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Towards a Standardized Definition of Room Categories for Healthcare Facilities (RakaS)

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Abstract
National and international norms have defined various industry-wide room type categories. When trying to generate standardized key performance indicators [KPIs] in the non-medical support services of hospitals for the purpose of benchmarking between different hospitals, it became clear that the room category definitions employed so far are not detailed and specific enough for the healthcare industry to allow correct comparisons of costs. This is why a new standardized Room Categorization for Hospitals (RakaS) was set up, based on existing norms but defining rooms more specifically and in the greater detail necessary for the healthcare context. The new healthcare-specific room category standard allows not only the generation of KPIs suitable for benchmarking between the non-medical support services in hospitals, but also the more accurate allocation of costs and the capacity to define the characteristics of service delivery in service level agreements more precisely.

Keywords: Room Categories, Benchmarking, FM in Healthcare, Hospitals, Standardization

Starting Position And Conceptual Basis

Cost pressure in hospitals has forced the healthcare industry to find ways to improve effectiveness and efficiency in healthcare institutions [HC] including the non-medical support services [FM in HC] defined by Gerber (2016) and illustrated in Figure 1 (Abel & Lennerts, 2006; Kriegel, 2012; Madritsch, 2009; Marsolek & Friesdorf, 2009; SwissDRG., n.d.; Thiex-Kreye, 2009). In order to empower the people responsible for FM in HC, several initiatives of applied research have been undertaken. To name a few: The non-medical support services were defined (Gerber, 2016) and described in detail in a catalogue by Gerber and Läuppi (2015) based on the international norm SN EN 15221-4:2011, systematic benchmarking has been set up (Hotellerie-Benchmark), and a set of key performance indicators [KPIs] has been developed (Gerber et al., 2016a) including specified process descriptions (Gerber et al., 2016b). When looking at existing and applied room categories in hospitals during these projects, it became clear that hospitals use very different kinds of room categories, sometimes based on existing norms, sometimes defined according to their own criteria and sometimes not systematically defined at all. It therefore became evident in all the initiatives mentioned above, as well as when trying to allocate costs in a systematic manner in order to reach numbers which are comparable and suitable for benchmarking, that there has to be a common understanding of room categories in order to reach standardized values that can be compared

Figure 1. Service Allocation Model for non-medical Supporting Services in hospitals – LemoS 3.0 (Gerber, 2016)

Existing room definition initiatives for hospitals or in general show that GEFMA812:14 has an approach to distinguish between room categories in hospitals, illustrated in Table 1.

Table 1. GEFMA 812:14 (translated by the authors)

R_100	Ward	R_915	Outer surface and access routes
R_200	Intensive therapy rooms	R_920	Laboratories
R_300	Surgery rooms	R_925	Rooms for laundry facilities
R_400	Delivery rooms	R_930	Rooms for the kitchen
R_500	Diagnostic / Therapeutic rooms	R_935	Dining room
R_600	Baths / Physical therapy	R_940	Pharmacy
R_700	Offices and simple diagnostic / therapeutic rooms	R_945	Sterilization
R_800	Non-medical rooms with a high technical demand	R_950	Storage areas / Vacant space
R_905	General traffic area	R_955	Rooms for the library
R_910	Technical rooms and Workshops	R_960	Archives
		R_965	Central bed processing

DIN 277-2:2005 has a more systematic view regarding different possible room categories, clustering topics on a higher level. The approach is a cross industry view, however specifically including a main category "Curing and Caretaking (NUF6)" as shown in Table 2.

Table 2. Room Categories according to DIN 277-2:2005 (translated by the authors)

