BARROS
Soluções em gestão

ASSOCIADA À FDC

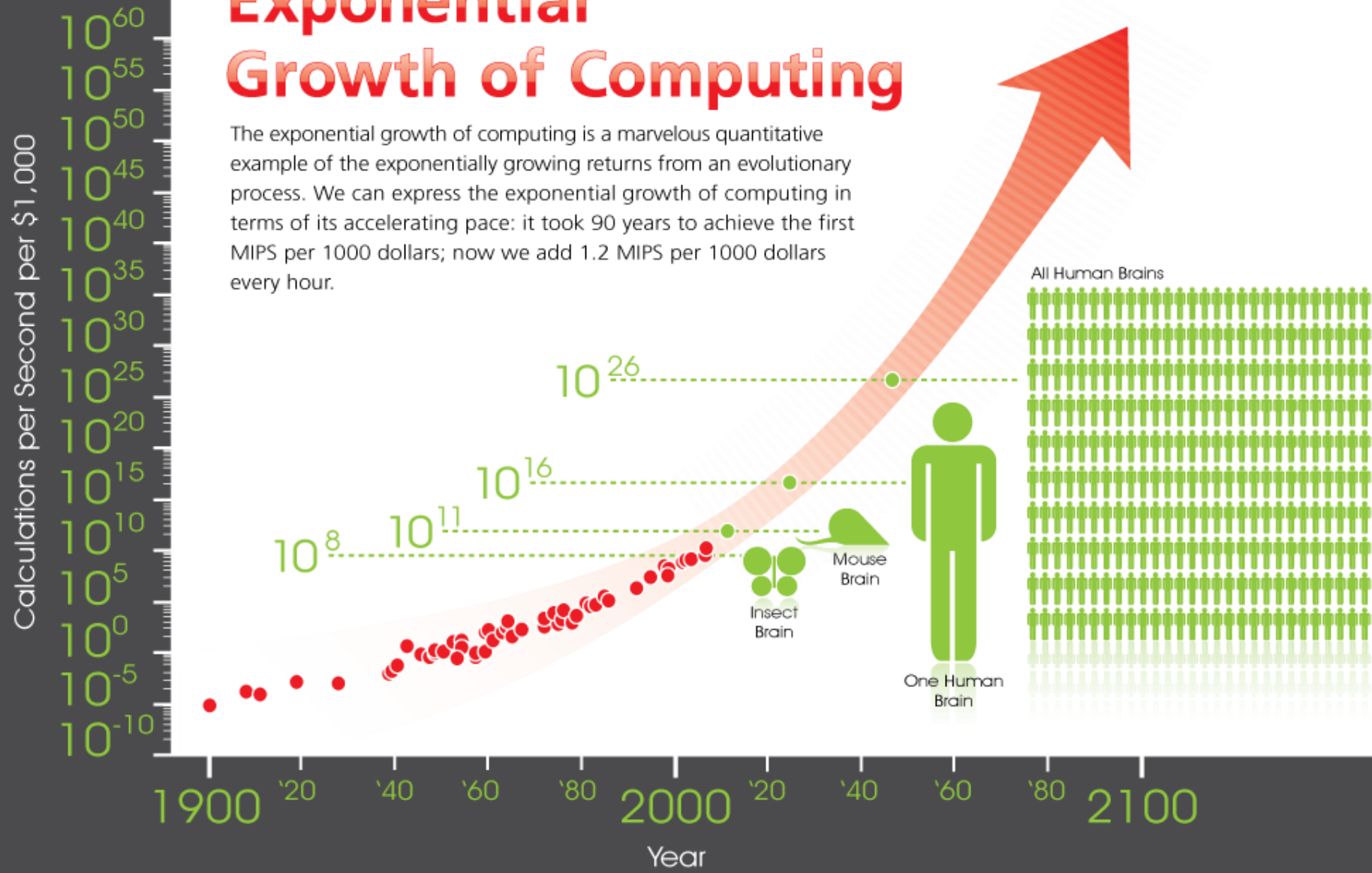
CENTRO DE REFERÊNCIA EM INOVAÇÃO (CRI-CE)
REFLEXÕES SOBRE TRANSFORMAÇÃO DIGITAL

CARLOS ARRUDA

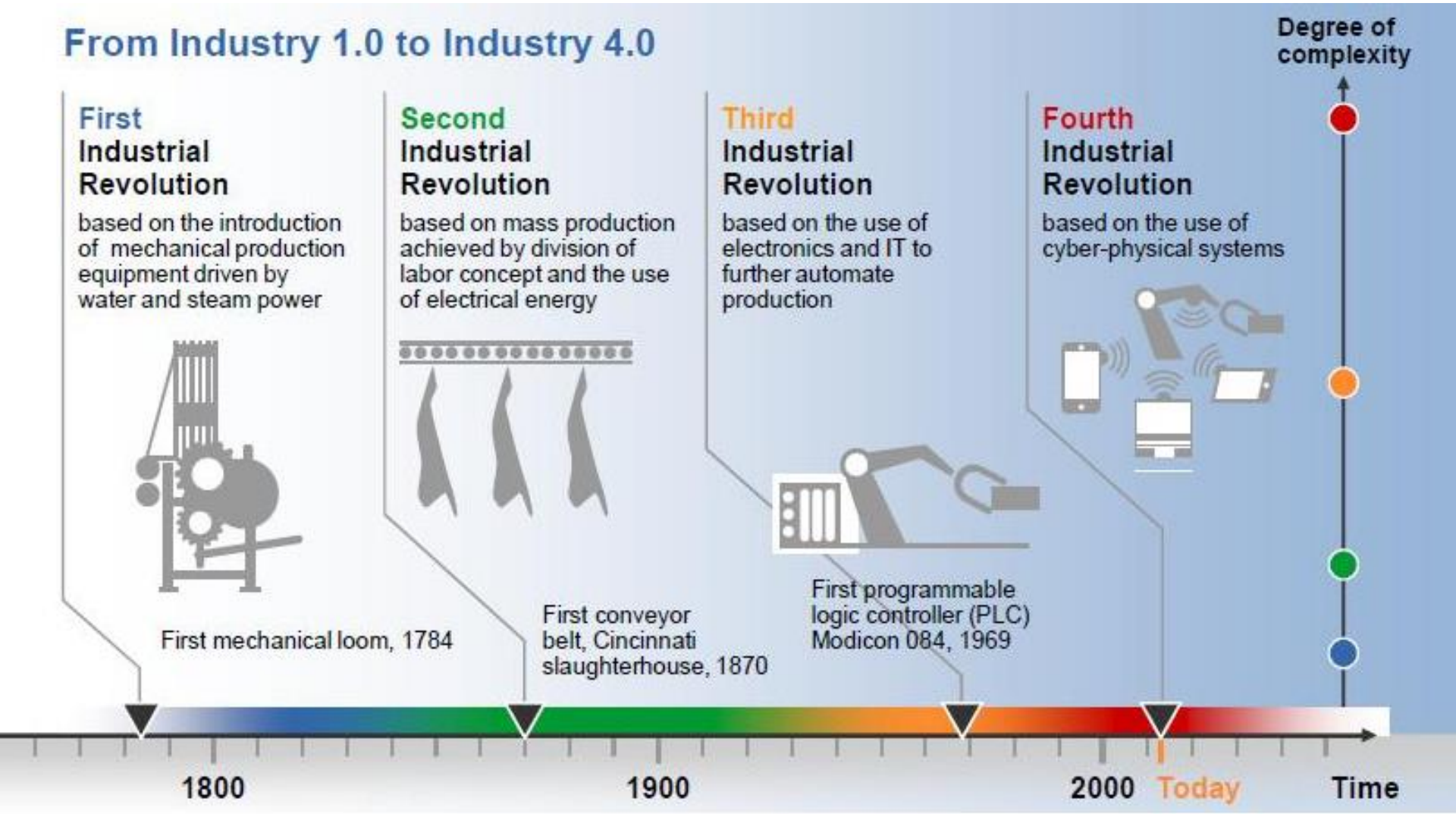
FEV 2018

Exponential Growth of Computing

The exponential growth of computing is a marvelous quantitative example of the exponentially growing returns from an evolutionary process. We can express the exponential growth of computing in terms of its accelerating pace: it took 90 years to achieve the first MIPS per 1000 dollars; now we add 1.2 MIPS per 1000 dollars every hour.

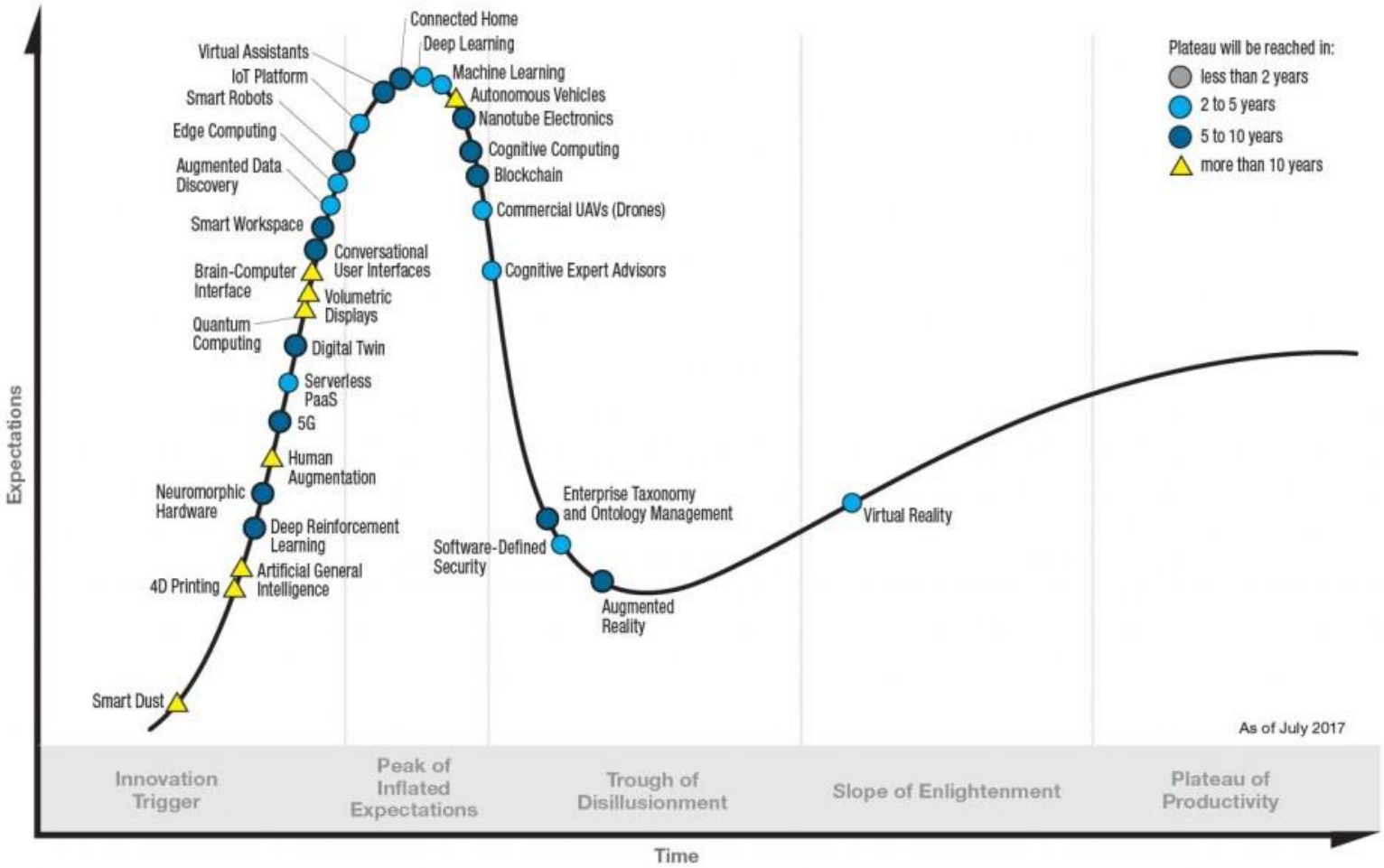


Source: Ray Kurzweil and KurzweilAI.net



Fonte: 2013 Acatech / German Federal Ministry of Education and Research, Recommendations for implementing the strategic initiative Industry 4.0 & Factory of the future will see merging of virtual and real worlds

