REDUCE
WASTE**

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

SDG12

RESPONSIBLE PRODUCTION AND CONSUMPTION

Ensure sustainable production and consumption patterns

SDG SUMMARY	PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE		SDG SCORE	KEY
	5/11	×	**5.5/10**	×	**52**	=	**13**	Average performance compared to all 17 SDGs

KEY: ABOVE · EQUAL · BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 12 at 13; this is equivalent to the average across the SDGs. The current impact on SDG 2 is driven by:

- An average proportion of targets identified as those where the industry can make a significant impact (5 out of 11 targets);

- A lower than average level of importance of the industry's activities in achieving these targets (5.5/10); and

- A relatively high performance of the industry against the metrics that contribute to these targets (52/100).

If performance was maximised (to 100), the potential impact of the industry SDG 12 is 25. Metrics underpinning this score include broad-based measures of penetration and mobile broadband connectivity as well as specific metrics looking at energy consumption, waste disposal and the industry's commitment to ethical practices.

INDUSTRY IMPACT OVERVIEW

The industry contributes to SDG 12 across the three categories of: conserving natural resources, reducing waste, and building sustainability capability. This contribution is made through the: management of its own operations, through the provision of connectivity that enhances community interaction and provides access to educational material related to sustainability, and through enabling improved and more robust monitoring solutions to protect the environment.

The mobile industry impacts Targets 12.2 (sustainable use of natural resources), 12.5 (reduction of waste) and 12.6 (industry accountability for sustainability) through the energy-efficient management of its infrastructure and power sources, by reducing global e-waste, and by implementing sustainability-reporting and processes. The industry impacts Targets 12.8 (engaging community sustainability) and 12.a (scientific and technological capability) through the provision of basic data and M2M connectivity; investment in M2M or IoT is particularly important to this SDG as it calls for enhanced technology capability in developing nations.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Sustainable Use of Natural Resources			
12.2	By 2030, achieve the sustainable management and efficient use of natural resources.	**42**	**Biggest Impact: Sub-Saharan Africa** The industry has had the largest impact towards this target in the Sub-Saharan Africa where the mobile industry has promoted examples of clean energy to fuel, particularly, its remote infrastructure, while the highest opportunity is in North America due to the penetration of M2M technologies, which has the potential to reduce the high energy consumption of mobile infrastructure and levels of e-waste.
Category 2: Reduction of Waste			
12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	**49**	**Biggest Impact: Sub-Saharan Africa** The industry has had the largest impact towards this target in Sub-Saharan Africa through the reduction of IT waste that has been enabled by the mobile industry and its widespread network of distributors. The biggest opportunity lies in North America as the region produces a substantial amount of e-waste per capita.
Category 3: Building Sustainability Capacity			
12.6	Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.	**19**	**Biggest Impact: Asia-Pacific** The industry has had the largest impact towards this target in Asia-Pacific, where there is significant need for improvement in sustainable business practice and a large proportion of operators have committed to sustainable practice principles. There is a significant opportunity for improvement across all regions for improvement in commitment to and true integration of sustainable practice and reporting into business activities.
12.8	By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.	**27**	**Biggest Impact: North America** The biggest impact is in Europe, due to the high levels of penetration and access to information. The highest opportunity for the industry to contribute towards this target is in Sub-Saharan Africa, where improvements in connectivity can enable all communities to access information to improve their sustainability.
12.a	Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.	**5**	**Biggest Impact: North America** The industry has had the largest impact on this target in North America by supporting the development of IoT infrastructure, which enables more sustainable patterns of production and consumption. The biggest opportunity for impact is in developing countries where the implementation of IoT technology is less mature, and an increase in penetration has the potential to have a significant impact on industrial processes.

TARGET-BY-TARGET IMPACT

Sustainable Use of Natural Resources (Target 12.2)

The industry contributes to Target 12.2 (sustainable use of natural resources) by managing energy efficiency within its own operations, including the deployment of renewable energy solutions to power its network:

- Mobile networks consume material amounts of energy; efficiency management requires network architecture, and network and support equipment choices that take efficiency into account. The latter applies particularly to data centres where technology advancements are introducing significant efficiencies.[1]

- Mobile network operators can and have been introducing clean energy to power parts of the network, particularly through solar. Developments in fuel cell technology have helped accelerate its uptake with more than 300 fuel cell solutions off-grid in Africa. However, there are barriers to widespread adoption: cost; the lack of consistency of supply generated; and the challenge of supporting high-capacity sites. These often make a traditionally-powered infrastructure option preferable.[2]

The industry also contributes to this Target through the deployment of smart meters and other IoT developments that allow consumers and businesses users to monitor, measure and analyse their usage more effectively and organise more impactful interventions as a result.

Reduction of Waste (Target 12.5)

The industry contributes to Target 12.5 (prevent and reduce waste) by implementing best-practice e-waste management through effective recycling and reuse programmes:

- E-waste is an issue across the ICT industry, in 2014, 41,800kt of e-waste was produced. Developed regions have higher levels of e-waste than developing nations. 15.6kg of e-waste was produced per person in Europe vs. 6.6kg in Latin America, though growth is slower reflecting the maturity of the markets. Mobile phones themselves only contributed to 0.5% of e-waste in 2014; however, the mobile industry's impact extends to helping the broader sector manage this particular environmental challenge.[3]

- There are good examples of industry-led initiatives to manage the disposal of phones: in Colombia, the campaign "Recicla tu móvil o celular y comunícate con la tierra" (Recycle your mobile or cell and communicate with the earth) was started in 2007 by Telefónica Movistar, Tigo, and Claro (in partnership with phone manufacturers). Having placed 155 collection boxes in cities around the country, the campaign saw 646 tons of e-waste collected, including 907,613 mobile phones.[4]

Recycling is now being embraced by many operators and is seen as both an important contribution to sustainability as well as a commercial operation that provides additional options for customers. There are also an increasing number of schemes that take second-hand phones from developed to developing markets, both on philanthropic and commercial bases.

1. GSMA (2015). The mobile industry working together to manage e-waste in Colombia.(http://www.gsma.com/latinamerica/mobile-industry-ewaste-colombia)
2. GSMA (2014). Tower Power Africa: Energy Challenges and Opportunities for the mobile industry in Africa. (http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/11/Africa-Market-Report-GPM-final.pdf)
3. GSMA (2015). eWaste in Latin America. (http://www.gsma.com/latinamerica/wp-content/uploads/2015/11/gsma-unu-ewaste2015-eng.pdf)
4. GSMA (2015). The mobile industry working together to manage e-waste in Colombia. (http://www.gsma.com/latinamerica/mobile-industry-ewaste-colombia)

FIGURE 1
SMALL IT E-WASTE, 2014 (UN)*

Source: UN
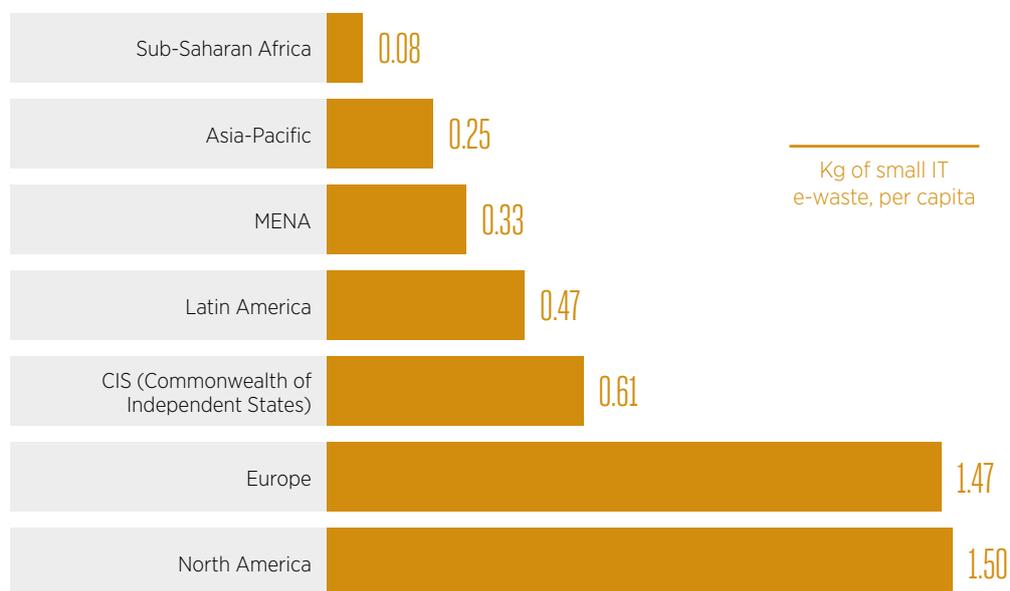
Kg of small IT
e-waste, per capita

Sub-Saharan Africa	0.08
Asia-Pacific	0.25
MENA	0.33
Latin America	0.47
CIS (Commonwealth of Independent States)	0.61
Europe	1.47
North America	1.50

*Population weighted average of countries in our 90 country sample for which data is available

IMPACT STORY: E-WASTE INITIATIVES – DEUTSCHE TELEKOM

Too many used cell phones and smartphones are stuck in drawers or disposed of illegally with household waste. In Germany, a country with a high proportion of mobile subscribers and handsets in the mobile ecosystem, the recycling reuse rate for small electronic appliances is low.

Deutsche Telekom has been offering customers various ways to recycle their handsets since 2003. Customers have been able to return their used, high-end cell phones and smartphones to Telekom Shops under a buy-back program since 2013, receiving a voucher equivalent to the monetary value of their devices that they can use to make purchases at a Telekom Shop.

In 2014, the group introduced the online collection portal 'Handysammelcenter' in cooperation with Deutsche Umwelthilfe (DUH). Companies can use the portal to properly and safely dispose of their used cell phones and smartphones free of charge and receive a certificate as confirmation. Devices in good condition are generally reused. Public authorities, associations and other organisations can use the portal to initiate their own collection campaigns. Any profit generated in this way is donated to nature conservation and environmental protection projects run by DUH.

The campaign is scheduled to run to May 2017; so far more than 2 million used cell phones have been collected.

Source: http://www.cr-report.telekom.com/site16/customers-products/sustainable-products-and-services/sustainable-ict-solutions#atn-8641-8647
To see more impact stories that contribute to each of the Sustainable Development Goals, visit

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TARGET-BY-TARGET IMPACT

Building sustainability capability (Target 12.6, 12.8, 12.a)

The industry contributes to Target 12.6 (industry accountability for sustainability) by integrating sustainability reporting into existing reporting cycles:

- Sustainability information provides numerous benefits for both the reporting entity and government. Information on sustainability enhances accountability; moreover, data can be used by governments to assess the impact and contribution of businesses to the economy.[5]

- Operators from group companies that represent a significant proportion of subscribers world-wide have signed up to the UN Global Compact ten principles for sustainable business, committing to corporate sustainability that aligns a company's value system to meet fundamental responsibilities in human rights, labour, environment and anti-corruption.[6]

The industry contributes to Target 12.8 (engaging community sustainability) by connecting communities to the mobile services and the internet, enabling them to increase the sustainability of their lifestyles:

- A study by The Carbon Trust, which analysed 4,000 mobile users across the USA, UK, Spain, South Korea and Mexico, identified some of the most common uses of mobile for sustainable living:

  - 84% of smartphone users, that also drive a car, use satnav apps to plan travel routes more efficiently or avoid traffic;

  - 80% of respondents use mobile to work or study from home, avoiding the need to travel;

  - Nearly half (49%) of those surveyed stated that they purchase digital instead of physical products, such as newspapers, music and books;

  - 68% of smartphone users are willing to use an app to control electrical devices and heating or cooling at home.[7]

The industry contributes to Target 12.a (scientific and technological capacity) by supporting the development of IoT solutions that increase the ability to monitor consumption and production to drive more sustainable consumption and production patterns:

- One of the barriers to sustainable consumption and production is linking cost to usage. IoT can play an important role in capturing usage information that can then underpin consumption management and pricing. Resultant actions might then include scheduling consumption when energy rates are lower or incentivising workers to lower their usage.[8]

- IoT is critical in supporting smart cities to optimise consumption patterns without user intervention; a practical example being light sensors used to turn lamp posts on or off, depending on the level of daylight.[9]

- IoT systems are also used as monitoring solutions to protect and maintain the environment. Systems are able to accurately measure: temperature, humidity, light level and air quality to understand the primary drivers of detrimental impacts to the environment.[10]

5. Global Reporting Initiative. The benefits of sustainability reporting. (https://www.globalreporting.org/information/sustainability-reporting/Pages/default.aspx)
6. United Nations Global Compact (2016). The Ten Principles of the UN Global Compact. (https://www.unglobalcompact.org/what-is-gc/mission/principles)
7. Carbon Trust (2015). Smartphones supporting sustainable lifestyles as mobile makes its mark on climate change. (https://www.carbontrust.com/about-us/press/2015/12/smartphones-supporting-sustainable-lifestyles-as-mobile-makes-its-mark-on-climate-change/)
8. Energy Manager Today. (2015). Energy Management: The Internet of Things Changes Everything. (http://www.energymanagertoday.com/energy-management-the-internet-of-things-changes-everything-0120273/)
9. Thegreatiproject: Smart cities impact. (http://thegreatiproject.com/smart-cities-impact/)
10. Internet of things based smart environmental monitoring using the Raspberry-Pi computer (http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=7323023&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxpls%2Fabs_all.jsp%3Farnumber%3D7323023)

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted by the industry's own operations, and as a provider of connectivity and platforms:

- **Operations:** Impact is delivered through the sustainable management of resources across operations by implementing energy-best practices in infrastructure development. This impact is felt to differing degrees across Targets 12.2, 12.5 and 12.6.

- **Connectivity:** Voice and data connectivity enables individuals to reduce their environmental footprint and increase the sustainability of their lifestyles. This impact is felt predominantly in Target 12.8.

- **Platforms:** Delivered through IoT such as smart metering and automated technology that underpins smart cities and promotes environmental protection. This impact is felt predominately in Target 12.a.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is primarily direct and, to a lesser extent, systemic:

- **Direct impacts:** Including through sustainable use of natural resources (Target 12.2), reduction of waste (Target 12.5), industry accountability for sustainability

(Target 12.6) and improving scientific and technological capacity (Target 12.a); and

- **Systemic impacts:** By connecting communities to more environmentally sustainable lifestyles through mobile. Near ubiquitous access to mobile services has transformed how people travel, study, interact, and consume products, as well as connecting them, through the internet, to information to help them lead more sustainable lifestyles. (Target 12.8)

GEOGRAPHIC IMPACT

The level of impact of the mobile industry varies across regions. The largest overall impact is in Asia-Pacific, through the impact on Target 12.5. Further geographic analysis highlights:

• There is a significant opportunity in North America where the largest e-waste per capita is produced. The increase in energy consumption and generation of e-waste needs to be balanced by the efficiency of operations where the industry can be exemplary, showcasing the use of their own technology as part of the solution.

FIGURE 2
AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
31	23	23	29	28	19	26
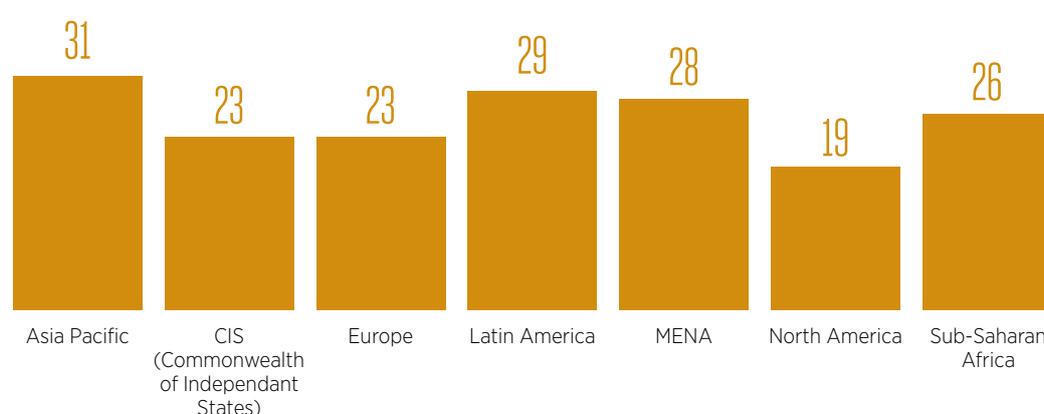
LOOKING FORWARD

The mobile industry has a significant contribution to make to SDG 12, both as an operator and as the provider of the infrastructure and connectivity that catalyses more sustainable consumption through education and improved management.

