

Industry 4.0 and entrepreneurship of people with disabilities

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Abstract: With technical evolution work processes are changing. Big enterprises have often the advantage of having well developed organizational structures to adapt on possibilities of Industry 4.0 and even to influence the further technical development of global working culture. Only if organizational structures and technical instruments harmonize an improvement of work processes can be realized. The discussion focusses on this challenge and gives examples.

Keywords: Industry 4.0, entrepreneurship, organization, disabilities.

1 The key elements of industry 4.0

The industry 4.0 is a word creation based on (industry 1.0), mass production (industry 2.0) and automation (industry 3.0). Industry 4.0 describes the digital networking of all people, machines, processes and systems involved in the production and value chain, and also as a fourth industrial revolution. (DUDEN WIRTSCHAFT 2016, [translated by the author, 25.09.17]).

Following the industry 4.0 paradigm, all objects of the factory world are equipped with integrated computing power and communication capability. This is by no means only about machine-to-machine (M2M) communication, but will also have far-reaching implications for the interaction between man and technology. Against the background of technological progress, it is to be assumed that both the task and the demand spectrum of the human being in the factory will change. As machines and workpieces become increasingly autonomous, complex production scenarios, such as the custom-made production of individual items, can also be managed without human intervention. In this case, the classic, location-based workplace (for example a control room or office) will increasingly lose importance from the face-to-face networking and mobile real-time information. The decision-making and monitoring processes can also be carried out directly from the place of action and be managed from a distance - and for a variety of different production plants. Thus, the assumption goes that the individual employee will in the future shoulder a larger area of activity and responsibility - also in terms of space. (Gorecky 2014 [translated by the author, 25.09.17])

From automation to networking, that's an important aspect of Industrie 4.0. A large number of technical concepts and applications are already being marketed under the term Industrie 4.0. Characteristic elements for this were Prof. Dr. Five central fields (ESCH 2015 [translated by the author, 25.09.17]):

- The automation, by which increasingly data-driven decisions are made on the basis of big-data analyzes.
- The standardization through which uniform communication standards and interface standards for data processing are created.

- The embedding of sensors as components of physical actors, which lead to a fusion of hardware and software.
- Digitization, with which information can be recorded and processed, thus enabling the creation of a digital image of the goods flow.
- The networking between man and machine as a central component along the value chain.

These developments represent an advantage for entrepreneurs but especially for the disadvantaged one because these new possibilities can compensate their deficits. Be it due to language, cultural or handicap nature. Therefore, it is important to analyze the requirements to introduce industry 4.0 in a successful way.

2 Organizational requirements for successful implementation of industry 4.0

The overall goal of this concept is to cope with growing flexibility requirements of the sales markets, an increasing individualization of the products, shorter product life cycles as well as a growing complexity of the process sequences and products. In other words, the existing technological and economic limitations of automation are to be pushed out of the increasing flexibility requirements. Theoretically inspired by Latour's Actor Network Theory, which suggests a broad equality between human and non-human actors, the role of an active actor is distinguished from the traditional perspective on technology as a passive object of technology. It is also spoken of "hybrid" systems in which the task and action relationship between technology and human beings always recurs in a specific way. Conceptually, this refers to the often-overlooked fact that automation does not only affect individual jobs, activities and the qualifications of individual persons, but also has consequences for the entire organizational and social network of a production system. On the other hand, this socio-technical system is again linked to higher-level strategic guidelines and is an element in the overall process of a value-added chain. If one follows the concept of the socio-technical system, the relevant dimensions of the change of production work in the context of autonomous production systems can be precisely specified here: a) the direct man-machine interaction and the immediately related qualification requirements, b) the task structures and the (C) the work organization as the work-sharing structuring of tasks and activities in a horizontal and hierarchical way, and thus the formation of cooperation and communication between the employees working in the system and out of the system. (HIRSCH-KREISEN 2014, [translated by the author, 25.09.17]).

