*European Research Studies Journal*
*Volume XXVIII, Issue 3, 2025*

*pp. 569-575*

# QRM as a Method for Improving Processes, Using the Example of a Company in the Automotive Industry

*Submitted 23/05/25, 1st revision 05/06/25, 2nd revision 20/06/25, accepted 20/08/25*

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***Abstract:***

***Purpose:*** *The aim of this article is to present QRM as a modern management method based on reducing lead times in companies.*
***Design/Methodology/Approach:*** *An automotive company was selected for the study, which was the first in the Podkarpackie Province to implement QRM.*
***Findings:*** *The study found that the method had a positive impact on reducing project lead times, which directly translated into higher customer satisfaction and improved operational liquidity of the organization.*
***Practical implications:*** *It is worth emphasizing that QRM should not be treated as a closed project, but as a dynamic methodology that can be developed successively. The company has real opportunities to extend the application of QRM to other departments, including research and development, service, and repetitive production, which will allow for even better utilization of the methodology's potential and increased process integration.*
***Originality/Value:*** *An innovative approach to the QRM method.*

***Keywords:*** *Quick Response Manufacturing (QRM), Process Improvement, Automotive Industry, Lean Management, Production Efficiency.*

***JEL Codes:*** *L62, M11, O32, L23, D24.*

***Paper type:*** *Research article.*

***Conflict of interest:*** *The authors declare no conflict of interest in connection with the publication of this manuscript.*

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## 1. Introduction

Today, manufacturing companies must respond quickly to changing customer needs and dynamic market conditions. Increasingly, efficiency and meeting customer requirements are becoming the main goals of many organizations. To meet these requirements, companies are looking for new production management methods that allow them to shorten order fulfillment times and increase operational flexibility. One such method is Quick Response Manufacturing (QRM).

Quick Response Manufacturing (QRM) is a production management concept whose main goal is to minimize order fulfillment times while increasing the flexibility of the company (Suri, 2010). The author of the concept, Rajan Suri, claims that "the most important competitive advantage of modern companies is time, which should be treated as a strategic resource of the company" (Suri, 1998).

QRM focuses not only on production, but on a holistic approach to the functioning of the company. Another author emphasizes that "the implementation of the QRM method involves a change in the organizational structure from functional to process-based" (Grajewski, 2007). The essence of QRM is also the reduction of the total order fulfillment time, i.e., Manufacturing Critical-path Time (MCT), which takes into account all processes, including administrative and logistical ones (Suri, 2010). According to Polish authors, (Błaszczyk, 2016) QRM can be considered a natural complement to Lean.

Manufacturing, with the key difference being that QRM emphasizes flexibility and responsiveness above all else, rather than just eliminating waste. Kosieradzka presents a similar opinion, pointing out that "QRM perfectly complements the Lean approach, especially in single-piece and small-batch production, where short response times are essential" (Kosieradzka, 2014). The POLCA (Paired-cell Overlapping Loops of Cards with Authorization) system is an integral part of the QRM method. POLCA, an alternative to Kanban, enables effective production management with a high degree of product diversity (Kot, 2021).

## 2. Literature Review

Polish literature also extensively describes QRM Cells, i.e., special production units responsible for the entire process, from planning to shipping the finished product (Głowacki, 2015). In foreign literature, Slack Chambers and Johnston (Slack, Chambers, and Johnston, 2013) point out that the implementation of QRM requires a transformation of the organizational culture at all levels of the company, emphasizing the key role of internal communication and cooperation between departments.

Polish authors, (Zymoniak and Hamrol 2014) point out that companies implementing QRM observe a significant reduction in delivery times, a decrease in

inventory levels, and an increase in operational efficiency. Similar conclusions can be drawn from research conducted by Chaberka (2013) , who points to an increase in customer satisfaction thanks to a faster response to their needs.

In the context of applying QRM in technological transport systems, Michłowicz emphasizes that "the integration of internal transport management with QRM principles brings about a noticeable reduction in the flow time of materials within a company" (Michłowicz, 2017).

