Abstract

Despite the existence of many different occupational exoskeletons, their adoption is still rather low. These devices could support people doing heavy work since musculoskeletal disorders are a problem for 60% of the Europeans. There are many different strategies to prevent these disorders, such as rotating tasks or reducing the loads of items that must be lifted. Previous research has suggested that a combination of these different strategies is most efficient.

However, a new strategy is on the horizon: the use of exoskeletons. In recent years, many different companies have developed occupational exoskeletons, but they are hardly used. It is therefore important to investigate the reasons for the lack of adoption, and how acceptance of occupational exoskeletons can be improved. We used a mix of different research methods, both qualitative (such as focus groups and ethnographic research) and quantitative (path modelling and exploratory factor analysis) to investigate this. The UTAUT model (Unified Theory of Acceptance and Use of Technology), an existing technology acceptance model was used to assess the intention to use occupational exoskeletons. This was done by collecting data via a survey from three companies interested in adopting exoskeletons. “Effort efficiency”, or how easy it seems to use an exoskeleton, plays a significant role in predicting the intention to use occupational exoskeletons. Using the UTAUT model, it was possible to explain 74% of the variance of the intention to use exoskeletons. To understand which factors also influence the adoption of occupational exoskeletons, a literature review was conducted. Based on the findings of the review, a framework was constructed consisting of five categories of factors: psycho-social factors, physiological factors, implementation related factors, work-related factors, and policy related factors. Then, we used focus group data and literature to formulate design and implementation requirements for the adoption of occupational exoskeletons following the factors from our framework. Another outcome of this thesis is a survey instrument based on our framework that enables exoskeleton designers and/or researchers to assess the acceptance of occupational exoskeletons. Throughout the whole process, we only found one company with a user that regularly uses exoskeletons. Therefore, we also created a typology to categorize different types of potential users and non-users of occupational exoskeletons. Our findings suggest that comfort and the incompatibility with tasks are important reasons for the current lack of adoption. This thesis ends with a discussion, and it presents potential future work that can build upon our findings.