Contribution to social goals is critical to sustainability and the need to continue to evolve the efficiency of operations is a commercial imperative. It is particularly important, given the continued growth of the subscriber base and the simultaneous scaling of resource consumption from phone usage, networks, data centres, and travel. The industry can enhance the impact of its contribution by being an exemplar in these areas, showcasing the use of their own technology as part of the solution.

IoT solutions, for example smart metering, can also make a significant impact on other industries, capturing the information that is a necessary component of any properly designed improvement programme and providing a platform for third parties to understand and use this in alignment with this SDG. However, IoT in general is still at early stages of evolution; the industry's involvement in its further development will enhance the impact on this SDG.

Mobile connectivity also provides the critical backbone to: a) the sharing economy; and b) the digital economy – both dynamics holding out the promise of very significant savings in natural resources. The current impacts of these are likely to be more pronounced in the developed world, where the ubiquity of connectivity and smartphones drive the network effects to make these interventions commercially sustainable.

SDG13

CLIMATE ACTION

Take urgent action to combat climate change and its impacts

SDG SUMMARY

	PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE			
	3/5	×	**6.4/10**	×	**39**	=	**SDG SCORE** **15**	

KEY
Average performance compared to all 17 SDGs

ABOVE EQUAL BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 13 at 15; this is above the average across the SDGs. The current impact on SDG 13 is driven by:

- A high proportion of targets identified as those where the industry can make a significant impact (3 out of 5 targets);

- An above average level of importance of the industry's activities in achieving these targets (6.4/10); and

- A relatively average performance of the industry against the metrics that contribute to these targets (39/100).

If performance was maximised (to 100), the potential impact of the industry on SDG 13 is 38. Metrics include broad based connectivity measures covering penetration, quality, resilience as well as infrastructural investment and IoT development. Given the focus of this SDG, there is also a metric for the governmental adoption of relevant ICT usage.

INDUSTRY IMPACT OVERVIEW

The mobile industry primarily impacts SDG 13 through the development and support of IoT-facilitated environmental monitoring, which enables governments and institutions to collect data critical to the adaptation to, and management of, climate change.

The industry also contributes as a provider of emergency broadcasting systems that provide early warning for climate-related events, strengthening resilience to climate-related hazards and natural disasters. The industry adds disaster response capacity to a country's infrastructure through connectivity, used by response agencies to broadcast emergency messages and track movement of populations, but also by the public affected by an emergency or disaster.

The mobile industry contributes to three out of the five targets in SDG 13, two of which are focused on increasing the adaptive capacity of countries to climate change, while the third, Target 13.b, is specifically related to the capabilities of the least economically developed countries, to increase their capacity to manage and recover from climate-related events. The industry has limited impact on the remaining targets, due to the primarily governmental and international institutional roles required in implementing climate action policy and mobilising financial support for developing nations.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Increasing Adaptive Capacity			
13.1	Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.	**26**	**Biggest Impact: North America** The mobile industry has had the largest impact on this target in North America where the quality of mobile infrastructure significantly contributes to the resilience of communities to climate-related hazards and natural disasters. The highest opportunity is in Sub-Saharan Africa where investment in infrastructure to increase penetration and resilience of services in the region could significantly increase the impact of the industry.
13.3	Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.	**18**	**Biggest Impact: North America** The industry has had the largest impact in North America, through infrastructure maturity and resilience that supports effective early warning systems, as well as M2M connections that support environmental monitoring. Sub-Saharan Africa has the highest opportunity for improvement, where improvements in penetration of both basic mobile services and M2M can improve the region's capacity to manage the impacts of climate change.
Category 2: Capacity Building in Developing Countries			
13.b	Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.	**31**	**Biggest Impact: Asia-Pacific** The industry has had the largest impact in Asia-Pacific, where mobile and other information and communications technology has been used government services and planning, this is also an area highly susceptible to climate-related weather events The highest opportunity for growth is in Sub-Saharan Africa, through the use of ICT in the provision of government services to manage the impacts of climate change.

TARGET-BY-TARGET IMPACT

Resilience to Climate-related Hazards and Natural Disasters (Target 13.1)

The industry contributes to Target 13.1 (resilience to climate-related hazards and natural disasters) by maintaining resilient network infrastructure that supports emergency broadcasting in the case of a climate-related or other natural disaster:

- Emergency broadcast systems supported by mobile networks are critical to preparing communities for natural disasters. This is particularly effective in developing countries where alternative infrastructure might be less robust, for example, the Bangladeshi Government announced that advanced warning of impending natural disasters would be transmitted to mobile devices. These messages can be sent to tens of thousands of users and, unlike SMS texts which are delivered to an inbox, are shown directly on the screens of the mobile devices.[1]

- Mobile services in and of themselves help individuals spread warnings amongst their communities. The impact of this is significant in developing countries where critical information is often disseminated primarily through mobile. In East Africa, for example, herders use mobile phones to send early drought warnings, in an attempt to mitigate against agriculture disasters.[1]

- Effective network infrastructure is a critical dependency in building resilience in the face of disasters, through reliable access to communication for communities and disaster recovery efforts. The mobile industry can have a significant impact on resilience during a disaster by ensuring that the network is operational and has sufficient capacity:

  - Capacity is critical: surges in network use typically spike during periods of disaster, for example, in the aftermath of the Great East Japan Earthquake in 2011, a large spike in the number of phone calls caused network congestion, resulting in usage restrictions on 70%-95% of mobile phones[2];

  - Mobile network operators have taken action to accommodate spikes in network usage, by enabling systems and processes for regulating usage at emergency situations or by deploying mobile base stations in affected areas[3];

  - Safeguarding infrastructure: mobile network operators have experienced huge damage to infrastructure during disasters. This had led to the development of more robust infrastructure such as 'Super Base Stations' deployed by China Mobile, which have been proven to continue functionality during disasters and environmental shocks.

Mitigation, Adaptation, Impact Reduction and Early Warning (Target 13.3) and Mechanisms for Planning and Management in Least Developing Countries (Target 13.b)

The industry contributes to Target 13.3 (mitigation, adaptation, impact reduction and early warning) similarly to Target 13.1, by enabling early-warning broadcast systems to reduce the impact of climate-related natural disasters:

- Richer data sets are at the heart of establishing the impact of climate change, and then facilitating its ongoing management. IoT monitoring solutions can enable relevant authorities and communities to take targeted action in response to climate change and climate related events. A new initiative in Sri Lanka involves mobile stations providing farmers with quick access to rainfall data, so they can better plan for flood or other

1. Center for Technology Innovation at Brookings. (2013). How Mobile Devices are Transforming Disaster Relief and Public Safety (https://www.brookings.edu/wp-content/uploads/2016/06/West_Valentini_Mobile-Technology-Disaster-Relief_v20.pdf)
2. Ministry of Internal Affairs and Communications (Japan). (2011). Study Group: Maintaining Communications Capabilities during Major Natural Disasters and other Emergency Situations. (http://www.soumu.go.jp/main_content/000146938.pdf)
3. GSMA. (2014). Disaster Response, Mobile Network Restoration and Humanitarian Response. (http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/02/Mobile-Network-Restoration-and-Humanitarian-Response.pdf)

extreme weather. This system is expected to evolve to incorporate text messages sent from the sensors directly to farmers and government officials when rainfall levels are expected to rise in the area, giving farmers approximately six hours to make the necessary interventions in their fields to prevent crop losses from floods.[4]

• In terms of adaptive capacity, IoT innovations have already been shown to improve energy efficiency to address the root cause of climate change. Smart grid systems collect sensor information from electrical meters, fault detectors, voltage sensors and other connected devices.

Based on real-time data, automated decisions are taken, for example to turn off power-hungry devices like water heaters. Research shows that the implementation of smart grid systems has the potential of lowering carbon emissions by approximately 12%.[5]

The industry contributes to Target 13.b (mechanisms for planning and management in least developing countries) in a similar way to Target 13.3, by transferring and supporting IoT solutions for effective climate change monitoring that enable data-driven decision making on how best to adapt to climate change in developing countries.

IMPACT STORY: SOLAR HOME SOLUTION – TELENOR

A large proportion of Pakistan's rural population lacks access to electricity and depends on expensive, inefficient fuel-based sources. Systemic challenges include lack of energy-related savings and payment solutions where less than one-third of the population has bank accounts.

As the country's second largest mobile network operator with 22% market share at the time, Telenor Pakistan partnered its mobile money solution, Easypaisa, with the Pakistani energy service company Roshan Energy, to launch an innovative solar home solution for marginalised poor communities living in off-grid areas. Developed on pay-as-you-go model, the product enables customers to purchase solar solutions with an upfront payment of 15%, with the remaining

payments being paid within 18 months through Easypaisa. This model allows users to top-up their Solar Home Solution from any of the 70,000 Easypaisa shops across the country or directly through their Easypaisa Mobile Accounts.

This unique model has empowered customers to pick whether they want their solar equipment to work for a full month or just for a day. Currently, there are three Solar Solution Models being offered, ranging from 30 to 100 watts solar panels. The Solar Home Solution has been rolled out in Hyderabad, Thatta, Badin, Tharparker and Rahim Yar Khan so far. It is expected that this initiative will empower nearly 40% of the Pakistanis who live off the grid with access to clean and affordable solar energy.

Source: https://www.telenor.com/sustainability/initiatives-worldwide/easypaisa-lighting-up-homes-in-pakistan-%f0%9f%92%a1/
To see more impact stories that contribute to each of the Sustainable Development Goals, visit

www.gsma.com/betterfuture

4.   Reuters. (2015). Mobile technology helps Sri Lanka cope with climate change. (http://www.reuters.com/article/us-food-climatechange-technology-idUSKBN0LS1ZF20150224)
5.   Appcessories. (2015). Can Internet of Things Technology Really Stop Climate Change? (http://www.appcessories.co.uk/internet-of-things-stop-climate-change/)

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted by the mobile network operator's core activity as well as through the enabling connectivity and provision of platforms:

- **Operations:** Providing a resilient mobile network that supports emergency broadcasting systems during times of climate-related and natural disasters. The resilience of mobile networks has been critical to the effective management of disasters to date and this impact is directly dependent on the quality and type of infrastructure deployed by mobile network operators;

- **Connectivity:** Providing an access mechanism in addition to dedicated population warning and disaster response systems, by connecting those affected to relevant institutions and the appropriate information sources; and

- **Platforms:** Enabling IoT systems and services, such as smart grids. Solutions like this can contribute to a better understanding of climate trends to inform management of climate action, as well as trigger emergency warning systems, where appropriate, to maximise forewarning of an event.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is primarily direct and indirect:

- **Direct impact:** Stems from the support of emergency broadcasting systems;

- **Indirect impact:** Though intertwined with emergency warnings with a significant role as a potential trigger, environmental monitoring using IoT technology represents an indirect impact contributed to by the mobile industry.

GEOGRAPHIC IMPACT

The level of impact the industry has across regions varies. The largest overall impact is in North America and Europe, through the impact on Targets 13.1 and 13.3. Further geographic analysis highlights:

- Investment in quality infrastructure in developing economies will be key to increasing the industry's overall impact on this SDG.

- In developing countries, mobile network operators have an opportunity to become part of the monitoring and response fabric of a country, enabling the local institutions to respond more effectively to climate change challenges.

- In CIS, higher uptake of M2M services that increase efficiency and higher capital investment in infrastructure is likely to have relatively large impact on improving resiliency in the face of climate-related disasters.

FIGURE 1
AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
24	23	38	28	23	44	18
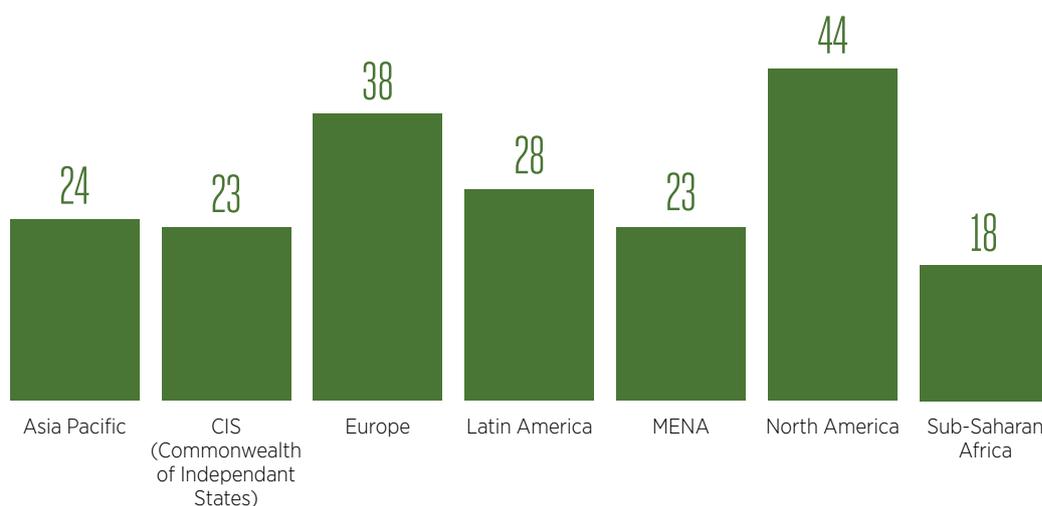
LOOKING FORWARD

Emergency broadcasting systems and resilient infrastructure have long been an important way in which mobile network operators can contribute during times of natural disasters. As the frequency of climate-related extreme events increases, this role will become even more important in supporting countries to build their resilience.

The role of the mobile industry in supporting IoT environmental monitoring is likely to differ between regions, depending on the maturity of their existing weather and environmental monitoring systems. While the technology is largely transferable between regions, one of the critical barriers will be the required surrounding infrastructure to collect and analyse the data, as well as to translate it into effective warning systems and climate action policies. Enhancing this infrastructure in developing countries is specifically called for in SDG 13.

Addressing these barriers will require considerable international cooperation and resourcing, the industry needs to be at the centre of these debates to maximise impact on this SDG in the future.

SDG14

LIFE BELOW WATER

Conserve and sustainably use the oceans, seas and marine resources

14 LIFE BELOW WATER

SDG SUMMARY

PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE		SDG SCORE	KEY
3/10	×	5.4/10	×	45	=	**7**	Average performance compared to all 17 SDGs

ABOVE EQUAL BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 14 at 7; this is below the average across the SDGs. The current impact on SDG 14 is driven by:

- A low proportion of targets identified as those where the industry can make a significant impact (3 out of 10 targets);

- A below average level of importance of the industry's activities in achieving these targets (5.4/10);

- A relatively average performance of the industry against the metrics that contribute to these targets (45/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 14 is 16. There are over 5 underlying metrics used to develop this score across the 3 targets, primarily broad metrics like mobile penetration and infrastructure, M2M connections and the use of ICT services by governments. Target 14.7 is specifically relevant to developing countries, so developed countries have not been considered.

INDUSTRY IMPACT OVERVIEW

The impact the mobile industry can have on SDG 14 is constrained by the subject of the SDG being primarily away from land or underwater, where signal propagation degrades. However, the industry can play a role by providing a channel to capture and access information, in this way enabling better functioning markets for the key populations targeted, such as remote coastal communities, Small Island Developing States, least developed states and artisanal fishers. The industry can also contribute by improving monitoring and management capabilities for near-shore coastal ecosystems, including fisheries through connectivity and deploying IoT.

More specifically, the mobile industry's contribution to achieving this goal is based on providing access to information (linked to Target 14.b) to enable better functioning markets for artisanal fishers, and providing the technical platform on which to build cost-effective biodiversity-monitoring solutions (linked to Target 14.2). The combination of both capabilities has further potential to help coastal communities in Small Island Developing States and least developed states to manage their environments more sustainably, enhance the production capabilities of their fisheries and improve their economic status, as called for in Target 14.7.