Similarly, Rutkowski points out that QRM production cells can significantly improve the efficiency of internal transport (Silva, 2020). Quick Response Manufacturing is a production management concept focused on minimizing order fulfillment times and maximizing production flexibility.

However, the effective implementation of QRM requires a profound structural and cultural reorganization of the company, as emphasized by both Polish and foreign authors. Quick Response Manufacturing (QRM) is a production management strategy whose main goal is to significantly reduce the total order fulfillment time (lead time), with particular emphasis on high variability and small batch production. Rajan Suri, the creator of the concept, defines QRM as "a strategy that encompasses the entire organization, focused on reducing lead time in every area of the company's operations, not just in production" (Suri, 2010; Thalassinos *et al.,* 2023).

According to Suri (1998) "lead time is becoming a key factor in gaining competitive advantage." Broadening this definition, Błaszczyk (2016) points out that "QRM emphasizes flexibility and quick response to changing customer requirements, which distinguishes this method from popular approaches such as Lean or Just-in-Time. Similarly, Kosieradzka emphasizes that QRM complements other production strategies, especially in the case of single-unit and small-batch production, where the ability to respond quickly is essential.

QRM is not an approach that excludes other management strategies. As shown by the research of (Silva, 2020) and co-authors, it can effectively coexist with elements of Lean Manufacturing, complementing each other in terms of eliminating waste and reducing flow time.

## 3. Research Methodology and Results

For the purposes of this article, a case study methodology was used, based on a specific company in the automotive industry. A case study as a research method allows for an in-depth understanding of the processes taking place in a company, their conditions, and potential opportunities for improvement. The research was conducted in a company that specializes in the design and implementation of complex technological transport systems.

In the case of this company, QRM was a response to market needs, based on established qualitative and quantitative measures. These measures were not chosen at random, but through an analysis of key indicators relevant to the organization. The quantitative measures selected here were those falling within the "golden triangle of design," namely, time, timeliness, and quality. In terms of qualitative measures, the following were selected for analysis: verbal and nonverbal communication, customer satisfaction, and the commitment of project/process teams.

Considering the first indicator, i.e., the reduction in total order fulfillment time, after the implementation of QRM, the time was reduced by 8 weeks, which represents 40% of the baseline time. This reduction was possible thanks to parallel task execution, better planning, and increased responsiveness of teams to changing boundary conditions within the QRM cells.

The second indicator concerned the timeliness of deliveries, and the analysis carried out resulted in a 15% increase in the timeliness of deliveries. The main factors that contributed to this improvement were, above all, improvements in the area of more detailed and thorough work planning.

In addition, an important aspect here was the analysis of so-called bottlenecks, which significantly contributed to delays and the need for additional activities on the production lines. The last, but no less important factor was earlier response to delays, which in turn led to greater awareness among the team and an increase in their competence.

The third factor analyzed was broadly understood quality (errors in the process and the number of complaints). Here, too, the implementation of QRM had a positive impact on the improvement of the analyzed indicator. It was noted that QRM contributed to a 42% decrease in the number of errors resulting from human factors, which in turn had a positive impact on the organization's cash flow.

The second measure examined in this area was the number of customer complaints. Here, too, a 60% decrease in the number of customer complaints was observed, which in turn allowed for new inquiries from customers and their overall satisfaction with the cooperation. QRM as a method allowed for ongoing verification on production lines, better and more precise quality control at every stage of the process, and the elimination of MUDA at every stage of the process.

The fourth indicator examined was indirect costs and resource allocation. The research revealed a very interesting finding, namely a reduction in the number of ineffective departmental and interdepartmental meetings and a reduction in the time needed to approve design changes.

Both of these metrics showed a 30% reduction compared to the baseline. QRM itself does not focus directly on cost reduction, yet the company was able to improve resource utilization and reduce costs, which had a very positive impact on the financial health of the entire organization.