Gartner Hype Cycle for Emerging Technologies, 2017



gartner.com/SmarterWithGartner

Source: Gartner (July 2017)

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Gartner

Three Trends

AI Everywhere

Deep Learning
Deep Reinforcement Learning
Artificial General Intelligence
Autonomous Vehicles
Cognitive Computing
Commercial UAVs (Drones)
Conversational User Interfaces
Enterprise Taxonomy
Ontology Management
Machine Learning
Smart Dust
Smart Robots
Smart Workspace

Transparently Immersive Experiences

4D Printing
Augmented Reality
Brain-Computer Interface
Connected Home
Human Augmentation
Nanotube Electronics
Virtual Reality
Volumetric Displays

Digital Platforms

5G
Digital Twin
Edge Computing
Blockchain
IoT Platform
Neuromorphic Hardware
Quantum Computing
Serverless PaaS
Software-Defined Security

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Source: Gartner
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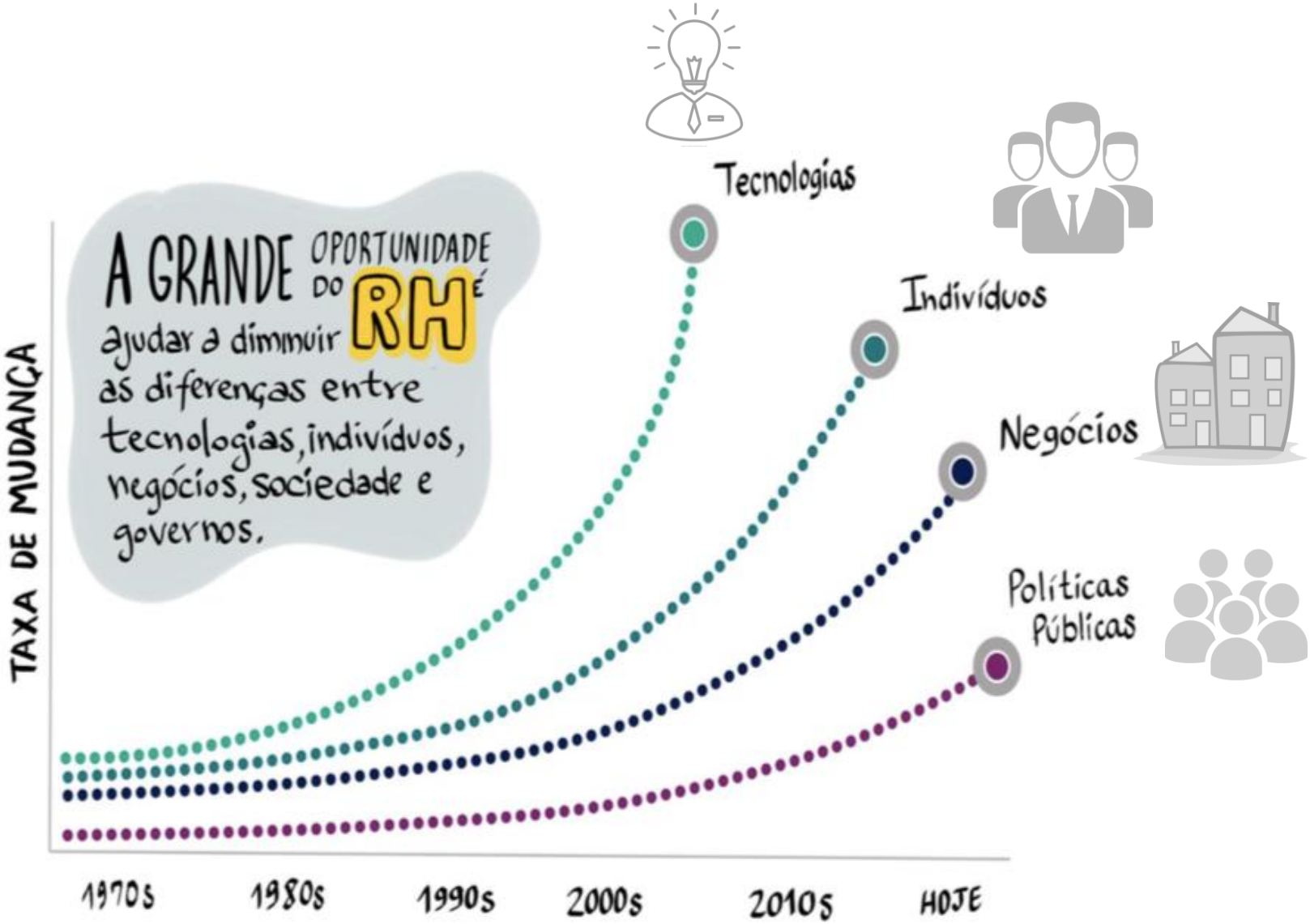
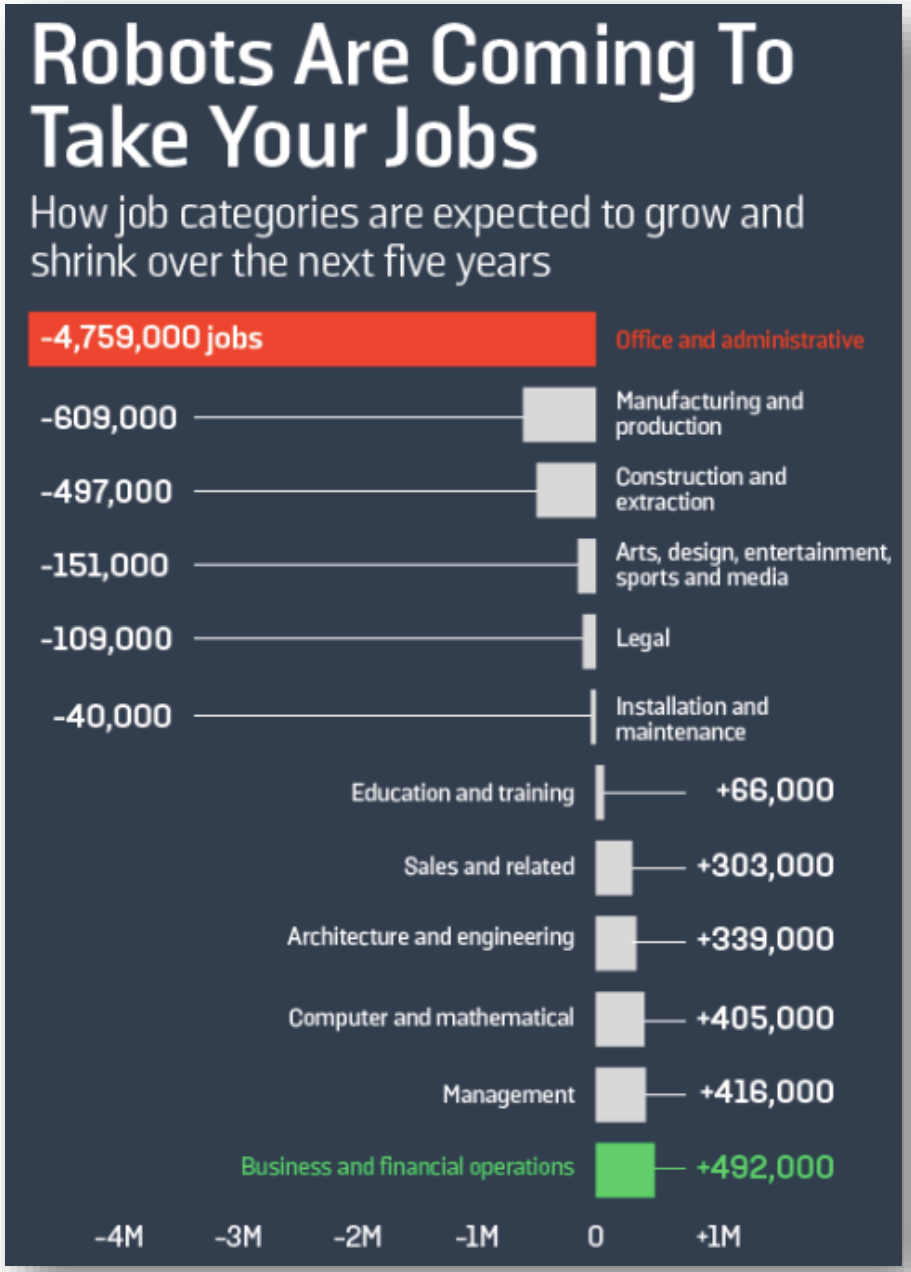
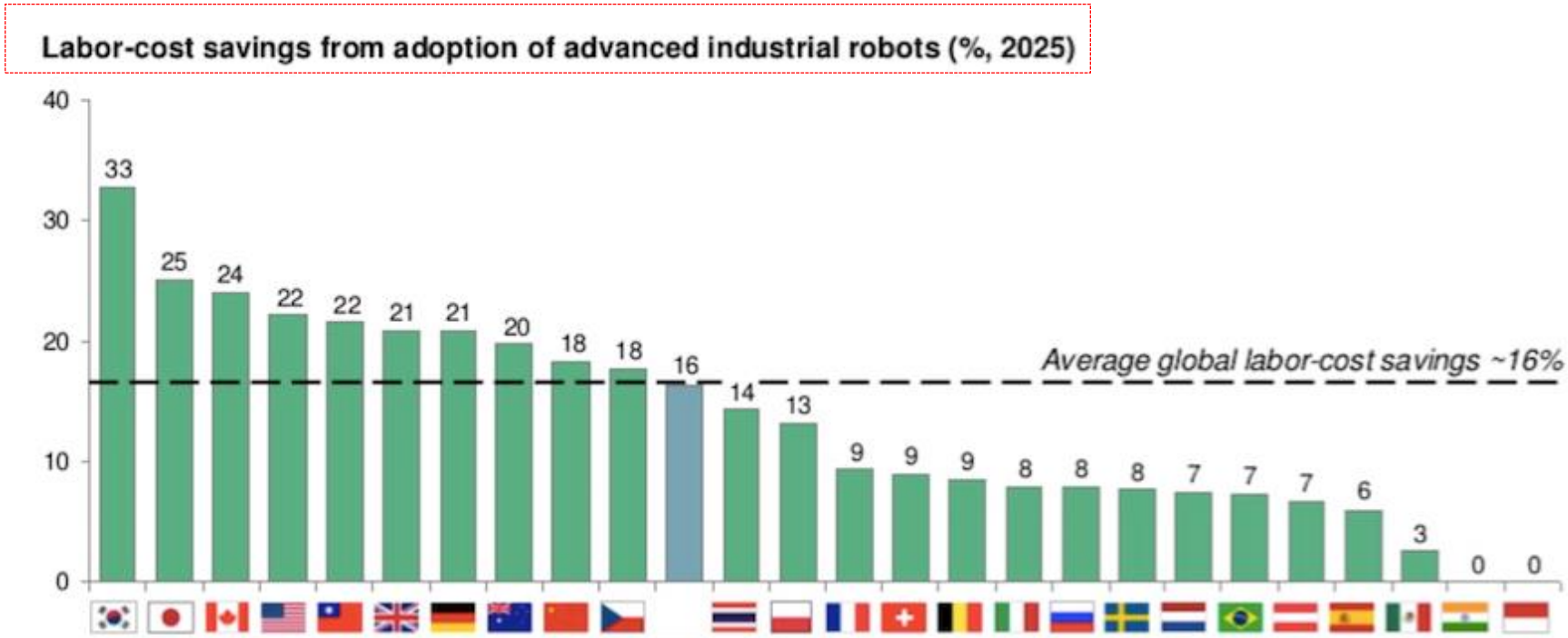
Gartner



