

**Arthur D Little**

# Material efficiency for smartphones

Plenary session 2

June 28<sup>th</sup>, 2018

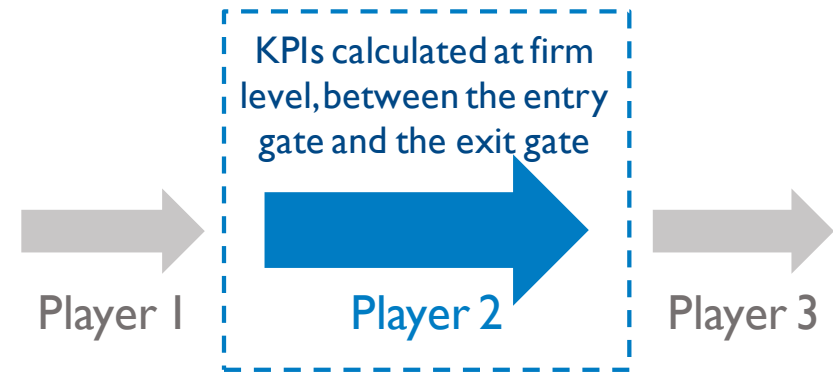
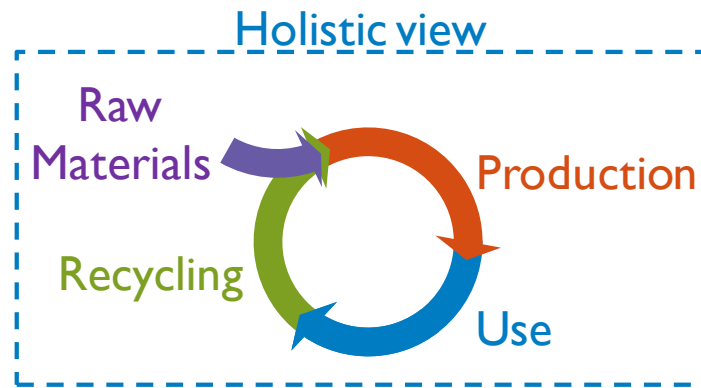


# Compared to the holistic circular economy approach, Material Efficiency KPIs are to be implemented by each player in their era of accountability

## Circular economy

vs.

## Material Efficiency KPIs



- In a circular economy, each player must have a holistic view of the value chain in which its products are
- Efficient and rigorous... but could be difficult to implement across all stakeholders of a complex value chain

