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Innovative Management Strategies in the Rental System for the Example of a Professional Manufacturer of Protective Clothing and Workwear

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Abstract

The article presents selected issues from the field of management and organisation methods in the sector of professional clothing production, with respect to rental and servicing in the rental system. Logistics solutions were described for the example of ORK POLAND Sp. z o.o., a leading producer of protective clothing in the European market, known under the ORK Wear trademark. The country's leading enterprises are among the clothing recipients, who also provide professional services in the dynamically developing laundry service for work and protective clothing as a rental service. Evaluation of the influence of industrial washing procedures on the properties of materials and clothing products was performed in laboratory conditions according to the EN ISO 15797 standard and with the use of a testing station that was implemented by ORK POLAND Sp. z o.o., as the first and only company in Poland, under project cooperation with Łukasiewicz Research Network – Textile Research Institute.

Key words: clothing rental system, management strategies, quality of product.

Introduction

Services offered on the commercial market in the area of rental systems for professional protective clothing and workwear have become a developed industry in the sector of the economic provision of professional personnel with leased products, which are not only subjected to industrial maintenance and servicing but also represent personalised products in the realisation of clothing performance services. The economic aspects of product rental and maintenance services represent not only a cost reduction for service recipients with regard to the purchase of garments and self-service during their use, but they also give companies the opportunity for long-term planning of their expenses, due to the specified costs of leasing the service. Advantageous aspects of practicing a product rental system also include the impact on the service recipient's work organisation due to the relief of the workforce and the ability to perform other work activities in the company than those related to securing employees with the necessary protective clothing or workwear. In the offer packages of professional clothing suppliers in the rental system, there are also services of free product resizing, service consultations, elimination of storage places by on-time delivery of the clothing, as well as assurance of the durability of the functionality and aesthetics of the products in specific conditions of operation and

industrial maintenance, which depends on the structural and design solutions of textiles and clothing applied by the products' designers and technologists.

The rental and maintenance of products is a service developed for the needs of enterprises, known in management strategies as outsourcing, i.e. using external sources, in this case the commercial potential of specialised companies in the workwear and protective clothing sector. For producers or distributors of professional products of this group, the service of clothing in the rental system requires the implementation of activities in the field of industrial maintenance, which is usually a cooperative activity of companies with industrial laundries. Due to the costs of deliveries, related to the location of the recipients of the products, the economic solution in the system of managing the company for producers of specialised professional clothing for rental is selling the products to companies realising rental services using their own technical facilities of an industrial laundry. In the protective-clothing-and-workwear supply chain, the companies realising technological orders are responsible for the compliance of the products' functional features with normative regulations with a specified durability of protective features and functional quality of clothing for industrial maintenance processes. In order to secure the requirements in this area, proven raw material and structural

solutions of materials are used by manufacturers of professional clothing and are also developed in the direction of introducing new, competitive offers on the local and global market for work and protective clothing.

The advantages of rental services of clothing (including protective clothing) result in the steady growth of this market, which is confirmed by many reports. Prospects for the clothing rental service industry are also optimistic due to new-comers in the business, providing the industry with further growth in the coming decade [1]. The rental market has disrupted the retail industry and is expected to flourish in the long run despite COVID-19 setbacks [2]. The European textile rental market is expected to reach 17.04 billion US dollars in 2023, growing at a CAGR (Compound Annual Growth Rate) of 3.39% during the period spanning 2019-2023 [3]. What is more, protective and workwear clothing are less affected by the Covid-19 pandemic than, for example, formal dress like suits or shirts due to the nature of their end users' jobs, which should also positively impact the rental services of such clothing.

Characteristics of the organisational profile of a company implementing activities in the textile rental system area and the requirements for products in terms of ensuring the functionality and quality of products for industrial maintenance are presented in the article for the example of one of the leading manufacturers of professional workwear and protective clothing in the European market, the company ORK Poland Sp. z o.o (ORK Poland), which since 2019 has implemented the Eureka Initiative E! 13190 RENTEX international project in the thematic area of a rental system for a specific range of products in cooperation with Łukasiewicz Research Network – Textile Research Institute (Łukasiewicz – Textile Research Institute) [4].