Fonte: 2017 Deloitte Human Capital Trend Study

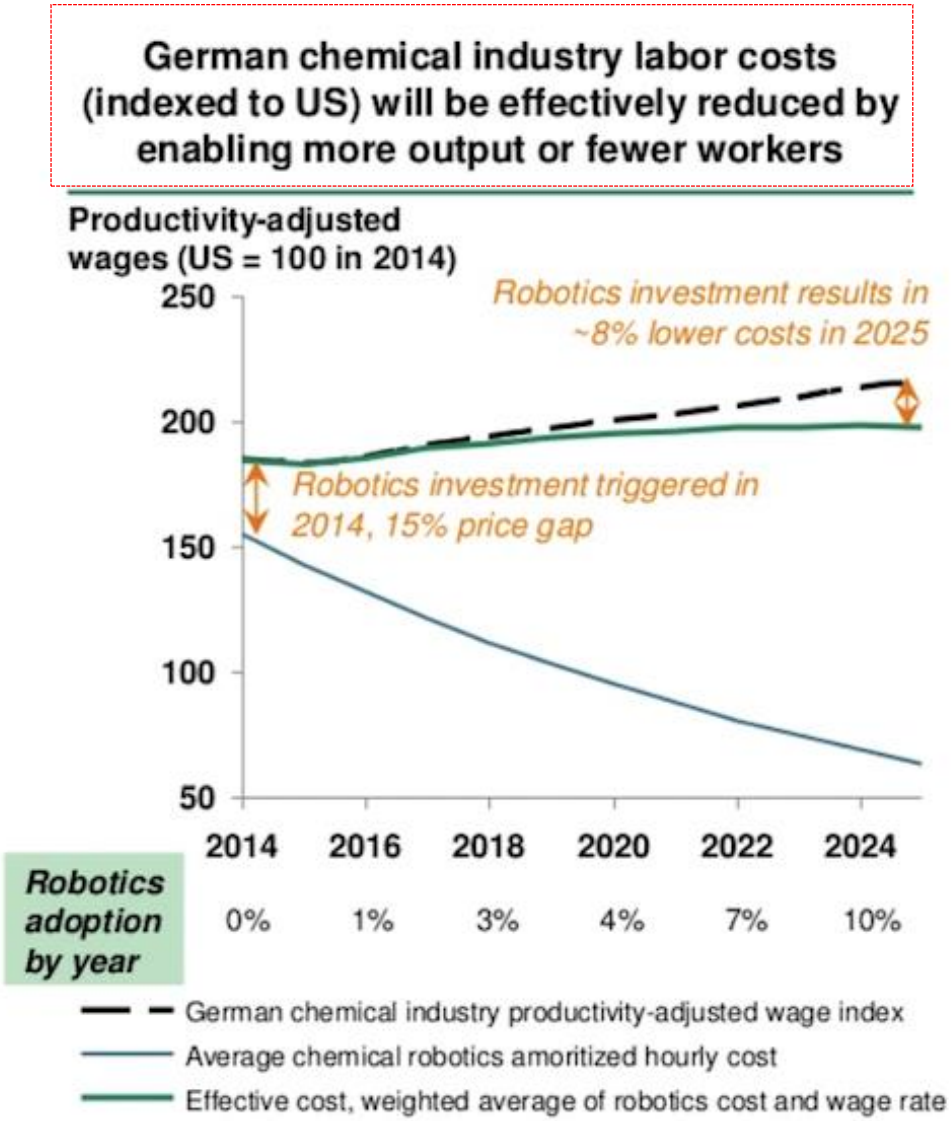


Fonte: WEF (2016) Qual o futuro das empresas e do trabalho



Scenarios	South Korea	Japan	Canada	United States	Taiwan	United Kingdom	Germany	Australia	China[1]	Czech Republic	Global total	Thailand	Poland	France	Switzerland	Belgium	Italy	Russia	Sweden	Netherlands	Brazil	Austria	Spain	Mexico	India	Indonesia
Aggressive	47	40	35	32	33	30	41	39	34	35	30	24	26	30	29	27	26	14	25	24	23	22	19	7	0	0
Conservative	21	15	12	10	12	10	6	6	9	5	8	8	4	6	6	5	5	4	5	5	5	4	4	1	0	0

Adoção de robótica pode gerar redução de custos industriais
Fonte: BCG (2015)



Indústria alemã como benchmarking: investimentos em robótica e redução de custos
Fonte: BCG (2015)

O FUTURO DO TRABALHO

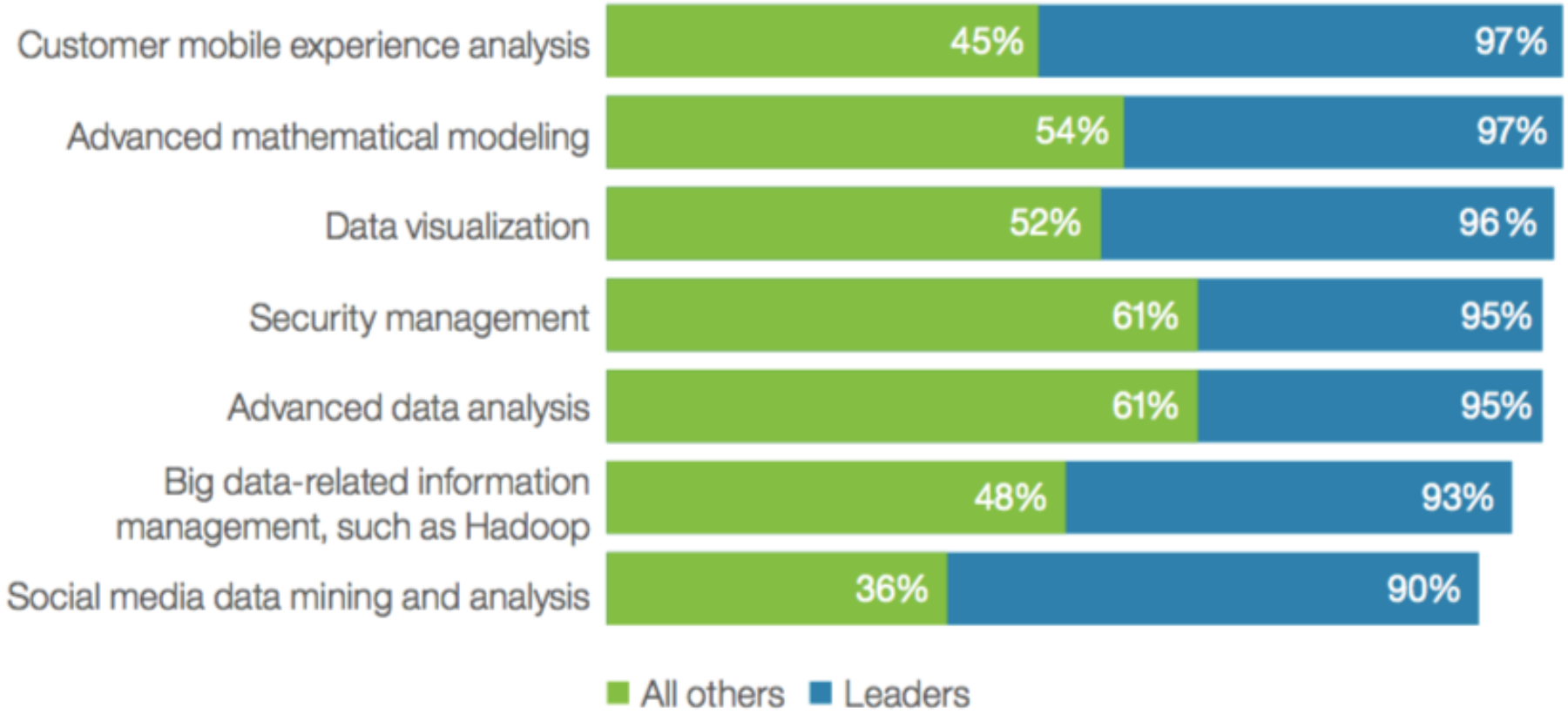
Top 10 Job Skills Needed in 2020

1. Complex problem solving
2. Critical thinking
3. Creativity
4. People management
5. Coordinating with others
6. Emotional intelligence
7. Judgment & decision making
8. Service orientation
9. Negotiation
10. Cognitive flexibility

Source: 2016 *The Future of Jobs Report*, World Economic Forum

COMPETÊNCIAS INDIVIDUAIS

SETOR FINANCEIRO: COMPETÊNCIAS REQUERIDAS PARA A TRANSFORMAÇÃO DIGITAL



Source: 2017 IBV Digital Reinvention in Finance Study.

NOVAS CARREIRAS

Andreas M. Antonopoulos

Mastering Bitcoin: Unlocking Digital Cryptocurrencies

Slush, 01/12/2017

4 DICAS PARA PROMOVER A TRANSFORMAÇÃO DIGITAL DA SUA EQUIPE

1. **Invista em requalificação tecnológica *(lifelong Learning)***

BARROS
Soluções em gestão

ASSOCIADA À
FDC

umbora

UDACITY

coursera

edX

Fonte: HBR, 2017 Deb Henretta e Anand Chopra-McGowan, Ways to Help Employees Keep Up with Digital Transformation

4 DICAS PARA PROMOVER A TRANSFORMAÇÃO DIGITAL DA SUA EQUIPE

2. Dê aos funcionários acesso direto aos usuários

- Facilite acesso a ferramentas de acesso direto aos clientes como social media listening, user research e mapeamento de jornadas podem ser facilitadores importantes para a transformação digital dos funcionários.

Meltwater
IceRocket

Addict-o-matic

TweetDeck

Fonte: HBR, 2017 Deb Henretta e Anand Chopra-McGowan, Ways to Help Employees Keep Up with Digital Transformation

4 DICAS PARA PROMOVER A TRANSFORMAÇÃO DIGITAL DA SUA EQUIPE

3. Desenvolva práticas digitais de RH “Employee Experience Design” (EED)

- O EED é uma abordagem de sistemas participativos para melhorias no local de trabalho que aplica métodos e princípios de design de experiência, como pensamento de design, co-criação e design empático. Ele também usa ferramentas e técnicas que são típicas do gerenciamento de experiência do cliente e do design de serviços como o mapeamento de jornadas de experiências dos funcionários ou análise do ponto de acesso (touchpoints).