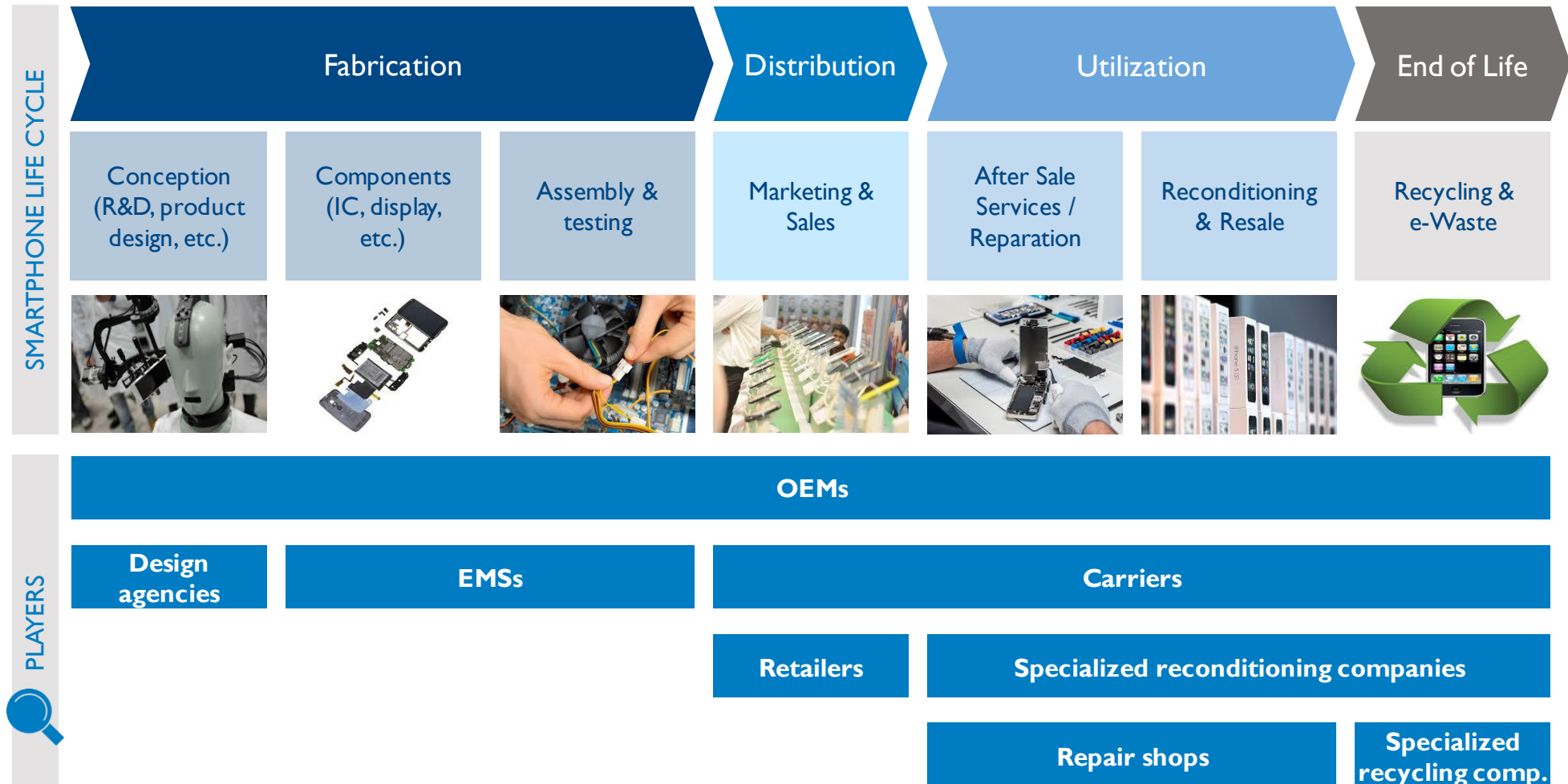
- Each player is empowered to monitor its KPIs at its own level
- Once standardized and harmonized across the value chain, material efficiency KPIs will increasingly be summed up, with a cradle-to-grave approach

# Updated KPIs for WMF 2018

Updated set of KPIs		Description
Use Less	Buy-to-use	Material value in the product / material value used in production
	% of recycled materials	Weight of recycled / total weight of materials in new product
	End-of-life recycling	Weight of materials effectively recycled / total weight of materials
	Energy	Total energy consumption to produce the product
Use Longer	Product lifetime	Total lifetime of the product, from completion to waste
	Resale price	Resale price after Y years / initial price (Y is industry specific)
Use Smarter	% of innovative materials	Weight of new or innovative materials / total weight of materials
	Product performance vs. weight	Performance measurement of the product key functions vs. weight
	Overall product usage	% of the time the product is used relatively to its full capacity

Source: WMF & Arthur D. Little analysis































# The smartphone industry value chain is composed of 4 steps, with several types of players present in multiple steps



Source: Arthur D. Little analysis

There are numerous players in the smartphone industry

ILLUSTRATIVE

OEMs	EMSs	Carriers	Repair shops	Specialized reconditioning companies	Specialized recycling companies
       	      	      	      	    	   

Source: Arthur D. Little analysis

## Depending on their type, the players have a different impact on each KPI

		OEMs	EMSs	Carriers	Repair shops	Specialized reconditioning companies	Specialized recycling companies
Use Less	Buy-to-use	High	High		Limited	Limited	
	% of recycled materials	High	High		Limited	Limited	
	End-of-life recycling	High	High	High	High	High	High
	Energy	High	High	Limited	Limited	Limited	High
Use Longer	Product lifetime	High	High	High	High	High	
	Resale price	High	High	High	High	High	
Use Smarter	% of innovative materials	High	High		Limited	Limited	
	Product perf. vs. weight	High	High				
	Overall product usage	High	High	Limited	Limited	Limited	

