

Chapter 6

Software Engineering Approach for Designing Apparel Business Data Analytics

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ABSTRACT

Apparel products are essential for any society, and its business operations are extensively competitive. The ability to optimize serving business processes while satisfying customer expectations has never been more critical than in today's globalized business world. Therefore, managing and channeling business operational data to work towards customer delight and generate healthy profits is essential to survive prosperously. Practitioners are highlighting the benefits of retail data analytics that are now being applied at every stage of the business process - tracking emerging popular products, forecasting sales, and future demand through predictive intelligence by using intelligent techniques. The chapter focuses on big data analytics software systems, their testing, and quality assurance-related issues in Hadoop, an open-source framework. It discusses challenges concerning massively parallel data generation from multiple sources, data characterization, software application quality factors, and some software testing mechanisms.

INTRODUCTION

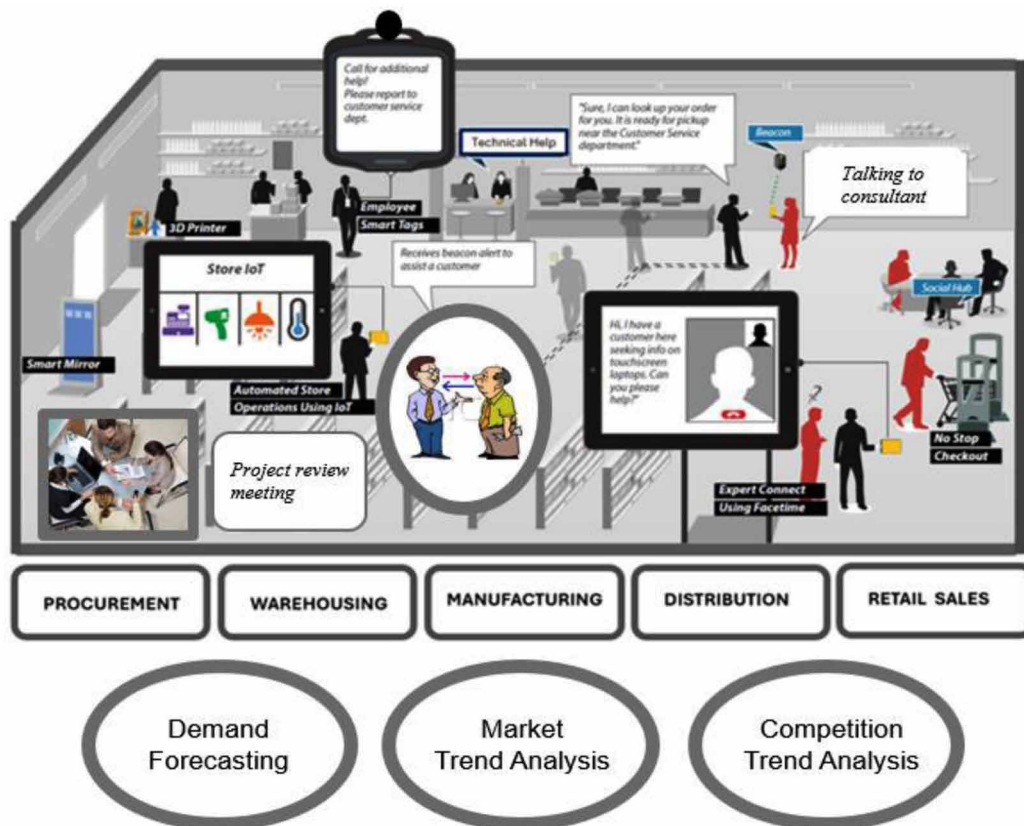
James Madison wrote in the Federalist 51 article: “If men were angels, no government would be necessary”. Madison was the founding father of the American Constitution. Suppose he had lived in today's industrious world, where every aspect of industrial work practices involves directly or indirectly monitoring, collecting information, and producing decision-making guidance for specific purposes using software applications—commonly known as “Big Data Analytics”. Madison might have written in that case: “If software developers of big data analytics were angels, software testing and debugging would be unnecessary”. Unfortunately, mistakes are common among most big data analytics developers, and

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many of them require assistance when designing and writing data analytics software. These errors must be identified and corrected, which is known as software testing and has been around since the inception of computer programs. Complex systems with various domain-specific requirements are continuously being explored by researchers to further advance software design and development (Pal, 2020) (Fitzgerald et al., 2011). The success of a system is dependent on quality results at each stage of development, making superior software development a critical aspect of success (Pal & Karakostas, 2020) (Pal, 2019) (Pal & Williams, 2021). This chapter aims to provide a fundamental comprehension of data analytics software testing in the context of the apparel industry.

Figure 1. Diagrammatic representation of apparel product sales activities



Apparel The demand for ready-to-wear garments has increased tremendously in recent years, leading to a surge in the apparel manufacturing industry. Mass production has reduced the cost of apparel and ensured consistent quality. The apparel industry is a complex combination of textile and garment production, with an extensive range of products to cater to people's diverse requirements.

The industry's success now hinges on cost competitiveness, which has led to the emergence of a post-industrial production system that focuses on mass-customized, low-volume production. In order to achieve supply chain efficiency, advanced technologies like just-in-time delivery, vendor-managed

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