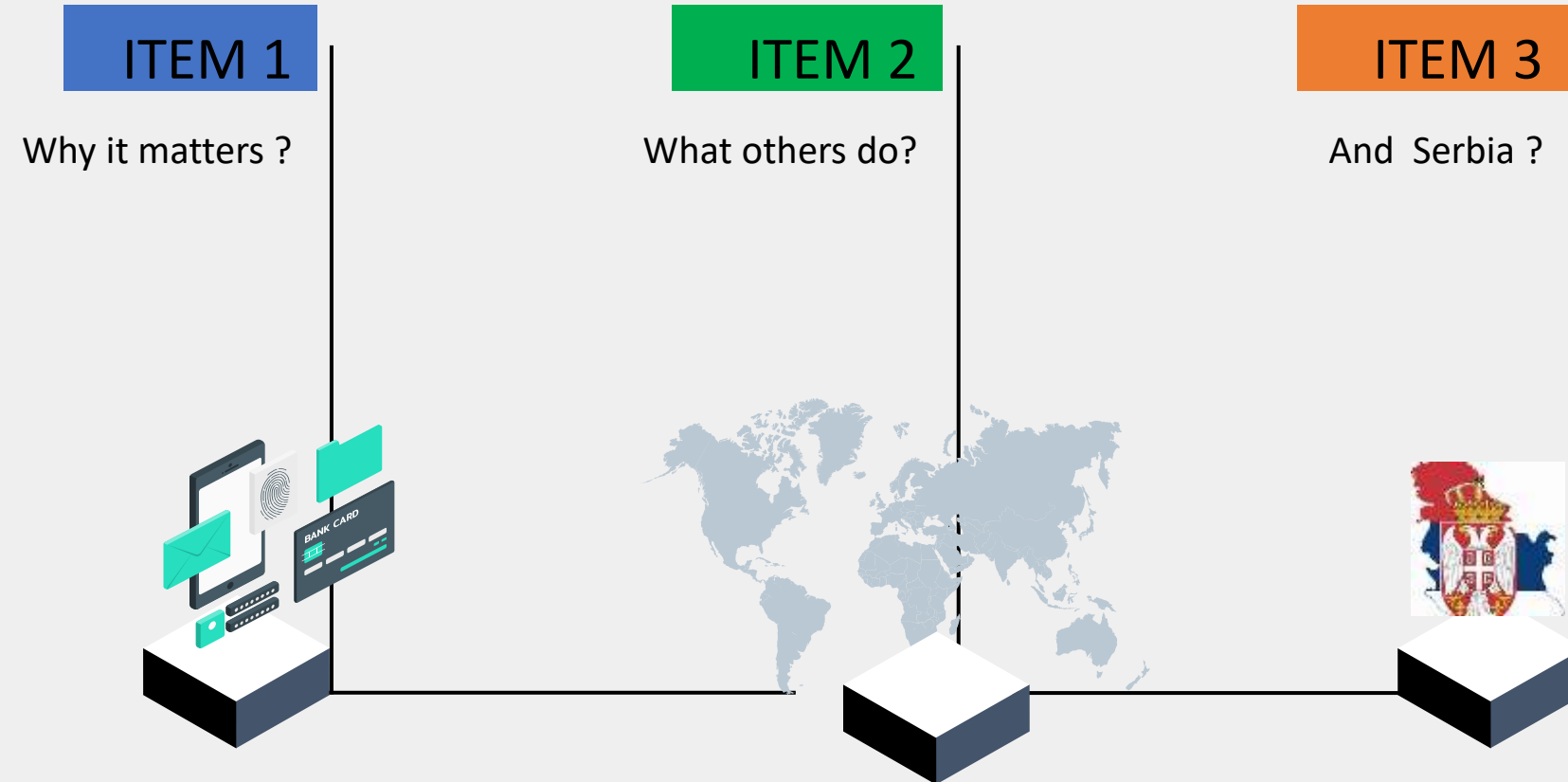


Industry 4.-Quality 4.0-
Human resources
competence - the main
risk or opportunity?

Vladimir Simić

Content



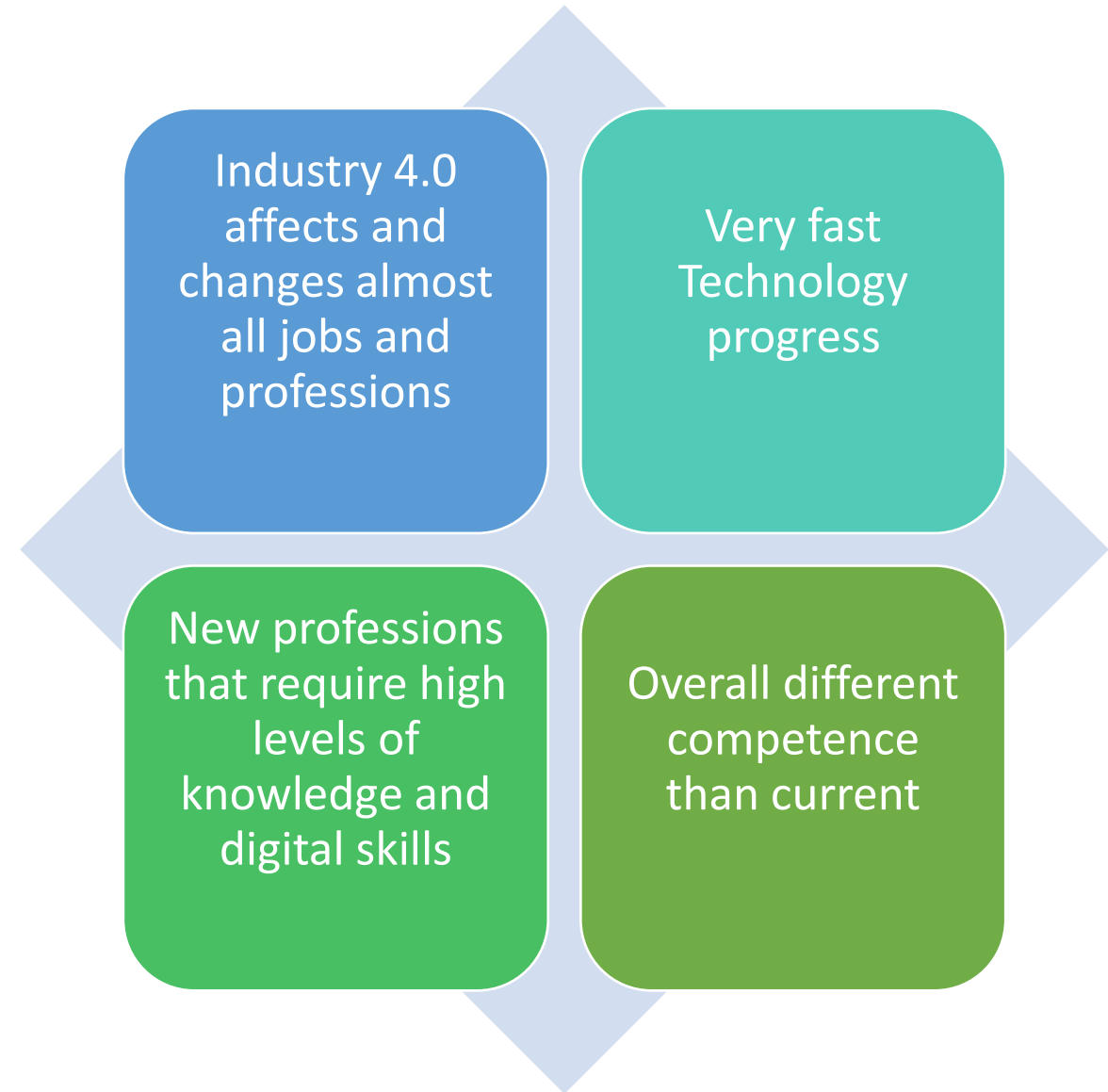
The topic "competence" is described as a high priority in almost all industry 4.0 and Quality 4.0 publications

*„Every solution breeds new problems.“ Murphy
low*

Already at the
start
old problems
are intense

- Competence problems:
 - concerns about staff shortages by number and competence, on the one hand and appearance of surplus employees under the influence of modern technological solutions, which constitute the backbone of Industry 4.0, on the other hand.
 - Industry 4.0 will require working power with high capacity to adapt to new types of jobs that will emerge and dominate, with the necessary knowledge and skills for those new jobs and work environments.

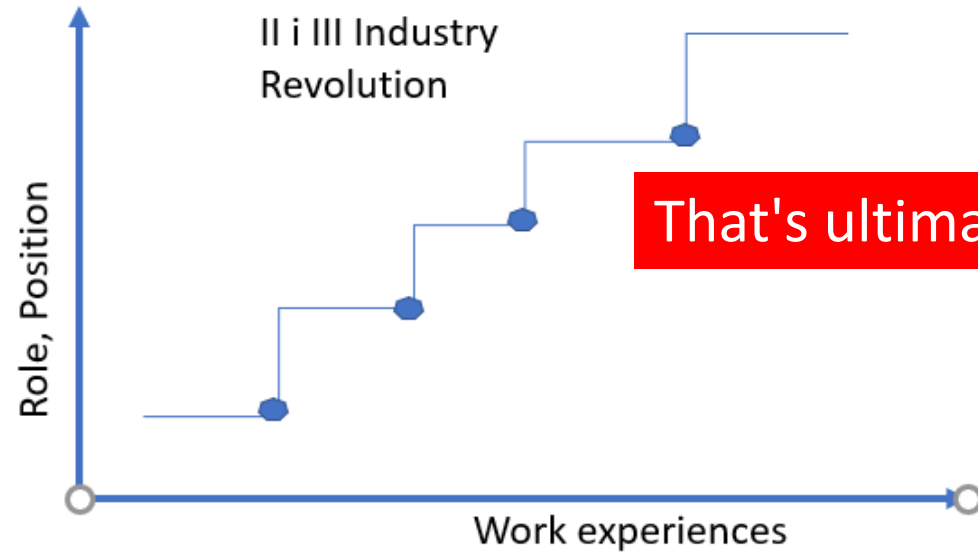
Everything
changes--very
fast!



