

Drivers of Acceptance in Human-Robot Collaboration: Interpretative Insights from Healthcare Manufacturing

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Collaboration: Interpretative Insights
from Healthcare Manufacturing**

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Abstract

Collaborative robots (cobots) are transforming healthcare manufacturing, offering better working conditions and greater productivity. Yet, most studies remain confined to lab settings, providing limited insight into how these robots perform in real-world settings. This gap calls for research that explores their practical application, challenges, and impact within actual organisational contexts. This thesis fills this critical gap by exploring how factors influencing the acceptance of collaborative robots shape system performance in healthcare manufacturing. It does so through three key objectives: (1) identifying critical factors influencing acceptance in collaborative robot applications, (2) developing a conceptual framework, grounded in empirical findings, that associates acceptance-related factors with system performance, and (3) offering actionable recommendations to create conditions that support favourable user responses to collaborative robots.

The research draws on a real-world case study at a leading global healthcare company in Germany, combining document analysis, eight participant observations, and 27 semi-structured interviews with employees and managers. Guided by reflexive thematic analysis, the study developed a holistic conceptual framework for understanding human-robot collaboration. This framework maps critical factors influencing the acceptance, and consequently system performance of collaborative robot applications to the input, process, and output dimensions across the individual and organisational levels. These factors include elements at the input dimension—such as human, robot, and environmental aspects—that shape attitudes towards collaborative robots. In turn, these input factors influence key dynamics at the process dimension. Ultimately, acceptance of collaborative robots is determined at the output dimension, which is directly reflected in system performance. Notably, emotional responses emerged as critical to the acceptance of these robots. Addressing employee concerns and supporting positive attitudes must be the central foci of any successful collaborative robot implementation strategy.

This study advances theoretical understanding at the intersection of human-robot collaboration and technology acceptance research by introducing a novel conceptual framework for analysing the acceptance of collaborative robots and how it shapes system performance. At the same time, it delivers practical insights for managers seeking to foster employee acceptance of collaborative ro-

bot integration and drive better outcomes in healthcare manufacturing. Derived from the conceptual framework, actionable recommendations tailored to specific employee groups are provided to inform the enhancement of existing collaborative robot applications and the strategic planning of future implementations.

Keywords: Collaborative robots, cobots, system performance, technology acceptance, healthcare manufacturing, reflexive thematic analysis, human factors, robot factors, organisational and environmental factors

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