- Being in charge of design, conception and fabrication, OEMs and EMSs have a strong impact on all KPIs
- OEMs are the only players able to have a holistic view of their products

- Carriers, repairers and reconditioners can recycle the product, extend its lifetime and impact its residual value (resale price)

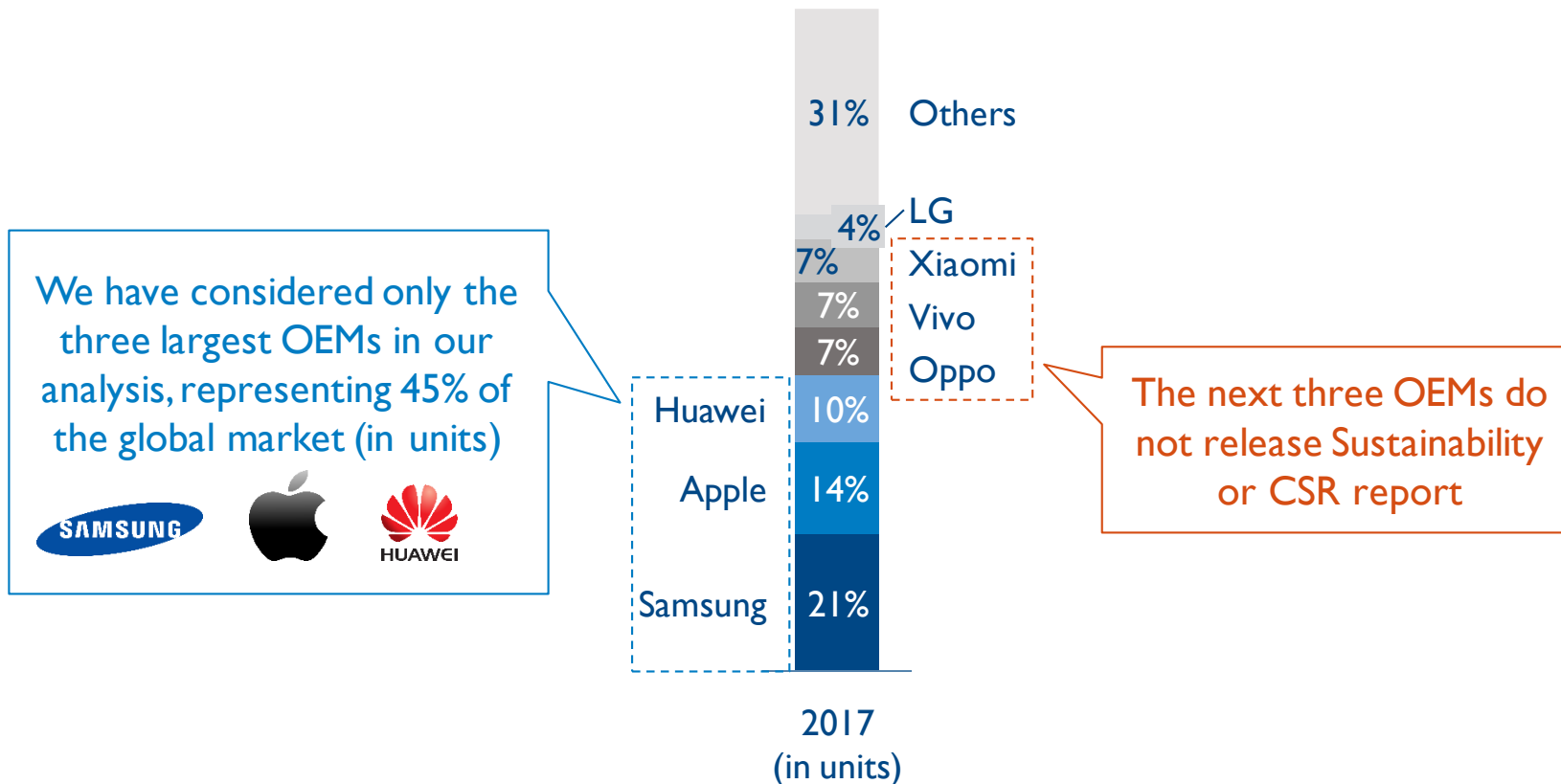
- Recycling companies' impact is limited to recycling the product and the energy used for recycling