The industry has a lesser impact on the majority of targets focusing on the management and protection of ecosystems, particularly those depending strongly on the enactment and enforcement of laws and regulations, prohibiting certain form of fisheries subsidies or preventing marine pollution such as Targets 14.1, 14.4, 14.5, 14.6 and 14.c, as well as the targets related to academic knowledge generation and transfer, such as Targets 14.3 and 14.a.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Sustainable Growth			
14.2	By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.	**17**	**Biggest Impact: North America** The industry has had the highest impact in North America, where penetration of supporting M2M solutions is the highest. The largest opportunity is in Asia-Pacific, where the need for strengthened environmental protection practices can be further enabled as M2M solutions mature.
14.7	By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.	**22**	**Biggest Impact: Latin America** The industry has had the highest impact in Latin America, where there is relatively high need for connectivity to support sustainable use of marine resources and a moderate level of infrastructure and penetration. The largest opportunity is in Sub-Saharan Africa, driven by the need for improved infrastructure and affordable access to services to increase penetration.
Category 2: Inclusion			
14.b	Provide access for small-scale artisanal fishers to marine resources and markets.	**34**	**Biggest Impact: North America** The industry has had the highest impact in North America due to the connectivity available to the region, including to fishing communities and the use of ICT by the government to provide services that support these communities. The largest opportunity is in Sub-Saharan Africa, where investment in infrastructure can improve connectivity to fishing communities and markets.

TARGET-BY-TARGET IMPACT

Sustainable Growth (Targets 14.2, 14.7)
The industry contributes to Target 14.2 in its role as one of the key driving forces behind the development and roll-out of M2M/ IoT solutions:

- Mobile network operators are active in developing M2M solutions, from defining the operating standards to cooperating with manufacturers in building modules that will enable the large number of sensors required. In particular, common standards are currently being developed for the Low Power Wide Area (LPWA) market; Narrow Band IoT (NB-IoT); Extended Coverage - GSM - Internet of Things (EC-GSM-IoT); and Long Term Evolution - Machine (LTE-M). These standards will enable operators and their ecosystem of partners to accelerate the commercial availability of LPWA solutions, enabling the design of M2M applications that require low data rates, have long battery lives and are capable of operating unattended for long periods of time.

- These types of solutions can provide a cost-effective option for monitoring near-shore coastal marine ecosystems and therefore contribute to the more effective conservation management of such areas. For example, a solution monitoring declining populations of harbour seals in the Scottish archipelago, implemented by the Sea Mammal Research Unit (SMRU) Instrumentation Group at the University of St Andrews in cooperation with Vodafone[1], set up to assess the causes, management and mitigation options of harbour seals decline and to prioritise future research.

The industry contributes to Target 14.7 by helping improve the sustainable management of coastal ecosystem and fisheries, both through IoT solutions as well as through enabling education and knowledge sharing:

- The UN first World Ocean Assessment[2], reports that at least 500 million people depend on fishing for food and livelihoods, and that this dependency is particularly high in the developing world, which is home to 97% of the world's fishers, working mostly in the 'small-scale' traditional and artisanal sectors. The report also highlights that fisheries and aquaculture support the livelihoods of at least 10 per cent of the world's population, many of which are in jeopardy given that over 90 per cent of fish stocks are assessed as either fully fished or overfished. Reversing this trend in collapsed fisheries requires improved management, which in turn depends on accurate data on the status of stocks. Good data are fundamental to effective marine conservation and efforts to rebuild fisheries.

- In addition to the M2M capabilities of Target 14.2, the mobile industry also enables the management of coastal ecosystems through the establishment of crowdsourcing platforms. These platforms can range in form from a simple SMS database, where participants text in updated information, to more complex applications that use the GPS, near field communication (NFC) and imaging capabilities of devices to update their knowledge base. This knowledge can be used to enable better sustainable management of coastal ecosystems and fisheries and hence improve the conditions for the communities that rely on these ecosystems for their nourishment and economic survival. An added benefit is that, as these solutions fundamentally rely on engaging the immediate stakeholders (i.e. the coastal communities) they also help build their knowledge of how they can sustainably interact with their ecosystem.

1. Vodafone. (2016) Connected Seals. (http://mediacentre.vodafone.co.uk/pressrelease/harbour-seals-orkney-receive-marine-smartphones/)
2. UN. First global integrated marine assessment (first world ocean assessment). (Updated 2016) (http://www.un.org/depts/los/global_reporting/WOA_RegProcess.htm)

Inclusion (Target 14.b)

The industry contributes to Target 14.b in its role as a connectivity provider, enabling access to information:

- Through the use of mobile services, small-scale fishermen can gain access to information about the market as well as general marine resources. Even a simple voice call or text sent through the fishermen community network can be sufficient to provide key information, such as catch availability, current price levels and weather information. A number of studies have claimed that when mobile services are introduced in a community, they enable the creation of informal networks which helps drive system efficiency, improving overall benefits for all involved.

- In addition, the availability of mobile services creates the foundation on which more formal "digitised" markets can be established; for example, an NGO can build applications to provide relevant information to fishers. The value of such types of applications has already been demonstrated for farming communities in a number of locations across the world.

- Finally, mobile handsets provide a generic multipurpose communication platform, which is more affordable for artisanal fishers than the specific technology solutions (such as marine very high frequency radios, GPS, sounding systems, etc.) used by more advanced fishing communities. The capabilities provided by devices and apps today are sufficient to provide a toolkit that can significantly improve the effectiveness of artisanal fishers.

IMPACT STORY: CONNECTING MARINE MAMMALS TO M2M GLOBAL NETWORK – VODAFONE

In the UK, and in many other parts of the world, populations of marine mammals are at risk from human activities. These include noise pollution, over-fishing, habitat degradation and the long-term effects of climate change.

The Harbour seal, one of two species residing in the UK, has seen its population decline by up to 90% in some areas over the last 10 years. In order to understand the reasons for such dramatic regional declines, Vodafone UK has partnered with the Sea Mammal Research Unit (SMRU) Instrumentation Group at the University of St Andrews to equip and connect smart tags worn by seals.

These tags have significantly improved the reach and quality of transmission of data that is vital to SMRU and other research organisations around the world. SMRU have used data collection tags since they first developed them in 1982, and now provide the new M2M enabled tags to research organisations around the world. Using

Vodafone's M2M network and third-party satellite services, researchers can now receive data on seal locations, dive behaviour and ocean environment directly from the tag itself. These tags, affixed to a seal's fur with harmless adhesives, allow for greater opportunities to collect and study data from more remote areas than were previously accessible. The data collected allows the SMRU to advise government bodies and other interested parties on the best practices for marine conservation.

The first M2M-enabled tags were put into operation in April 2016, with further plans for data collection throughout 2016. In the meantime, SMRU and Vodafone will continue to look at ways to improve the speed and efficiency of data transmission, to ensure researchers have access to accurate and timely data. While still in early stages of operation, this project highlights the new and innovative methods of research that mobile connectivity can enable.

Source: (http://mediacentre.vodafone.co.uk/pressrelease/harbour-seals-orkney-receive-marine-smartphones/)
To see more impact stories that contribute to each of the Sustainable Development Goals, visit

www.gsma.com/betterfuture

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted by the industry's role as a provider of connectivity and platforms:

- **Connectivity:** Establishing basic communications facilitates the information flows, which is essential to improving safety for marine communities and the functioning of markets that underpins wealth creation;

- **Platforms:** Third parties can use the platforms established by mobile operators to create cost-effective solutions in enhancing the management of ecosystems. Government agencies and NGOs can also use mobile networks to disseminate relevant content to remote communities, improving their awareness of environmental issues affecting them, as well as providing relevant knowledge that can improve their livelihoods.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is primarily indirect and systemic.

- **Indirect impact:** Includes the management of coastal ecosystems (Target 14.2) and providing access to artisanal fishers (Target 14.b);

- **Systemic impact:** Includes the provision of access to artisanal fishers to their community networks (Target 14.b).

GEOGRAPHIC IMPACT

The level of impact the industry has on SDG 14 across regions varies. The largest impact is in North America, through the impact on Target 14.2. This is due to the availability of M2M solutions and the supporting infrastructure coverage. Further geographic analysis highlights:

The highest opportunity to increase the industry's impact exists in Sub-Saharan Africa, Asia-Pacific and MENA, and will require improving coverage through infrastructure development and increased availability of purpose-built M2M solutions to drive uptake.

FIGURE 1

AVERAGE TARGET SCORE ACROSS REGIONS
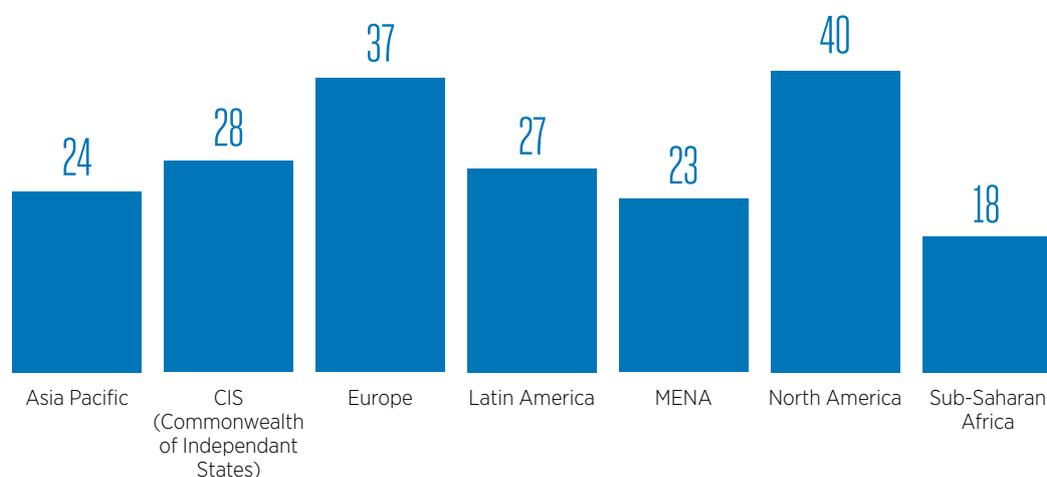
LOOKING FORWARD

SDG 14 largely emphasises governmental and institutional action, a domain the mobile industry has limited impact on.

However, better management and protection of marine resources, in part dependent upon an enhanced understanding of marine ecosystems, is also central to this and there are areas where the mobile industry can contribute. Mobile devices and platforms have contributed to the improvement of conditions for artisanal fisher communities, as well as providing solutions contributing to more cost-effective management of coastal ecosystems.

This impact has the potential to grow as the industry continues to invest in platforms and the establishment of more cost-effective technical solutions for IoT services, and as the use of mobile services becomes more widespread, increasing the potential of crowdsourced collection of marine environment data. Given the limited financial resources of many of the populations targeted, the affordability of mobile services is critical and may require additional innovation and consideration.

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

SDG SUMMARY

PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE			
4/12	×	**5.2/10**	×	**44**	=	**SDG SCORE** **8**	

KEY
Average performance compared to all 17 SDGs

ABOVE EQUAL BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 15 at 8; this is below the average across the SDGs. The current impact on SDG 15 is driven by:

- A low proportion of targets identified as those where the industry can make a significant impact (4 out of 12 targets);

- A below average level of importance of the industry's activities in achieving these targets (5.2/10); and

- A relatively average performance of the industry against the metrics that contribute to these targets (44/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 15 is 17. Eight metrics have been used to develop this score, including mobile and mobile broadband penetration, M2M connections, mobile infrastructure (2G, 3G and 4G population coverage and years since 3G launch) and small IT e-waste per population.

INDUSTRY IMPACT OVERVIEW

The mobile industry has a role to play in enhancing our ability to more effectively monitor and manage land-based ecosystems such as forests, through the use of IoT. As these solutions can be rapidly and cheaply customised for each application, they represent a flexible and economic approach to supporting the related targets, nevertheless they depend upon a level of system standardisation and connectivity that is still evolving.

The industry is also enabling increased stakeholder participation through crowdsourcing solutions, both for data collection purposes, as well as for increasing the frontline capabilities for the agencies tasked with combating poaching and trafficking. While these solutions can generally be deployed efficiently, requiring

limited customisation, they require connectivity and the continued engagement of the crowd to work effectively.

Finally the mobile industry has a role to play in addressing the impact of the improper disposal of e-waste on natural habitats. This can be achieved by ensuring the sustainable processing of e-waste generated through its operations and services, by introducing effective handset recycling schemes and ensuring the proper disposal of any redundant electronic equipment from its operations.

The industry is expected to have marginal effect on targets focused on creating the appropriate policies or in mobilising the appropriate resources for the sustainable management of land-based ecosystems.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Protecting Natural Environments and Habitats			
15.2	By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.	**17**	**Biggest Impact: North America** The mobile industry has the largest impact in North America, where M2M is relatively well developed and network coverage near ubiquitous. The highest opportunity is in Asia-Pacific, where further development of mobile coverage and adoption of M2M will deliver additional impact.
15.4	By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.	**17**	**Biggest Impact: North America** Target 15.4 is measured in the same way as 15.2, see commentary above.
15.5	Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.	**29**	**Biggest Impact: Sub-Saharan Africa, Asia-Pacific and MENA** The industry has the largest impact on this target in Sub-Saharan Africa, Asia-Pacific and MENA, where there is significant need for urgent action for the protection of species and habitats, therefore increasing the impact of mobile as a means of communication to support conservation initiatives. The biggest opportunities for improvement against this target are in the same regions, as improvements in basic connectivity as well, as M2M technology, can further increase capabilities in conservation.
Category 2: Protecting Endangered Species			
15.7	Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products.	**28**	**Biggest Impact: North America** The mobile industry has the largest impact in North America, where penetration and coverage is highly developed. The highest opportunity lies in Sub-Saharan Africa, where development in mobile penetration will create a platform from which anti-poaching and trafficking initiatives can utilise crowdsourcing to increase reach.

TARGET-BY-TARGET IMPACT

Protecting Natural Environment and Habitats (Targets 15.2, 15.4 and 15.5)

The industry contributes to Targets 15.2, 15.4 and 15.5, predominantly by providing or enabling a number of platforms that allow for better information gathering on land-based ecosystems to inform conservation management. Mobile-based implementations can provide a cost-effective means of monitoring activity in forests:

- The relative cost of devices enabled by mobile connectivity, as compared to other solutions such as satellite tracking, can make mobile-enabled devices attractive for environmental monitoring, even when customisation is required;

- Some of the simplest cases, where solutions are based on basic mobile services like SMS and data-enabled crowdsourcing of information from participating stakeholders, have been found to be very effective.[1] In addition to cost, there are benefits in the accessibility and usability of the technology that can increase the engagement of the user group.

A number of case studies exist for crowdsourcing initiatives to support SDG 15. In southern Cameroon, the indigenous forest people have gained a degree of formal control to land they have occupied for centuries through a project where they use smartphones to map their own boundaries.[2] IoT implementations can also be effective in protecting both animals and humans: IoT trackers on elephants have been used to map location and habits and predict when they are likely to come into contact with local farmers in Kenya, thereby minimising risk of aggravated interactions.[3]

Protecting Endangered Species (Target 15.7)

The industry contributes to Target 15.7 through increasing the frontline capabilities for the agencies tasked with combating poaching and trafficking:

- The mobile industry, through its significant presence, can help to address trafficking by encouraging all stakeholders, including the general public, to share information on instances of trafficking. A number of initiatives and specialised mobile applications have already emerged, providing tools that help identify wildlife trade and spot illegal products. One such example, the Wildscan app, is a comprehensive species identification and response mobile app designed to help frontline wildlife law enforcement agencies correctly identify, report and handle marine, freshwater and terrestrial animals caught in the illegal wildlife trade.[3]

The mobile industry also contributes to Target 15.5 by effectively disposing of operational waste to reduce any negative impact on biodiversity:

- The most significant type of waste the mobile industry generates is e-waste, defined as any electrical or electronic equipment. E-waste is becoming a significant environmental issue, having reached a volume of 50 million metric tonnes in a year and growing annually at double digit rates; one tonne of electronic waste is equivalent to 8,000 mobile phones[4]. The mobile industry produces two types of e-waste: redundant network infrastructure, and mobile devices and accessories. Of the two types, mobile devices are by far the largest component of e-waste, as well as the most difficult to tackle due to its distributed nature. Mobile network operators have been actively engaging with their customers and have been implementing waste disposal and recycling processes that allow consumers to dispose of their old devices in a sustainable way.