The second stage of the analysis involved the analysis of qualitative metrics. The first metric examined was team effectiveness and communication. The following results were obtained as part of the effectiveness analysis and based on employee surveys:

- 87% of employees indicated a better understanding of the project's objectives.
- 79% assessed that decision-making processes had become faster and clearer.
- 73% noticed that the sense of shared responsibility within the team had increased.

This approach resulted in employees themselves coming up with initiatives and proposing changes and improvements that would improve their work and have a positive impact on the atmosphere in the organization.

Another metric that was verified was customer satisfaction. Here, too, the introduction of QRM had a positive impact on customer satisfaction. Customer feedback included repeat orders within six months of QRM implementation, increased customer satisfaction (9/10 on the scale used in the survey), and positive feedback: greater transparency in communication, faster response to customer inquiries, and improved quality of documents and reports delivered.

The collected data and analysis of the research clearly show that the implementation of QRM has significantly increased the efficiency of the company's operations on many levels. Project completion times have been shortened, timeliness has been improved, quality has been increased, communication has been streamlined, and the satisfaction of both employees and customers has been raised. QRM has become not only an operational method, but also a source of sustainable competitive advantage over other companies in the sector under study.

The implementation of the QRM method based on the research conducted has brought the company many benefits, which have significantly impacted the value delivered to customers, the quality of service provided, and the internal functioning of the entire enterprise.

QRM is not just an organizational project, but a dynamic process that is constantly evolving. The challenges that arise in its implementation are a natural part of cultural and systemic transformation. At the same time, they provide valuable feedback that allows the company to continuously improve its approach and create conditions for long-term development. Further investments in competence development, process

automation, and flexible teamwork models will allow the organization to fully exploit the potential of QRM as a methodology of the future in project production management. QRM has proven to be an effective and modern tool supporting the implementation of strategic goals of a production and design company operating in a dynamic and demanding market environment.

The organization's experience shows that the implementation of this methodology can be a real opportunity to improve competitiveness, increase customer value, and permanently improve the organization's operational efficiency.

## 4. Conclusion

QRM in the automotive industry can significantly improve the efficiency of production processes, increase flexibility, reduce inventory, and speed up response times to changing market needs. Implementing this method requires the commitment of the entire organization and a consistent drive to improve production processes, but the benefits in terms of increased competitiveness, better quality, and lower costs are significant.

The use of QRM in the automotive industry allows companies not only to respond more quickly to market changes, but also to reduce production costs and improve product quality.

Furthermore, the implementation of QRM in project conditions has yielded significant results, confirming the validity of the method in dynamically changing environments. The implementation of QRM has proven to be an effective response to the key challenges faced by many organizations in the current globally changing conditions. The flexibility of an organization stems from the market requirements it imposes on organizations currently operating.

The transformation of the classic functional structure into a model based on interdisciplinary QRM cells has reduced project completion times by up to 35–40%, which has directly translated into higher customer satisfaction and improved operational liquidity. QRM teams, which were given real decision-making power, planning autonomy, and responsibility for the entire project process, demonstrated significantly higher efficiency.

In practice, this not only accelerated operations, but also eliminated errors resulting from multi-stage task transfers between departments. Thanks to a better understanding of the project context and stronger commitment, employees were more willing to initiate solutions and showed greater attention to quality. On the other hand, the implementation of QRM was not without its challenges.
The key issue was changing the organizational mindset—moving away from a strongly hierarchical structure toward a model based on trust, shared responsibility, and rapid decision-making. This required both training and strategic involvement of

the management team, which had to create conditions for the development of a time- and value-oriented culture.

However, the effects of QRM implementation are undeniable. The company has seen an increase in timeliness, improved project quality, reduced overhead costs, and better customer relations. Its ability to take on complex and non-standard orders has also increased, which has broadened its offering and strengthened its position competitive on the domestic and foreign markets.

It is worth emphasizing that QRM should not be treated as a closed project, but as a dynamic methodology that can be developed successively. The company has real opportunities to extend the application of QRM to other departments, including research and development, service, and repetitive production, which will allow for even better utilization of the methodology's potential and increased process integration.

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