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## Good integration for the chemical industry

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### Abstract

The theme of integration seems to be a very interesting to many organisations. The integration is linking of autonomous units in a higher structure to achieve a goal and a synergistic effect.

This article seems the idea of integration within an organisation deliverable under some specific rules and conditions. The article deals with the topic of integration within the scope of the past and the present in the chemical industry. It describes parts of the integrated management system. The past is presented by examples of chemical production enterprises in the Czech Republic during the epoch of the First Republic (and earlier). The article also indicates some the pitfalls of the current integration at organisations.

The integration of management systems in organisations of the chemical industry is of a great importance.

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*Keywords:* Integration; chemical industry; integrated management system; organisation; past and present state

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### 1. Introduce

The theme of integration seems to be a very interesting and it is currently a very modern topic for many individuals and organisations. The integration can be described as: “linking of autonomous units in a higher structure to achieve a synergistic effect”. It is also possible to define as by [9]: “the processes by which mutually independent systems are related to each other in order to communicate together, but also other related events of components communicate mutually to each other within information system”, or

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according to [23], p.69 as: “a sociological process of unification of elements and activities in the new system with specific goals”. The integration is closely related to a synergy, as defined by [27], p.290: “associate or cooperative effects that are created by two or more particles, elements, parts or organisms - effects that cannot be obtained by other way”. More precisely, it is synergy of an integration type with an impact on a labour productivity in the organisation according to the classification of synergies when assessing their effect as in [27]. It seems somewhat strange at the first sight, to achieve something more than the “summation”. However, in human systems such as enterprises are, it is possible, as described in [27]. It is basically a synergy when the team is tuned and achieves the complexity through the collective work as mentioned in the book [24].

The integration is known as a term from a software field. The integration is known as business connection at the level of enterprises. Many consulting organisations deal with an integration. They present the integration as easy task when it comes to implementation. Nevertheless many enterprises have still big problems with it. Some authors of publications doubt even about the success of such solutions. The author of this article sees the idea of integration within an organisation deliverable under some specific rules and conditions.

## **2. Integrated management system in the chemical industry**

The article deals with the topic of integration within the scope of the past and the present in the chemical industry. The chemical industry has many sub-branches, as is mentioned in publications [1],[2],[5]. This branch of industry could be considered as a one of the industry standards of the integrated management system. In common conception this standard describes the specific requirements for procedures, resources, quality, employee training, and management tools and so on. An integrated management system contains some industry standard, quality management system in [14], management system of safety and occupational health in [16], environmental management system in [15], and management system of information safety in [17]. The safety management system in [29] is important to consider also in connection with applications in the chemical enterprise and dependability management system by [18] too. Therefore the organisation uses several different systems often, as the books [3] and [26] show. The crisis management for the prevention of loss of organisation competitiveness should be a part of all systems of an integrated management system in an organisation, as the author [30] notes.

The chemical industry as a whole is a specific field without any fundamental industry standard for the present. Now it goes rather to an easier integration way and it uses more common standards of management systems that have been named in text of this article above. The good laboratory practice according to the norm ISO 17025 in [19] and a social responsibility according to various standards (for example SA 8000) can be added to them. Further, the chemical industry leans against a large number of regulations and notices.

During building up of the integrated management system the organisation meets the problems as a lack of interest or a lack of integration perception of enterprise problematic by some employees, a high cost, an extensive administration, a separate management of parts of the system, a poor communication of interested parties, inconsistent approaches, terminology conflicts, as stated in [21],[26]. The opinion can be met that it is a part of the quality management system. In addition, conflict in linkage among quality, time and cost is presented in [6], which however, the author [7] refutes in the concept of integration. On the contrary, the successful building up of the integrated management system means: a simplified agenda, risk prevention, training to all employees and a reduction of the isolation of certain groups of employees. The managers should consider this information for their work. An evaluation of the integrated management system of the organisation is not yet fully finalised in the practice. It depends on many aspects, which are covered by number of disciplines. At present, evaluation can be considered according

to the costs, the degree of system integration, the customer satisfaction of relevant parts and according to the number and the relevancy of nonconformities.

### 3. The history of chemical industry with respect to the integration of management systems

The past is presented by examples of chemical production enterprises in the Czech Republic during the epoch of the First Republic (and earlier). The chemical industry has many sub-branches it would be possible to write about each of them separately. The first organisation dealing with a chemical production was in the Czech Republic in Velka Lukavice already in 1778 and it produced the sulphuric acid, as described in [1] and [5]. The Association of Chemical and Metallurgical Production, a.s. worked from 1856, according to the texts [1] and [11]. For example: in 1935 according to statistics by the author [5], there were 1422 organisations in the chemical industry. Relations of this industry to other industries are important. For example the chemical industry helped to the textile industry with a textile bleaching technology.

It can be presented, that there is “an analogous Bata” in the chemical industry, based on the analysis of publication resources across the aspects of the integrated management system. Mr. Bata himself with his enterprise worked in the chemical industry, too (production of tires according to [5]) of course.

- Mr. T. Bata opened a shoe shop in the town of Zlin. Low costs were assured by innovations. He bought new equipment and used more effective marketing tools with a focus on the customer. He developed infrastructure of organisation and improved social conditions of employees in [4],[12] and [22].
- Dr. M. Schaffner was a director of the Association of Chemical and Metallurgical Production, a.s. in Usti nad Labem. He did not go immediately for profit, although owners of this organisation preferred it. Dr. Schaffner placed emphasis on the research. He improved working and social conditions of employees and developed infrastructure of the organisation in [11].
- Mr. J. Pilnacek opened a soap workshop in Hradec Kralove and affiliated production of the wax. He improved social conditions for employees and bought new equipment. He conducted his own research. Emphasis was placed on the quality of production in [10].