Source: Arthur D. Little analysis

Legend: ■ High impact of the KPI by the player  
■ Limited impact of the KPI by the player

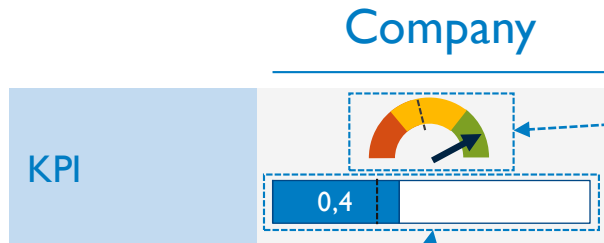
# We have analysed the 3 largest OEMs: Samsung, Apple and Huawei

OEM market shares  
Global, 2017, in % of units sold



Source: Arthur D. Little analysis, Counterpoint

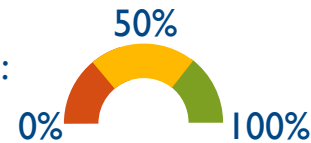
# As a Material Efficiency dashboard, we propose a dual methodology to evaluate both firm's KPI management and KPI value



## KPI management

- Qualitative qualification of the company's efforts to monitor and improve the KPI
- Source: company communication only (annual report, RSE report and website)

## Rating system:



### – detailed ratings:

- +20% if the company communicates about the KPI's subject
- +20% if the company monitors the KPI's value
- +30% if the company shows efforts in improving the KPI's value
- +30% if the company shares the KPI's value (only +15% if the value shared cannot be matched with a device)

### – Average weighted by the market shares:



## KPI value

- The KPI value in the adapted unit
- When the KPI is not a % nor a ratio, the maximum of the bar chart is arbitrary chosen

Average of the KPI weighted by the market shares



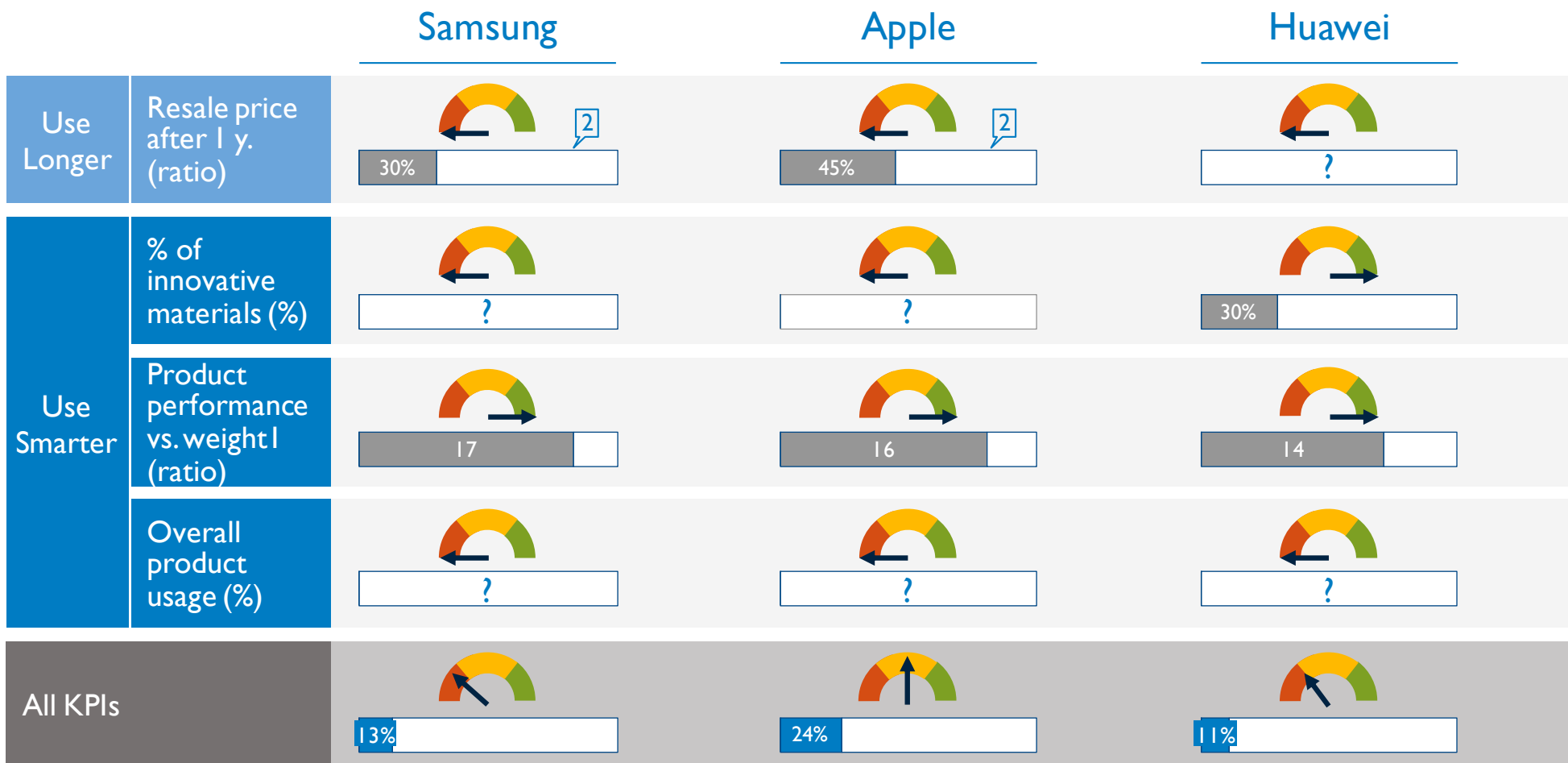
# OEMs communicate about most KPIs' subjects but rarely share values

