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Digital implications for human resource management in surgical departments

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Summary
Background Changes in demographics and dynamics of our society are affecting the healthcare system, leading to an intensified "war for talents," especially for surgical departments. Also with regard to the current COVID-19 pandemic, the present work analyzes the potential of digitalization for human resource management of surgical departments in hospitals.
Methods PubMed and Google Scholar were searched to identify articles referring to the specific subject of human resource management and its digital support in hospitals and surgical departments in particular.
Results The main topics include the digital affinity of young physicians and surgeons in terms of staff recruiting, digital support for everyday working life in surgical departments, and the potential of digital approaches for surgical training. These topics are put into the context of company strategies, and their future potential is identified accordingly.
Conclusion Digital programs, digital structures, and digital tools can today be used by human resources departments to advertise the hospital and to make the recruitment of future candidates increasingly attractive. In addition, by making digital tools available, the employees' satisfaction can be raised with the potential of a strong employer branding. In times of the COVID-19 pandemic, digital personnel strategies and training formats have to be regarded a contemporary offering.

Keywords Personnel · Digitalization · Recruiting · Strategy · Surgery

Main novel aspects

Advantages of the use of digitalization for HRM in surgical departments include:

- Continuous evaluation and support of recruitment and marketing efforts with brand building.
- Transparency and enrichment of the employees' development in training.
- Cost and staff optimization and processual improvement for surgical departments and their hospitals.

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Introduction

In today's Western world, a progressive demographic change can be observed, resulting in a subsequent decrease of the working population fraction [1]. As a consequence, hospitals are having difficulties filling open positions with young physicians—a situation which is expected to worsen in future years [2]. This problem is especially prevalent in surgical disciplines, since surgical work is less and less attractive for medical students, leading to a nationally and internationally increasing shortage of young surgeons [3, 4].

This development can be observed in context of a change of values within the new generation of young physicians. The so-called Generation Y can be identified by a strong willingness to perform, but also by the desire for autonomy and a well-adjusted work–life balance with a rising weight on leisure time [5]. The authorities of surgical societies have attempted to counteract this development with increased advertisement for surgical disciplines on both regional and nationwide levels [6].

To increase the efficiency of the organizational processes, to make jobs more attractive, and to improve staff recruitment, digitalization has become increasingly important—today being one of the main topics in politics, economics, and society [7].

The rapid development, use, and implementation of innovative digital technologies in the healthcare sector is called "Medicine 4.0," comparable to "Industry 4.0" in economics [8, 9]. In this context, 1.0 describes employment of machinery, 2.0 the use of production lines and electric energy, 3.0 the use of electronics and information technologies (IT). 4.0 refers to the next "version" and describes the digital evolution.

While digital tools such as messenger services and process optimization were once primarily used in private life, today's use and acceptance of digital instruments can be increasingly observed in medicine and the everyday working life [10–12].

It is to be expected that the vast variety of digital innovations coming up in the near future may be interdisciplinary helpful for both physicians and patients [8]. This development will put the patient's wellbeing first, thus benefitting several players within the healthcare industry.

In terms of human resource management (HRM), especially in surgical disciplines, a conscious look at digital options could create opportunities for recruiting employees as well as for raising the adherence of these employees by means of attractive and innovative working conditions. With the resulting contact and travel restrictions, the current COVID-19 pandemic has additionally increased the need for digital solutions in many fields of HRM [13].

This work aims to identify and phrase, based on the existing literature, reasonable approaches to implementing digital structures for HRM of surgical departments.

Materials and methods

A literature review was conducted at https://pubmed.ncbi.nlm.nih.gov. In addition, to enlighten economic aspects, articles and books were reviewed, which can be identified on Google scholar.

Fields for the core topic searches were defined:

- Digital affinity of young physicians and surgeons with regards to personnel recruiting. Search criteria: online AND application AND job (149 hits).
- Digital support in everyday work for surgical departments (as a sub-theme: direct exculpation of the HRM). Search criteria: digital AND workflow AND surgical department (286 hits); digital AND residents AND surgical department (317 hits).
- Approaches to digitally supported teaching methods in the surgical curriculum. Search criteria: digital AND teaching AND residents AND surgery (217 hits).

Results

Digital options for recruitment advertising (or personnel recruiting)

In metropolitan regions and in highly specialized surgical departments, the need for employees can be covered sufficiently by initiative applications. Especially at academic teaching hospitals and university hospitals, students in the last year of medical studies can be attracted and recruited [14]. Because surgical disciplines have become less attractive and are thus facing decreasing numbers of young physicians, employee advertisements in terms of a "war for talent/potential" have been intensified [15].

Besides advertisements in newspapers, exhibitions at medical convents, or other medical events, communication via digital channels has become increasingly important to recruit new employees [15]. Primarily, an attractive online presence via an attractive homepage and accompanying social media channels can increase the visibility of a (medical) company/hospital substantially [16]. As economic companies portray, surgical departments should offer easily accessible content, revealing the operative spectrum as well as clear and detailed working conditions available to all applicants.