Management strategies in the rental system for the example of a professional clothing manufacturer

Timeliness of delivery at a lower cost of service in the system of consumer product rental is one of the most important directions of the organisational development of companies, which aim to maintain or increase competitiveness in

their area of activity and reduce business risk. The competitive activity of companies is connected with applying methods improving production processes. ORK Poland, specialising, among others, in the technological sector of protective and corporate clothing products and known under the brand name "ORK Wear", applies in its plant the Toyota Production System (TPS), which is based on the method of rapid recognition and correction of problems that may lead to faulty production. The management method applies the principles of logistics management of the Lean Manufacture (LM) method, which in its general approach, as opposed to mass production, is based on the introduction of restrictions, from raw material inventory to the storage of products, while ensuring a continuous flow of goods, and, by assumption, the full use of the company's production potential [5]. The concept of this method is focused primarily on the needs of the customer, which is closely related to the quality and quantity of the completed order while using less production inventory [6]. In the TPS system, the first stage of the production process is the analysis of value-generating activities from the customer's point of view, which is related to both the internal reception of the output product at subsequent stages of the production lines and the service recipient. The TPS system is thus based on a comprehensive concept of management and quality built into the process. An important factor in the development of the enterprise here is also the focus on teamwork and employee creativity [7]. These factors are directly related to the ongoing development of employees through, among others, thematic training and qualification improvement in the area of activity conducted in the company.

The core competence of ORK Poland is functional and multifunctional protective clothing development, which is supplied to the leading professional branches in Poland. Among recipients of the clothing there are leading European organisations that provide professional services for the dynamically developing service of washing workwear and protective clothes as a rental service. In the production process the company uses materials and tailoring accessories selected from products offered on the commercial market. Functional properties confirmed by certificates to ensure the protection of users against given risk factors in the working environment and the durability of these

properties for maintenance processes carried out in the rental system, are the basis for product selection. Bearing in mind these requirements as well as the ongoing implementation of innovative solutions in the sector of professional protective clothing and/or clothing characterised by other added values due to, for example, the texture or type of raw material, the company undertakes licensed cooperation with manufacturers of specialist textile materials and tailoring accessories worldwide (e.g. Polartec LLC, 3M, Carington, Coats, Klopman, Invista) who develop their products based on the latest technological innovations.

In order to make the best choices and provide clothing that not only meets the requirements of repeated washing and drying but also provides users with appropriate protection levels against hazards arising from the specificity of a workplace, the ORK Poland company has opened its own research laboratory, which constantly monitors the quality of components necessary in the production of clothing (fabrics, accessories, semi-finished products).

This action allows for the detection of deviations from any company guidelines prior to the product delivery stage and eliminates potential complaints from end customers that could be directed at the company's business partners. To extend special assistance to customers who offer clothes rental services, which is not provided by ORK Poland itself, the company's activities include the area of evaluating products for multiple washing and drying cycles. With the use of own technical facilities, namely the research laboratory, the company tests clothing products in the scope of selected material properties (weight, colour change, dimensional stability), which are important in the aspect of the durability and usable functionality of the product serviced in the rental system. Selected products are also tested in the industrial laundries cooperating with the final recipients of the garments before a line of clothing is introduced onto the commercial market. These activities not only increase the guarantee of the garment's wearable quality and thus meet customer requirements, but are also important in terms of fulfilling the business objectives of the garment manufacturer's partners in terms of costs and product life cycle. This area of ORK Poland's activity uses part of the methods of quick recognition and

correction of problems under the Toyota Production System, which allows for the elimination of defective production while securing the needs and requirements of the customer. An important support tool is the company's cooperation with leading research entities in Poland and abroad in the field of the assessment of functional indicators of fabrics and clothing using accredited methods to meet the often strict normative requirements set for protective products. One of the company's recent R&D activities is cooperation with the Łukasiewicz – Textile Research Institute within the international Eureka Initiative project E!13190 RENTEX, in which the company is the national industrial partner and the leader of the scientific consortium [4]. The project develops multifunctional protective clothing products using a new range of fabrics in the form of specially developed knitting materials, which are an innovation in the sector of professional clothing directed to the rental system. Another important element in the structure of the Lean Manufacturing system which is implemented in ORK Poland is the concept of Just-In-Time (JIT) inventory management, which increases the effectiveness and efficiency of supply chain management (SCM) [8]. The purpose of systems based on the JIT concept is to manage the cycles of order fulfillment at each stage in such a way as to eliminate losses in the company as a result of possible irregularities in the timing associated with the delivery of semi-finished products, the manufacture of products, the return of products, complaints about the service provided, etc. [9]. Organisational management in a company according to this concept is a combination of inventory and quality control and production management functions, and focuses on quality improvement by the employee as well as subsequent implementation of quality control techniques. The workers are the most valuable source of quality assurance in the production process, controlling the quality of the product after each operation with the possibility of making their own decisions, along with stopping production. Their experiences are an important source of information in the preparation and interpretation of the control techniques implemented. Product quality comes before the efficiency of the production process [10]. Advanced organisational management in the company, based on the worldwide known Just-In-Time system (philosophy), has had a significant impact on the position