		Samsung	Apple	Huawei
Use Less	Buy-to-use (ratio)			
	% of recycled materials (%)			
	End-of-life recycling (%)			
	Energy (Wh)			
Use Longer	Product lifetime (year)			

Source: Arthur D. Little analysis, Samsung, Apple, Huawei

<sup>1</sup> Maximum recycling rate for iPhone 6 using Liam

# In spite of a very secretive policy, Apple is more communicative about its KPIs, and shows the best results



Source: Arthur D. Little analysis, Samsung, Apple, Huawei

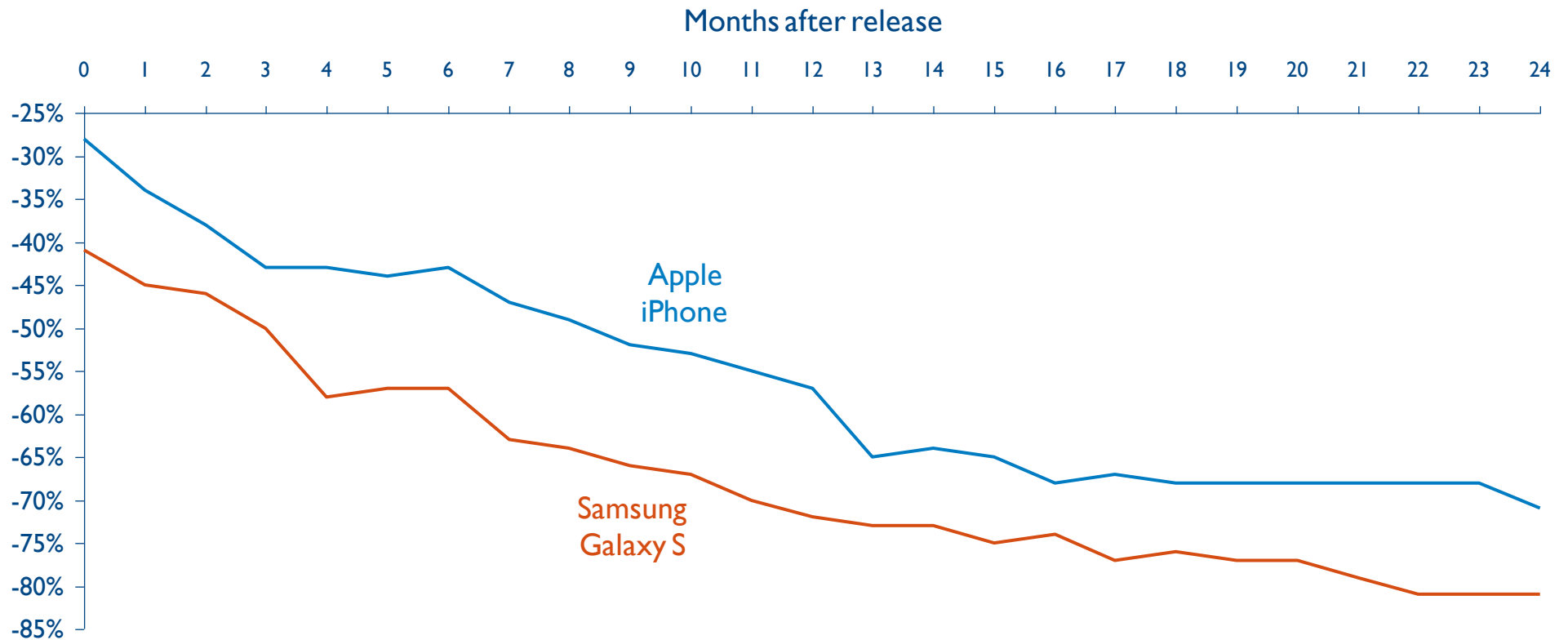
<sup>1</sup> Processor speed (MHz) / weight (g) ; Samsung Galaxy S9, iPhone 8, Huawei P20