IT's been radically changed in the IT services for two decades

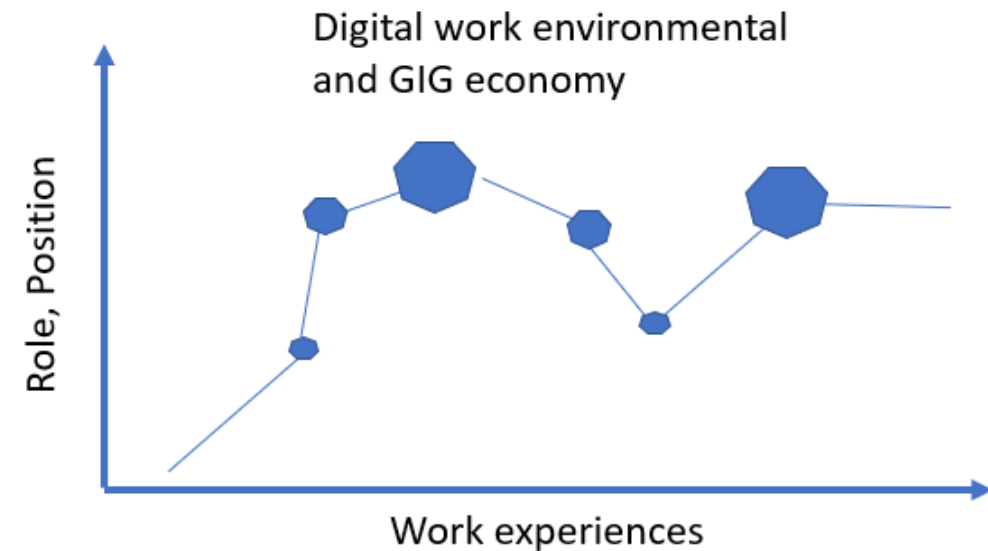


Constantly present motivation to progress, learn and be engaged



That's ultimately what all employees will have to do in the future.

- 1970 Manual packaging of the thinner and solvents
- 1973 automatic packaging machines
- 1973 Robots in storage of licenses in Sweden
- 1985 Automatic sampling of oil – project Luka Rennie in the USSR
- 1993 Automatization of Euroquality Group business within FOX PRO environmental
- 1994 the first website in Serbia on quality issues
- 2008 first on-line trainings
- From 1990 to now I have collected 102 diplomas and certificates of various training



Germany
institute MMB
„What type of
competencies
will Industry
4.0 require?“

- The study noted that 2017 more than 30 per cent of the German economy consider the "inadequate qualification of employees the main problem of the transition to I 4.0.

The scientist of this institute, Dr. Ulrich Schmid, also provides a formula for competence 4.0:

IT + specialist knowledge X soft skills
= Competence 4.0

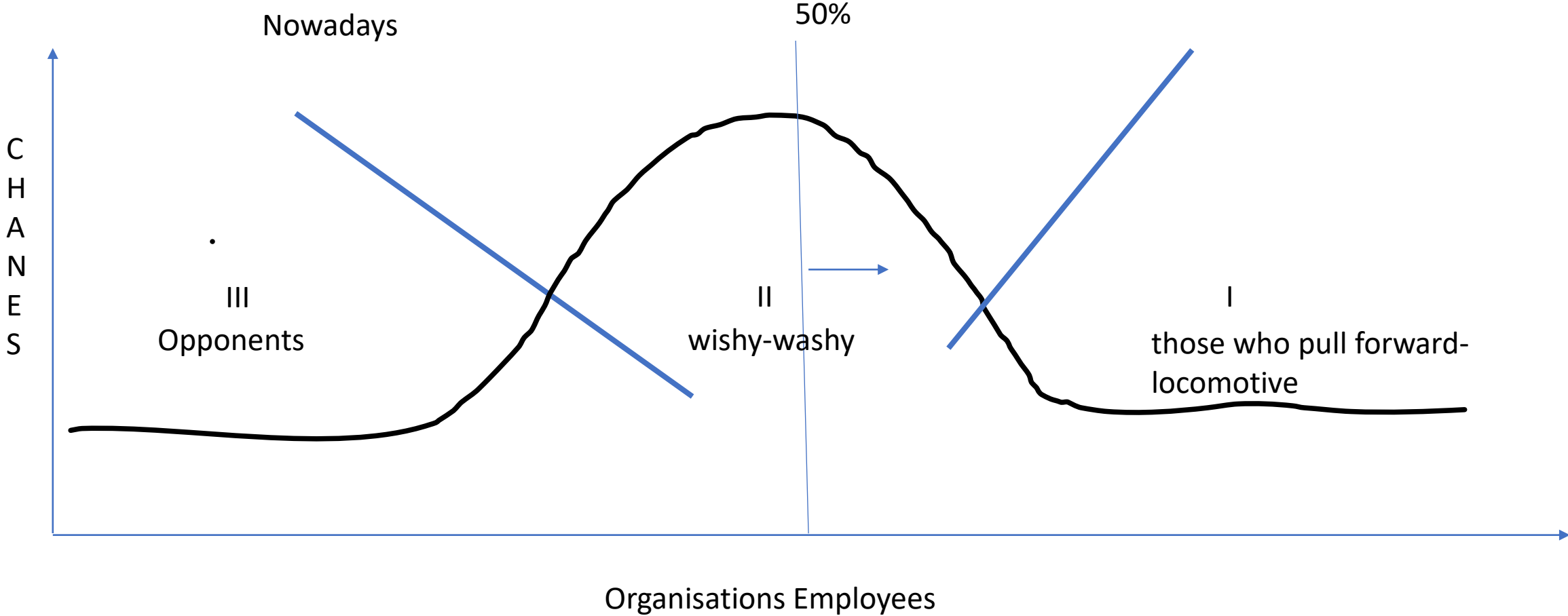


And I think it
should be
added for
Serbia

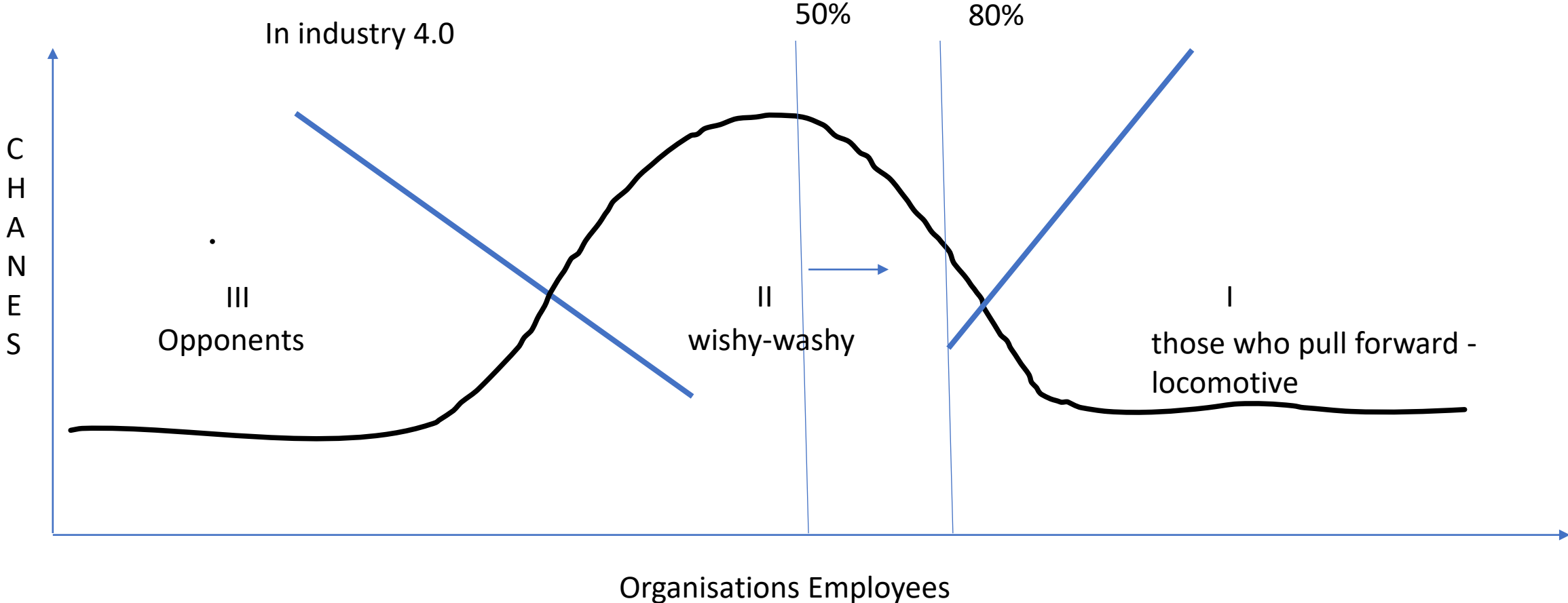
- IT + specialist knowledge X Soft Skills + \sum Employees
Motivation = Competence 4.0

Dilemma-whether to be a “+ or *”
but it, motivation has to be considered!