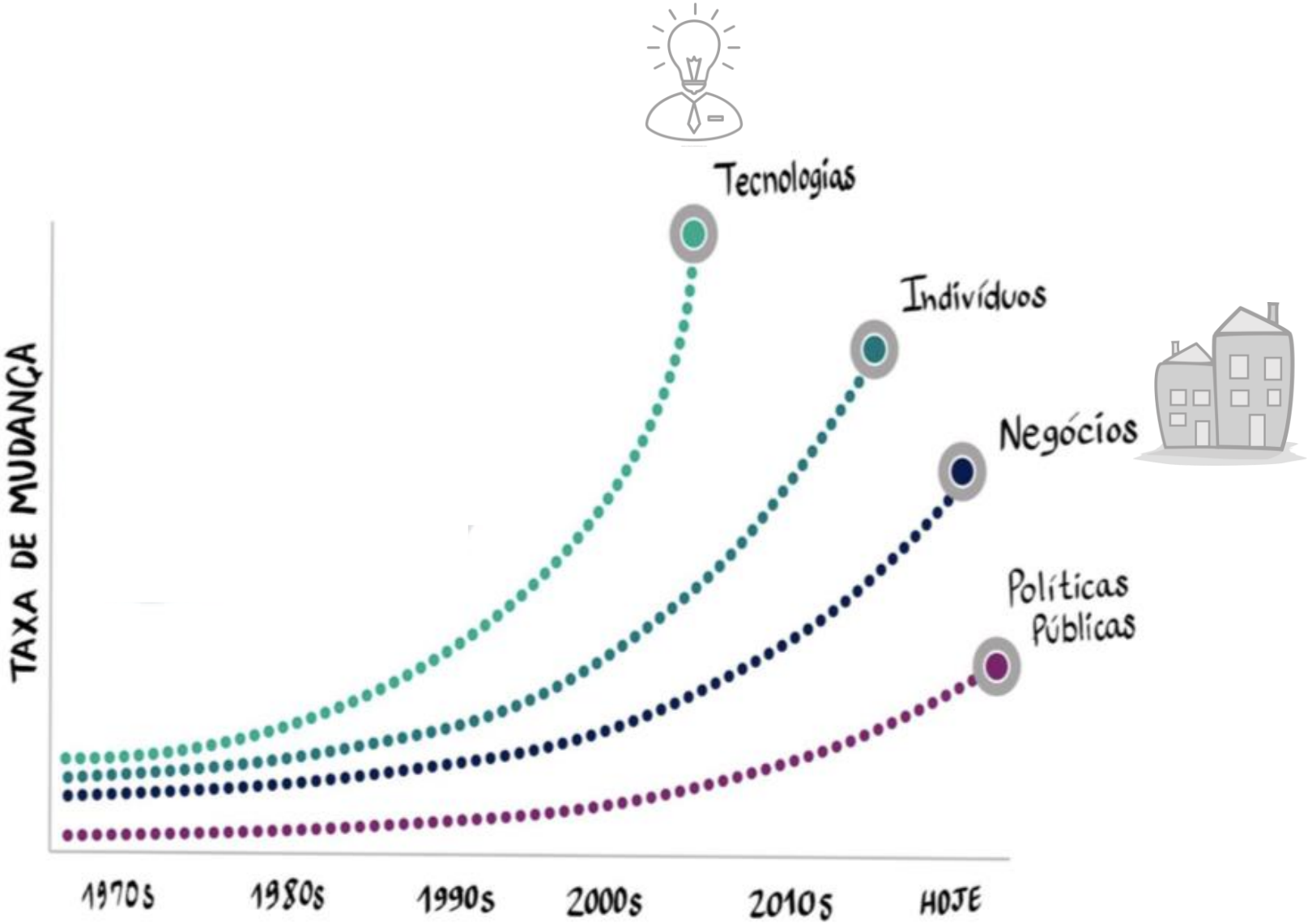
Fonte: HBR, 2017 Deb Henretta e Anand Chopra-McGowan, Ways to Help Employees Keep Up with Digital Transformation

4 DICAS PARA PROMOVER A TRANSFORMAÇÃO DIGITAL DA SUA EQUIPE

4. Ajude os funcionários a adotarem métodos ágeis (agile)

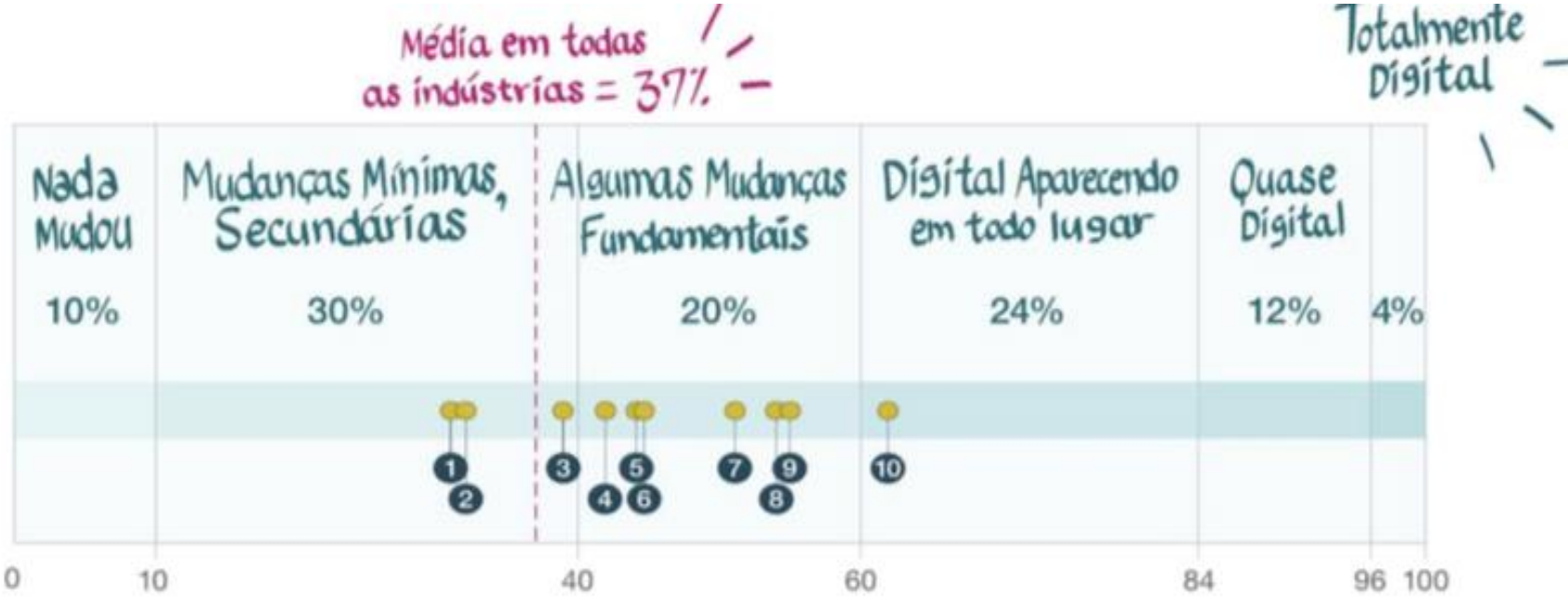
- Defina um um conjunto de atividades e comportamentos no dia-a-dia que permitam que os funcionários atuem de forma rápida, experimentando e inovando.

Fonte: HBR, 2017 Deb Henretta e Anand Chopra-McGowan, Ways to Help Employees Keep Up with Digital Transformation



Fonte: 2017 Deloitte Human Capital Trend Study

A TRANSFORMAÇÃO DIGITAL ESTÁ ACONTECENDO TODOS OS SETORES, MAS EM DIFERENTES GRAUS.



1. produtos de consumo (31%),
2. automóveis e montagem (32%),
3. serviços financeiros (39%),
4. serviços profissionais (42%),
5. telecom (44%),
6. viagens, transportes e logística (44%),
7. serviços e sistemas de saúde (51%),
8. alta tecnologia (54%),
9. varejo (55%)
10. mídia e entretenimento (62%)

Fonte: 2018 McKinsey Digital-Reinvention_Unlocking-the-how

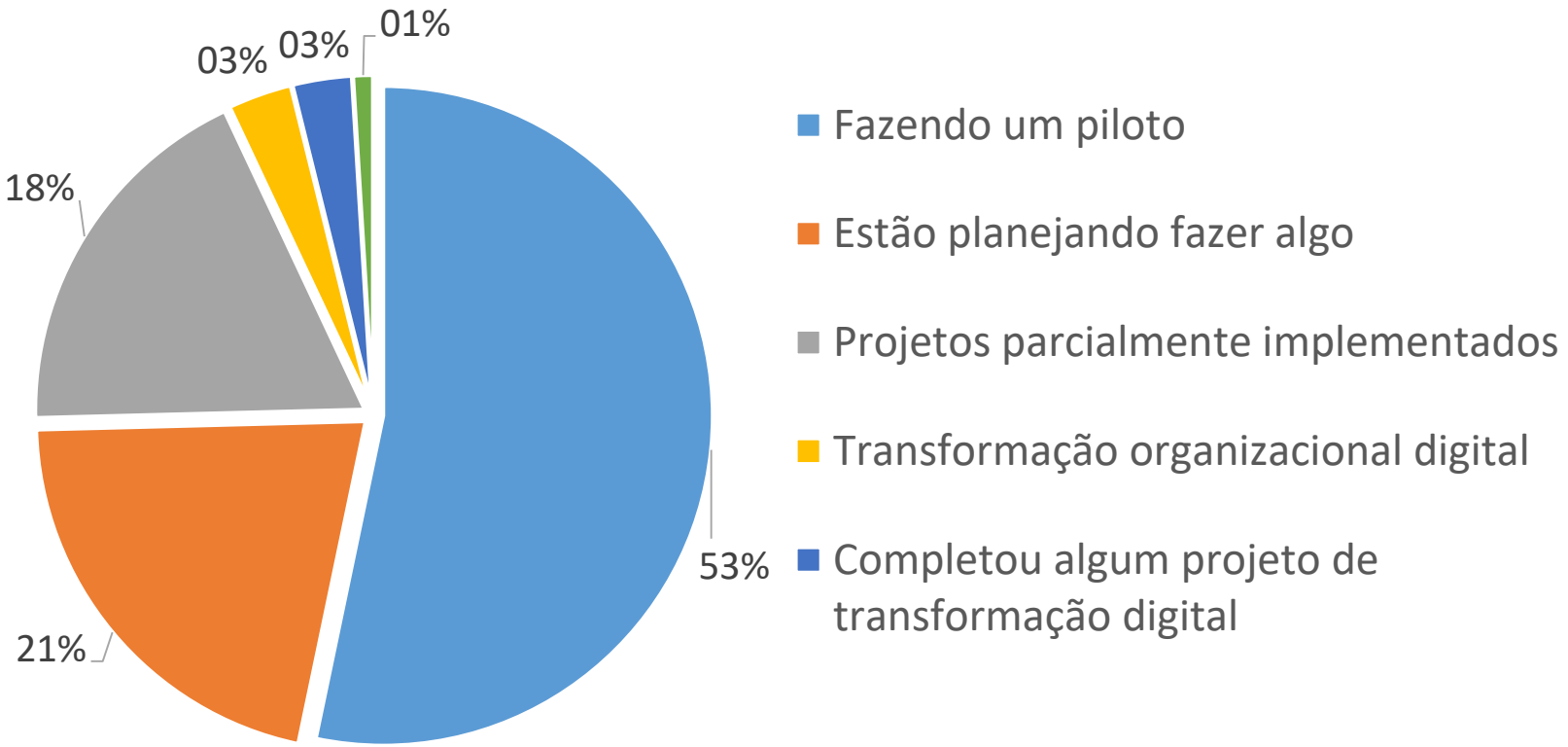
Fonte: 2017 Meira Gente DIGITAL

1. Quantos de vocês acreditam que as tecnologias digitais estão transformando o seu setor?

2. Quantos de vocês acreditam que sua empresa esteja preparada para lidar com as tecnologias digitais?

3. Quantos de vocês têm uma estratégia digital clara e coerente?

SEGUNDO PESQUISA DA SAP, A TRANSFORMAÇÃO DIGITAL É AINDA UM EXPERIMENTO



Fonte: 2017 SAP, Digital Executive Transformation Survey

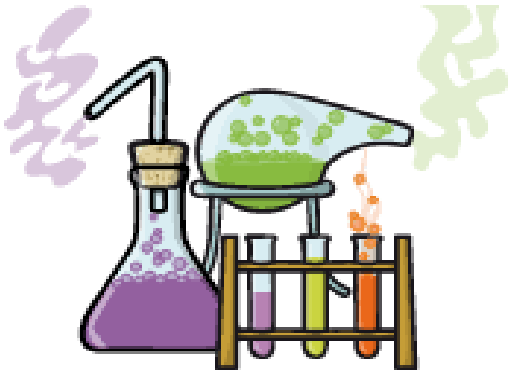
SUGESTÕES SOBRE COMO PROMOVER A TRANSFORMAÇÃO DIGITAL EM SUA EMPRESA

1. **Defina propósitos!**

Use métodos como *design thinking* para gerar ideias de como explorar determinadas tecnologias digitais. Por exemplo, realize um workshop sobre como identificar oportunidades para uso de inteligência artificial ou internet das coisas.