<sup>2</sup> Third-party data (Decluttr)

# Example of KPI value (resale price) – Both Apple and Samsung smartphones similarly depreciate quickly over the first 2 years

## Average rate of depreciation

Source Decluttr (US smartphone reseller), iPhone 5 to 7, Galaxy S3 to S7

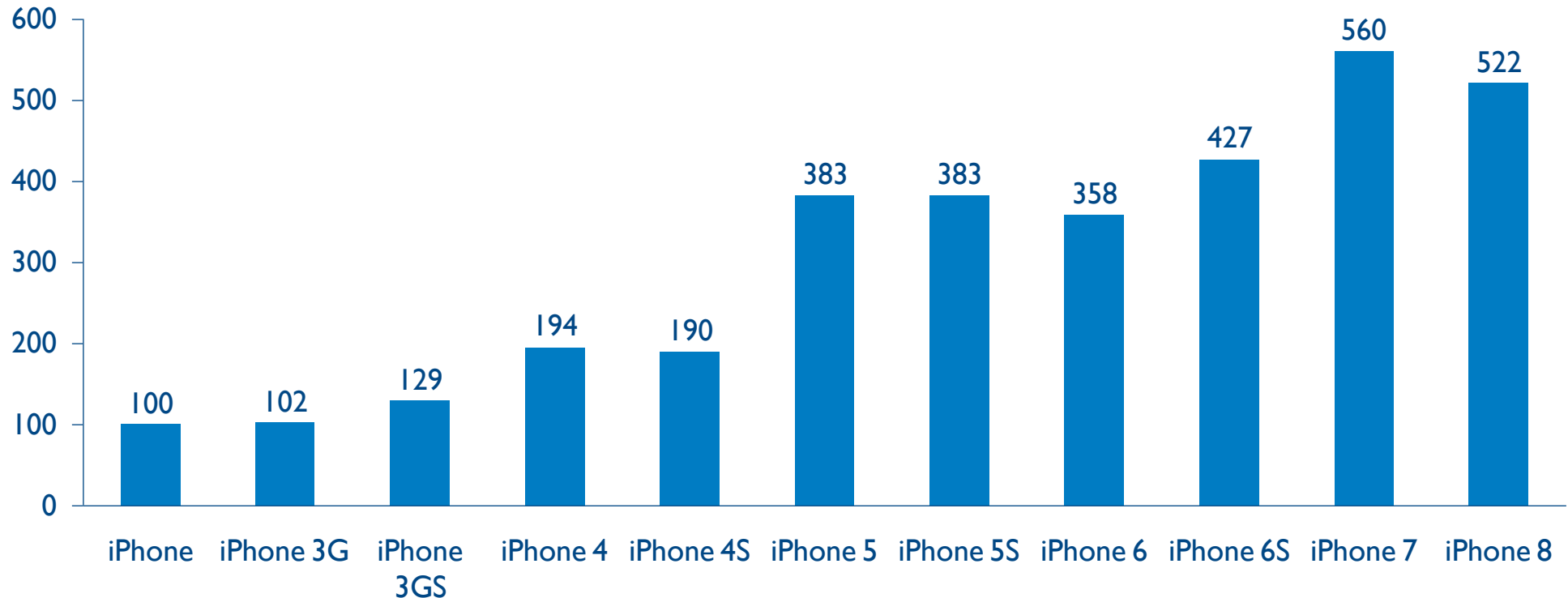


Source: Arthur D. Little analysis, Decluttr

## Example of KPI value : Product performance vs. weight of iPhones

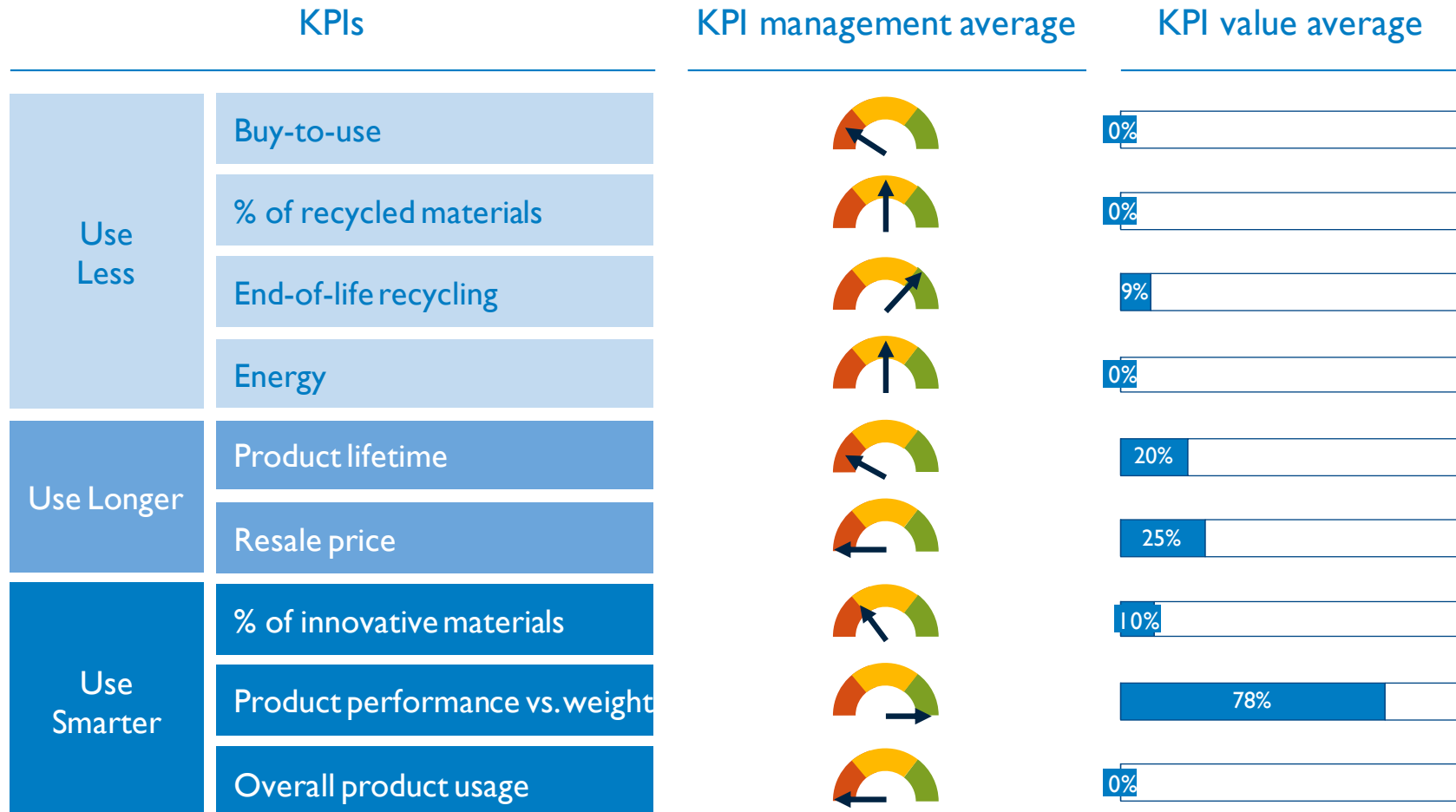
### Product performance vs. weight of iPhones