FOR CUCCESFUL CHANGE OVER 51% OF MOTIVATED EMPLOYEES

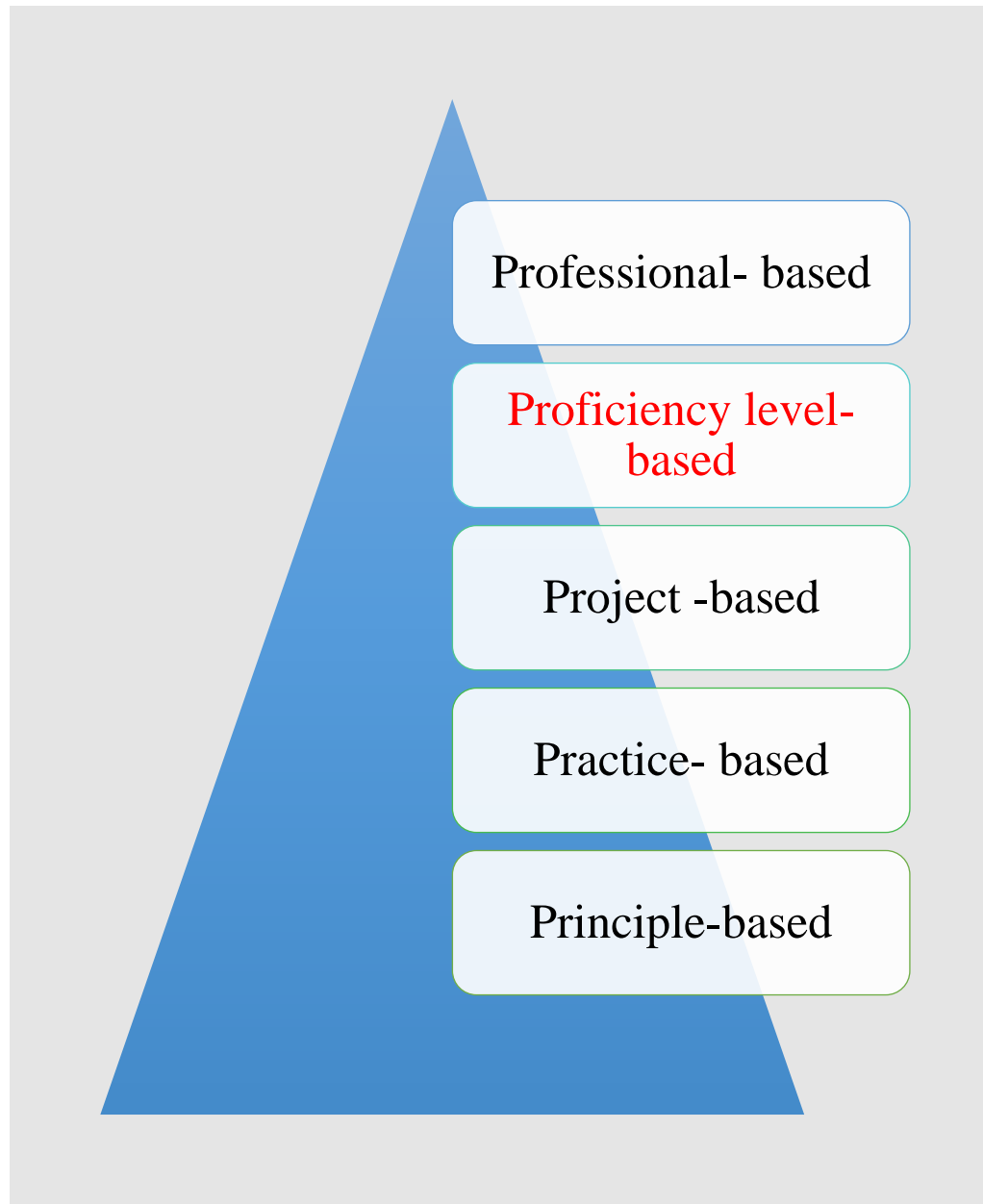


FOR CUCCESFUL CHANGE OVER 81% OF MOTIVATED EMPLOYEES

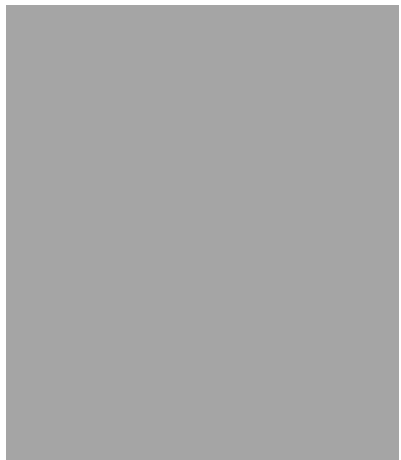


World Economic Forum (WEF) je 2019 proposed 4P frame platform

- I added a fifth P level of expertise for each competence



4P and 5P

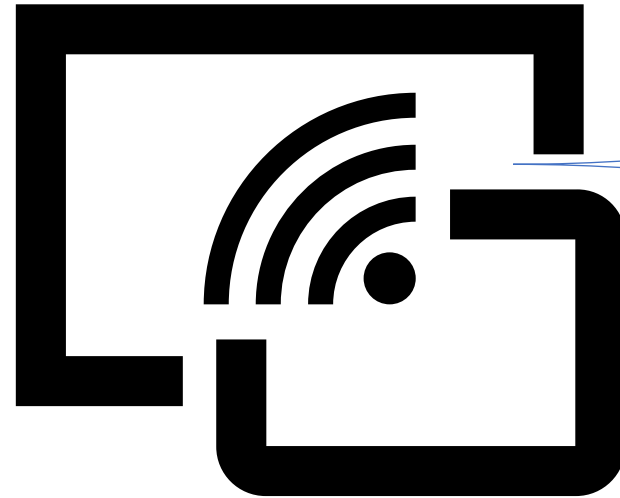




Why do I think this is important?