1. Ushahidi.Vital Signs. (https://www.ushahidi.com/case-studies/vital-signs)
2. The Guardian. (2016). How smartphones can help track illegal deforestation.(https://www.theguardian.com/media-network/2016/apr/07/smartphones-track-illegal-deforestation-cameroon)
3. Graham, M. (2012). Mobile phone communication in effective human elephant- conflict management in Laikipia County, Kenya. Fauna and Flora International. (http://news.bbc.co.uk/1/hi/world/africa/4354291.stm)
4. United Nations Environment Programme (2016). Infographic highlighting the hazards of e-waste and how to dispose of such waste.(http://www.unep.org/publications/Annual_report.asp)

IMPACT STORY:
PROTECTING BIODIVERSITY IN MONT BLANC – ORANGE

One of the most important and most difficult aspects of biodiversity protection is establishing the wide area, near real time, and economically-sustainable data-gathering mechanisms required to understand, monitor and manage particular ecosystems such as forests or mountains. Creating this monitoring system requires a combination of a network of sensors, augmented by the collection of multiple on-the-ground observations. Orange, a frequent contributor to biodiversity studies such as the impact of submarine cables on aquatic ecosystems, established a 3-year partnership in 2015 with the Centre de Recherches sur les Écosystèmes d'Altitude in Chamonix (CREA - Alpine Ecosystems Research Centre), exploring the setup of such a monitoring system in the Mont Blanc area.

Orange has integrated data-gathering sensors into its high-altitude antennas to help expand CREA's observational network. Orange employees contribute to the maintenance of CREA's climate stations, in tandem to their everyday work on the copper, fibre, 3G and 4G networks in the Alps. Additionally, Orange employee volunteers are involved in a participatory science project, where they carry out surveys of the local environment (flora and fauna), as well as interview local inhabitants using specific questionnaires. All of this helps CREA collect more relevant data to supplement the on-the-ground observational research being carried out to build up a comprehensive picture of the effects of climate on biodiversity in Mont Blanc.

By focusing on a small region, this project demonstrates the variety of ways in which the mobile industry can aid similar efforts around the world. As an organisation and as individuals, Orange have engaged with the local scientific community and with the issue of biodiversity, creating a clear example for others.

Source: http://www.orange.com/en/Responsibility/Environment/COP21/CREA
To see more impact stories that contribute to each of the Sustainable Development Goals, visit
www.gsma.com/betterfuture

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. The industry's primary way of impacting this SDG is as a provider of platforms, through defining, creating or enabling IoT solutions and providing a medium over which to engage the immediate stakeholders in the management of the ecosystems they interact with.

The industry also has an impact through its operations, by engaging with their customers, to reduce the negative externalities of waste generation.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time).

The industry primarily impacts this goal through indirect impacts, as in the majority of cases it will be a capability and functionality provider, requiring partners to deliver against the relevant targets.

GEOGRAPHIC IMPACT

The largest impact overall is in North America, primarily due to high regional scores for Targets 15.2, 15.4 and 15.7. This is due to the significant adoption of M2M and high levels of mobile penetration, which respectively enable solutions to measure impact and provide channels to engage stakeholders around the prevention of poaching and trafficking. Further geographic analysis highlights:

- Developing economies and economies in transition across Asia-Pacific, CIS, Latin America, MENA and Sub-Saharan Africa have the greatest opportunity for future impact, which will develop in line with continued growth in mobile penetration and maturation of the market for M2M solutions.

FIGURE 1
AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
22	24	28	24	22	31	19
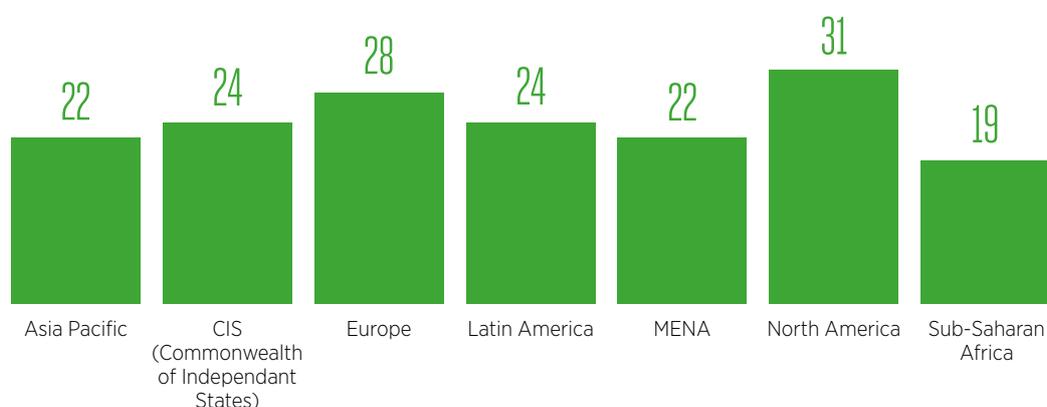
LOOKING FORWARD

The mobile industry clearly has a role to play in becoming a key enabler of better sustainable management capabilities for land-based ecosystems. As IoT and M2M solutions for sustainability are still in a development stage, mobile operators often need to play a hands-on role in establishing initial products and services or playing an active role in environmental and research initiatives. Given the severity of the challenge presented in this SDG, and the size of the population connected by the industry, the industry is faced with both opportunity and responsibility to enhance their impact.

In addition, given the rise of e-waste generation as a global issue and the impact on natural habitats, operators are in a unique position to minimise the negative effects by adopting best practice of e-waste disposal within their own operations and by supporting the downstream recycling of devices.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Our industry makes it easier for citizens to connect to their communities and government institutions. Increased connectivity promotes understanding and tolerance by connecting different cultures and religions.

#betterfuture

# 6 OUT OF 12 SDG16 TARGETS IMPACTED BY THE MOBILE INDUSTRY

ACTIVELY PARTICIPATE IN ADDRESSING GLOBAL POLICY ISSUES AND PROMOTE AND ROLE-MODEL THE VALUES OF RESPONSIBLE BUSINESS

#betterfuture

DEVELOP MOBILE-ENABLED PLATFORM SERVICES THAT SUPPORT GOVERNMENT AND INSTITUTIONS TO SERVE THEIR CITIZENS
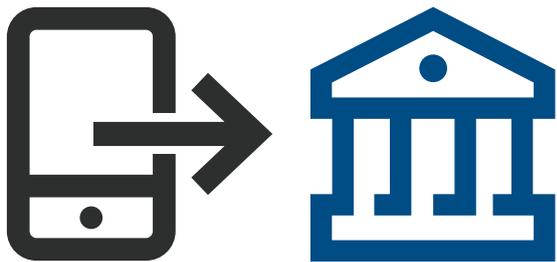
16 PEACE, JUSTICE AND STRONG INSTITUTIONS

SDG16

PEACE, JUSTICE AND STRONG INSTITUTIONS

Promote just, peaceful and inclusive societies

SDG SUMMARY

PROPORTION OF TARGETS SCORED	IMPORTANCE	PERFORMANCE		SDG SCORE
6/12 $\times$	**5.3/10** $\times$	**49** =		**13**

KEY
Average performance compared to all 17 SDGs

ABOVE   EQUAL   BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 16 at 13; this is equivalent to the average across the SDGs. The current impact on SDG 16 is driven by:

• An average proportion of targets identified as those where the industry can make a significant impact (6 out of 12 targets);

• A below average level of importance of the industry's activities in achieving these targets (5.3/10); and

• A relatively high performance of the industry against the metrics that contribute to these targets (49/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 16 is 30. There are 8 primary metrics used to develop this score across the 6 targets, including broad measures of mobile penetration, as well as more specific metrics, such as data security, and commitments to sustainable and ethical business.

INDUSTRY IMPACT OVERVIEW

The mobile industry impacts SDG 16 in three primary ways. Firstly, by implementing responsible business practices and upholding high standards of privacy and security rights. Secondly, through connectivity which facilitates the fundamental right to free expression, beliefs and access to information. Thirdly, through the provision of mobile identity solutions that increase inclusion in the digital economy and fulfil the basic human right of formal recognition.

The mobile industry contributes to six of the 12 targets in SDG 16 across each of the target groupings: combating violence and crime; promoting justice and the rule of law; inclusive and transparent governance; and human rights and fundamental freedoms. The industry has limited impact on the remaining targets due to their broad nature, and the significant governmental and institutional roles required to deliver them.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Reducing Violence and Related Deaths			
16.1	Significantly reduce all forms of violence and related death rates everywhere.	**31**	**Biggest Impact: Europe** The industry has the largest impact in Europe, where high levels of mobile penetration allow for improved violence and crime prevention. The highest opportunity is in Sub-Saharan Africa (SSA), where lower mobile penetration indicates that there is significant potential to improve connectivity in the region.
Category 2: Promoting Justice and Rule of Law			
16.3	Promote the rule of law at the national and international levels and ensure equal access to justice for all.	**9**	**Biggest Impact: Asia-Pacific** The industry has had the largest impact in Asia-Pacific, where legal frameworks are not as robust as in more developed regions, but data security, relative to the strength of legal frameworks, is high. The highest opportunity is in the Commonwealth of Independent States (CIS) and SSA, where there is significant opportunity to strengthen legal frameworks and support the rule of law as an industry.
Category 3: Inclusive and Transparent Governance			
16.5	Substantially reduce corruption and bribery in all their forms.	**21**	**Biggest Impact: Asia-Pacific** The industry has had the largest contribution on this target in Asia-Pacific, where legal frameworks are not as robust, but the impact of the mobile network operators' commitment to ethical business practices is relatively high. The highest opportunity is in CIS and SSA where ethical business practices can be strengthened across the supply chain to reduce corruption and bribery.
Category 4: Human Rights and Fundamental Freedoms			
16.9	By 2030, provide legal identity for all, including birth registration.	**34**	**Biggest Impact: North America** The mobile industry has had the largest impact in North America, where penetration is high and mobile connectivity can serve as a channel for e-government services. SSA has the highest potential for impact through improvements in online government services and penetration of mobile services.

TARGET SUMMARY

Target	Description	Target Score	Commentary
16.10	Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements	**32**	**Biggest Impact: North America** The industry has had the largest impact in North America, where high accessibility of mobile internet supports access to information equitably across all demographics. The industry has the highest opportunity to make an impact in Sub-Saharan Africa, by developing infrastructure and improving affordability of mobile services to increase connectivity and access to information.
Category 5: Combatting Violence and Crime			
16.a	Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime	**31**	**Biggest Impact: North America** The mobile industry has had the largest impact in North America, where connectivity has supported the capability of law enforcement agencies to monitor physical areas or communications to prevent violence and combat terrorism. The industry has the highest opportunity for growth in Asia-Pacific, where development of reliable and resilient infrastructure into the future can support law enforcement agencies, as is observed in developed regions.[1]

TARGET-BY-TARGET IMPACT

Reduce Violence and Related Deaths (16.1)
The industry provides the enabling technology that allows police officers to transfer information efficiently and effectively, providing the input for better decision making:

- By having information readily available police officers can be more proactive in their efforts to prevent violence. This capability is further improved with advancements in network performance and speed. The industry partners with relevant bodies to build platforms that enable police officers to carry out operational duties with mobile technology currently underpinning a number of police operations, for example police radios, ticket issuance, and automatic number-plate recognition.

- Where networks allow, police are piloting streaming video or wearable cameras to improve deployment, evidence collection and safety.[1]

- Crowdsourcing incident identification and evidence, and using data solutions to understand material movements of people all impact this target.

1. Accenture (2014). How Mobile Technology Enhances Police Work. (https://www.accenture.com/ae-en/-/media/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Dualpub_1/Accenture-How-Mobile-Technology-Enhances-Police-Work.pdf)

Promoting Justice and Rule of Law (Target 16.3)

The industry contributes to Target 16.3 (lawfulness and access to justice) by setting and enforcing data privacy and security standards that meet national and international standards, advocating responsible practices across the supply chain and providing access to information that promotes peace and justice.

- Digitisation of personal information has significantly increased the profile of data privacy and security as critical issues in consumer law. This has triggered the mobile industry to address security challenges and privacy responsibilities in order to protect its network and subscribers. While traditional security strategies were focused on physical security, mobile network operators are now focused on breach protection of their software and are using defences such as enhanced encryption, authentication and key management.[2]

- As the application of mobile networks evolves, the industry can have a significant impact by identifying and addressing new legal and security challenges: the GSMA has developed guidelines to promote the secure development and deployment of services in the growing Internet of Things (IoT) market to offer IoT service providers and the wider IoT ecosystem practical advice on tackling common cybersecurity threats, as well as data privacy issues associated with IoT services.[3]

- The industry can amplify its impact on this target by encouraging the broader supply chain to adhere to national and international law, for example, by implementing procurement policies that ensure that suppliers are compliant. Many mobile network operators, including Vodafone, conduct due diligence on their suppliers to ascertain their compliance with ethical practices, for example, identifying whether any minerals used in component manufacturing were unlawfully sourced from conflict areas.[4]

Inclusive and Transparent Governance (Target 16.5)

The industry contributes to Target 16.5 (reduce corruption and bribery) by implementing ethical practices against corruption and bribery within its own operations and supply chain:

- In order to reduce the opportunities for bribery and corruption, mobile network operators implement policies and programmes to drive ethical practices within operations, and conduct appropriate due diligence during procurement, to encourage suppliers to adhere to ethical practices. Many mobile network operators outline their commitment to good corporate governance and make this information publically available. AT&T, for example, outlines a 'Code of Business Conduct' guide that addresses common ethical and compliance issues.[5]

- The industry can also ensure proper monitoring of mobile money services to identify suspicious activity and partner with police, to isolate and prevent criminal activity. Moreover, mobile money as a service is an effective tool to fight corruption, as the tool inhibits some of the common forms of cash-based corruption such as skimming bill payments, cash transfers, and salaries.[6]

2. Telecoms.com (2015): How telecoms operators can face today's security challenges. (http://telecoms.com/opinion/how-telecoms-operators-can-face-todays-security-challenges/)
3. GSMA (2016). GSMA Announces security guidelines to support growth of internet of things. (http://www.gsma.com/newsroom/press-release/gsma-announces-security-guidelines-to-support-growth-of-the-internet-of-things/)
4. Vodafone (2016). Responsible supply chain – Performance. (https://www.vodafone.com/content/sustainabilityreport/2015/index/operating-responsibly/responsible-supply-chain.html)
5. AT&T. Good Corporate Governance. (http://www.att.com/Common/about_us/files/csr_2012/good_corporate_governance.pdf)
6. Chemonics. How Mobile Money can cut down on corruption in Afghanistan. (http://blog.chemonics.com/how-mobile-money-can-cut-down-on-corruption-in-afghanistan)

