

# Scientific visualisation of complex interdependencies in hospitals

## Competency Group Hospitality Management



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**The IFM is on a quest to find ways to manage the complexity of hospital processes from different perspectives. An interdisciplinary project was conducted using scientific visualisation to support this goal. The findings indicated that there is a lot more involved than simply devising methods to illustrate the multiple variable context and the hypothetical data situation.**

tient transport are necessary. In order to have the right resources ready at the right place at the right time in the quality needed, many different aspects such as finances, administration, planning, logistics, infrastructure, energy and safety and security have to be taken into account. These, in turn, themselves need resources to be provided and thus also trigger resource management.

### From an Excel spreadsheet to illustration variations

As a basis for the illustrations to be developed, numerous Excel tables were created. The data was then first realized as hand-drawn sketches, both physical and digital, which allowed discussions to take place concerning the understanding of the context as well as the clarification of the goalsetting and the inclusion of additional facts. Subsequently, different illustration variants were investigated and experimented with, before choosing the most adequate illustrations through a user workshop. This process is visualized in Figure 1.

### Unexpected findings

This project can be seen as a first step towards further development, particularly because, in addition to the expected difficulties regarding how to illustrate complex abstract en-

vironments, it has also become clear that other topics have to be taken in consideration. These include

- the required willingness of the creative illustrators to thoroughly understand the interdependencies of the field in order to come up with the most adequate illustration techniques;
- the need for close, interdisciplinary collaboration between the illustrators and the experts, including the goodwill of the other discipline(s) and, thus, a mutual openness and creativity to develop the new knowledge area;
- the fact that many experts in practice are not used to dealing with a hypothetical data situation and therefore have to be supported in expressing exact visualization needs;
- the potential need for user-friendly digital applications for the sketching of illustrations, and
- the inclusion of creativity methods in order to support the development.

The various documentations about the project can be viewed at:

[zhaw.ch/ifm/fminhc-visu](https://zhaw.ch/ifm/fminhc-visu)



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### Introduction

Visualisations can help to handle complex contexts as seen in topographical maps in geography, prototype simulations in technical engineering or the use of X-Rays in medicine. In the business administration context, workflows, process or organisational models are used to make an abstract context visible. As projects in the context of hospital organisational management have revealed, two-dimensional illustrations offer limited value for dealing with multi-layered, interdisciplinary and interdepartmental contexts. In order to find ways to illustrate multi-dimensional and multi-perspective contexts as a basis to support communication amongst project stakeholders, an interdisciplinary creative Bachelor thesis was conducted by a ZHdK student with supervision by a lecturer from the ZHAW. The goal was to find different illustration alternatives through the example of resource management in hospitals.



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### Resource management in hospitals as an example

It becomes clear very quickly that resource management in hospitals is a complex issue. Hospital resources are divided not only into human resources, equipment and material goods, both medical and non-medical, but there are also numerous interdependencies and the need for prioritization amongst the resources. If a specialist medical team is not available, neither device nor material goods nor pa-

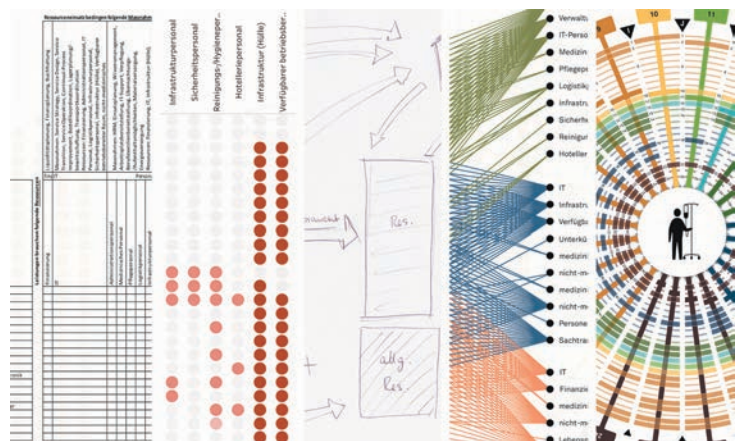


Fig. 1: Visualisations of interdependencies in patient-centered resource management in hospitals