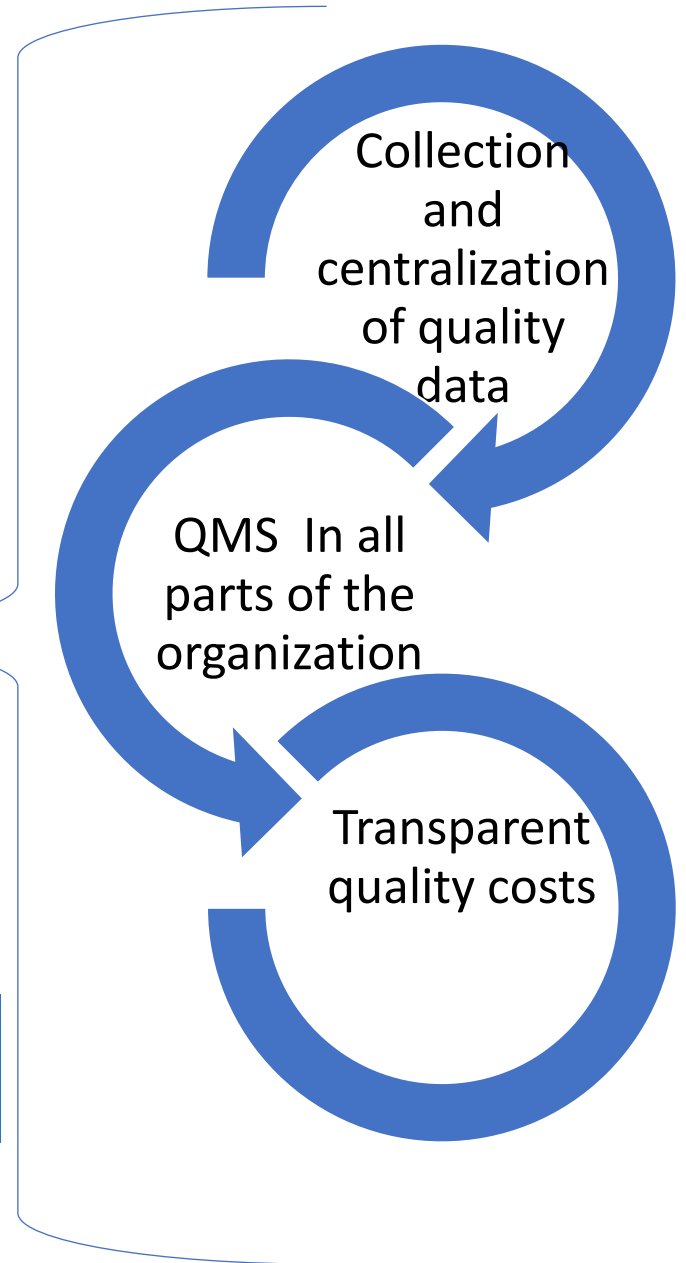
Take a very simple example – standards

What else is important about Q4

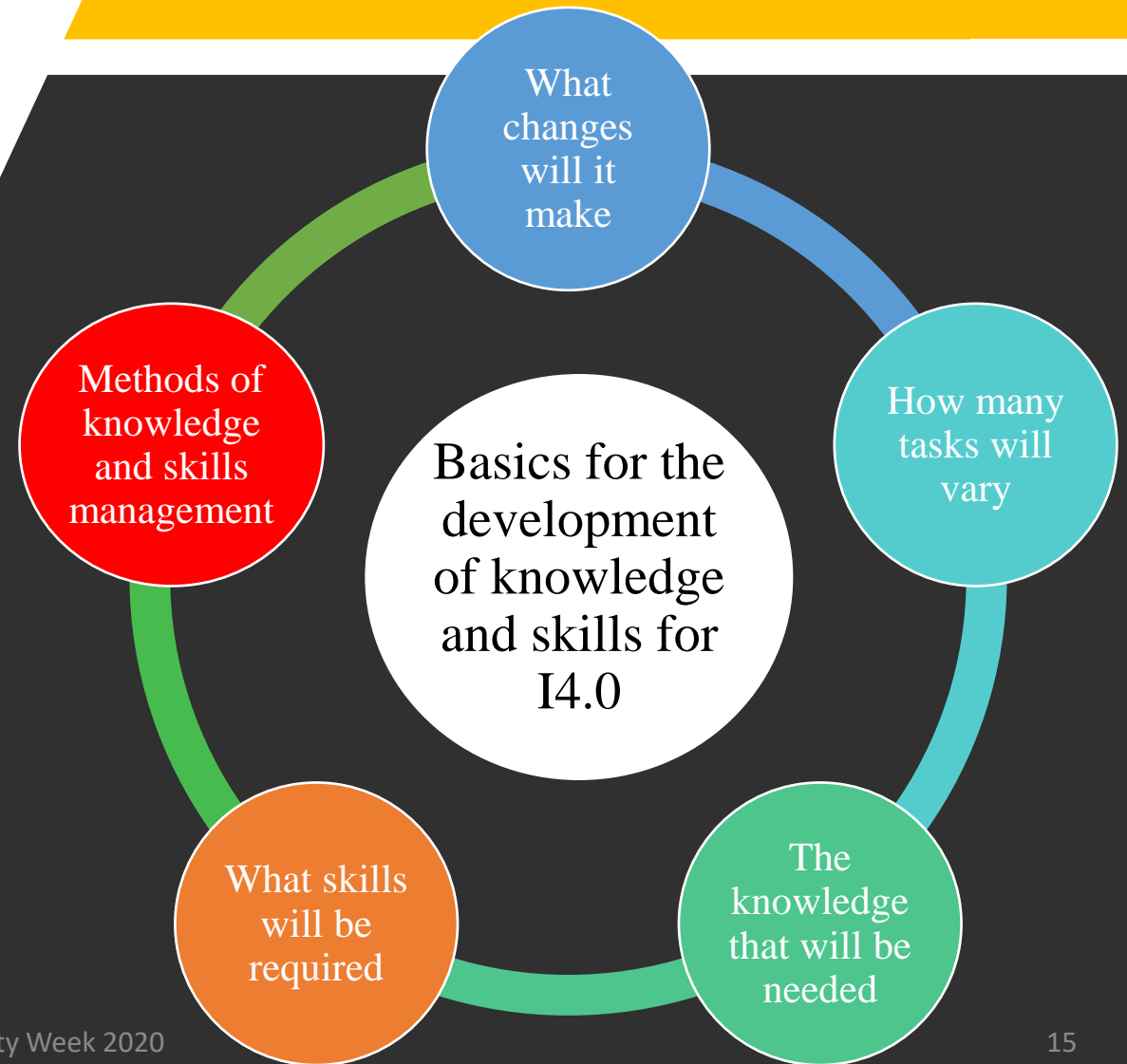


Imagine if we don't collect the same data or don't apply costs standard

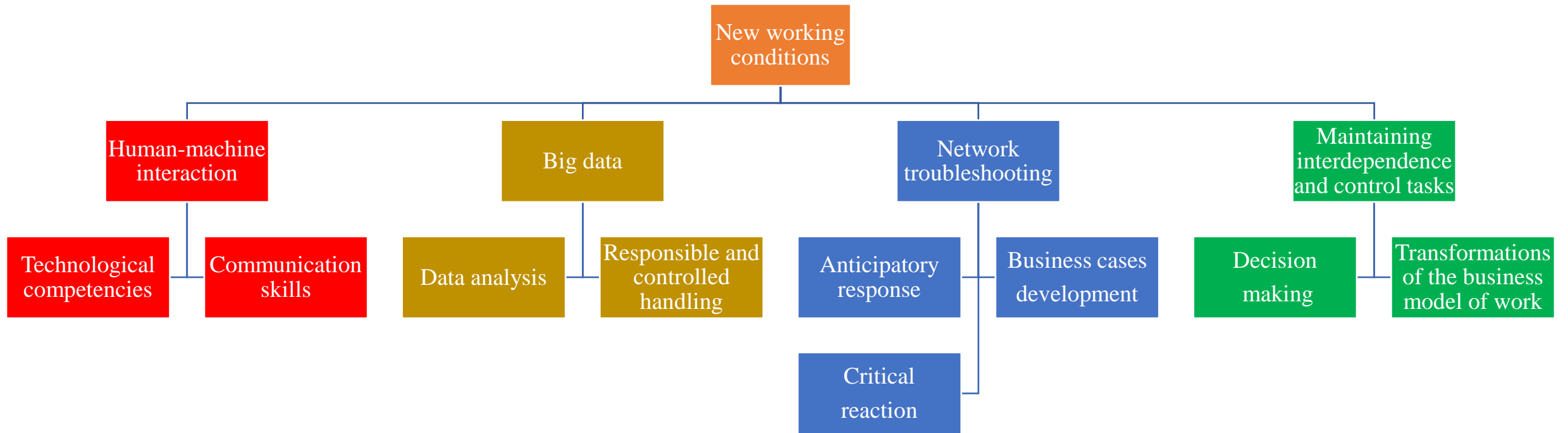
And another example about management systems



When developing knowledge development programs and skills for Industry 4.0 and Quality 4.0



New work conditions expected



Simple example – work executor

Now - automated production	Industry 4.0 – Quality 4.0
Easy tasks to execute	Monitoring machines, robots
Repeatable tasks	Defect detection
Observing and seeking help from those in charge	Making decisions
Standardisation	Standardisation, preventive maintenance

Risks and opportunities of competence

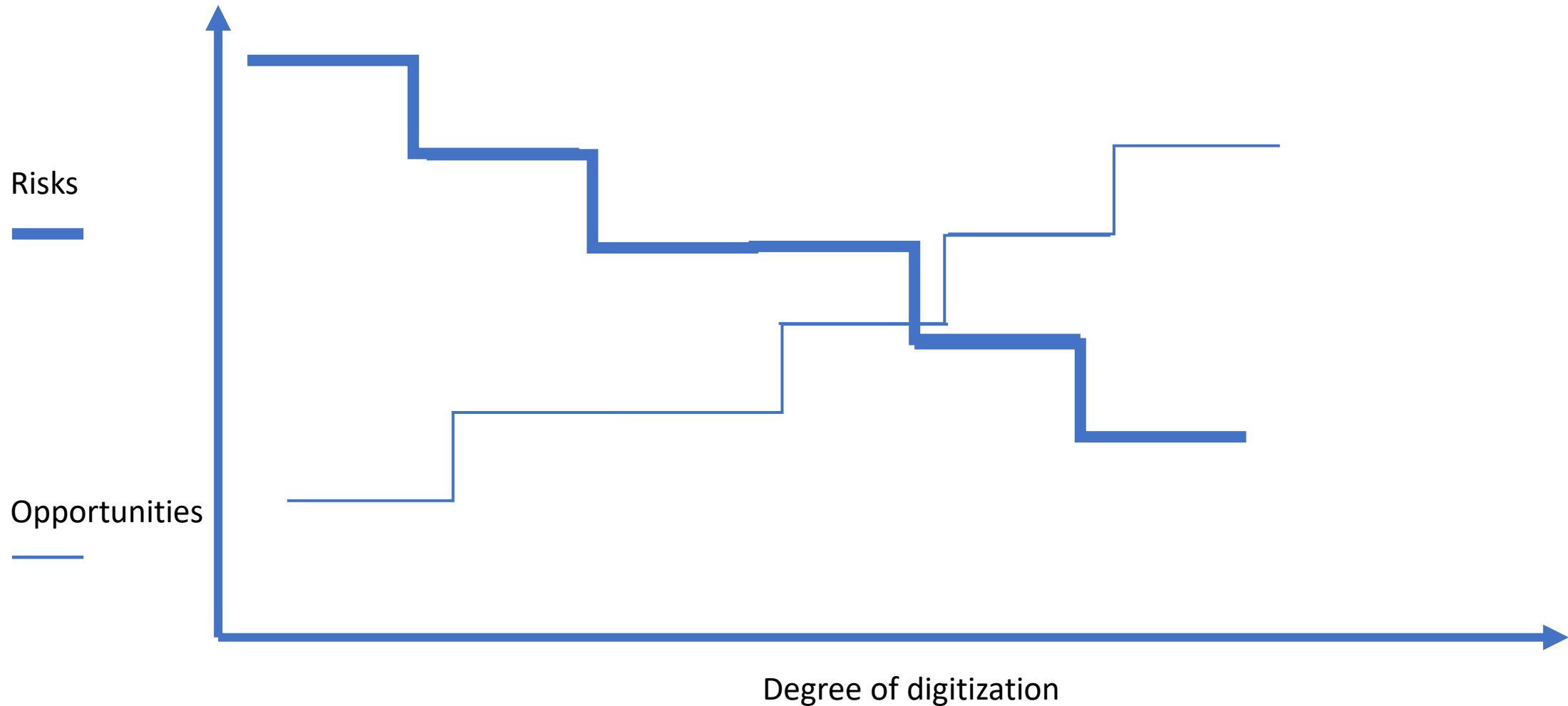
R_k -Risk of competence, R_z-risks related to knowledge, R_v-Skills Risks, R_i-Risks related to experiences a n-number of risks that exist in the organization, P-opportunities with the same supplementary letters for the elements of competence and V probability and U-impact-consequences.

$$R_k = \sum R_{1-n} = \sum V_{1-n} * U_{1-n}$$

$$R_k = \sum R_z + R_v + R_i$$

$$P_k = \sum V_{n-1} * U_{n-1}$$

Risks and opportunities I4.0 –competencies



Some of the today risks that exist within and competences will disappear

- employees do not have enough time to learn
- trainings gives limited knowledge

Some new risks

My professor A. Despic



On the other hand, a new one will appear, or, if present today, have increased effects on competence as:

- Knowledge is changed faster than the individual can overcome
- Limited access to training facilities
- The speed in which the information reaches employees.