and competitiveness of the manufacturing company in the market and provided opportunities to deliver products at a high level of quality at the lowest possible cost and time of service realised [11]. The JIT production system requires effective coordination in the supply chain by identifying hidden problems in the value chain, which reduces production losses and delays in the production schedule while increasing the company's profits from sales of the service realised. These factors are related to the business management ensuring a continuous flow of products and services applied by ORK Poland. In case of market uncertainties related to the supply and demand of services, companies are forced to store products in order to avoid delays in order fulfilment. Actions of this type effect high costs both in terms of the storage of products and management blocking the possible income from the sale of the service [8]. Application of the Just-In-Time system in the production management process, in addition to economic aspects, also has an essential ecological significance. This system has been defined as a source of added value and actively seeks to effectively eliminate production waste by acquiring adequate quantities of semi-finished products or raw materials to secure the current needs of the implemented service [8, 12]. Thus, using the JIT method, products are manufactured without surplus in the continuity of the production process. The application of this method at each stage allows to minimise losses, maintain a constant level of quality and not disturb the continuity of the production process. The production lines are always equipped with all the necessary components, in the right quantity and order, and as resources are consumed, further elements are produced, preventing slowdowns or interruptions in the production process.

A key part of efficiency in SCM is the management of information systems by integrating all internal and external activities in the logistics system of the company's service activities. In order to improve the quality of management processes in companies implementing professional clothing services in the rental system, complex information systems are increasingly implemented as Business Process Management (BMP) tools, which, based on the analysis of the entire service process, allow optimisation and development of solutions in the direction of increasing the efficiency and compet-

itiveness of the company [13]. As part of such actions and in order to quicken the exchange of data electronically, ORK Poland has implemented a modern, internet-based enterprise resource planning (ERP) system, merging information related to the management of trade, production and warehouse processes in the sphere of orders and deliveries with financial and human resource processes. The implementation of this system was carried out in the company by modernising the existing IT infrastructure by adding a fully digital manufacturing execution system (MES) as well as creating tools for electronic B2B data exchange with domestic and foreign contractors, and by the use of electronic signatures, automation of the process of analysis and data processing [14]. The B2B system is based on a central ERP system for data exchange with contractors, based on the SQL database (Structured Query Language), with the use of electronic cooperation platforms. The activities covered the following business processes: orders from domestic and foreign customers and suppliers, electronic exchange of documents and reports generation in the financial and human resource area, automation of processes with business partners, and services in the software-as-a-service format with the use of electronic signatures. Based on the B2B system implemented, international business processes are carried out: continuous and easy access to the current offer through a trading platform, direct order placement on the trading platform, and electronic document exchange. Advanced electronic services for automatic data processing were introduced, which are provided to domestic and foreign business partners, as well as modern technical installations, optimising energy efficiency and increasing the environmental safety of investments (e.g. reduction of electricity consumption). The proprietary solutions implemented for electronic production management based on the Microsoft ERP system include all production BOMs (bill of materials) and certified product routes. This eliminates the possibility of taking raw materials from the warehouse and releasing to production lines other than those defined. Full computerisation of the plant enables real-time supervision of production processes. In the production lines, the company uses digitalised clothing templates available in an electronic form, which ensures repeatability of the production process for each article. This solution streamlines production

and each piece of clothing represents the highest quality standards, thus meeting the requirements and expectations of both customers and product users. In production processes of specialist professional clothing, ORK Poland uses Jidoka (automation with a human touch), known as the main guiding principle of digital transformation of a company. The rule is understood as a continuous increase in the level of automation in a sustainable manner in terms of economic, social and technological aspects, enabling the development of competitive, diverse and low-volume production. The principle is a component of the lean manufacturing system introduced by the company, and its aim is to improve the efficiency of the production process through the use of advanced automation solutions that can be implemented using the skills potential of employees (process operators) [15]. One of the latest development projects of ORK Poland in this regard is the automation of cutting room work through the integration of cutting layouts from CAD files with the ERP system and the preparation of a dedicated MES production management panel layout.