1. Living and Residing	living spaces 1.1; common rooms 1.2; break rooms 1.3; waiting rooms 1.4; dining rooms 1.5; detention areas 1.6
2. Office work	offices 2.1; open-plan offices 2.2; meeting rooms 2.3; design office2.4; counter hall 2.5; control room 2.6; surveillance rooms 2.7; office technology rooms 2.8; other offices spaces 2.9
3. Production, Manual and Machine work, Experiments	workshops 3.1; shops 3.2; technological laboratories 3.3; physical, physical-technological, electrical laboratories 3.4; chemical, bacteriological, morphologic laboratories 3.5; rooms for animal husbandry 3.6; rooms for plant cultivation 3.7; kitchens 3.8; rooms for special works 3.9
4. Storing, Distributing and Selling	storage rooms 4.1; archives, accumulation rooms 4.2; cold stores 4.3; rooms for acceptance and issuing 4.4; salesrooms 4.5; exhibition spaces 4.6; other storage rooms 4.9
5. Education, Teaching and Culture	classrooms with fixed seating 5.1; general classrooms and practice rooms without fixed seating 5.2; special classrooms and practice rooms without fixed seating 5.3; libraries 5.4; sports rooms 5.5; meeting rooms 5.6; stages, studios 5.7; display rooms 5.8; sacred spaces 5.9
6. Treatment and Caretaking	rooms with general medical equipment 6.1; rooms with special medical equipment 6.2; rooms for surgical procedures, endoscopies and childbirth 6.3; rooms for radiodiagnostics 6.4; rooms for radiotherapy 6.5; rooms for physiotherapy and rehabilitation 6.6; bedrooms with general equipment in hospitals, nursing homes and mental homes 6.7; bedrooms with special equipment 6.8; other care rooms 6.9
7. Other use	sanitary rooms 7.1; wardrobes 7.2; storerooms 7.3; parking spaces for cars 7.4; passenger spaces 7.5; rooms for central technique 7.6; shelters 7.7; other rooms 7.9
8. Operating equipment	wastewater treatment and disposal, water supply for gases (except for heating purposes) and liquids 8.1; heating and service water heating 8.2; interior ventilation systems 8.3; electric power supply 8.4; telecommunications 8.5; elevator and conveyor systems 8.6; other technical building systems 8.9
9. Traffic access and safety	corridors, halls 9.1; stairways 9.2; shafts for conveyor systems 9.3; traffic spaces 9.4; other circulation areas 9.9

The updated version DIN 277-1:2016, however, drops the idea of the detailed definition of rooms across industries and reduces the definition by circumscribing the high-level room clusters as main categories as shown in Table 3.

Table 3. 277-1:2016 (translated by the authors)

NUF 1	Living and Residing
NUF 2	Office work
NUF 3	Production, Manual and Machine work, Research and Development
NUF 4	Storing, Distributing and Selling
NUF 5	Education, Teaching and Culture
NUF6	Treatment and Caretaking
NUF 7	Other use

Another existing norm would be DIN 13080:2003 which offers room categories, however only showing incomplete examples as supplements to a function view and thus not suitable as a well-founded basis for room categories.

It becomes clear that there are several approaches to room category definitions available, they are, however, either not consistent, have differing levels of detail, do not have a mapping between each other and are not systematically defined based on specific criteria.

Research Objectives and Goals

The research objective of the project was to develop a systematic, standardized room categorization on the basis of existing and applied norms, but taking the specific needs of healthcare facilities into account. The categories should be pragmatic, not too detailed while still considering the important aspects of the service delivery itself, different cost drivers and the necessity of a more accurate cost allocation. The resulting room categorization should help hospital managers to generate comparable KPI parameters so that true benchmarking will become possible. Benchmarking should then deliver the necessary basis to find ways to become more effective and efficient and thus to be able to help reduce cost in the provision of healthcare services in hospitals.