And what are they doing and talking about?

- Competence is a topic that is engaged in all worldwide, from international and regional organizations, forums, professional associations and associations, faculties and organizations from economic and social life
-

„Just because you CAN do something doesn't mean you SHOULD.“Murphy law



And what are those others doing and talking about?

- Everyone is or at least those who want to see it, but now it is clear **that digital technology is prechewing all jobs and forms of work** and that technology will provide new ways of linking and co-operation globally, which will enable and facilitate many organizations expansion of activities and markets.
- The amount of information generated on the network will continue to increase exponentially, which will certainly lead to **more complex information architecture**.
- Certainly, these **tearing down various barriers** to the business today, is a great relief but at the same time, for people **create new demands and complex development in relations and especially competence**.

Estimated impact of Industry 4.0 technologies on jobs

<i>Estimate</i>	<i>Time frame</i>	<i>Technology</i>	<i>Study</i>
47 per cent of total United States employment at high risk of being automated	10–20 years	Artificial intelligence and robotics	Frey and Osborne, 2017
9 per cent of total employment in the United States and 21 countries of the Organization for Economic Cooperation (OECD) and Development at high risk of being automated	10–20 years	Artificial intelligence and robotics	Arntz et al., 2016, 2017
50 per cent of today's work activities worldwide could be automated	By 2055	Artificial intelligence and robotics	McKinsey Global Institute, 2017 ¹⁴
8.5 per cent of the global manufacturing workforce, mostly in lower-income regions of major economies, could become redundant	20 years	Industrial robots	Oxford Economics, 2019

Source: UNCTAD compilation.

The UNCTAD was 2017 within the 17-year conference organized a very significant panel discussion "Industry 4.0- the possibilities behind the challenge" indicating the challenges and possible from whose review is easily recognized position of competence and employment.

1. Increase in revenues
2. Nursing health Care
3. Investments in infrastructure
4. Investments in buildings
5. Investments in energy
6. Technological development
7. A market for jobs that were not previously charged

A different approach has a McKinsey Global Institute that 2017 has given an overview of a possible scenario for work demands as a consequence of seven catalyst for development and demand for jobs from 2016 to 2030

Mckinsey Global institute predictions for the US

Impact of adoption by 2030

Work potentially displaced by adoption of automation, by adoption scenario, % of workers (FTEs¹)



Workforce that could need to change occupational category, by adoption scenario,² % of workers (FTEs)



Impact of demand for work by 2030 from

Trendline demand scenario,



- Changing the category are expected and learning new skills is a very necessary condition.

BBC „ Robots to
affect up to 30%
of UK jobs“
Source: PwC

Job automation risk

- Transportation and storage - 56% of jobs at high risk from automation
- Manufacturing - 46%
- Wholesale and retail trade - 44%
- Administrative and support services - 37%
- Financial and insurance - 32%
- Professional, scientific and technical - 26%
- Construction - 24%
- Arts and entertainment - 22%
- Agriculture, forestry and fishing - 19%
- Human health and social work - 17%
- Education - 9%

- Job sharing
- Interim management
- Casual work
- ICT-based mobile work
- Voucher-based work
- Portfolio work
- Crowd employment and
- Collaborative employment.

Eurofound
identified
nine new
forms of
employment
in the EU in
2015



And Serbia?

- *„Chaos always wins, because it's better organized“.
Murphy's laws*

Why am I optimist!

Done so far!

What's going on?



But it must be faster and more organized!

We'd do a lot of stupid things if we didn't take these opportunities.!

Serbian position

- The ITU (International Telecommunication Union) is monitoring the development of the infrastructure market in 192 countries ,
- The conclusions for both of the observed periods talk about progress in liberalizing and modernizing Serbia's telecommunications market, and a large mobile phone penetration and most households are connected to the Internet, and a broadband network is on the rise in Serbia.

Key indicators for Serbia (2016)		Europe	World
Fixed-telephone sub. per 100 inhab.	34.8	37.7	13.6
Mobile-cellular sub. per 100 inhab.	120.6	118.0	101.5
Fixed-broadband sub. per 100 inhab.	19.2	30.2	12.4
Active mobile-broadband sub. per 100 inhab.	67.4	80.1	52.2
3G coverage (% of population)	98.5	98.5	85.0
LTE/WiMAX coverage (% of population)	78.2	92.2	66.5
Mobile-cellular prices (% GNI pc)	3.0	1.0	5.2
Fixed-broadband prices (% GNI pc)	3.0	1.2	13.9
Mobile-broadband prices 500 MB (% GNI pc)	1.0	0.6	3.7
Mobile-broadband prices 1 GB (% GNI pc)	1.2	0.6	6.8
Percentage of households with computer	65.8	79.6	46.6
Percentage of households with Internet access	64.7	82.5	51.5
Percentage of individuals using the Internet	67.1	77.9	45.9
Int. Internet bandwidth per Internet user (kbit/s)	26.3	178.0	74.5

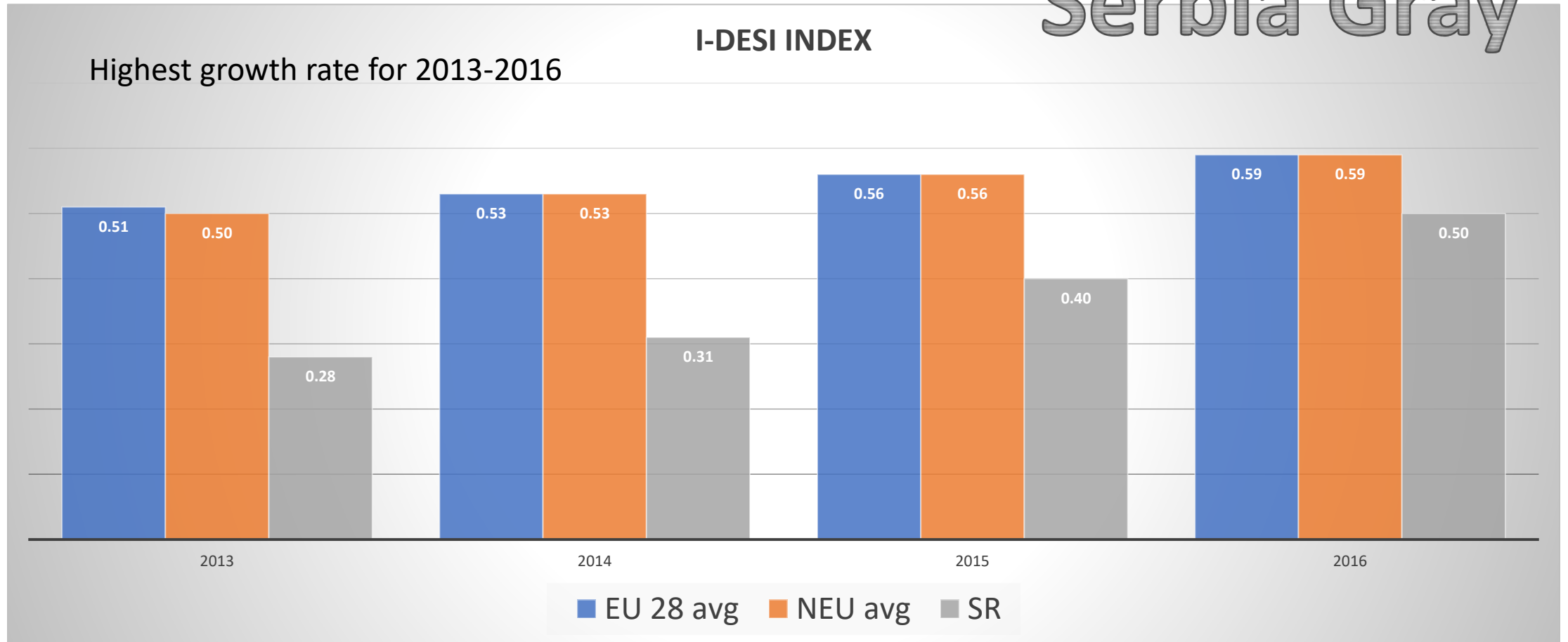
Note: Data in italics are ITU estimates. Source: ITU (as of June 2017).