Profit of organisation was not the first interest of these managers in the chemical industry. Occupational safety and moral values were evident tasks of these managers at that time. To give employees long term job contracts and higher salaries were common fact for them. There were many benefits for employees, such as: flats, personal accounts, medical care and care for the disabled people, charitable foundations, water supply, electrification, cultural activities and so on, as publications, as [10],[11],[12] and [22] prove. These enterprises have a low turnover. They are models of leadership for present organisations.

It can be said that they proved to manage the integration of management systems in the present concept. They preferred the quality. Organisations in the Czech Republic could be characterised by a higher quality of their products compared with the rest of the world according to the authors [5] and [10]. Even laboratory tests of quality of input and output production were provided by the organisation evidences in the Association for Chemical and Metallurgical Production, a.s. according to [11] and in Baťa enterprise, according to [4]. In addition, the safety at work was observed. They provided changes and improvement of workplaces and changes of work organisation, created appropriate procedures, used as the first personal protective work equipment. They protected their recipes and their technological procedures and had a number of patents. Historically, patents in the chemical industry play a very important role. Among the major industry patents can be mentioned for example: 1791 year production of soda [5], 1856 year production of a man-made fibber, 1909 year production of the Bakelite, about 1930 year production of nylon and synthetic pesticides according to [1]. The publication [11] describes even an

exploration of chemicals, an improving air around the organisation and monitoring of a groundwater (wells were guarded), the same in [28]. Further, a closed water cycle was promoted in the organisation according to the text [2]. The article [12] gives regard to the focus on low cost of organisations of the time. In the text [20] is described installation separators of fly-ash and establishing of an association for the protection and safety at work late as in 1953 year. These organisations had also a high quality of production technologies. Implementation of mechanisation is emphasized in [12]. Factors such as an electricity production led to the development of new technologies and later to the new types of products (for example an artificial stone) in [5].

Emphasis of pre-war chemical industry businessmen was a very important in the infrastructure. It was consisted in the development of: heating, gas installation, electrification, water economy, rail and water transport, building construction, building of stores and gas stations, mentioned by [5],[8],[11],[12],[20] and [22]. The most part of this infrastructure is used today.

Much more information about the chemical industry is from the period after the 2nd World War II as in [20]. The emphasis is on the post-war production in publications [8],[28] and [13] too. Less information is from the previous period and they are dealing more with the lists of used production technologies, than information about a life of an organisation and a relationship to employees. A long period and an expensive construction of technological complexes for the chemical industry is obvious from the publications, for example in the text [20] over 2 years, in the paper [13] 3 years, in the article [5] even more years.

#### **4. The present state of the chemical industry with regard to the integration of management systems**

The occupational health and safety at work and the environmental protection have shown as significant around year 1970, when the first negative effects on humans and on the nature caused by the chemical industry were proved, as mentioned at [1]. Contamination of soil, water and air was significant. The accidents that occurred due to withdrawal of approach from above had a significant impact on employees of the given organisation mainly in the later period, but on inhabitants of the given region also, as the text [1] shows. Therefore, the risk analysis is needed in such organisation. It should be complex in the spirit of system integration.

The implementation of such corrective and preventive actions should follow and in order to control the risks. The created legislative instruments must be enforced.

The present important organisations of the chemical industry have implemented an integration, which report to the legacy of pre-war founders according to provided information. It included quality, environment and safety at work according to publications [8],[28] and [13]. Linking and inspiration of other industrial branches continues, for example chemistry and food in [13]. For example in 2010 year in [25] perceive the domestic chemical industry was driven economically by the automotive industry mainly. A significant cooperation between the chemical industry and the textile industry is seen in the field of artificial fibbers manufacturing at the time of a crop failure. The present issue is obsolescing of technological complexes in the Czech Republic as mentioned in [25].

The obstacle of the current integration also faces the problem of introduction of new technologies and a lack of raw materials (but basic materials were available in this country in the past, too), as texts [2],[5] and [12] write. Therefore, the focus of domestic enterprises on foreign resources, the oil mainly, is necessary. Work in the chemical industry is demanding, dirty and principally dangerous which is corresponding to the 3K tool mentioned by the author [7]. These all facts are worsening the conceivable safety of the employees. Therefore, the role of integration of management systems is important.

The emphasis on research in the domestic chemical industry is observable at all times. This country had many great, enthusiastic and organisationally skilled chemists, as mentioned in [5], which is compensating handicaps toward the foreign chemical businesses.

## 5. Conclusion

The past is represented by the example of an enterprise of chemical production in the Czech Republic in epoch around the First Republic. It can be presented, that there is “an analogous Bata” in the chemical industry based on an analysis of publication resources across the aspects of the integrated management system.

The current survey shows interesting results with respect to integration and also in field of work safety. The present research describes autonomous approach and approach of the chemical industry outcomes from history. The article reflects the research of other new industry standards.

The article also indicates some of the pitfalls of the current integration at organisations. It makes the integration a more difficult. The text also expresses, what present leaders of enterprises should have learned in order to benefit not only to their organisation, but to the whole environment and the region as well.

The integration of systems must be viewed continuously. It cannot be built up separately by parts, as it is in many organisations today. The chemistry is a natural science and it supports the integration directly. A mistake was to forget a natural part and to deal with a technology part only. A number of nonconformities and breakdowns of the chemical industry confirms it.

The integration of systems in organisations of the chemical industry is of a great importance. In their own way many of pre-war businessmen knew it by themselves. They did not focus on profit only, but they also cared about their employees and broader neighbourhood of their organisation. They had even overcome the economic crisis. A long term success of the organisation was the result of well-considered integration of management systems even from a present perspective.

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