Processor speed / weight, index 100 for iPhone I



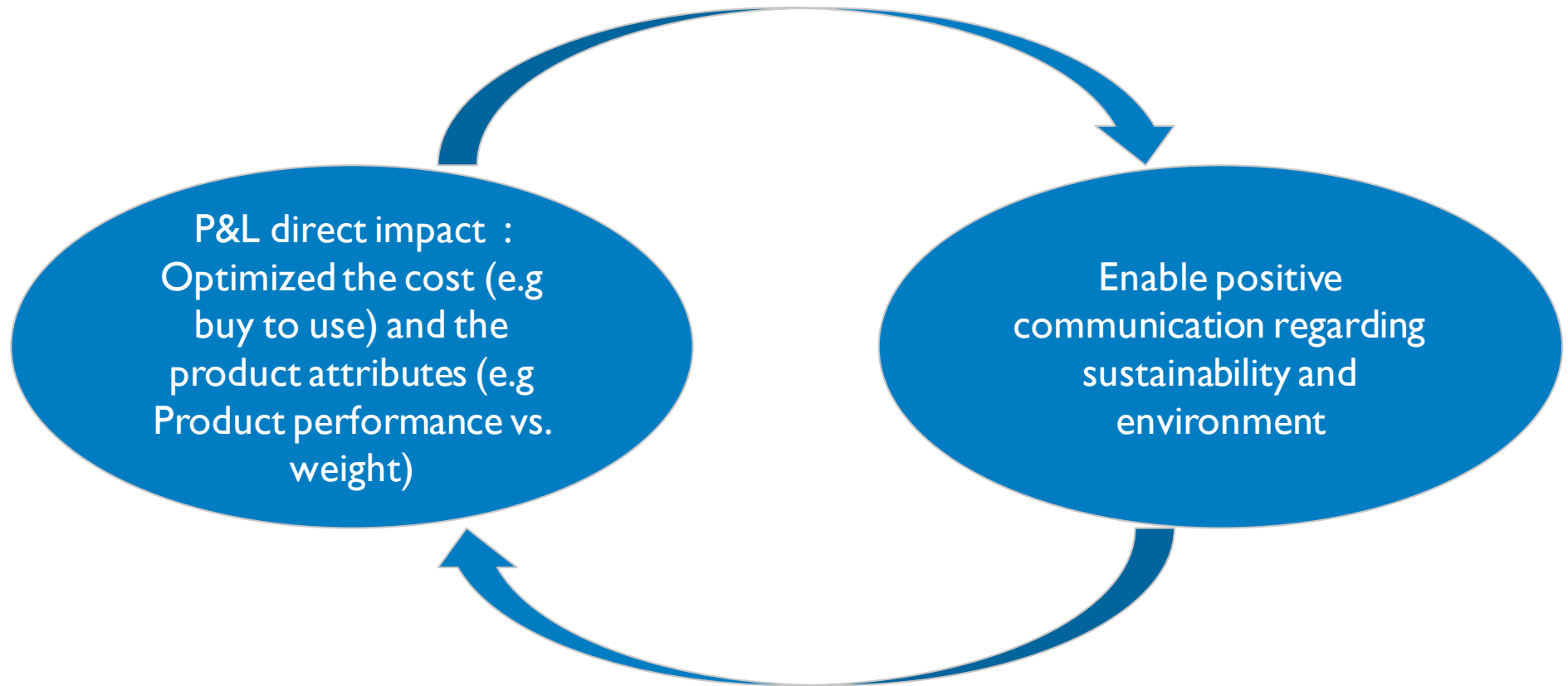
Source: Arthur D. Little analysis, Apple

# Overall, OEMs shows rather low performance on average, both for KPI management and KPI value



Source: Arthur D. Little analysis

## How Material Efficiency KPIs could be spread across companies on a large scale ?



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