ITU Development Index IKT (IDI) Serbia's big leap

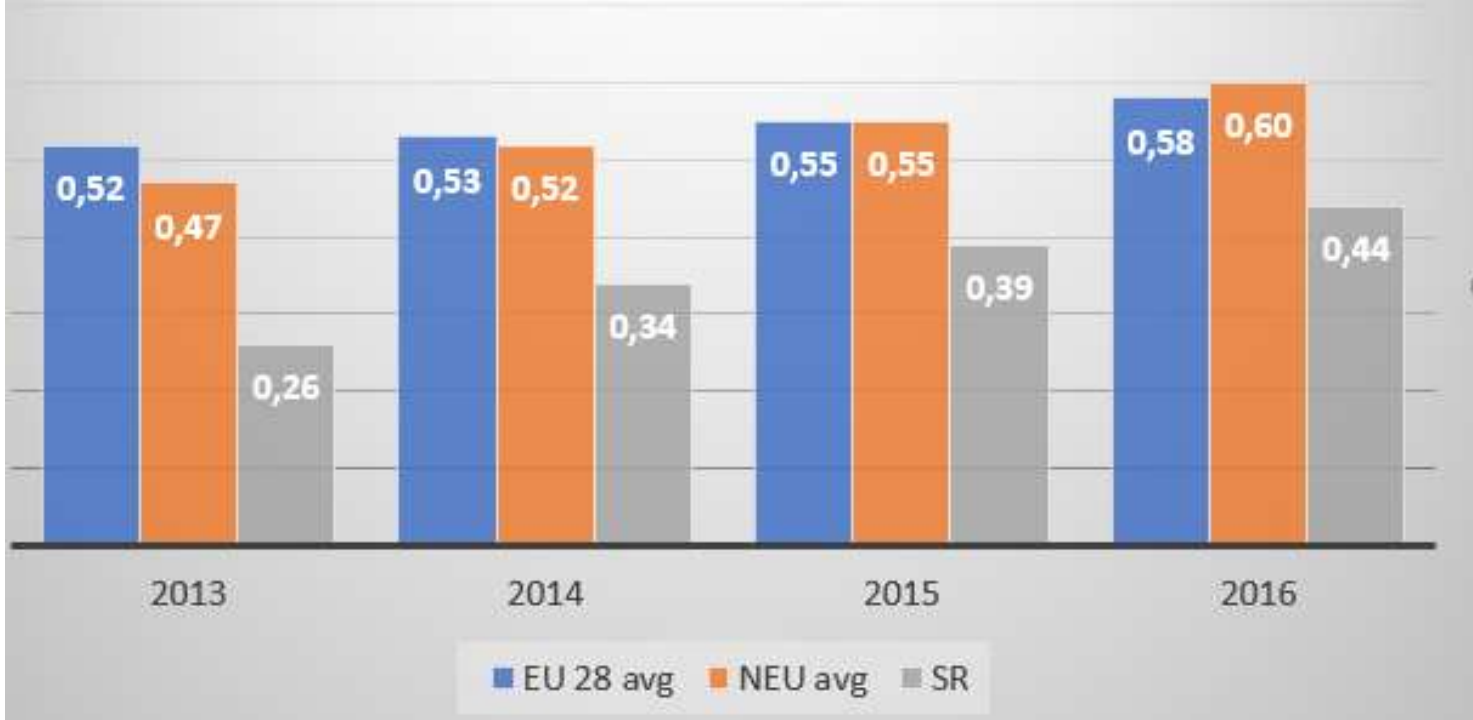


EU28 Countries individually i EU as a whole, compared to the 17 Other countries of the world

Serbia Gray



Human Capital dimension index



Human Capital Index

Serbia Gray

- Serbia at 27 of the 157 observed countries and has a better position than most countries in the region, both Turkey, Russia, China, but worse than Italy, Denmark, Austria, the Netherlands
-

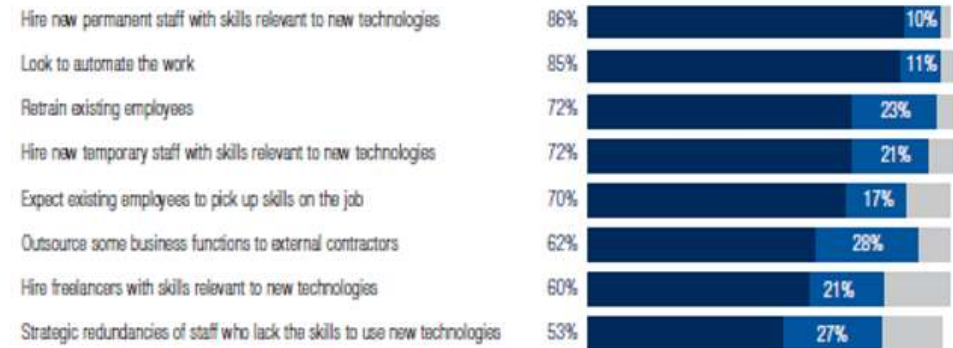
The World Bank
analyses

WEF World Economic Forum 2018 on ways of securing the skills needed for the needs of surveyed organizations

- The Group of Western Europe and Eastern European countries, where Serbia is shown
- There are little differences in this data between the most developed and those who have recently entered the European Union, or are preparing for it:
- Automatization of production 84% in Western Europe and 85% in Eastern Europe,
 - re-training of employees from 74% to 72%,
 - outsourcing from 63% and 62%,
 - Engagement freelancers of 60% in both groups of countries.

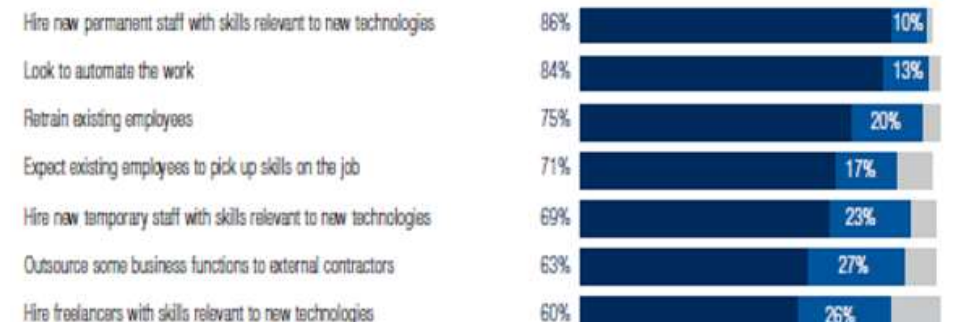
Regional Profile
Eastern Europe

Responses to shifting skills needs (share of companies surveyed)



Regional Profile
Western Europe

Responses to shifting skills needs (share of companies surveyed)



Our means of information

Examples in the paper



Business

Siemens intervju: Digitalizacija – cunami koji nosi kvalitativne promene

5. juni 2019. Marijana Pečić



digitalna**srbija**
INICIJATIVA

Digitalni manifest

ШАНСА У 4. ИНДУСТРИЈСКОЈ РЕВОЛУЦИЈИ
- ТЕМА овогодишњег КБФ је изазови будућности и 4. индустријска револуција. Изабраном темом желели смо да подсетимо да живимо у времену великих промена - времену четврте индустријске револуције, у коме се интензивно развијају нове технологије: вештачка интелигенција, нанотехнологија, биотехнологија, геном едитинг, проширена реалност, 3Д принтинг. Време великих промена је шанса за Србију, за њен скоковити развој и хватање технолошког прикључка са развијеним светским привредама.

Experience

Inicijativa Digitalna Srbija

AKTUELNO O NAMA KOGA PREDSTAVLJAMO? SA

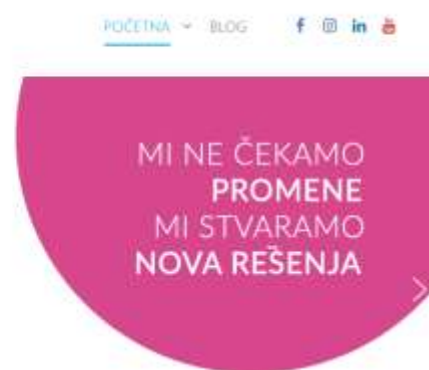
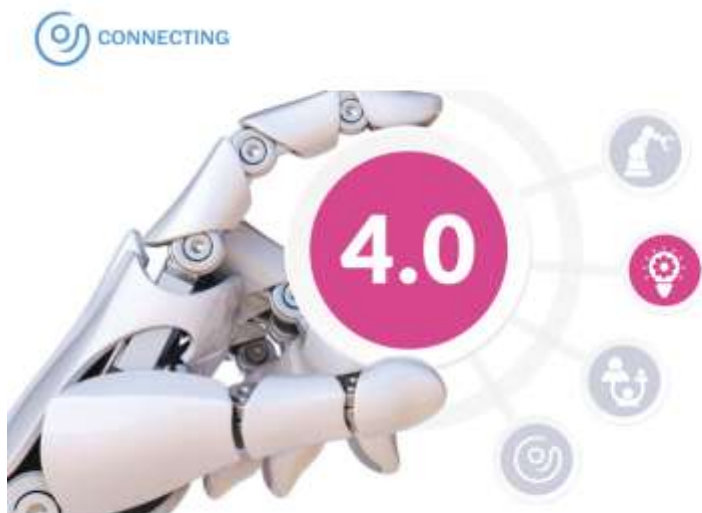
Srbija kao lider u digitalnoj ekonomiji 21. veka

MASTER 4.0
tvoj sledeći nivo

PROGRAMI PREDAVAČI KOMPANIJE PRIJAVA FAQ KONTAKT

Sledeći nivo IT i biznis znanja na državnim fakultetima. Master program na koji se dugo čekalo.