FIGURE 1
OPEN DATA INDEX SCORE VS RULE OF LAW INDEX SCORE
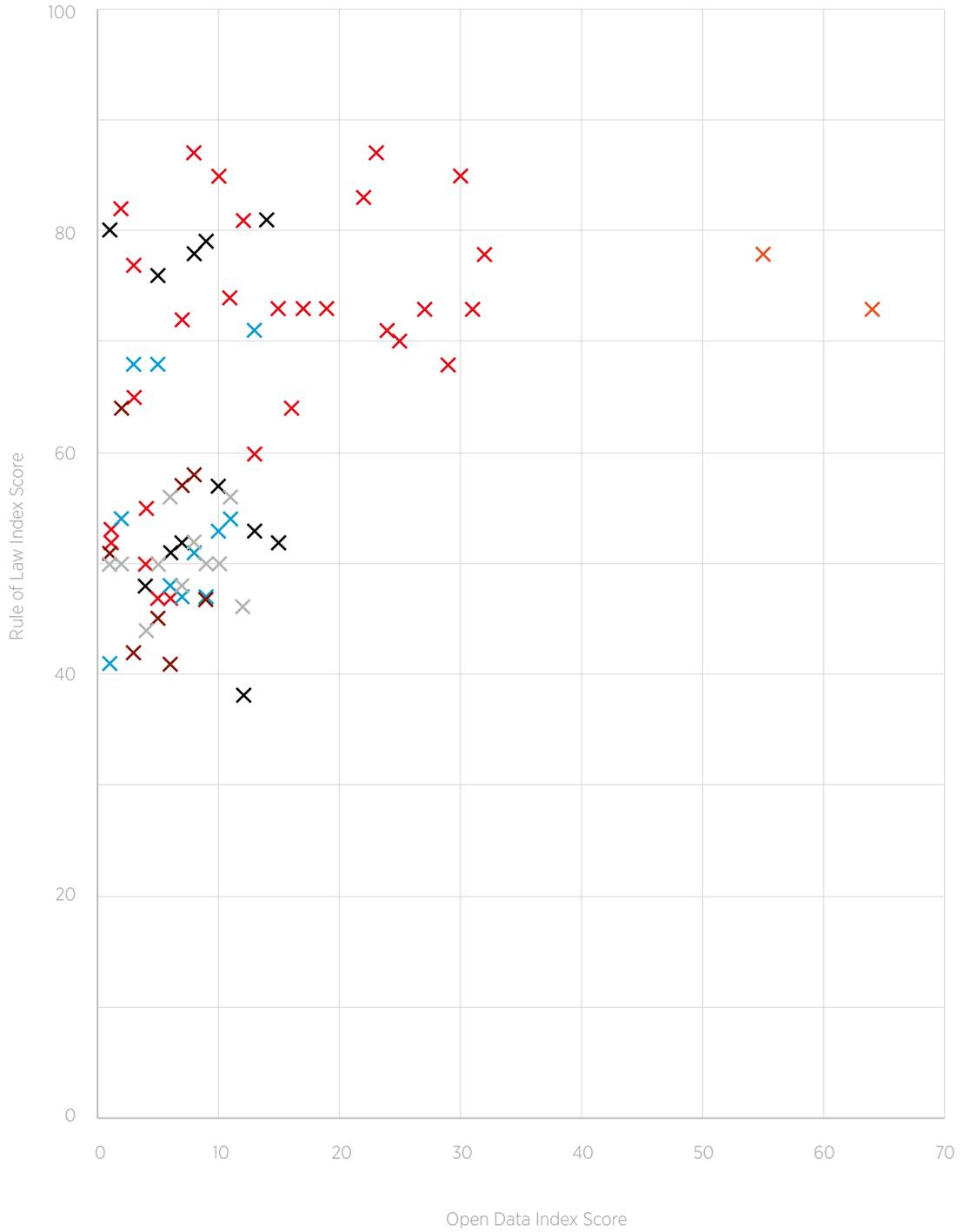
Asia Pacific   CIS   Europe   Latin America   MENA   North America   Sub-Saharan Africa

TARGET-BY-TARGET IMPACT

Human Rights and Fundamental Freedoms (Target 16.9 and 16.10)

The industry contributes to Target 16.9 (legal identity for all) by developing mobile solutions for identity management and birth registration, facilitating access to fundamental services and freedoms that are typically inaccessible to those without formal identities;

- Nearly 2.4 billion people do not have a formal identity[7]. Given the reach of its services and subscribers, the mobile industry is well positioned to improve this number. Current efforts have been focused on addressing identity at birth, particularly in isolated areas where there is limited opportunity for birth registration. In Senegal, for example, a pilot programme over two months, covering 30 villages resulted in 100% of births (approximately 300) being registered.[8]

- Mobile solutions for identity also impact the developed world, for example in the United Arab Emirates, where the government has announced plans to provide its citizens with access to every public service, using mobile identity as a key enabler of the programme.[9]

The industry contributes to Target 16.10 (protect fundamental freedoms and ensure public access to information) by enabling widespread access to the internet, supporting the fundamental freedoms of expression, thought, belief and opinion, as well as providing a channel to public information:

- While fundamental freedoms are underpinned by human and legal rights, the mobile industry can promote freedom of expression, thought, belief and opinion by opening a channel for individuals to share ideas and information around the world. Where this information would have been previously unattainable, the connectivity of mobile can contribute to the discovery of truth and progress of society as a whole.[10]

For these reasons, access to the internet has been highlighted by international development organisations as a key enabler for developing nations in particular. The UN has declared internet access a basic human right; which reflects and enforces the criticality of the internet as a tool for progressing human rights, fighting inequality and catalysing development and human progress.[11]

Combatting Violence and Crime (Target 16.a)

The industry contributes to Target 16.a (strengthen national institutions to combat violence, terrorism and crime) by supporting national security authorities to combat terrorism and crime:

- In combatting terrorism and organised crime, governments are increasingly aware of the important role the mobile industry can play.

- Operators, in conjunction with governments, can develop technical solutions to identify organised crime and terror threats. Interception devices enabled by connectivity can be deployed to monitor suspicious or threatening communication. The devices work by emitting a stronger signal than nearby towers in order to force a phone or mobile device to connect to them instead of a legitimate tower. Once a mobile device connects, the phone reveals its unique device ID, after which the stingray [phone surveillance device] releases the device so that it can connect to a legitimate cell tower, allowing data and voice calls to go through.[12]

7. World Bank. (2015). World Development Report 2016: Digital Dividends. (http://www.worldbank.org/en/publication/wdr2016)
8. GSMA. (2014). Mobile Identity-Unlocking the Potential of the Digital Economy. (http://www.gsma.com/personaldata/wp-content/uploads/2014/10/14-10-10-GSMA-SIA-Joint-Paper-Mobile-Identity_October-2014.pdf)
9. GSMA. (2014). Mobile Identity-Unlocking the Potential of the Digital Economy.(http://www.gsma.com/personaldata/wp-content/uploads/2014/10/14-10-10-GSMA-SIA-Joint-Paper-Mobile-Identity_October-2014.pdf)
10. UN (2011). Report of the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression, Frank La Rue. (http://www2.ohchr.org/english/bodies/hrcouncil/docs/17session/A.HRC.17.27_en.pdf)
11. UN (2011). Report of the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression, Frank La Rue. (http://www2.ohchr.org/english/bodies/hrcouncil/docs/17session/A.HRC.17.27_en.pdf)
12. WIRED (2015). Turns out Police stingray spy tools can indeed record calls. (https://www.wired.com/2015/10/stingray-government-spy-tools-can-record-calls-new-documents-confirm/)

IMPACT STORY: CHILDBIRTH REGISTRATION IN PAKISTAN – TELENOR

Childbirth registration is key to mitigating issues like child marriage and child trafficking and improves planning of government services. However, in most developing countries a number of factors such as time, cost, travel, process hindrances, and general lack of awareness all contribute towards very low rate of birth registrations. In Pakistan for example only 33% of children are registered at birth.

To address this, a joint collaboration between Telenor, UNICEF and the Pakistani authorities is aiming to increase the rate of birth registration by leveraging mobile services. Birth registration details are reported through authorised community members such as health workers and marriage registrars, and through Telenor Pakistan's distribution nodes, to the designated government official using an android app. The data is made accessible by simple web-based dashboards to concerned stakeholders, which helps create heat-maps for areas requiring the most attention.

A pilot was completed in January 2016 for the Punjab and Sindh regions with very promising results. A baseline comparison has shown an increase in registration rates from just below 30% via conventional registration during the same period in 2014, to above 90% during the pilot phase. The partners are exploring opportunities to scale up the project with the ambition to reach more than 7 million children by 2018.

Source: https://www.telenor.com/media/articles/2014/providing-proof-of-identity-in-pakistan/
To see more impact stories that contribute to each of the Sustainable Development Goals, visit

www.gsma.com/betterfuture

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. The impact on this SDG is delivered across all types of industry activities: operations, connectivity, platform, and non core.

- **Operations:** Through mobile network operators, own responsible business values and broader supply chain management.

- **Connectivity:** Connecting individuals and communities to information, as well as to a global communication channel that supports fundamental freedoms.

- **Platform:** Through providing legal identity services.

- **Non-core:** Supporting security authorities to combat terrorism and organised crime, leveraging the MNO role as custodian of relevant information.

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is primarily direct.

Access to the internet contributes indirectly; however, the human rights aspect of fundamental freedoms and the liberalisation of public information are two critical factors that the mobile industry cannot wholly address.

GEOGRAPHIC IMPACT

The largest impact overall is in Europe and North America. This is primarily due to the maturity and quality of infrastructure put in place across the regions, which provides consistently reliable, high-speed connectivity. Further geographic analysis highlights:

• Improving connectivity in regions such as Sub-Saharan Africa and Asia-Pacific will further enable transparent governance, aid in combatting violence and crime, and provide essential services to more people in need of them.

FIGURE 2

AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
27	25	31	28	25	33	16
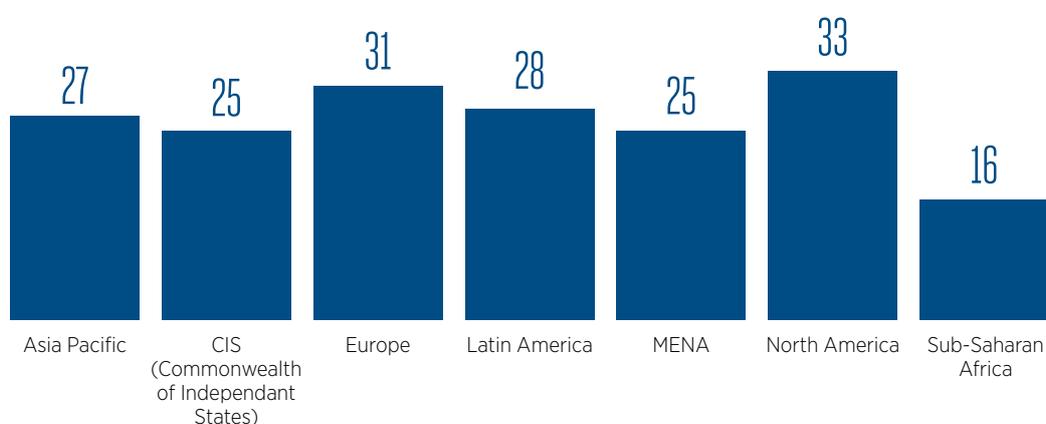
LOOKING FORWARD

The mobile industry impact on SDG 16 requires sustained and committed efforts to responsible business practices and setting the standard for lawful and ethical practices across the supply chain. While the link between business performance and responsible business values is broadly acknowledged, implementing pragmatic and effective responsible business policies and processes that are truly integrated into the core operations of a business, remains challenging for the industry, and of course for other industries.

Contribution to SDG 16 by the mobile industry also requires significant partnering with government and other institutions. Critical to the industry fulfilling its potential will be constructive relationships that clearly identify the role of the mobile industry in the context of many other players; current initiatives around mobile identity are a good example of where the industry and governments have identified an issue where mobile has stepped forward to lead on the development of a distinctive solution.

17 PARTNERSHIPS FOR THE GOALS

SDG17

PARTNERSHIP FOR THE GOALS

Revitalise the global partnership for sustainable development

SDG SUMMARY	PROPORTION OF TARGETS SCORED		IMPORTANCE		PERFORMANCE		SDG SCORE	KEY
	7/19	×	**6.1/10**	×	**25**	=	**6**	Average performance compared to all 17 SDGs

KEY — Average performance compared to all 17 SDGs: ABOVE · EQUAL · BELOW

ANALYSIS

The analysis scores the mobile industry's impact on SDG 17 at 6; this is lower than the average across the SDGs. The current impact on SDG 17 is driven by:

- A low proportion of targets identified as those where the industry can make a significant impact (7 out of 19 targets);

- An average level of importance of the industry's activities in achieving these targets (6.1/10);

- A relatively low performance of the industry against the metrics that contribute to these targets (25/100).

The potential impact of the industry, if performance was maximised (to 100), on SDG 17 is 23. There are more than 5 underlying metrics used to develop this score across the 7 targets, including broad measures of mobile penetration, as well as specific indicators of research and development progress.

INDUSTRY IMPACT OVERVIEW

The mobile industry impacts SDG 17 through the building and expansion of environmentally-sound infrastructure that enables new, sustainable technologies, applications and systems; and also through the sharing of IP to increase capacity building. The mobile industry contributes primarily to 7 of the 19 targets in SDG 17, across the categories of: finance; environmentally-sound technologies; mobilisation of the technology bank; capacity building; multi-stakeholder partnerships; and policy and institutional coherence. The industry has limited impact on the remaining targets, due to the broad nature of the targets and, in particular, the emphasis on the role of government and institutions.

TARGET SUMMARY

Target	Description	Target Score	Commentary
Category 1: Finance			
17.1	Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection.	**2**	**Biggest Impact: Sub-Saharan Africa** The mobile industry has had the largest impact in Sub-Saharan Africa through the uptake of mobile financial services that increases the formalisation of transactions in the economy. The biggest area of opportunity is in MENA, where greater mobile solutions have the potential to further formalise financial services and support the domestic capacity for revenue collection.
Category 2: Environmentally-sound Technologies			
17.7	Promote the development, transfer, dissemination and diffusion of environmentally-sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed.	**12**	**Biggest Impact: Latin America** The mobile industry has had the largest impact on this target in Latin America through investment in resilient infrastructure development. Sub-Saharan Africa presents the greatest opportunity for mobile network operators to integrate sustainable technologies into new infrastructure projects as networks are expanded.
Category 3: Mobilising the Technology Bank and Science, Technology and Innovation (STI)			
17.8	Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017, and enhance the use of enabling technology, in particular information and communications technology.	**3**	**Biggest Impact: Asia-Pacific** The industry has had the largest impact in Asia-Pacific, where technology adoption rates are high and are supported by mobile connectivity. The highest opportunity to improve impact against this target is in Sub-Saharan Africa by sharing IP to improve the development of infrastructure.
Category 4: Capacity Building			
17.9	Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation.	**31**	**Biggest Impact: Latin America** The industry has had the largest impact in Latin America, where sustainable practices are being integrated into infrastructure development. The biggest opportunity is in Asia-Pacific, where further investment in mobile infrastructure will contribute to broader infrastructure planning across the region.

Target	Description	Target Score	Commentary
Category 5: Multi-Stakeholder Partnerships			
17.16	Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries.	**23**	**Biggest Impact: Asia-Pacific** The industry has had the largest impact in Asia-Pacific, through cooperation with local governments and commitment to ethical business practices. The biggest opportunity is in the Commonwealth of Independent States, where further commitment to multi-stakeholder partnerships can significantly increase the impact on this target.
17.17	Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships.	**13**	**Biggest Impact: Asia-Pacific** The industry has had the largest impact in Asia-Pacific, through commitments to sustainability. The biggest opportunity is in the Commonwealth of Independent States, where further commitment to sustainability and ethical practice frameworks could promote public-private partnerships in the region.
Category 6: Policy and Institutional Coherence - Data, Monitoring and Accountability			
17.18	By 2020, enhance capacity-building support to developing countries, including for least developed countries and Small Island Developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts.	**29**	**Biggest Impact: Europe** The industry has had the largest impact on this target in Europe through high levels of connectivity that have enabled effective inter-organisational cooperation. Sub-Saharan Africa has the greatest need for infrastructure development and presents the highest opportunity for the industry to impact this target.

TARGET-BY-TARGET IMPACT

Finance (Target 17.1)

The industry is a primary facilitator of mobile money services which helps formalise money flows and provides a channel for assessment and collection of taxes. In particular, mobile money serves as an effective medium for tax payment.

- The industry has a distinct advantage in that it reaches large populations, including those in hard-to-reach remote areas. Mobile money can be utilised by tax authorities to reach a wider population and reduce tax avoidance. For citizens, the medium offers a convenient, simple and effective way of paying taxes, allowing remote payments and reducing the administrative burden. One year after the Tanzania Revenue Authority enabled tax payments over mobile money for property taxes and personal income taxes, around 15% of the tax base was collected using mobile money.[1]

Environmentally-sound technologies (Target 17.7)

The industry contributes to Target 17.7 (promote environmentally-sound technologies) by seeking to ensure that continuous upgrading and deployment of infrastructure minimises negative impacts on the environment.