SUGESTÕES SOBRE COMO PROMOVER A TRANSFORMAÇÃO DIGITAL EM SUA EMPRESA

2. Experimente!



- Desenvolva protótipos usando metodologias ágeis.
- Teste e implemente estes protótipos para gerar dados, feedbacks e interações com usuários e com a tecnologia.

SUGESTÕES SOBRE COMO PROMOVER A TRANSFORMAÇÃO DIGITAL EM SUA EMPRESA

3. Data is the new gold!

- Promova interações continuas e rápidas com usuários.
- Desenvolva e implemente soluções e processos digitais gerando dados e extrapolando deles novas soluções e processos.

Caso: BLUE RIVER TECHNOLOGY

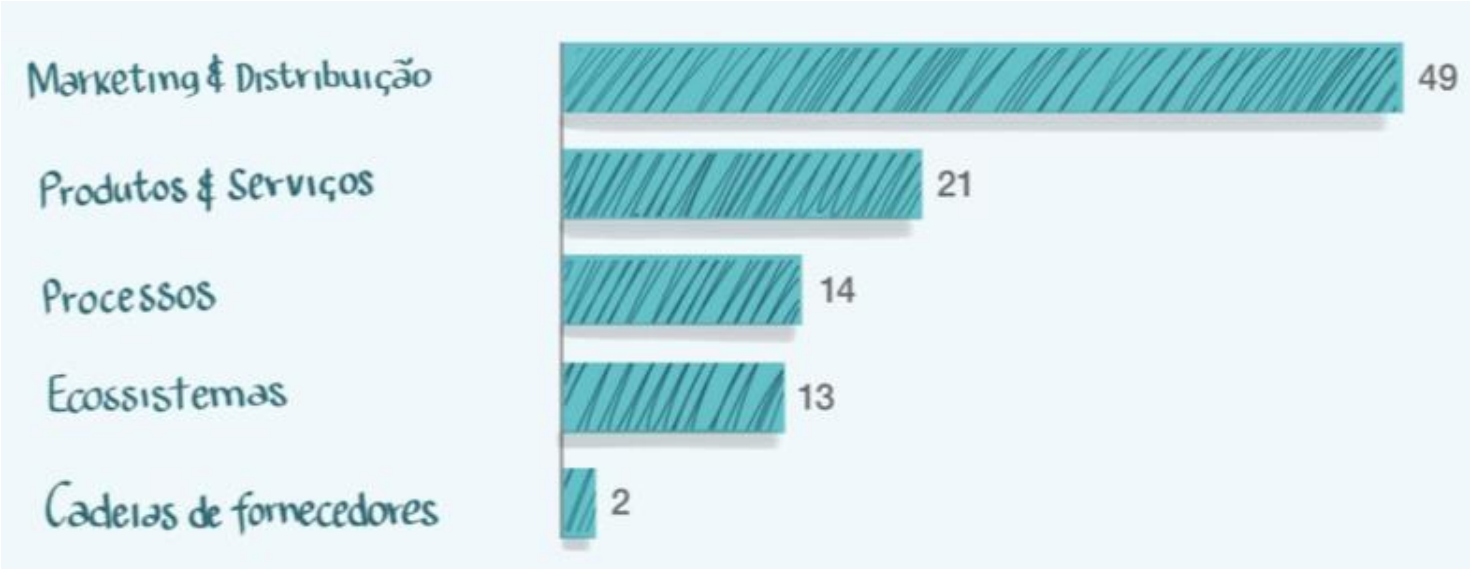
SUGESTÕES SOBRE COMO PROMOVER A TRANSFORMAÇÃO DIGITAL EM SUA EMPRESA

4. Estruture e dinamize ecossistemas!

(**orchestrate ecosystems)**

- Estabeleça uma estratégia digital baseada em uma visão holística em vez de uma série de soluções pontuais.
- Mantenha um foco claro nas necessidades, aspirações e desejos de parceiros.
- Explore e desenvolva ecossistemas para expandir e alinhar um conjunto mais amplo de capacidades e para ajudar a criar e cumprir as necessidades e desejos dos clientes.

ONDE AS EMPRESAS ESTÃO FOCANDO SUAS ESTRATÉGIAS DIGITAIS



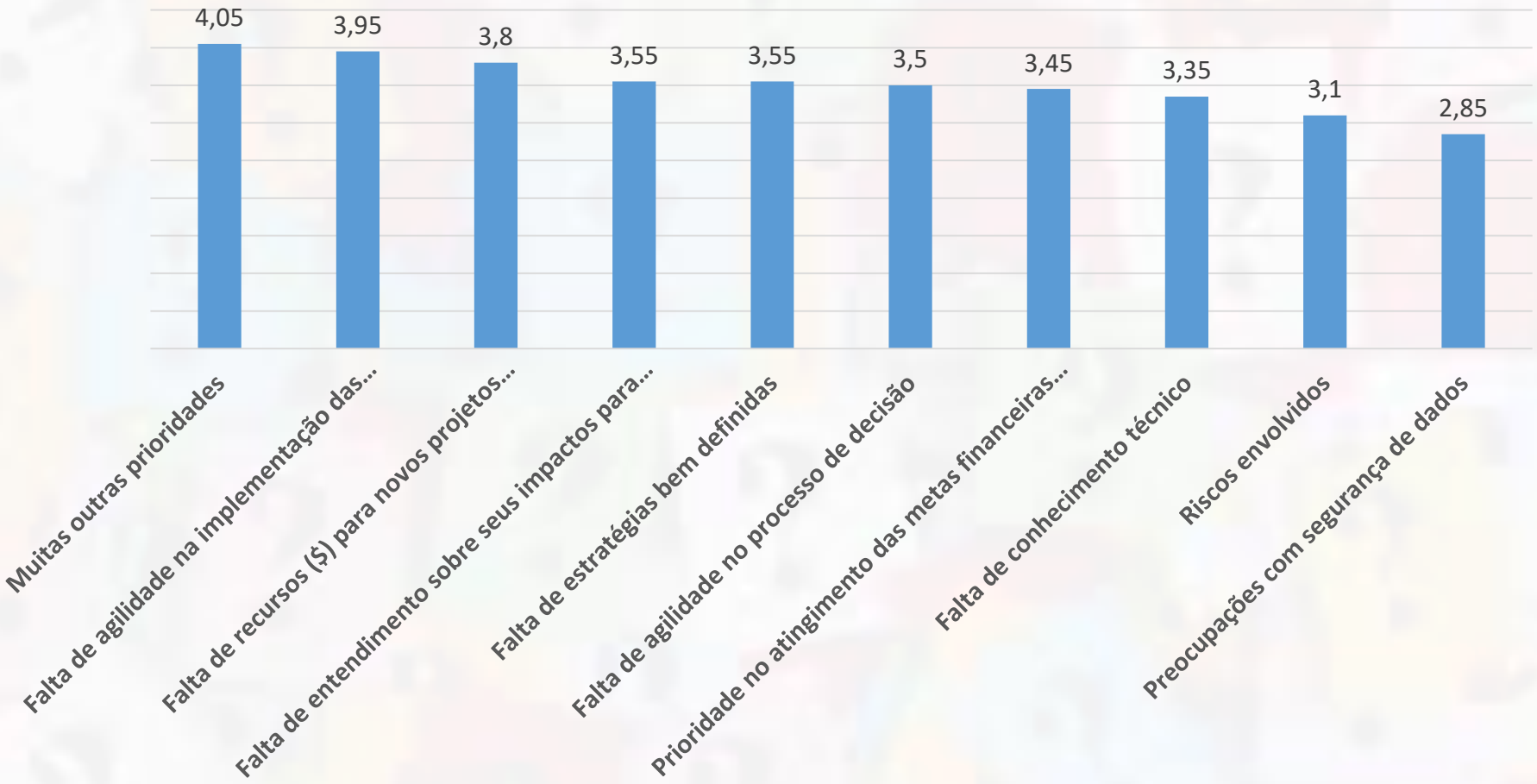
2018 McKinsey Digital-Reinvention Unlocking the how

POR QUE ESTRATÉGIAS DIGITAIS ESTÃO FALHANDO?

- **PITFALL 1: FUZZY DEFINITIONS**
  - We view digital as the nearly instant, free, and flawless ability to connect people, devices, and physical objects anywhere. By 2025, some 20 billion devices will be connected, nearly three times the world population.
- **PITFALL 2: MISUNDERSTANDING THE ECONOMICS OF DIGITAL**
  - New economic realities of digital competition.
  - Digital is destroying economic rent
  - Digital is driving winner-takes-all economics
  - Digital rewards first movers and some superfast followers
- **PITFALL 3: OVERLOOKING ECOSYSTEMS**
  - Understanding the new economic rules will move you ahead, but only so far. Digital means that strategies developed solely in the context of a company's industry are likely to face severe challenges. Traditional approaches such as tracking rivals' moves closely and using that knowledge to fine-tune overall direction or optimize value chains are increasingly perilous.
- **PITFALL 4: OVERINDEXING ON THE 'USUAL SUSPECTS'**
  - Most companies worry about the threats posed by digital natives, whose moves get most of the attention—and the disruptive nature of their innovative business models certainly merits some anxiety. Excessive focus on the usual suspects is perilous, though, because incumbents, too, are digitizing and shaking up competitive dynamics. And the consumer orientation of many digital leaders makes it easy to overlook the growing importance of digital in business-to-business (B2B) markets.
- **PITFALL 5: MISSING THE DUALITY OF DIGITAL**
  - The most common response to digital threats we encounter is the following: "If I'm going to be disrupted, then I need to create something completely new." Understandably, that becomes the driving impetus for strategy. Yet for most companies, the pace of disruption is uneven, and they can't just walk away from existing businesses. They need to digitize their current businesses *and* innovate new models.