Wearable quality of occupational clothing in a rental system

Renting professional clothing in a rental system has an important ecological aspect due to the reduction of chemical consumption in relation to personal conditions; but it also determines the need for the development of textile technology in the area of the durability and usable quality of a product for industrial laundry conditions. ORK Poland is currently a leading producer of specialised protective clothing in the European market with respect to the rental system. Products include functional or multifunctional protection against hot thermal factors, static electricity, electric arc, UV (UPF), among others. The company's developed sector also includes high-visibility clothing products, where background materials are the subject of technological development with the company's partners. Special functions of the products are defined by the requirements of standards for specific groups of protective clothing: EN ISO 11612, EN ISO 14116, EN 1149-5, IEC 61482-2, EN 13034, EN 342, EN 343, EN 13758-1, EN ISO 20471 and the reference standard EN ISO 13688. The recipients of the products are in-

dustrial sectors requiring the protection of the employee from specific environmental hazard factors in the workplace, as well as companies with industrial laundries. The task of ORK Poland is to supply professional clothing and servicing of used products which are subject to industrial maintenance.

Frequently used procedures of industrial washing and drying lead not only to the lowering of the aesthetic values of clothing (e.g. change of colour, creasing, pilling, shape deformation etc.), but they also reduce the resistance of textiles and products to mechanical factors, increasing, for example, the susceptibility of clothing to tearing or abrasion. Change of garment dimensions resulting from conservation processes is not only a factor that negatively influences the aesthetic values of a product, but it can also result in a reduction in workwear functionality or lack of assurance of the required safety level in protective clothing application. For assessment of the properties of textiles, workwear and protective clothing intended for industrial conservation, the normative document EN ISO 15797 is applicable. The reproduction of industrial washing processes (i.e. water washing and drying/finishing) is not fully possible under laboratory conditions, and the assessment of textiles under the rigorous conditions of industrial laundries is not a practical solution, especially at the stage of design and research work in the sphere of clothing intended for industrial conservation. EN ISO 15797 does not specify instructions and specifications for procedures and equipment to be used under industrial laundry conditions. However, it allows for standardised evaluation of textiles using specific equipment and test procedures and provides a basis for the assessment of relevant properties of textiles and products, such as dimensional stability, colour fastness, fabric and seam alignment, surface changes etc. Within the framework of the project cooperation with Łukasiewicz – Textile Research Institute [4], ORK Poland, as the first and only company in Poland, has implemented a test stand for industrial laundering in laboratory conditions according to the methodology of the standard. This equipment allows for evaluation of the durability and quality of use of textiles that are to provide protective functions after multiple processes of industrial wet conservation, which was carried out under the project E! 13190 RENTEX PROJECT. On the basis of

the project's research work in this area, factors affecting the durability of the material structure have been demonstrated, especially the dimensional stability, which not only deforms the product but, above all, significantly affects the functional properties and functionality of the garment's protective features. The results of the research became the basis for changing the washing temperature and selecting structural solutions of the material designated for industrial washing. The structural and functional properties of the fabrics, including the special functions, were evaluated primarily at the accredited laboratories of Łukasiewicz – Textile Research Institute.

Summary

High awareness of customers who currently are offering products on the market of specialist professional clothing and development of the sector of rental and servicing, which has become a convenient logistic tool both for companies producing clothing and supplying groups exposed to environmental factors at work, determines the development of textile technology and the implementation of proven methods of organisation and management in enterprises of this industry. Active development based on market innovations, modern management concepts, and customer needs allows to introduce and expand the activity of companies in the area of protective products, also in the textile sector. Production process management methods presented in the article and conducted at the ORK Poland company, based on the Toyota Production System, are characteristic for the realisation of smaller batches of ordered products with a continuous flow of services and goods. These activities require ongoing adaptation of the products created and services to the changing expectations of customers. Clothing manufactured by ORK Poland are competitive products on the European market, as well as supplying work and protective clothes to leading professional branches in Poland. Among the recipients of their clothes there are also leading companies in Poland which implement professional services in the dynamically developing branch of washing work and protective clothes as a rental service. The effect of the efficient management policy and methods of organising production processes implemented is the company's high position in the constantly growing market of protective clothing, which is

proved by the ORK Wear brand, recognised in the European market, or the wide business cooperation of the company, as well as the presentation of innovative solutions in the field of protective clothing at prestigious international trade fairs, such as “A+A Safety, Security and Health at work”, TECHTEXTIL or SAWO [16]. The company’s developmental approach to new technologies in the textile sector of specialised protective materials results in the implementation of market innovations on product lines or series developed by the company, as well as in cooperation with research institutions at home and abroad.



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