- The industry has made a significant effort to upgrade core infrastructure to environmentally sustainable solutions, particularly in developing countries where diesel generators have typically been used to power telecom towers. The emergence of solar photovoltaic, fuel cell, wind power and other renewable technologies have resulted in wide-scale upgrades of infrastructure, for example, at 4,021 telecom sites across India.[2]

Mobilising the Technology Bank and Science, Technology and Innovation (STI) (Target 17.8)

The industry contributes to Target 17.8 (mobilise the technology bank and STI) by increasing the provision of mobile technology in least developed countries, which has a variety of enabling benefits for inhabitants. As defined by the target, only developing countries were considered.

- The industry is a direct contributor to improvements in connectivity and has catered to populations in least developed countries by driving down the affordability of handsets and associated data. This in turn has catalysed the dissemination of mobile technology in these countries and enhanced the technology bank and level of STI. The adoption of mobile technology by farmers, fishermen and micro-entrepreneurs in many least developed countries has resulted in improvements in overall productivity as well as reduced information asymmetries.[3]

Capacity Building (Target 17.9)

The industry has a distinct contribution in particular to the technological aspect of capacity building as well as notable impacts on building institutional capacity in least developed countries.

- Least developed countries often lack the fundamental technology infrastructure required for basic connectivity, and this inhibits a variety of associated benefits. The mobile industry makes a significant contribution to alleviate this problem by investing substantially in the technological capacity of least developed countries. Sub-Saharan Africa is a particular focus for mobile network operators and it is estimated that Capital Expenditure (CAPEX) will total approximately US$97 billion by 2021, on new cell sites for 2G and 3G networks as well as support for transmission capacity.[4]

1. GSMA (2014). Paying Taxes through mobile money. (http://www.gsma.com/mobilefordevelopment/programme/mobile-money/paying-taxes-through-mobile-money-initial-insights-into-p2g-and-b2g-payments)
2. GSMA (2013). Green solutions for Telecom Towers: Part I (http://www.gsma.com/membership/wp-content/uploads/2012/03/Intelligent-Energy-Whitepaper-Green-Sol-telecom.pdf)
3. ITU News. Digital inclusion for the least developed countries. (https://www.itu.int/net/itunews/issues/2011/02/pdf/201102_22.pdf)
4. GSMA (2014) The Mobile Economy: Sub-Saharan Africa. (http://www.gsmamobileeconomyafrica.com/GSMA_ME_SubSaharanAfrica_Web_Singles.pdf)

- Furthermore, mobile is increasing in importance as a tool for learning and the industry is uniquely positioned to improve institutional capacity by improving education and training methods through mobile technology. Mobile network operators are making dedicated efforts to contribute to building healthy local ICT ecosystems, targeting local universities, research institutes, industry associations and other institutions.[5]

Multi-stakeholder Partnerships (17.16 and 17.17)

The industry helps to enhance the global partnership for sustainable development, by helping harness the data revolution in sustainability. Furthermore, the industry is taking active steps to seek partnerships that promote sustainability and amplify existing contributions to the SDGs:

- Mobile network operators have distinct capabilities and access to data on large populations, which can be synthesised and used to inform public decision making for the benefit of sustainable development. The industry has a distinct advantage over others due to the ability of mobile network operators to amass rich data sets. As an indicator, a single mobile network operator serving 8 million prepaid mobile subscribers can generate approximately 30 million Call Data Records (CDRs) daily, equating to 11 billion records annually.[6]

- The importance of the industry in forming partnerships has been recognised by governments and institutions. The UN Secretary-General Adviser on the 2030 Agenda for Sustainable Development, Dr. David Nabarro, has encouraged and commended the mobile industry's commitment to work together and develop policy frameworks, services, content and technical standards that would ensure no one is left behind.[7] In addition this view has been adopted by mobile network operators, for example, KT Corporation have highlighted the importance of cooperation between all GSMA mobile network operators, stating this as the "best case approach" to maximising industry contribution to the SDGs.

Policy and Institutional Coherence - Data, Monitoring and Accountability (Target 17.18)

Governments and institutions are increasingly aware of the importance of harnessing big data to better inform decision making. The industry is a primary collector of public information which, to the extent that law permits, can be shared with authorities for improvements in data monitoring and accountability.

Mobile technology, such as devices, apps, smart sensors and cloud computing, is increasingly becoming a core enabler to produce rich data sets. With these data sets, governments can make better informed policy decisions for sustainable planning and development.[8]

IMPACT BY INDUSTRY VALUE CHAIN ACTIVITY

The industry impact can be assessed by the stage in the value chain it is derived from: operational activity, the provision of connectivity, the development of content or service platforms, and non-core activity. This SDG is most impacted by the industry's core operations and through the provision of telecommunications infrastructure.

Additionally, there is an emerging non-core, outreach role for telecoms operators in least developed countries to partner with governments and institutions to supplement the existing Technology Bank and stimulate growth across Science, Technology and Innovation.

5. Kramer, William J., Beth Jenkins, and Robert S. Katz. 2007. The role of the Information and Communications Technology Sector in Expanding Economic Opportunity. Corporate Social Responsibility Initiative Report No. 22. Cambridge, MA: Kennedy School of Government, Harvard University. (https://www.hks.harvard.edu/m-rcbg/CSRI/publications/report_22_EO%20ICT%20Final.pdf)
6. Teletech. By the Numbers: Three Big Data Opportunities for Telecoms. (http://www.teletech.com/resources/articles/numbers-three-big-data-opportunities-telecoms)
7. UN (2016). UN Adviser underlines importance of partnership with mobile-communications industry to achieve Sustainable Development Goals. (http://www.un.org/sustainabledevelopment/blog/2016/02/un-adviser-calls-for-new-mobile-communications-industry-partnership-to-achieve-sustainable-development-goals/)
8. Iron Mountain. The Impact of Big Data on Government. (http://www.ironmountain.com/-/media/Files/Iron%20Mountain/Knowledge%20Center/Reference%20Library/White%20Paper/T/The_Impact_of_Big_Data_on_Government.pdf)

IMPACT BY TARGET PROXIMITY

The way the industry impacts the SDGs can also be characterised by the proximity to the target: impact can be direct (no intervening stage or actor), indirect (requiring third-party collaboration or intervention) or systemic (impact that requires the interaction of multiple parties over time). The impact made by the industry on this SDG is primarily direct across all relevant targets.

GEOGRAPHIC IMPACT

The largest impact overall is in Europe, through the impact on Target 17.18. This is primarily due to the quality of infrastructure put in place across the region, which provides high levels of connectivity and enables greater collaboration between governments and institutions. Further geographic analysis highlights:

• North America has a lower need for action compared to Sub-Saharan Africa (SSA), hence scores lower.

• Mobile network operators in North America and Europe have a high opportunity to take a leadership role in the private sector, to integrate sustainable development agenda into business activities.

• Improving connectivity in regions such as SSA will enable effective participation from various industries and communities, leading to a greater impact towards this goal.

FIGURE 1
AVERAGE TARGET SCORE ACROSS REGIONS

Asia Pacific	CIS (Commonwealth of Independant States)	Europe	Latin America	MENA	North America	Sub-Saharan Africa
18	10	20	18	17	9	10
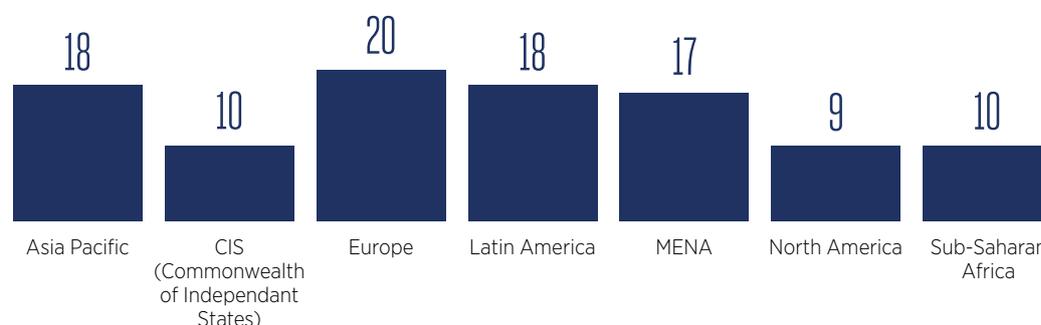
LOOKING FORWARD

The current impact on SDG 17 is primarily driven by the deployment and upgrade of environmentally-sound telecoms infrastructure, to reduce negative environmental impacts and promote capacity building across different dimensions in least developed countries. The industry has further potential to increase its impact by enabling least developed countries with the necessary IP and capabilities to benefit from advancements in IoT technologies and accelerate the dissemination and diffusion of the environmentally-sound technology they enable. In addition, there is growing support within the industry for collaboration in order to maximise the impacts of the contribution to the SDGs. Mobile network operators have voiced their support and willingness to engage with one another to pool together resources for the benefit of the SDGs. Moreover, there is a clear and important role for the industry to progress and develop the relationships made with governments and other institutions to improve the collective approach to achieving the SDGs.

APPENDIX B
# FRAMEWORK APPLICATION

APPENDIX B
FRAMEWORK APPLICATION

INTRODUCTION

This appendix describes and illustrates the impact measurement framework. First, the formulation of the SDG impact score is outlined and contextualised with an example. Second, each component of the impact score is discussed in further detail, explaining the rationale underpinning their application through a series of examples.

SDG IMPACT SCORE

The impact scores for each SDG are comprised of three primary components:

A — Proportion of targets scored

B — Importance of the industry's activities to the target

C — Performance of the industry against the metrics contributing to the target
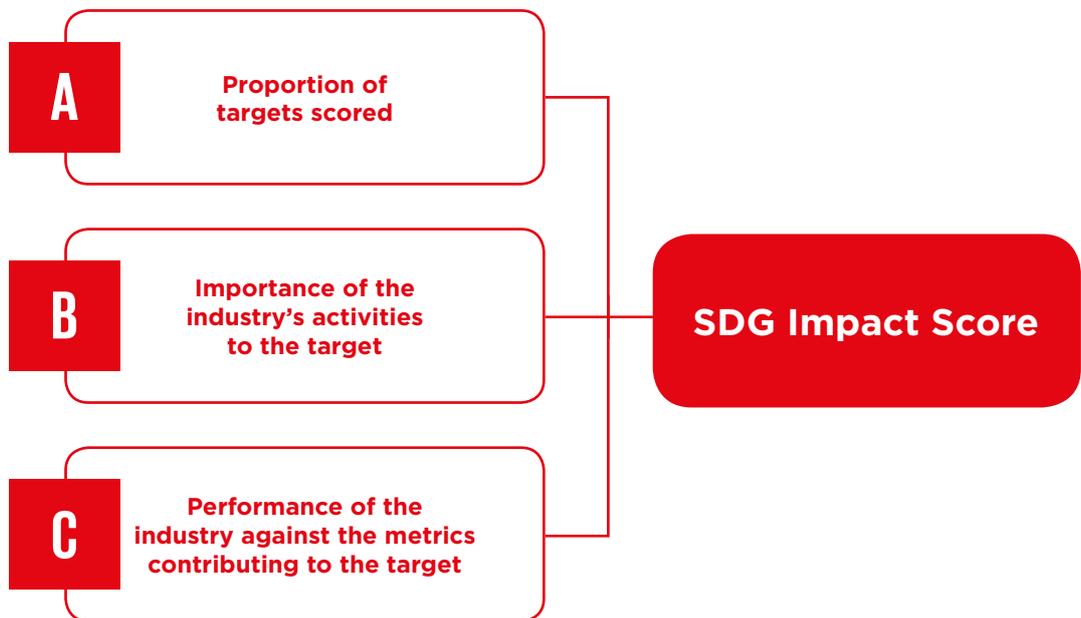
SDG Impact Score

The SDG impact scores are against a theoretical maximum of 100 which would be achieved if all the targets for an SDG were:

• considered materially impacted by the mobile industry;

• the importance of the mobile industry was paramount to each target;

• the performance of the industry against the underlying drivers and metrics was as high as it could be across all geographies.

5 GENDER EQUALITY

SDG 5: GENDER EQUALITY - IMPACT SCORE EXAMPLE:

Taking SDG 5: Gender Equality as an example:

- Four out of nine targets are materially impacted, primarily relating to enabling women's economic and social participation, and providing access to information and communications technology. Those which are not materially impacted relate to ending violence, discrimination and harmful practices, and enacting government policy and legislation; all broad challenges primarily calling for involvement from governments, NGOs and the private sector.

- The industry's importance to the materially impacted targets is 7.0 out of 10, which is above the average for all SDGs due to the fact that the industry is particularly well placed to impact a number of targets, including target

5.b (enhance use of enabling technology, particularly information and communications technology (ICT)).

- Performance against the seven metrics used to quantify progress is assessed at 37. These include: the proportion of women employed by the telecommunications industry, the proportion of women able to access the internet, the availability of women-specific mobile health applications, and the penetration of mobile money services among women.

The difference in impact score by SDG is driven more by the proportion of targets impacted, and by the performance, than by importance.

Based on the analysis, multiplying the three components results in the industry, achieving an impact of score of 11 on SDG 5.

A PROPORTION OF THE TARGETS SCORED

The resultant rankings of the SDGs reflect the proportion of targets that the mobile industry can materially affect. Some of the SDGs are heavily focused on actions that the industry can only peripherally influence, such as the setting of new laws or the creation and distribution of international subsidies and, as such, are excluded.

Targets are typically excluded where there is an explicit requirement for governmental or institutional intervention such as laws or treaties, for example Target 17.14 (Policy: Enhance policy coherence for sustainable development). Some SDGs are largely focused on this type of intervention, for example, SDG 11: Sustainable Cities and Communities, where the underlying targets have a heavy emphasis on policy, planning and financial assistance. Similarly, targets so broad in ambition that the mobile industry's impact is comparatively less significant, for example, Target 16.1 (Significantly reduce all forms of violence and related death rates everywhere), are also typically excluded.

B IMPORTANCE OF THE INDUSTRY'S ACTIVITIES TO THE TARGET

The industry's activities, or drivers, which impact the targets, are assessed both in terms of the importance of the driver in achieving the target, and then, the importance of the mobile industry to the driver. Combined, these are referred to as the driver's 'importance'. To determine importance, two questions are asked:

1. The importance of the driver in achieving the overall target – how many aspects of the SDG target does the driver address?

2. The role of the mobile industry – how important is the role of the mobile industry in delivering the driver?

As an example, target 5.b is "Enhance the use of enabling technology, particularly ICT, to promote the empowerment of women". One of the drivers for this is providing "an affordable mobile service entry point to women in all areas." The driver scores highly for two reasons: (1) the driver is important to achieving the target as mobile services are a critical entry point to broader ICT connectivity, and (2) the mobile industry is critical to providing these services.

Overall, driver importance scores are concentrated in the range of 5-10 out of 10, reflecting the fact that targets are selected on the basis of their relevance and significance.

C

PERFORMANCE OF THE INDUSTRY AGAINST THE METRICS CONTRIBUTING TO THE TARGET

For each prioritised target, drivers are identified. Each driver is then measured against a number of metrics collected at country level. The distribution of scores, even within a region, often varies as factors, such as the development or demographic profile of an economy, influence the impact of the mobile industry. Performance is then derived from a set of underlying metrics ranging from mobile penetration to deployment of mobile health applications, and which sometimes deal with a subset of countries. For example, penetration of mobile money services is only measured in developing countries, reflecting where services are in operation. Both these factors drive significant variance in scores.

SUMMARY

In summary, the industry impacts all SDGs. The degree of impact is influenced, firstly, by the focus of the SDG and its targets, particularly whether it calls for public or private sector intervention and, secondly, by the extent to which the industry has delivered against its potential to impact the targets through its activities and services like: connectivity of voice, broadband, and the delivery of the various platforms called out in this report (such as mobile agriculture value-added services to deliver information to farmers). While there are commonalities in the way impact is delivered, maximising impact will require a bespoke response by SDG.