Methodology

The categorization as a research and development output is seen as an artefact. Thus, for its development, Design Science Research principles according to Hevner et al. (2004), Hevner and Chatterjee (2010), Peffers et al. (2007) and Vaishnavi and Kuechler (2008) illustrated in Figure 2 were applied.
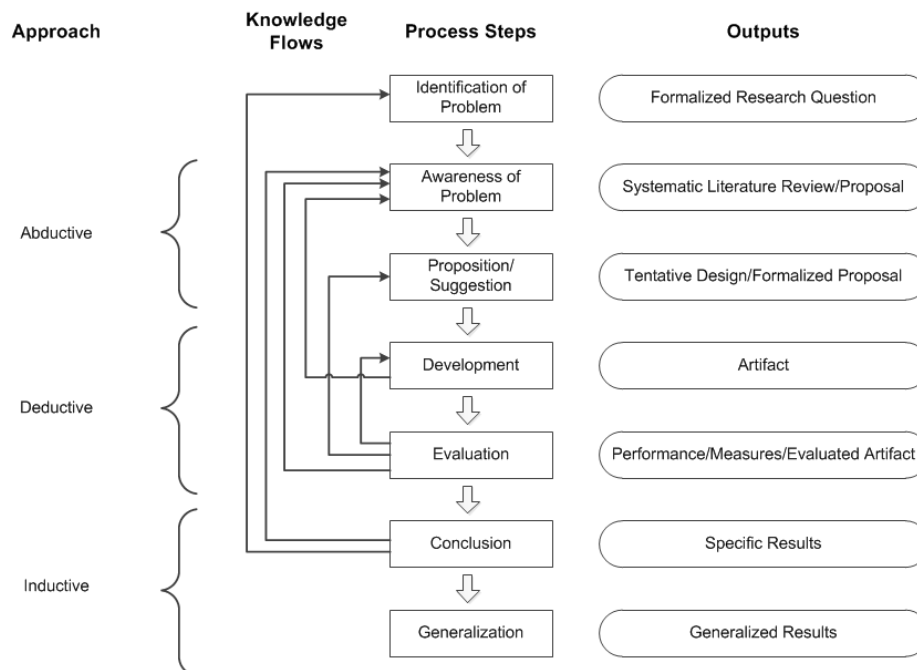
Figure 2. The general methodology of design science (based on Vaishnavi & Kuechler, 2008 and Dresch et al., 2015)

After the identification of the problem in other projects, a literature research was conducted in order to have the basis for developing a more specific categorization. In the Development phase, iterations of an explorative approach combining expert feedback on the artefact took place. Currently, the project is in the Evaluation phase, asking for (international) feedback of researchers and FM in HC practitioners.

Development of a Standardized Room Categorization for Healthcare Facilities

First of all, the norms GEFMA 812:2005 and DIN 277-1:16 were juxtaposed. It became clear that the main categories named in DIN 277-1:2016 shown in Table 3 are suited as categories for a complex and versatile enterprise like a hospital. Applied room definitions in hospitals showed that the differentiation of rooms from DIN 277-2:2005 had been applied in the past and that therefore a total change of numbering and definition would cause misunderstandings and complicated adjustments and would therefore face lack of acceptance. It was therefore decided to continue with the existing numbering and categorization, however to define the rooms specifically for the healthcare industry and to add new room sub-categories where necessary; not changing, but complementing the existing structure. The necessity for more specified breakdown of room categories was given if
- the allocation of costs has to be done specifically for a department or subsidiary enterprise
- the infrastructure of the room is significantly different to other similar rooms and has therefore different cost drivers due to more complex installations or maintenance plans
- safety & security, energy supply and/or hygiene requirement aspects require different handling and thus induce different costs

The output of the project is twofold: Firstly, the room categories are systematically illustrated. Figure 3 shows the principle – the detailed illustration suitable to print-out can be downloaded under
www.zhaw.ch/ifm/fm-healthcare/rakas/en

Secondly, the corresponding table explains the details behind the room categories:
Column 1: names the main room categories
Column 2: lists the room types mainly corresponding with DIN 277-2:2005, partially adjusted with the descriptions from DIN 277-1:2016 but also including newly-added categories
Columns 3: states the sources of the definitions in column two – in this way it is possible to find the original text if necessary to distinguish between the previous definitions and the extended definitions of this project
Column 4: defines and specifies the room categories
Column 5: justifies differentiations