Serbian youth



Organization for career Development and youth entrepreneurship "Connecting"



Promocija obrazovanja za 4.0 revoluciju

Više od 300 nastavnika, direktora škola i učenika bilo je u prilici da na 11 projekcija širom Srbije i Crne Gore odgleda naš film "Obrazovanje za 4.0 revoluciju".

Deniz Hoti

Socijalni dizajner, Preduzetnik & Edukator

ИНТЕРВЈУ **АЛЕКСАНДАР ВЛАХОВИЋ**
Председник Програмске одбора Kopaonik Business Forum

НАС које ије центрано питање српске економије и монетарне политике илустрира да садашњи растом ukazano с са развијенијом експанзионом, у историју "Новаг", сачини Александар Влаховић, председник програмске одбора Kopaonik Business Forum, на питању иквизи да се чини да ипични при пут воли закључке прошлог и да је раст привреде идаљем кварталу био инах 6,7 одсто.

е смо прошле године али да коментариран и раст од пет и више гата годишње мора иктерати економске ие. У супротном, са е растом биће нам не деценије да до-ио Мађарску, Чешку оску, па чак и Руну- западноевропским

ина буним грађанске ин- дустрије и капиталним про- јектом "Турски мост", Србију павери напред у историју земаља Централне и Источне Европе.

Да ли може да се одржи оваква стопа раста?

инвестиције и иностуан- је. При томе, Србија мора да има амбициозну разви- цу итежу која је омогу- ћити достигање раста по- стигања од стране остало- гатине. То би довело до иктерати мећу КПП у ие- ринду са јавне дивизије

ишећку новца, који је инах око 40 одсто БДП-а, са чини је изванка ствари иккертности. За разлог инах и српским предузе- ћима иккертности предузе- ћима инах је обавезити иккертност којеко финанси- сирама, развоја мена-

МОРАМО РАСТИ СЕДАМ ОДСТО ГОДИШЊЕ

ДОБРО У ПЛАНУ "СРБИЈА 2025." ЈЕ УДЕО ЈАВНИХ ИНВЕСТИЦИЈА!
Класични предузетници и Таква раст би, по иккертности иккертности, иккертности, је. Посебно пакова се иккерт-

ШАНСА У 4. ИНДУСТРИЈСКОЈ РЕВОЛУЦИЈИ

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And on
Kopaonik
business
Forum 2020

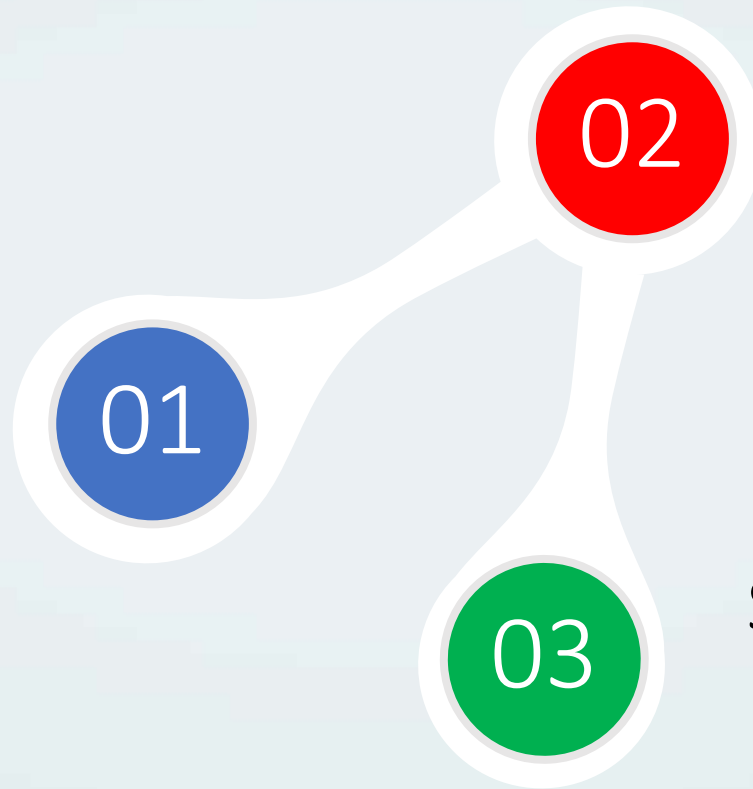
My 15-minute exposure on
Quality week

Several themes on
Kopaonik Business Forum

I'm not sure
that

Serbia has, my opinion, three scenarios for solving the competence issues for development in Industry 4.0 and Quality 4.0.

SCENARIO 1



SCENARIO 2



SCENARIO 3





First scenario

- To continue the current methods of working on the adaptation of Industry 4.0 in a large non-synchronisation of activities and without a single strategy and plans, which will continue to yield results, without doubt, but the question of growth rate and the degree of adapting very questionable, and risky.
- This scenario has relatively low risks, and the opportunities it provides, but it is all about individual cases, as well as in sports, and depend on the efforts and work of individuals and not the actions of the system and the realization of joint plans and strategies.



Second scenario


- To stop only on the organised development of public administration digitalisation as it has been done and so far, it would certainly be very destructive, the risks of this scenario are also high, because the changes and the public sector in Serbia for now are going very difficult, slow, with many and political influence.
- Opportunities are certainly present and refer to segments of improving public sector work and sporadically to other parts of the economy.



Third Scenario

- To prepare a unique strategy of Serbia and harmonized continue with accelerated development and serious restructuring of the overall human resources base and significantly strengthen the participation of employees with faculties in significant investment in education and raising competence at all levels of society.
- And this scenario is risky but it gives a tremendous amount of opportunities to a large number of participants and interested parties.

- The Scenario one could imply the continuation of development, growth by average growth rates in EU28 members up to 2016 years, of 15%
- Scenario two predicts growth in Portugal's growth rates by 2016, as the lowest rate in the EU, of 11%
- Scenario three assumes that this index will grow from 2016 at the rate of Slovenia's development so far, of 23%.



DESI Serbia's
index for the
next period to
2025

C1, C2 and C3 represent the foreseen scenarios for the development of Serbia

	I DESI INDEX up to 2016				Forecast to 2024		Estimated average growth for the period 2016-2025
	2013	2014	2015	2016	2020	2024	
EU 28 avg	0,51	0,53	0,56	0,59			
NonEU avg	0,50	0,53	0,56	0,59			
SR C1	0,28	0,31	0,40	0,50	0,58	0,68	NonEU avg countries
SR C2				0,50	0,55	0,64	Avg Portugal
SR C3				0,50	0,62	0,76	Avg Slovenia

By C1 scenario as Australia 2016

According to the script in the C2 index as Spain 2016

And according to scenario C 3 index as Holland 2016

I DESI Index Serbia in 2025

Scenario three



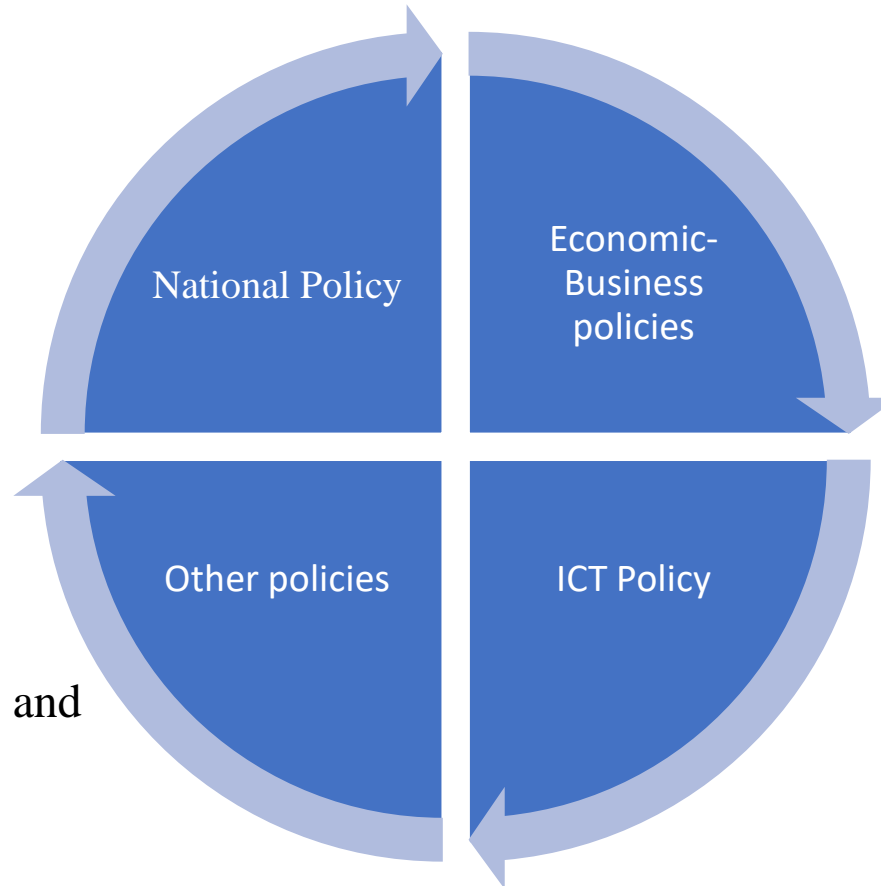
- Political preferences-strategies must be national, unique, achievable; Change of quality culture of a lasting task, development of an adequate system of knowledge development and desire remain "its" as much as possible.