Fonte: 2018 McKinsey Why-digital-strategies-fail.pdf

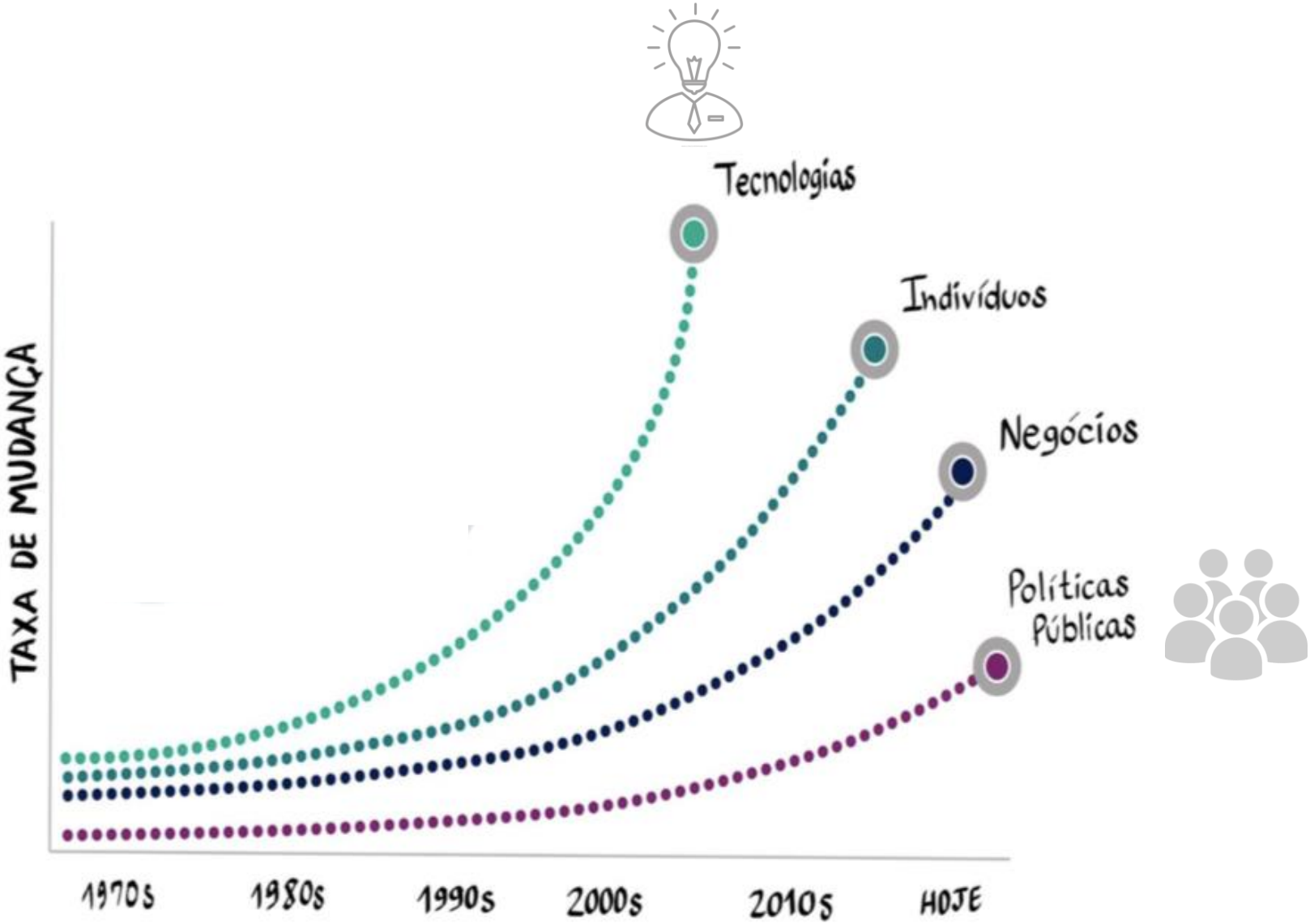
QUAIS SÃO AS PRINCIPAIS BARREIRAS PARA LIDAR COM AS TRANSFORMAÇÕES DIGITAIS NA SUA EMPRESA?



Culture is the most significant self-reported barrier to digital effectiveness.

Which are the most significant challenges to meeting digital priorities?
% of respondents

Source: 2016 Digital McKinsey survey of 2,135 respondents



Fonte: 2017 Deloitte Human Capital Trend Study

2017 IMD DIGITAL WORLD COMPETITIVENESS

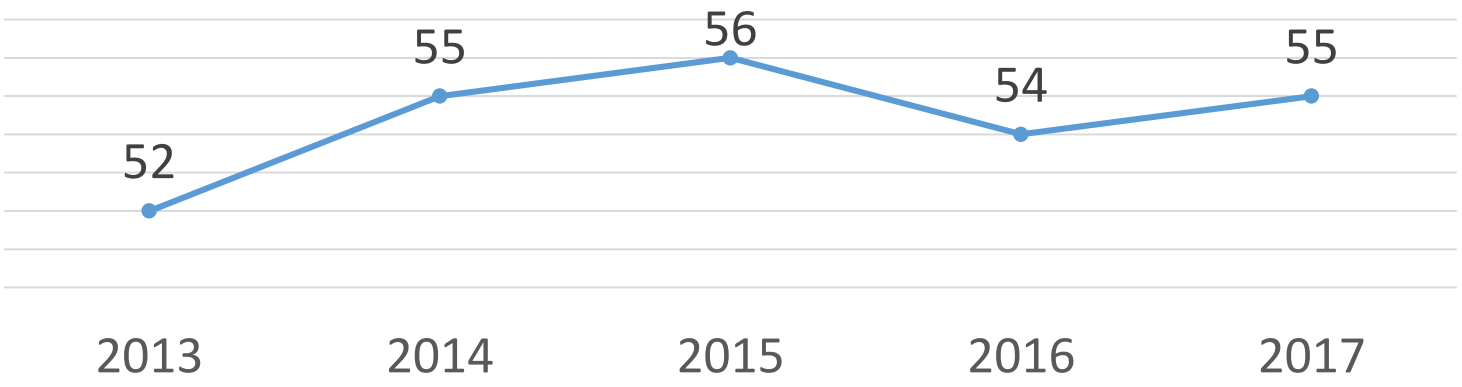
Total: 63

País	Ranking	País	Ranking
Cingapura	1	Reino Unido	11
Suécia	2	Israel	13
EUA	3	Alemanha	17
Finlândia	4	Japão	27
Dinamarca	5	China	31
Holanda	6	Chile	40
Hong Kong	7	Rússia	42
Suíça	8	Índia	51
Canadá	9	Brasil	55
Noruega	10	Argentina	57

IMD DIGITAL WORLD COMPETITIVENESS

Conhecimento	Tecnologia	Prontidão Futuro
Conhecimento necessário para descobrir, entender e desenvolver novas tecnologias	Contexto geral que permitem o desenvolvimento de tecnologias digitais	Nível de preparação do pais para aproveitar as transformações digitais
Talento, Treinamento e Educação, Concentração cientifica.	Ambiente regulatório, Capital de Risco, Ambiente tecnológico	Atitude empreendedora, Agilidade, Integração de TI

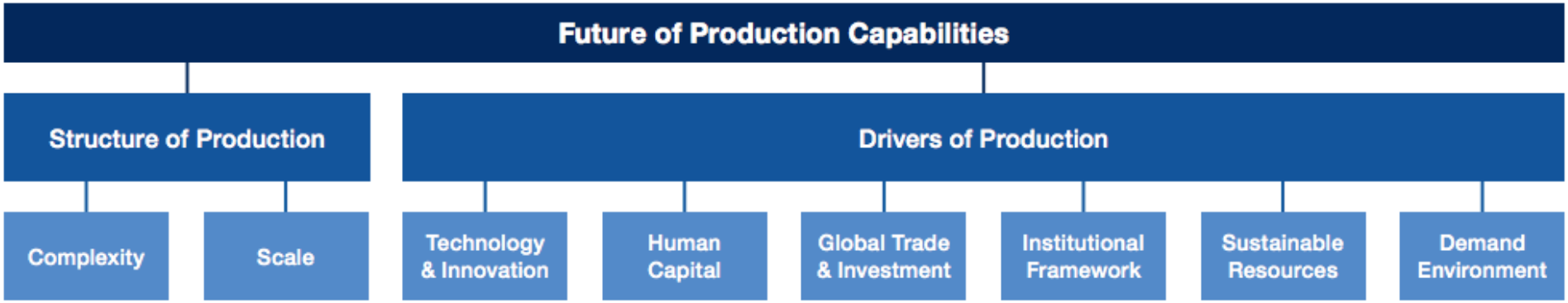
IMD DIGITAL WORLD COMPETITIVENESS: BRASIL

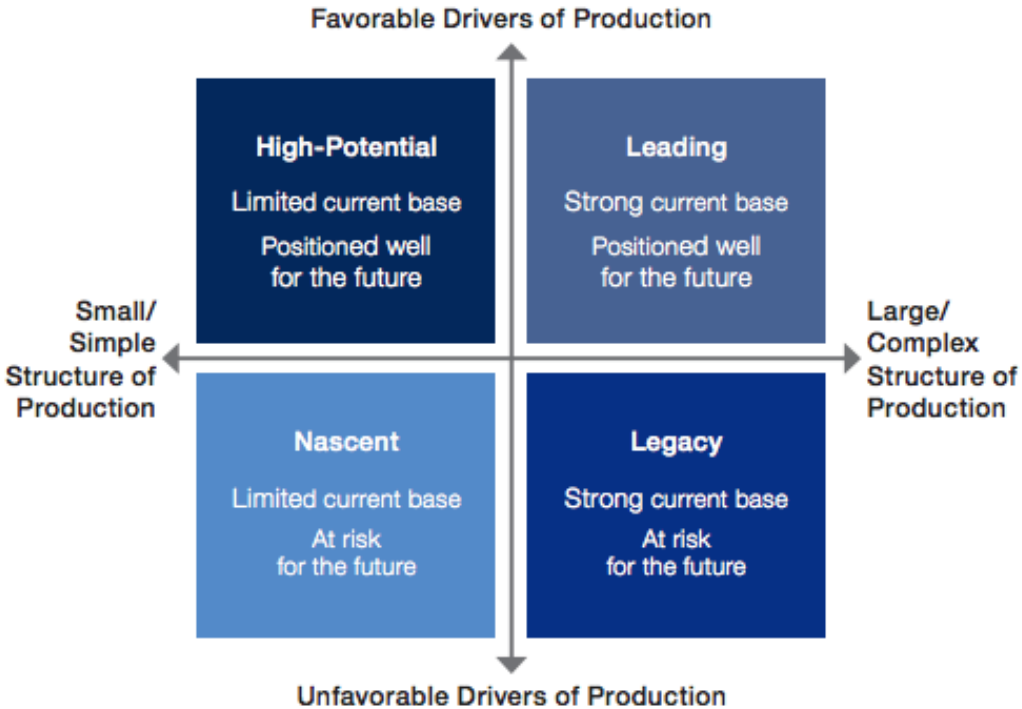


Total: 63

Conhecimento	Tecnologia	Prontidão Futuro
55	55	44
Talento, 60 Treinamento e Educação, 48 Concentração cientifica, 44	Ambiente regulatório, 60 Capital de Risco, 56 Ambiente tecnológico, 48	Atitude empreendedora, 45 Agilidade, 46 Integração de TI, 49

WEF - READINESS FOR THE FUTURE OF PRODUCTION





EXEMPLO LEADING: ESTADOS UNIDOS

Drivers of Production			8.2
Driver	Weighting	Rank	Score /10
Technology & Innovation	20%	1st	8.5
Human Capital	20%	3rd	7.9
Global Trade & Investment	20%	5th	7.7
Institutional Framework	20%	9th	8.6
Sustainable Resources	5%	37th	6.7
Demand Environment	15%	1st	8.5

Structure of Production			7.8
Structure	Weighting	Rank	Score /10
Complexity	60%	8th	8.6
Scale	40%	10th	6.6