That means, that enterprises need employees with technical knowledge, so that this aspect gets more and more important, so that deficits like physical handicaps or not enough cultural knowledge lose on meaning. This fact is also valid for the entrepreneurship of disadvantaged persons. For them industry 4.0 offers more possibilities to create their own business. On the other side the organizational requirements rise. Task structures and work organization must be defined clearly, so that the communication in the company and the acts of its employees based on technological systems keeps effective. To assure this two elements are important: Job descriptions for the staff are required, as well as an organizational guide, which, however, adapts to the business needs and has some flexibility in terms of changes. Because of technological developments and the rising global exchange enterprises needs to be prepared for quick changes and that is why founders must invest much time in organizational measures. Think on the rapid rising use of smartphones and the changing of communications in most

cultures because of this technology. The use of smartphones gains every day more on meaning in professional sectors. A mass of applications for smartphones gets developed every day and so, more possibilities get offered to entrepreneurs and founders. But without proper organizational structures the advantages of new technologies can't be used in an effective way. It can even be argued that thanks to good organizational structures, the meaningfulness of the use of certain technologies can only be estimated.

The project enterability is a German project helping people with disabilities to become founders and to develop their entrepreneurship successful, because the changes to get a classic job are too low. It started on 2013 and has supported 300 founders till 2016. 2015 enterability has won the European enterprise award. Two phases are focused by enterability (<http://enterability.de/> [25.09.17]):

- Before foundation
- After foundation

As said before, enterability concentrate on organizational precautions, so that it client's projects can be realized. That means they offer following services before foundation:

- Giving knowledge for founders (personality of founder, project idea and market analysis, marketing, time management and organization, accounting and administration, legal aspects, establishment formalities)
- Including the specificities of the disability of the founder in consulting of the project.

Services after foundation:

- Formal Processes: e.g. Commercial registration, tax registration, invoices, contracts and general terms and conditions
- Dealing with offices: Application for benefits from the Agency for Employment or the Integration Office
- Social security: health insurance, voluntary unemployment insurance, old-age provision, professional association
- Accounting: office organization, cash register and bank book, business analysis
- Controlling: Evaluation of the monthly balance sheets and the annual financial statements
- Financing: access to micro-credit and mediation of grants and loans
- Marketing and customer acquisition
- Networking: Industry- or topic-specific networking with other enterability founders
- Advice and assistance with technical work aids and with questions of "handicapped" work organization
- Health Prevention: dealing with mental and physical stress situations, questions of the work organization
- Crisis intervention and plan adjustment
- Ordered business task: help with the proper handling of the company and avoiding debt.

3 Examples

Use In the following sectors can be found ideas of entrepreneurships:

- Law and advice
- Technical services / traffic and transport
- Office services
- Leisure and culture
- Communication
- Wellness and fitness
- Real estate
- Education
- Social sector
- Textiles
- Manufacturing industry
- Sales

Founder of: Sweetstore

Degree of disability: 100 GdB

Since July 2013, Ali Lacin has been the owner of the sweetstore self-based sweets store. Right after his successful training as a wholesale buyer, he and his brother put his business idea into practice: they opened a wholesale trade with specialization in vegetarian sweets and those that did not contain any gelatin from the pig.

Ali and Osman Lacin sell not only special products, but also old-fashioned confectionery such as chocolate bars, nibbles, drinks, chewing gums and much more. In addition to the pick-up warehouse, the daily business also includes a delivery service for the Berlin / Brandenburg sales area. As of March 1, 2015, the young company is now starting with the online and ebay shop and can supply DHL with a strong logistics partner throughout Europe.

It proved to be a good start for the beginning that they had network-relevant network contacts from the outset through their father's professional activities.

Ali and Osman Lacin master the logistics and customer service with a high-lift truck and a clear task division so that Ali Lacin, who carries two leg prostheses, can meet his stress limit and even has time to go to practice four times a week. He is on the right track to qualify for the Paralympic Games 2016 in Rio.

4 Conclusions

Especially the last example shows that good organizational structures and combination with Industry 4.0 can support entrepreneurships in a new way, so that the last industrial revolution has led to more possibilities especially for people with disadvantages, so that industry 4.0 can be seen as a further aspect to better introduce elements of democracy.

Literature

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