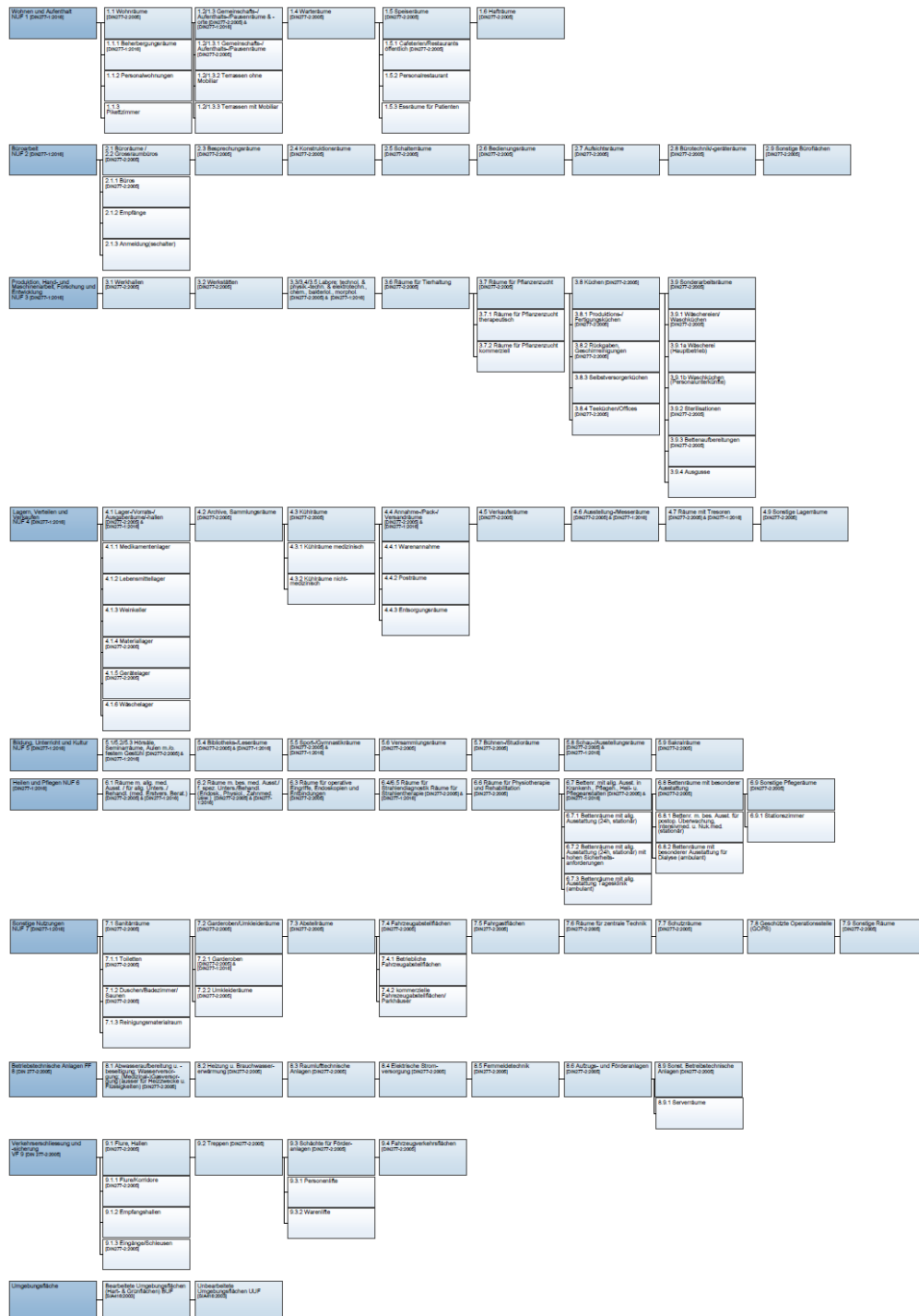The complete table can be downloaded under www.zhaw.ch/ifm/fm-healthcare/rakas/en

Figure 3. Illustration of Room Categorization in Hospitals (RakaS)

Conclusions, Limitations and Outlook

The standardized definition of room categories in healthcare presented is based on existing and proven norms but takes into account the specific needs of healthcare institutions. The modularity allows every

hospital to choose the composition of its own room category portfolio depending on its service portfolio and also the level of detail to collect and maintain data. Taking into account the existing norms ensures that categorizations already applied in hospitals can be continuously used and past data can be compared in the future. This room category standardization will help the people responsible for FM in HC to generate comparable data for benchmarking and for comparing internally and externally delivered services. Unfortunately, data outside the German speaking area of Europe was not accessible to the project. A dialogue with healthcare institutions worldwide about their experience of applied room categories would be highly welcome in order to see if the room categorization and thus potentially benchmarking data in connection with room data in general could be applied internationally.

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