Region	Country	Structure of Production		Complexity		Scale	
		Score	Rank	Score	Rank	Score	Rank
East Asia and the Pacific	Japan	8.99	1	10.00	1	7.47	5
East Asia and the Pacific	Korea, Rep.	8.85	2	8.96	4	8.69	2
Europe	Germany	8.68	3	9.40	3	7.59	4
Europe	Switzerland	8.39	4	9.82	2	6.25	12
East Asia and the Pacific	China	8.25	5	7.08	27	10.00	1
Europe	Czech Republic	7.94	6	8.74	5	6.76	8
North America	United States	7.78	7	8.58	8	6.59	10
Europe	Sweden	7.46	8	8.74	5	5.55	23
Europe	Austria	7.46	9	8.69	7	5.62	21
Europe	Ireland	7.34	10	8.16	13	6.11	14
East Asia and the Pacific	Singapore	7.28	11	8.40	11	5.59	22
Europe	United Kingdom	7.05	13	8.58	8	4.74	37
Europe	Finland	7.00	14	8.43	10	4.85	33
Europe	Italy	6.99	15	7.74	18	5.87	16
Europe	France	6.87	18	8.00	15	5.18	28
Europe	Poland	6.83	19	7.47	21	5.88	15
East Asia and the Pacific	Malaysia	6.81	20	6.80	30	6.82	7
Europe	Slovenia	6.80	21	8.27	12	4.60	39
Europe	Belgium	6.51	24	7.61	19	4.88	32
Europe	Israel	6.43	25	7.87	16	4.27	48
Europe	Netherlands	6.32	26	7.43	22	4.65	38
Europe	Denmark	6.29	27	7.61	19	4.31	46
Europe	Spain	6.05	29	6.70	32	5.06	30
North America	Canada	5.81	33	6.50	34	4.77	34
Europe	Estonia	5.75	34	7.36	23	3.34	70

East Asia and the Pacific Europe North America

EXEMPLO HIGH-POTENTIAL: NORUEGA

Drivers of Production			7.1
Driver	Weighting	Rank	Score /10
Technology & Innovation	20%	13th	6.9
Human Capital	20%	5th	7.8
Global Trade & Investment	20%	38th	5.7
Institutional Framework	20%	7th	8.7
Sustainable Resources	5%	1st	8.8
Demand Environment	15%	32nd	5.5

Structure of Production			5.6
Structure	Weighting	Rank	Score /10
Complexity	60%	26th	7.1
Scale	40%	67th	3.5

Region	Country/Economy	Structure of Production		Complexity		Scale	
		Score	Rank	Score	Rank	Score	Rank
●	Norway	5.65	36	7.09	26	3.48	67
●	Portugal	5.36	39	6.23	39	4.07	52
●	New Zealand	4.79	53	5.67	45	3.48	68
●	United Arab Emirates	4.53	57	5.05	58	3.76	59
●	Hong Kong SAR	4.52	58	6.80	31	1.10	97
●	Australia	4.26	61	4.47	68	3.96	54
●	Qatar	3.89	72	4.28	74	3.30	71

● East Asia and the Pacific ● Europe ● Middle East and North Africa

EXEMPLO LEGACY: MÉXICO

Drivers of Production 5.0

Driver	Weighting	Rank	Score /10
Technology & Innovation	20%	43rd	4.5
Human Capital	20%	73rd	4.5
Global Trade & Investment	20%	25th	6.3
Institutional Framework	20%	84th	4.2
Sustainable Resources	5%	61st	5.9
Demand Environment	15%	25th	5.8

Structure of Production 6.7

Structure	Weighting	Rank	Score /10
Complexity	60%	25th	7.2
Scale	40%	13th	6.1

Region	Country	Structure of Production		Complexity		Scale	
		Score	Rank	Score	Rank	Score	Rank
	Thailand	7.13	12	6.64	33	7.86	3
	Slovak Republic	6.98	16	7.87	16	5.65	20
	Hungary	6.96	17	8.05	14	5.33	26
	Mexico	6.74	22	7.16	25	6.11	13
	Romania	6.61	23	7.25	24	5.65	19
	Philippines	6.12	28	5.91	43	6.44	11
	India	5.99	30	5.57	48	6.61	9
	Lithuania	5.92	31	6.84	29	4.53	41
	Turkey	5.87	32	5.93	42	5.77	18
	Russian Federation	5.71	35	5.90	44	5.42	25

East Asia and the Pacific · Eurasia · Europe · Latin America and the Caribbean · Middle East and North Africa · South Asia

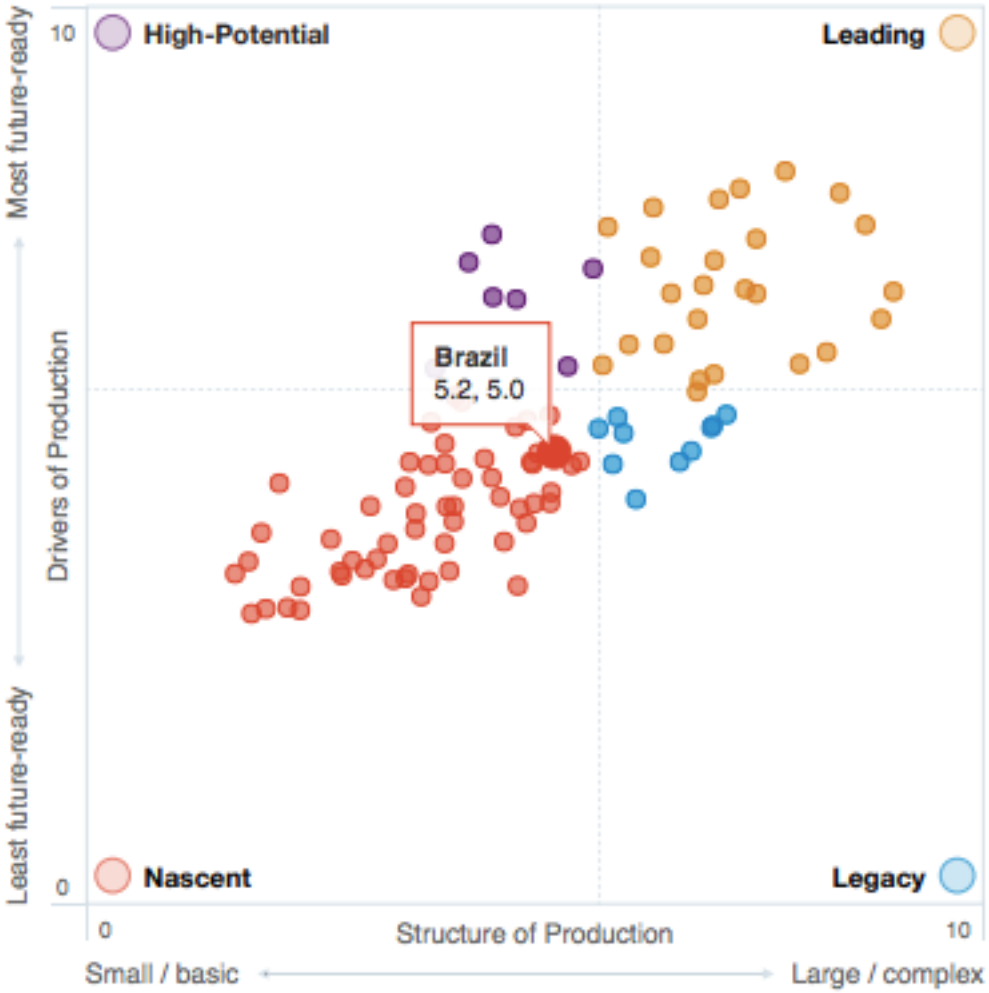
EXEMPLO NASCENT: BRASIL

Drivers of Production 5.0

Driver	Weighting	Rank	Score /10
Technology & Innovation	20%	45th	4.5
Human Capital	20%	74th	4.4
Global Trade & Investment	20%	54th	5.3
Institutional Framework	20%	72nd	4.5
Sustainable Resources	5%	19th	7.6
Demand Environment	15%	21st	6.1

Structure of Production 5.2

Structure	Weighting	Rank	Score /10
Complexity	60%	54th	5.3
Scale	40%	31st	5.0



Driver: Technology & Innovation 0-10 (best)	45	4.5
Technology Platform 0-10 (best)	51	6.2
2.01 Mobile-cellular telephone subscriptions /100 pop.	54	118.9
2.02 LTE mobile network coverage % population	72	56.5
2.03 Internet users % pop.	59	59.7
2.04 FDI and technology transfer 1-7 (best)	48	4.6
2.05 Firm-level technology absorption 1-7 (best)	52	4.6
2.06 Impact of ICTs on new services and products 1-7 (best)	54	4.6
2.07 Cybersecurity commitment 0–1 (best)	40	0.6
Ability to Innovate 0-10 (best)	37	2.8
2.08 State of cluster development 1-7 (best)	38	4.1
2.09 Company investment in emerging technology 1–7 (best)	52	3.6
2.10 Gov't procurement of advanced technology products 1-7 (best)	89	2.7
2.11 Companies embracing disruptive ideas 1-7 (best)	38	3.7
2.12 Multi-stakeholder collaboration 1-7 (best)	61	3.6
2.13 R&D expenditures % GDP	32	1.2
2.14 Scientific and technical publications Number per Billion PPP$ GDP	47	13.5
2.15 Patent applications applications/million pop.	49	1.60
2.16 Venture capital deal volume US$ millions	17	41,425.7
2.17 Venture capital deal volume per size of economy US$/GDP	44	20.5

Driver: Human Capital 0-10 (best)	74	4.4
Current Labor Force 0-10 (best)	59	5.7
3.01 Manufacturing employment % working population	45	12.3
3.02 Knowledge-intensive employment % working pop.	58	21.6
3.03 Female participation in labor force ratio	43	0.82
3.04 Mean years of schooling Years	80	7.4
3.05 Availability of scientists and engineers 1-7 (best)	77	3.6
3.06 Digital skills among population 1-7 (best)	88	3.5
Future Labor Force 0-10 (best)	76	3.1
3.07 Migration migrants/100,000 pop.	52	-0.9
3.08 Country capacity to attract and retain talent 1-7 (best)	63	3.3
3.09 Quality of universities Count	13	22.0
3.10 Quality of math and science education 1-7 (best)	97	2.6
3.11 Quality of vocational training 1-7 (best)	86	3.5
3.12 School life expectancy Years	37	15.4
3.13 Pupil-to-teacher ratio in primary education Ratio	69	20.9
3.14 Critical thinking in teaching 1-7 (best)	92	2.7
3.15 Active labor policies 1-7 (best)	84	2.7
3.16 On-the-job training 1-7 (best)	73	3.8
3.17 Hiring and firing practices 1-7 (best)	100	1.8

Index Component	Rank /100	Value
Driver: Global Trade & Investment 0-10 (best)	54	5.3
Trade 0-10 (best)	99	2.1
4.01 Trade % GDP	98	24.6
4.02 Trade tariffs % duty	92	0.12
4.03 Prevalence of non-tariff barriers 1-7 (best)	99	3.4
4.04 Logistics performance 1 – 5 (best)	53	3.1
Investment 0-10 (best)	7	8.0
4.05 Greenfield investments US$ millions	8	20,682.4
4.06 FDI inflows US$ millions	5	65,114.1
4.07 Domestic credit to private sector % GDP	47	62.2
Infrastructure 0-10 (best)	75	5.6
4.08 Transport infrastructure 0-100 (best)	65	41.9
4.09 Electricity infrastructure 0-100 (best)	78	70.8
Driver: Institutional Framework 0-10 (best)	72	4.5
Government 0-10 (best)	72	4.5
5.01 Regulatory efficiency 0 – 100 (best)	85	60.2
5.02 Incidence of corruption 0-100 (best)	58	40.0
5.03 Future orientation of government 1-7 (best)	94	2.6
5.04 Rule of law (2.5) - 2.0 (best)	60	-0.1