DETAILED FRAMEWORK

APPENDIX C
FRAMEWORK

INTRODUCTION

The framework seeks to assess the impact of the activities of the mobile industry on the UN SDGs, both qualitatively and quantitatively.

This appendix provides an overview of the methodology, a description of both the qualitative and quantitative approaches, and examples at each stage.

QUALITATIVE METHODOLOGY

Overview

The qualitative methodology identifies which of the 17 SDGs and underlying 169 targets are most relevant to the mobile industry. The methodology is made up of three key steps:

A	**Identifying and Developing Drivers** The first step was to identify a set of industry activities that contribute to a target, called drivers
B	**Scoring the Drivers** For each SDG the targets were prioritised and assigned a score based on the importance of both the driver on the target and the role of the industry in delivering the driver
C	**Metric Selection** Appropriate metrics were selected to quantify the drivers

The application of this methodology resulted in the identification of a subset of targets across all SDGs that the mobile industry has a particularly relevant contribution to and mechanism for measurement. The following sections explain steps A – C of the process in detail.

A   IDENTIFYING AND DEVELOPING DRIVERS

Developing a driver consisted of three main steps. The first was to deconstruct the SDGs and 169 targets to understand the various components in more detail. Secondly, a framework was developed to identify and categorise the mobile industry's activities and type of impact. Finally, based on the initial analysis, drivers were defined and mapped to specific targets. Each step is explained in further detail below:

1. Deconstruct the SDGs to understand:

- **Target terminology:** Certain terminology used in targets was analysed to identify the fundamental constructs of the target in more detail, for example, 'dimensions of poverty'.

- **Unit of measurement:** Some targets outline specific units of measurement, for example, '$1.25 a day' focuses on a select population.

- **Applicable geography/market:** Numerous targets explicitly state the importance on developing countries, whereas others are universally applicable.

- **Timeframe:** A number of targets outline clear timeframes, for example, by stating 'By 2020' or 'By 2030'.

- **Stakeholders:** The key stakeholders intended by a target were assessed to identify if there was a specific government or private sector focus.

Once the targets were analysed, a detailed review of indicator sets mapped to SDGs was undertaken. This provided a better informed understanding on the focus of measurement. The indicator sets assessed have been developed by the following bodies:

THE WORLD BANK   *~230 World Development Indicators*

SDG Compass   *834 Business Indicators*

Finally, a literature review of existing UN and social-impact frameworks was undertaken to gain an understanding on proposed methodologies to impact assessments. This provided a view on what factors are typically measured in similar studies, as well as how indicators are grouped.

2. Identify mobile industry activities

Two frameworks were developed to understand how the mobile industry impacts the SDG targets, one to understand industry activity and the other to define the type of impact.

industry activity: categorises drivers by the way in which the industry delivers impact. This supports analysis of what the biggest source of impact is: core operations, connectivity, platform or non-core services (other development/corporate social responsibility activities).

MNO Operations	The primary activities that are undertaken by mobile network operators in order to deliver products and services to market (e.g. infrastructure development, operating towers/data centres, network service ops)
Connectivity	The enablement of interaction between people and systems which is facilitated by mobile network operator's networks (e.g. 2G/3G/4G service provisioning for B2B and B2C)
Platform	Platforms (third-party or industry-led) that are enabled by the mobile industry technologies and services (e.g. mobile money, e-health, mobile agriculture)
Non Core	Additional activities that benefit development and/or sustainability but are not core MNO operations (e.g. development of M2M architecture standards)

Impact definition defines the type of impact that the mobile industry has on the target and how proximate that impact is to the actions of the mobile industry. This is critical in capturing many of the indirect, flow-on impacts on broader targets where the mobile industry is an enabler.
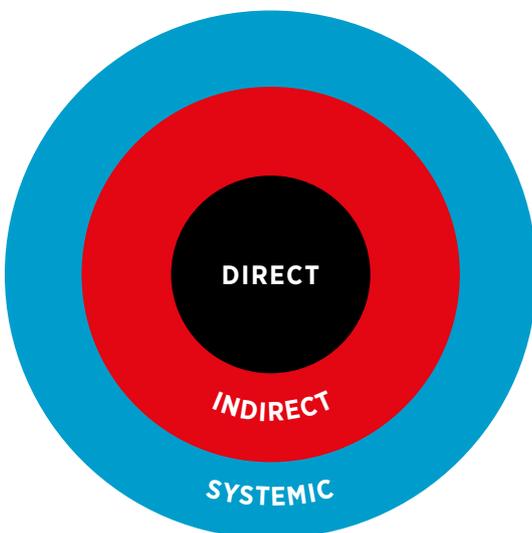
Direct impacts are those where impact on the target is created by the core activities and services of mobile network operators that do not require the involvement of downstream third parties (e.g. provision of voice services, energy consumption)

Indirect impacts are those where impact on the target is enabled through mobile industry services but participation of downstream third parties is required (e.g. roll-out of e-healthcare services to remote communities)

Systemic impacts are those where the aggregated effects of a connected national or global population, over the medium to long term, fundamentally changes the nature of relationships between individuals, businesses and markets (e.g. advancement in productivity or innovation due to mobile technology).

3. Select drivers

Once the industry activity and impact definitions were outlined, drivers were defined. The driver must describe an activity that:

- Can be performed or supported by the mobile industry;

- Can be mapped to the activities of the mobile industry (e.g. MNO operations, connectivity, platforms, non-core);

- Contributes to the achievement of the UN SDG target, either by:

  - Fulfilling a necessary condition to achieve the target, or

  - Increasing the speed to reach the target, or

  - Improving the economics of reaching the target

- Is specific to the target and achievable within the target timeframe.

Example Driver Development:

Target 1.1	
By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day	**1.1.1** Provide communications infrastructure to stimulate local economy growth in poor communities
	1.1.2 Enable social enterprise by connecting small and remote communities to information and marketplaces

There are three key considerations when developing the drivers:

1. Drivers that relate to core industry activities may be mapped across multiple targets;

2. Both direct drivers (where the mobile industry will take a leading role) and indirect drivers (where the mobile industry may need to partner with others) should be considered to capture flow on impact;

3. Driver descriptions should include the specific mechanism through which they are creating the impact for increased clarity.

This process of driver development and mapping to the appropriate targets resulted in the eventual sub-set of targets that formed the focus of our impact assessment.

B	SCORING THE DRIVERS

In order to differentiate the impact of the mobile industry against the drivers, the impact was assessed and scored across two dimensions:

1. **The importance of the mobile industry's role:** How important the role of the mobile industry is in delivering the driver;

2. **The importance of the driver in achieving the overall target:** How many aspects of the SDG target the driver addresses.

Each dimension was ranked on a score of 1 to 5, depending on the role or the level of importance. The combination of these two scores provided a qualitative assessment of the weight of the industry impact against a particular target. The same score can also serve to prioritise the targets.

The role the industry can play in achieving the driver can range at the lower end from being a simple participant, with no distinctive difference to any other participant, to the other extreme of being the critical component in achieving the driver. The full spectrum of roles is defined as follows:

Score	Role	Description
5	**CRITICAL**	No other industry or institution could achieve the driver at a comparable speed or cost. Example: The mobile industry is critical in providing affordable communications to remote rural areas as fixed infrastructure would typically have significantly higher last mile costs, making full rural coverage uneconomical.
4	**LEADING**	The mobile industry is the lead industry required to fulfil the role, with a high degree of control over the outcome. Example: The industry would have a leading role in providing communications services to stimulate local business growth; however, it would not be the only provider of such services.
3	**PARTNERING**	The industry would make a distinctive contribution as one of a few key participants; however, requires coordination with other industries and the industry would have a medium degree of control over the outcome. Example: In platform enabled services like e-health where high coordination with healthcare services would be required.
2	**SUPPORTING**	The industry would make a distinctive contribution, but would be among many participants required to make an impact and have a low degree of control over the outcome. Example: Creating solutions for identity management, the industry would need to coordinate with a number of government agencies and institutions.
1	**PARTICIPATING**	The industry could not have a distinctive role, and the contribution would be the same as any other industry. Example: Ensuring that suppliers and vendors adhere to the rule of law, e.g. in terms of waste disposal.

The second dimension in weighting the industry impact is the importance that achieving the driver would have against the target. This would range from low, where the driver would make some contribution but not be instrumental in achieving the target, to high, where the driver covers the ambitions of the target.

In order to assess the impact of the driver in terms of importance, a target was broken down to any constituent components[1], both explicitly and implicitly included within the description. The importance would then depend on a quantitative assessment of the number of target components the driver directly addresses and the qualitative assessment of the materiality of that impact on each of the addressable components. The full spectrum of importance is defined as follows:

Score	Importance	Description
5	**HIGH**	The driver nearly matches more than 60% of the components of the target and has a significant impact in delivering or enabling them. Example: In target 5.b (Enhance the use of technology, in particular ICT, to promote the empowerment of women).
4	**MEDIUM-TO-HIGH**	The driver matches at least half of the target components and has a material impact in delivering or enabling them. Example: Target 9.03 (Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets).
3	**MEDIUM**	The driver matches at least a third of the target components and has an obvious impact in delivering or enabling them. Example: Target 9.1 (Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all).
2	**LOW-TO-MEDIUM**	The driver matches a number of the target components and has some impact in delivering or enabling them. Example: Target 15.02 (By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally).
1	**LOW**	The driver matches one of the target components and has some impact in delivering or enabling it. Example: Target 16.3 (Promote the rule of law at the national and international levels and ensure equal access to justice for all).

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1. For example target 6.4 has three components: [1] By 2030, substantially increase water-use efficiency across all sectors [2] and ensure sustainable withdrawals and supply of freshwater to address water scarcity [3] and substantially reduce the number of people suffering from water scarcity

C   METRIC SELECTION

Metrics are used to measure the contribution of the industry towards each driver, relative to its theoretical maximum contribution. Metrics form the basis of the calculation of target and SDG scores, using the calculation framework described in the Quantitative Methodology section.

The metric must be an observable measure that represents the driver, and must also:

- Be influenced by mobile network operators;

- Have a direct link to the driver or be a proxy for driver measurement;

- Be obtainable across relevant geographies (country or region);

- Be measured on an ongoing basis (to allow for year-on-year comparison).

Where a metric cannot be observed or is best described by multiple metrics, underlying sub-metrics are defined. Sub-metrics must have the same characteristics as described above.

Wherever possible, metrics are sourced from reputable international bodies (e.g. WorldBank, UN, UNESCO, WEF) and industry bodies (e.g. GSMAi, ITU).

Countries included in this study were selected based on the availability of metrics, as well as providing coverage, measured by both population and number of countries, across geographic and development groups. Following analysis of data availability, 90 countries have been selected.

QUANTITATIVE METHODOLOGY

Introduction

The quantitative methodology is a calculation framework to calculate industry impact scores for each target and subsequent SDG.

SDG scores are derived through a bottom up approach, which enables the measurement of impact that the mobile industry delivers through each of its drivers. This appendix provides an overview of the methodology and a step-by-step description of the framework used to derive SDG scores.

This section provides an overview of the quantitative methodology, a description of each level of the calculation framework and examples of the equations used to perform calculations. Results of the application of the calculation framework can be found in Appendix A.

The output of the calculation framework is a synthetic indicator (value ranging zero – 100), which measures the importance of the mobile industry in achieving each target (and subsequently SDG), as well as how far the activities through which the industry makes a contribution, are developed relative to their theoretical maximum. This is calculated at a country level and can be aggregated in order to express at a regional level.

The approach aims to provide the most accurate possible view of the mobile industry's contribution to the SDGs; however, it should be noted that there are a number of constraints, including:

- Targets often refer to specific population sub-groups (e.g. the poor) or to improving a specific characteristic of life (e.g. reducing maternal mortality). It is generally not practicable to collect data (i.e. metrics and sub-metrics) which measures the industry's impact disaggregated for these sub-groups or characteristics of life.

- In some cases, data (i.e. metrics and sub-metrics) which measures the industry's impact is not recorded or made available. In these cases, a suitable proxy is selected. For example, as the number of mobile health service users is not widely reported, the number of available mobile health services is used as a proxy.

- In order to draw cross-country comparisons the data (i.e. metrics and sub-metrics) used to measure impact must be available across the majority of countries in the sample. In some cases, metrics which most accurately measure the industry's contribution are available only in a limited number of countries. In these cases, a proxy has been used.

Forward-looking opportunities to reduce the impact of these constraints are discussed at the end of the Quantitative methodology section.

Overview of Calculation Framework

The quantitative methodology uses the drivers identified through the qualitative methodology and the metrics which measure each driver.

Where a metric cannot be observed or data is unavailable, underlying sub-metrics are defined. These are indicators that together identify the missing metric. Sub-metrics must have the same characteristics of the metrics listed above.

The framework adopted to calculate SDG scores consists of seven steps:

- **A: Standardisation of Metrics.** Metrics are standardised on a 0-100 range. Where a metric is defined to have sub-metrics, these are standardised instead.

- **B: Sub-metrics Aggregation.** Where a metric is composed of sub-metrics, using statistical analysis sub-metrics are summarised into a single 0 - 100 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 driver score through averaging of the underlying country level metric scores.

- **D: Derivation of Target Impact Scores.** Target impact scores reflect (a) the current performance of the industry with respect of the drivers and (b) the role of the industry in achieving the target (i.e. how important are the drivers in reaching the target). Target impact scores are obtained by weighting the country level driver scores using the driver importance (as described in the qualitative framework).

- **E: Weighting of Target Impact Scores.** Where a target is relevant to specific population group, or addresses a specific need, target impact scores are weighted based on the scale of the relevant population within each country.

- **F: Derivation of SDG Impact Score.** The SDG impact score is a synthetic indicator which combines (a) how important the mobile industry's contribution is to achieving the Goal and (b) the extent to which the activities, through which the industry makes

a contribution, are developed relative to their theoretical maximum. The SDG impact score is calculated by equally weighting the targets impact scores, including those which are not prioritised and hence have a score of zero.

- **G: Regional Aggregation.** Regional scores for metrics, drivers, targets or SDGs are calculated as a population weighted average of the country level scores, accounting for missing countries through development of geo-income based clusters.

A high-level overview of this calculation framework is provided in the figure below.

FIGURE 1
Steps in the quantitative methodology
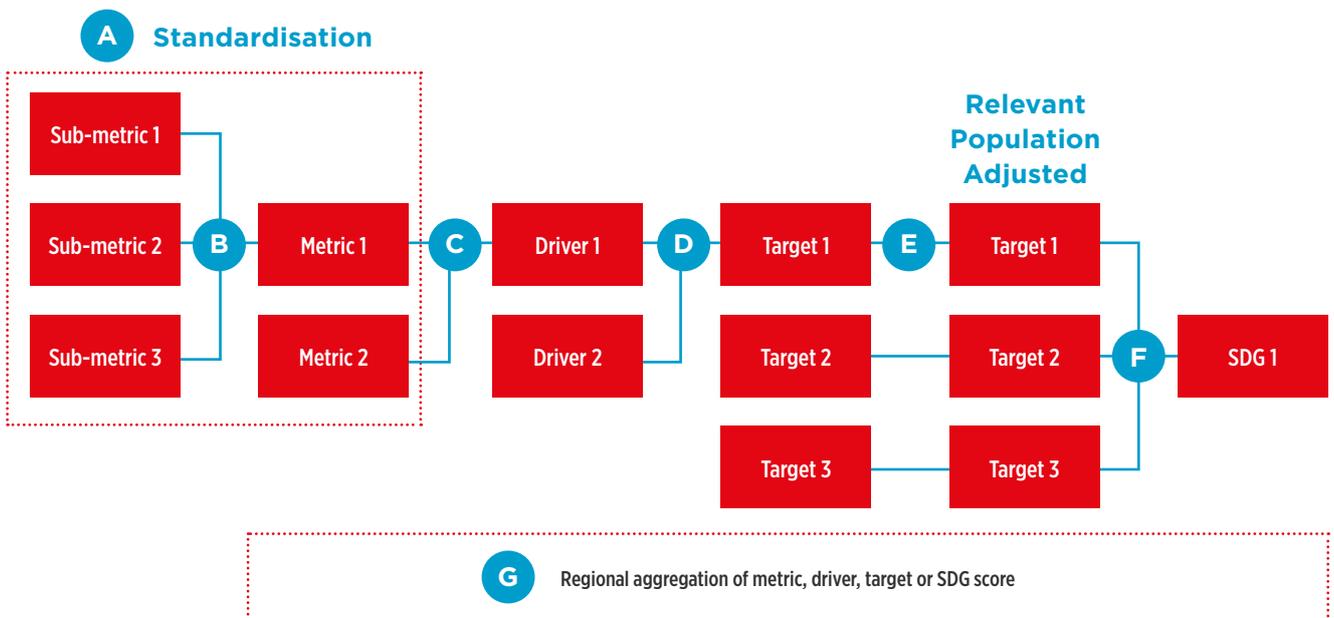
Selection of country sample

The analysis is conducted for a panel of 90 countries, listed in the table below.