Harmonised strategies

What to consider when preparing a national competency strategy for I.40

- National Development Strategy
- National Infrastructure Strategy Quality
- National Policy Quality
- National Strategy I4.0

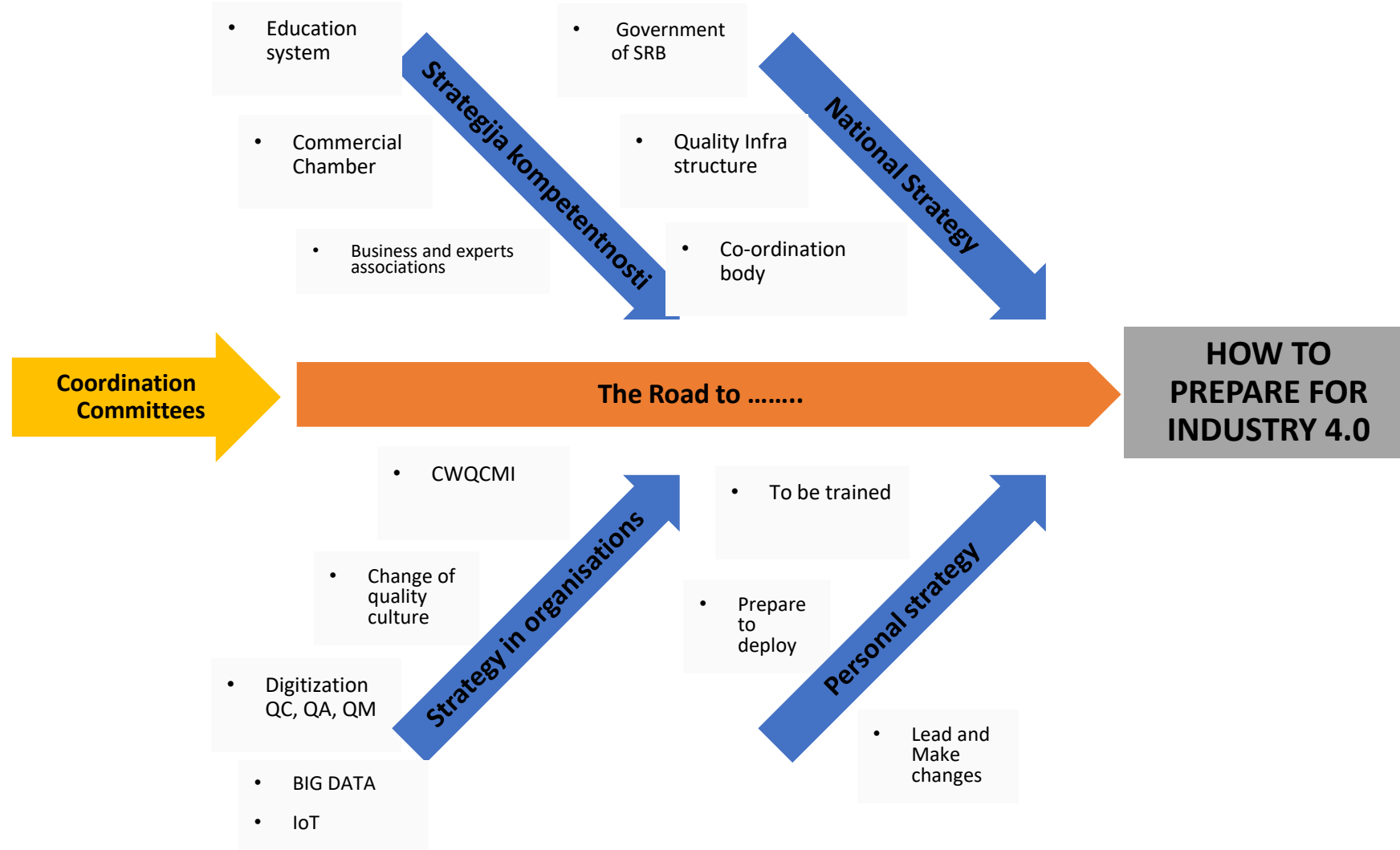
Other national policies related to education and Trainings, work conditions and environmental



Policies and action plans for the implementation of individual industries

- National ICT Strategy
- National security Strategies
- National development strategy ITC Infrastructure
- National development Strategies for
- Artificial intelligence
- National robotics strategy
- Etc.

Fish-Bone



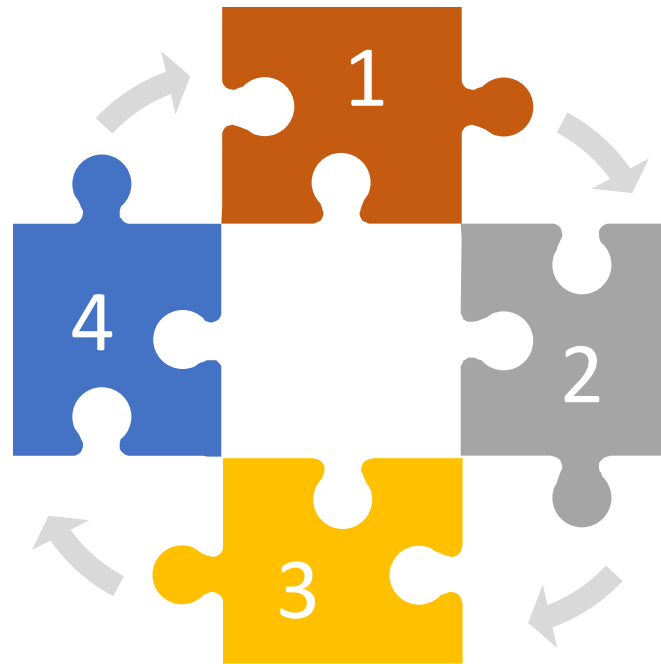
This Puzzle should be agreed

1

Government Coordination Body

4

Coordinating body in the Chamber of commerce



2

Coordinating body in quality infrastructure

3

Coordination Body at the university

Short-term measures and activities

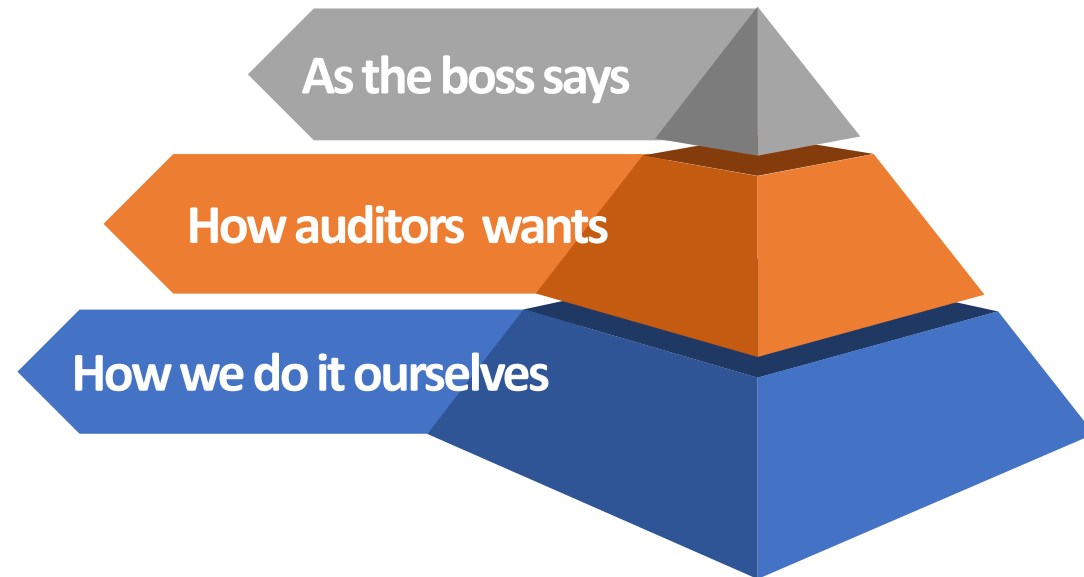
- Establishment of infrastructure and consolidation of all interested parties in Serbia over Industry 4.0
- Review and modification and harmonization of all the strategies and policies and the implementation of the unique development strategy for Industry 4.0
- Construction of mechanisms of incentives for the economy in terms of labour competences, for programs
 - requalification of the existing structure of employees
 - new employment
 - employment of foreigners
- Legal solving of flexible working arrangements and implementation
- Development of ICT infrastructure of Serbia throughout the depth and width of the application, not only in large centers
- Talent discovery and motivation programs
- Creation of confidence in the protection of data and information at the general state level and functionality of the IT service
- Creating new models and forms of education in interdisciplinary education modules

- Development of National Standards for the competence of a different business group
- Encouraging lifelong learning
- Development of cooperation between the public and private sector of the economy on new connection platforms
- Changes in quality culture by development of new national programs

Long-term
measures
and activities

It's high time for change the situation

QUALITY
4.0



- **Is this a conclusion or what?**
- So, I observe the competence, when Serbia is concerned, more as a chance than as risky elements Industry 4.0 and Quality 4.0.

„When you wear new shoes for the first time, everyone will step on them.“Murphy low



Motion
I World War - Thessaloniki
Front

Quality Week 2020

- Let's repeat the breach.?

Thank you!