Driver: Sustainable Resources 0-10 (best)	19	7.6
Sustainability 0-10 (best)	19	7.6
6.01 Alternative and nuclear energy use % total energy use	24	0.4
6.02 CO2 intensity level CO2 emissions in megatons/GDP (US$ billions)	24	0.2
6.03 CH4 intensity level CH4 emissions in megatons/GDP (US$ billions)	56	0.1
6.04 N2O intensity level N2O emissions in megatons/GDP (US$ billions)	65	0.1
6.05 Baseline water stress Annual withdrawals, % of annual available blue water	26	0.9
6.06 Wastewater treatment 0 – 5 (worst)	54	76.2
Driver: Demand Environment 0-10 (best)	21	6.1
Foreign and Domestic Demand 0-10 (best)	10	7.7
7.01 Market size 0-100 (best)	10	76.6
Consumer Base 0-10 (best)	45	4.5
7.02 Buyer sophistication 1-7 (best)	51	3.5
7.03 Extent of market dominance 1-7 (best)	42	4.0

Index Component	Rank /100	Value
Structure: Complexity 0-10 (best)	54	5.3
1.01 Economic complexity (2.5) – 2.5 (best)	54	0.2
Structure: Scale 0-10 (best)	31	5.0
1.02 Manufacturing value added in economy % GDP	74	10.1
1.03 Manufacturing value added US$ millions	9	226,520.3

Region	Country	Structure of Production Score	Structure of Production Rank	Complexity Score	Complexity Rank	Scale Score	Scale Rank
	Croatia	5.50	37	6.97	28	3.29	72
	Indonesia	5.41	38	4.31	73	7.06	6
	Bulgaria	5.23	40	6.26	38	3.68	61
	Brazil	5.22	41	5.33	54	5.05	31
	Serbia	5.18	42	6.28	37	3.53	63
	Ukraine	5.17	43	6.05	41	3.85	57
	Saudi Arabia	5.16	44	5.43	50	4.76	35
	South Africa	5.03	45	5.35	53	4.55	40
	Egypt	4.99	46	4.90	61	5.13	29
	Costa Rica	4.97	47	5.61	47	4.01	53
	Viet Nam	4.96	48	4.37	72	5.83	17
	Latvia	4.91	49	6.49	35	2.55	79
	Argentina	4.91	50	4.71	62	5.20	27
	Tunisia	4.83	51	5.29	55	4.13	50
	El Salvador	4.81	52	5.10	57	4.36	45
	Bahrain	4.78	54	5.63	46	3.51	65
	Bosnia and Herzegovina	4.66	55	6.13	40	2.44	84
	Colombia	4.61	56	4.94	59	4.12	51
	Uruguay	4.52	59	5.44	49	3.14	73
	Greece	4.44	60	5.43	51	2.95	75
	Kazakhstan	4.19	62	4.63	63	3.53	64
	Chile	4.18	63	4.47	67	3.76	60
	Cyprus	4.11	64	6.32	36	0.80	99
	Armenia	4.10	65	5.41	52	2.13	87
	Sri Lanka	4.10	66	3.66	81	4.75	36
	Guatemala	4.05	67	3.75	79	4.50	42
	Lebanon	4.02	68	4.93	60	2.65	78
	Jordan	4.00	69	4.09	76	3.86	56
	Oman	4.00	70	4.61	64	3.07	74

Region	Country	Structure of Production Score	Structure of Production Rank	Complexity Score	Complexity Rank	Scale Score	Scale Rank
	Dominican Republic	3.99	71	4.03	77	3.95	55
	Mauritius	3.84	73	4.51	66	2.84	77
	Pakistan	3.82	74	3.46	83	4.37	44
	Panama	3.82	75	5.27	56	1.64	92
	Kyrgyz Republic	3.73	76	4.54	65	2.53	81
	Morocco	3.67	77	3.27	86	4.28	47
	Peru	3.67	78	3.12	87	4.49	43
	Georgia	3.61	79	4.39	71	2.44	85
	Bangladesh	3.59	80	2.33	97	5.48	24
	Cambodia	3.56	81	3.40	84	3.79	58
	Kuwait	3.56	82	4.24	75	2.53	82
	Honduras	3.43	83	3.32	85	3.59	62
	Moldova	3.36	84	4.39	70	1.81	91
	Paraguay	3.24	85	3.71	80	2.54	80
	Botswana	3.17	86	4.44	69	1.26	96
	Senegal	3.11	87	3.57	82	2.43	86
	Kenya	2.97	88	3.00	89	2.91	76
	Ecuador	2.85	89	2.42	95	3.50	66
	Algeria	2.83	90	3.09	88	2.45	83
	Albania	2.73	91	3.86	78	1.04	98
	Zambia	2.39	92	2.75	90	1.85	90
	Tanzania	2.39	93	2.66	91	1.98	89
	Uganda	2.25	94	2.35	96	2.09	88
	Azerbaijan	2.16	95	2.53	92	1.60	93
	Ethiopia	2.01	96	2.46	94	1.32	95
	Ghana	1.96	97	2.22	98	1.56	94
	Cameroon	1.84	98	0.82	99	3.38	69
	Mongolia	1.81	99	2.53	92	0.74	100
	Nigeria	1.66	100	-	100	4.16	49

POLITICAS PÚBLICAS E ESTRATÉGIAS PARA A TRANSFORMAÇÃO DO BRASIL DIGITAL: MCTIC

REFERENCIA:
2017 MCTIC: ESTRATÉGIA BRASILEIRA PARA A TRANSFORMAÇÃO DIGITAL

POLITICAS PÚBLICAS E ESTRATÉGIAS PARA A TRANSFORMAÇÃO DO BRASIL DIGITAL: CNI

Impactos Esperados dos Clusters sobre Sistemas Produtivos

Indústria 2027

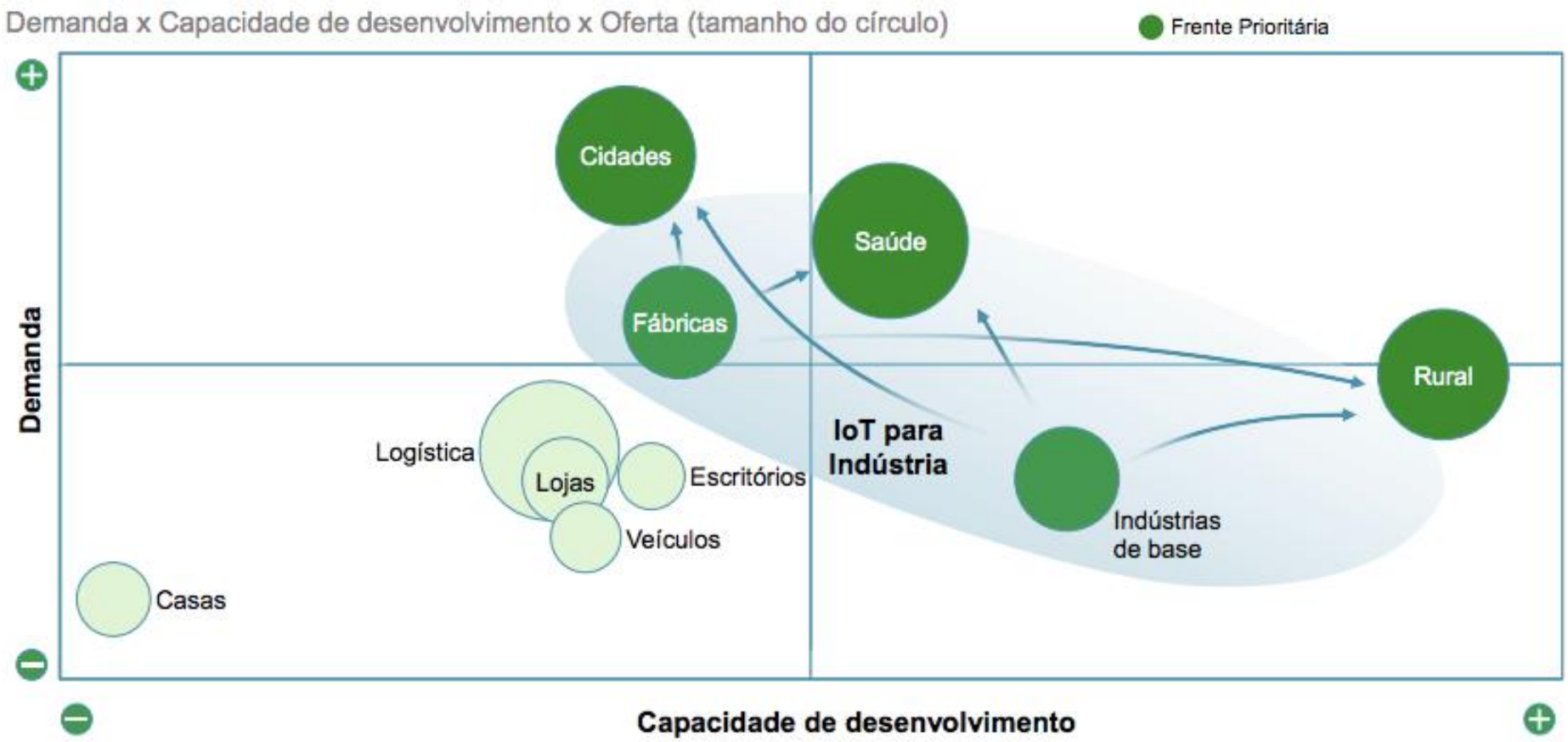
	Agro	Insumos Básicos	Química	Petróleo & Gás	Bens de Capital	Automotiva	Aeroespacial & Defesa	TICs	Bens de Consumo	Farma
Inteligência artificial	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Disruptivos (em 2017 e 2027)	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027
Redes de Comunicação	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Moderados (em 2017 e 2027)	Moderados (em 2017 e 2027)	Moderados (em 2017 e 2027)	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Moderados (em 2017 e 2027)
Internet das Coisas (IoT)	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Moderados (em 2017 e 2027)	Potencial disruptivo até 2027	Disruptivos (em 2017 e 2027)	Potencial disruptivo até 2027	Moderados (em 2017 e 2027)
PIC	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Disruptivos (em 2017 e 2027)	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Moderados (em 2017 e 2027)
Materiais Avançados	Moderados (em 2017 e 2027)	Moderados (em 2017 e 2027)	Disruptivos (em 2017 e 2027)	Disruptivos (em 2017 e 2027)	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Disruptivos (em 2017 e 2027)	Potencial disruptivo até 2027	Disruptivos (em 2017 e 2027)	Potencial disruptivo até 2027
Nano	Potencial disruptivo até 2027	Moderados (em 2017 e 2027)	Potencial disruptivo até 2027	Disruptivos (em 2017 e 2027)	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Moderados (em 2017 e 2027)	Potencial disruptivo até 2027	Potencial disruptivo até 2027	Potencial disruptivo até 2027
Biotecnologia	Disruptivos (em 2017 e 2027)	n/a	Disruptivos (em 2017 e 2027)	n/a	n/a	n/a	n/a	Moderados (em 2017 e 2027)	n/a	Disruptivos (em 2017 e 2027)
Armaz. de Energia	Moderados (em 2017 e 2027)	Potencial disruptivo até 2027	Moderados (em 2017 e 2027)	Moderados (em 2017 e 2027)	Potencial disruptivo até 2027	Disruptivos (em 2017 e 2027)	Moderados (em 2017 e 2027)	Moderados (em 2017 e 2027)	Moderados (em 2017 e 2027)	Moderados (em 2017 e 2027)

Moderados (em 2017 e 2027) | Potencial disruptivo até 2027 | Disruptivos (em 2017 e 2027)

REFERENCIA:
2017 CNI, Projeto Indústria 2027: Riscos e Oportunidades para o Brasil Diante de Inovações Disruptivas,

POLITICAS PÚBLICAS E ESTRATÉGIAS PARA A TRANSFORMAÇÃO DO BRASIL DIGITAL: BNDES

A matriz de priorização destacou quatro Frentes Prioritárias de IoT para o país



FONTE: 2017 BNDES “Internet das Coisas: um plano de ação para o Brasil”

FDC

REFLEXÕES SOBRE TRANSFORMAÇÃO DIGITAL

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