TABLE 1
Countries included in the analysis

Asia-Pacific	Commonwealth of Independent States (CIS)	Europe		Latin America	MENA (Middle East and North Africa)	North America	Sub-Saharan Africa
Australia	Azerbaijan	Albania	Latvia	Bolivia	Algeria	Canada	Benin
Bangladesh	Belarus	Austria	Lithuania	Brazil	Bahrain	United States	Botswana
Bhutan	Georgia	Belgium	Luxembourg	Chile	Chad	of America	Ethiopia
China	Kazakhstan	Bulgaria	Malta	Colombia	Egypt		Ghana
Hong Kong	Kyrgyzstan	Croatia	Montenegro	Costa Rica	Israel		Kenya
India	Russian	Cyprus	Netherlands	Dominican	Jordan		Nigeria
Indonesia	Federation	Czech Republic	Norway	Republic	Lebanon		Senegal
Japan		Denmark	Poland	Ecuador	Morocco		South Africa
Korea, South		Estonia	Portugal	El Salvador	Oman		Tanzania
Malaysia		Finland	Serbia	Mexico	Qatar		Zambia
New Zealand		France	Slovakia	Panama	Tunisia		
Pakistan		Germany	Slovenia	Paraguay	Turkey		
Philippines		Greece	Spain	Peru			
Singapore		Hungary	Sweden	Uruguay			
Thailand		Ireland	Switzerland				
		Italy	United Kingdom				

Countries included in the panel satisfy the following conditions:

• Population of at least two million

• Data is available for at least 70% of indicators (metrics and sub-metrics) used in the analysis

Regional and global results are adjusted to account for missing countries, as discussed in Step G of this appendix.

Framework steps

A: Standardisation

To ensure comparability, metrics (and sub-metrics which comprise them where applicable) are standardised on a zero – 100 scale based on a theoretical maximum and theoretical minimum value, where 100 represents the best performance. Indicators are adjusted to a comparable base (e.g. take up of mobile services is expressed as a per centage of population, costs are expressed as per centage of gross national income). Indicators are standardised using one of the two formula below, 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 (zero – 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-metric aggregation

Metrics that are not directly observable or for which data is unavailable are measured by aggregating a set of sub-metrics, chosen to collectively identify a metric, which is treated as a latent variable.

Sub-metrics are grouped on the basis of relevance to the metric they are intended to identify and the goodness of fit with the other sub-metrics. Sampling adequacy of each set of sub-metrics is tested through an analysis of the correlation matrix, and the calculation of the Cronbach's alpha and the Kaiser-Meyer-Olkin (KMO) statistic, as well as theoretical reasoning.

In line with literature, an alpha of at least 0.7 and a KMO of 0.5 are considered to indicate goodness of fit of a

set of sub-metrics. All 12 sets of sub-metrics identified tested above these thresholds.

The sub-metrics within each set are aggregated through sub-metric specific weights, derived using Principal Component Analysis (PCA) and Explanatory Factor Analysis (EFA)[2]. These techniques are widely used in composite indices to reveal relationships between variables[3]. As the two techniques give similar results, an average of the weights rounded to the closest multiple of five integer is used. The table on the next page lists the weights used in the analysis for each of the 12 metrics for which aggregation is performed.

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2. Sub-metrics are found to be not multivariate normal. However, weights are derived using a principal factor method, which is robust to non-normality. A detailed discussion on the matter can be found here: http://pareonline.net/pdf/v10n7.pdf
3. OECD, Handbook on Constructing Composite Indicators https://www.oecd.org/std/42495745.pdf

TABLE 2
List of sub-metrics and weights

Infrastructure development / coverage		Quality of services (network performance)		Local content	
Weight	**Indicator**	**Weight**	**Indicator**	**Weight**	**Indicator**
0.2	2G penetration	0.5	Latencies	0.2	Wikipedia edits per population
0.25	3G penetration	0.5	Download speed	0.2	Facebook penetration
0.25	4G penetration			0.2	Accessibility of mobile applications
0.3	Years since 3G launch			0.2	Websites accessible to population
				0.2	Wikipedia articles accessible to population

Affordability of mobile (including data)		Affordability of basic services - fem		Affordability of mobile (including post-paid data) - fem	
Weight	**Indicator**	**Weight**	**Indicator**	**Weight**	**Indicator**
0.25	Smartphone average selling price	0.25	Cost of entry level handset	0.25	Smartphone average selling price for women
0.25	Cost of mobile bundle	0.25	Cost of mobile bundle for women[4]	0.25	Cost of mobile bundle for women
0.25	Cost of postpaid 500 MB data plan	0.25	Cost of mobile voice for women	0.25	Cost of postpaid 500 MB data plan for women
0.25	Cost of prepaid 500 MB data plan	0.25	Cost of prepaid 500 MB data plan for women	0.25	Cost of prepaid 500 MB data plan for women

ICT and retail markets (e-business)		Business internet uptake (use of mobile to source inputs)		Affordability of basic services	
Weight	**Indicator**	**Weight**	**Indicator**	**Weight**	**Indicator**
0.4	Proportion of businesses using internet	0.35	Proportion of businesses using internet	0.25	Cost of entry level handset
0.4	Proportion of businesses with a web presence	0.4	Proportion of businesses with a web presence	0.25	Cost of mobile bundle
0.2	Proportion of businesses receiving orders through internet	0.25	Proportion of businesses placing orders through internet	0.25	Cost of mobile voice
				0.25	Cost of prepaid 500 MB data plan

Government use of ICT to provide services and access to services		Mobile in schools		M-banking	
Weight	**Indicator**	**Weight**	**Indicator**	**Weight**	**Indicator**
0.35	Government use of ICT	0.35	Internet penetration in schools	0.2	Mobile broadband penetration
0.35	Impact of ICTs on access to basic services	0.35	Impact of ICTs on access to basic services	0.2	Smartphone penetration
0.3	UN Online service index	0.3	Mobile broadband penetration	0.2	Population with debit card
				0.2	Population with an account at a financial institution
				0.2	Accessibility of mobile applications

4. Costs defined 'for women' are weighted on each country's women GNI.

By multiplying each sub-metric by the sub-metric specific weight and summing across sub-metrics in the same set, combined variables are obtained. Since groups of sub-metrics are chosen to describe an unobserved metric, the combined variable obtained describes the unobserved metric. The analysis uses standardised sub-metrics since standardised indicators are comparable.

The formula used to aggregate sub-metrics is the following:

$$Metric_i = \sum_{n=1}^{N} Metric\_Norm_{i,n} \; x \; Weight_n$$

- $Metric_i$ represents the value of a metric (zero – 100) in country i

- $Metric\_Norm_{i,n}$ represents the normalised (zero – 100) value of a sub-metric in country i

- $Weight_n$ represents the weight of Indicator n in the context of metric i, and is not country specific

- N represents the number of Indicators which make up metric i, and is not country specific

For countries for which at least 50% of the sub-metrics (by weight) within each metric are available, aggregated metrics are calculated using the available indicators with weights scaled proportionally to the number of available sub-metrics. For countries for which data is available for less than 50% of sub-metrics within each metric, aggregated metrics are not calculated and the metric is considered unavailable for that country. Where between 51-99% of sub-metrics are available the weights are scaled up relative to the data which is available.

C: Driver Scoring

Driver scores reflect the current performance of the mobile industry relative to its theoretical maximum performance. The scores range between zero and 100. Driver scores are derived at a country level by aggregating the country level metric scores.

To calculate the driver scores, metrics are aggregated using linear aggregation with equal weightings. An analysis of the correlation of metrics within drivers was performed, and evidenced that correlation of metrics within a single driver spans between zero to over 0.9. Given the variation in correlation coefficients, and the fact that no assumption is made on the importance of metrics, linear aggregation is used to obtain drivers scores.

Driver scores are calculated using the following formula

$$Driver_i = \frac{\sum_{n=1}^{N} Metric_{i,n}}{N}$$

- $Driver_i$ represents the value of a driver (zero – 100) in country i

- $Metric_{i,n}$ represents the value of a metric (zero – 100) in country i

- N represents the number of metrics used to measure driver i

D: Target Scores

Target impact scores range between zero and 100 and are derived at country level. Target impact scores reflect (a) how important the mobile industry's contribution is to achieving the goal and (b) the extent to which the channels through which the industry makes a contribution are developed compared to their theoretical maximum.

Target impact scores are obtained by weighting the country level driver scores using the driver importance scores. Drivers importance scores are scores out of 10, comprised of:

a. A score from one to five is assigned to each driver reflecting the applicability of the mobile industry in achieving the target

b. A score from one to five is assigned to each driver reflecting the role of the mobile industry with respect to the driver.

The two scores are summed to obtain a driver importance score. The derivation of driver importance scores is described in more details in Appendix B of this report.

In some cases, targets apply specifically to developing countries, for example target 9.a reads:

"Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing states"

Where a target does not apply to developed countries and/or countries in transition, a target score is not calculated for these countries.

Country level target scores are calculated using the following formula, which accounts for both cross-driver weighting (i.e. drivers with the highest Importance bear more weight on the target score) as well as the driver's importance relative to the maximum importance:

$$Target_i = \sum_{n=1}^{N} Driver_{i,n} \; x \; \frac{Importance_n}{\sum_{n=1}^{N} Importance_n} \; x \; \frac{Importance_n}{Importance_{max}}$$

- $Target_i$ represents the value of the target (zero – 100) in country i

- $Driver_{i,n}$ represents the value of driver n (zero – 100) in country i

- $Importance_n$ represents the importance score for driver n

- $Importance_{max}$ represents the maximum Importance score for any driver, which is equal to 10

- N represents the number of drivers contribution to target i

E: Relevant Population Adjustment

In many cases, SDG targets speak to improving a specific, measurable, aspect of people's lives (e.g. reducing maternal mortality), or to targeting a certain sub-group of the population (e.g. the poor). For these targets, the impact which the mobile industry has in each country depends on the size of the relevant population. For example, the relevant population for Target 1.1 is people under $1.25 a day. To account for the relevant population, indicators that measure performance in the relevant population should be used. In the example of Target 1.1, this would for instance be penetration among people under $1.25 a day. Since data at this level of granularity is not available, an adjustment factor is derived to account for relevant population.

To address variation in relevant population between countries, target scores that refer to subsets of population are adjusted by a factor ranging from [-1 to 1]. For example, the target level score for the country with the largest relevant population is increased by 100%, while the score for the country with the smallest (or no) relevant population is set to zero.

The adjustment factor for each target is calculated by normalising a country level indicator which measures the scale of the relevant population. For example for Target 3.1,[5] maternal mortality is used to determine the scale of relevant population.

Target scores are adjusted based on the size of relevant population using the following formula:

$$Target_{i,adjusted} = Target_i \: x \: (1 + Adjustment_i)$$

- $Target_{i,adjusted}$ represents the target score (zero – 100) in country i adjusted for the size of relevant population

- $Target_i$ represents the target score (zero – 100) in country i

- $Adjustment_i$ represents the adjustment factor [-1,1] in country i, this is specific to each target and is only applicable where a target speaks to improving a specific aspect of life or is targeted towards a specific sub-group of the population

F: SDG Impact Scores

The SDG impact score is a synthetic indicator which combines (a) how important the mobile industry's contribution is to achieving the goal and (b) the extent to which the activities through which the industry makes a contribution, relative to their theoretical maximum.

The SDG impact score is obtained by equally weighting the targets impact scores, accounting for non-prioritised targets. The equal weight given to target impact scores reflects the absence of ranking of the targets by the UN.

SDG impact score is calculated using the following formula:

$$SDG \: impact_i = \frac{\sum_{n=1}^{N} Target_{i,adjusted}}{N} \: x \: \frac{N}{\# \: Targets}$$

- $SDG \: Impact_i$ represents the value of the SDG impact score (zero – 100) in country *i*

- $Target_{i,adjusted}$ represents the value of the target (zero – 100) in country *i* adjusted for the size of relevant population

- N represents the number of targets which are prioritised, and hence have scores

- $\# Targets$ represents the total number of targets belonging to the SDG (as set out by the UN)

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5.   By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births

G: Aggregation to Regional Level

Metric, driver, target or SDG scores are aggregated to a regional level. Two regional classifications are used: a geographic one and a development based one[6]. Regional scores are calculated for all the countries in a region, thus accounting for countries outside the 90-country sample included in the analysis.

Regional scores are obtained by weighting the country scores by population in each region, using World Bank income classification clusters to account for countries

that are not included in the original 90 countries sample. Countries for which it has not been possible to calculate a metric, driver, target or SDG score (e.g. due to lack of data) are not considered in the population-weighted average.

As discussed in section D, some targets are applicable only to a sub-set of countries. Countries for which a target score has not been calculated are not considered in the population weighted average.

Forward Looking Opportunities

As discussed earlier in the report, there are a number of constraints on our ability to measure the industry's impact. These are primarily due to the lack of consistently measured, disaggregated data across countries. In particular, mobile network operators and ecosystem players could significantly improve the accuracy of impact assessment by committing to measure and make available the following information:

• Penetration of services (e.g. total, MBB, smartphone) disaggregated by income level, gender and geotype

• Number of users of mobile agriculture, mobile health and mobile money services specifying the sub-group of service (e.g. mobile health services targeting women, child mortality, infectious diseases etc.). As above, this should be disaggregated by income level, gender, and geotype.

• Energy use, apportioned to Mobile operations (i.e. excluding fixed and other business lines), as well as the per centage of this which is from renewable sources, both measured according to a set of standard agreed definitions.

• The actions they have taken in responding to disasters (natural, conflict and terrorist), as well as KPIs which measure their impact. A standard set of definitions to report this information should be agreed.

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6. Development based regions are sourced from Country Classification, World Economic Situation and Prospects 2014, UN, 2014. Available at: http://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf

GLOSSARY

Term	Definition
B2B	Business to business
B2C	Business to consumer
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CIS	Commonwealth of Independent States
CSR	Corporate Social Responsibility
Dax companies	Companies listed on the German stock index
DJSI Index	Dow Jones Sustainability Index
EBITDA	Earnings Before Interest Tax, Depreciation and Amortisation
EC-GSM-IoT	Extended Coverage - GSM - Internet of Things
EMEA	Europe Middle East and Africa
GNI	Gross National Income
GRI	Global Reporting Initiative
IoT	Internet of Things
KPI	Key Performance Indicator
LPWA	Low Power Wide Area
LTE-M	Long Term Evolution - Machine
M2M	Machine-to-Machine
MDGs	Millennium Development Goals
MENA	Middle East and North Africa
MNO Operations	Mobile Network Operator operations
MOOCs	Massive Open Online Courses
NB-IoT	Narrow Band - Internet of Things
NFC	Near Field Communication
OECD	Organisation for Economic Cooperation and Development
OTTs	Over-The-Top services
SDGs	Sustainable Development Goals
SDN	Software-Defined Network
Smart system	Self-Monitoring, Analysis and Reporting Technology system
SMEs	Small Medium Enterprises
STI	Science, Technology and Innovation (Target 17.8)
Super Base Stations	A centralised radio access network architecture
Value chain	Set of activities that the mobile industry carries out to create full value for its customers
VAS	Value Added Service