In the past few years, it has become standard that HRM departments extend their job promotions to social media, helping health companies and hospitals to (re)present themselves and to interact with the desired target groups [17, 18]. This seems reasonable, since last year medical students and young physicians informed themselves online about potential employers [19]. It seems almost compulsory to show presence on social media channels in addition to having a home-

page. As examples, many health companies and hospitals make use of Twitter®, WhatsApp®, YouTube®, and Instagram® to spread information about themselves and get in touch with potential applicants [19, 20].

Offering realistic exemplary digital operation catalogues from physicians working at the hospital, which can be used as a marketing channel, allows interested physicians insights into the actual spectrum of the operations. This can be useful to increase the hospital's attractiveness towards young physicians, especially in rural hospitals with a broad range of operations.

Personal contact can convey a good impression of the potential new workplace [21]. Senior consultants can be supported by the HRM to get in touch with potential job candidates via social media, creating realistic impressions for the candidates prior to any interview or work trial.

Furthermore, virtual reality or even augmented reality can be used to let job candidates be part of the everyday life in the potential hospital or even witness operations, to promote the institution's attractiveness [22].

All of the abovementioned aspects clearly yield higher costs for the hospitals, an effort to potentially be redeemed by successful recruitment of physicians.

Digital support for the daily surgical working life

Equipping hospitals with new digital solutions and IT tools is not part of HRM. However, a well-run IT system can raise the attractiveness of a hospital and thus create a pull effect on the labor market. The use of digital solutions can reduce physicians' load of paperwork and help regain a focus on the actual medical work of surgeons and physicians [23].

At the same time, allocation of "handy" documentation and communication tools can have a major impact on employees' satisfaction and therefore contribute to the attractiveness of the workplace [24].

Taking this into consideration, it becomes evident how easy-to-handle and well-structured clinical systems can improve work efficiency and make integrated communication and data sharing with other clinical disciplines possible [25].

Integrated systems can, for example, improve material procurement in operation theatres and therefore reduce costs. In cooperation with clinic system developers, new time-saving features can be created and integrated. Not only could voice-recognition software help reduce working time in general, but in the case of an integrated autocorrect feature, it could also help physicians with, e.g., an immigration background. Decision-support systems, for example, can display pharmaceutical interactions or the relation between laboratory parameters and the length of hospital stay, which can reduce error rates and employees' stress in general [26].

Electronic systems could also be of advantage in workforce planning, including roster organization or the management of overtime [27, 28].

The general advantages of digital innovations for HRM are not the main focus of this article, but are also applicable in surgical departments.

The main fields of HRM, such as administration of personnel files, personnel support, personnel accounting, or personnel controlling can be encouraged by digital programs [29]. The employee self-service could be extended by introducing digital forms (e.g., holiday applications or compensatory time) [30].

In addition, digital interfaces and functions can be used to supply managers with data for decision-making or process analyses, such as performance figures or personnel data (e.g., personnel deployment, taking full-time equivalents into account). Digital tools used in surgery, such as planning of operations or robotic systems such as the Da Vinci System (Intuitive Surgical, Inc., Sunnyvale, CA, USA), could be used in interviews and advertisements for potential employees to increase the institutional attractiveness [31].

Digitally supported training and further training

It has been well explored and proven that physicians in training and in further education can gain advantages through digitally supported knowledge transfer (eLearning) and combined digital and practical training known as "blended learning" [32]. Digital educational contents pose the advantage of multiple reusability after one-off production.

The training of new employees in relevant topics (e.g., guidelines for hygiene or transfusions) and standard operating procedures can be coordinated by virtual checklists leading to digital learning offerings. To maintain user compliance, focus should be placed on keeping the presentation of information short and precise [33]. At the same time, the employer can check whether the content has been used. Using normalized examination questions, it can be ensured that learning objects are not only passively consumed but have also been understood actively and therefore even have an advantage in comparison to attended lectures.

Surgeries performed can be connected directly to the clinic information system and linked to a digital surgery catalogue using digital logbooks, providing an overview to both the surgeon in training and the trainer on personal progress as well as on fairness in the distribution of surgical procedures among peers [34, 35].

Digital libraries using video/picture manuals of surgical operations can improve preparations for surgeries and therefore increase the satisfaction of trainees and trainers by raising the efficiency of operations [36].

Another advantage of electronic learning tools lies in the reduction of costs and absences of employees in advanced training courses, because the time

and place for learning can be chosen independently by the employees [37]. Today, enhanced also by the course of the COVID-19 pandemic, there are certain qualitatively demanding and also certified eLearning offers [38]. In hospitals this can be used in terms of a "cafeteria system," allowing employees to use additional eLearning tools besides the attended offerings [39]. These eLearning tools can raise the attractiveness for existing and new employees, thus ensuring equal or even lower costs. Studies, especially those relating to the surgical field, have shown that, e.g., digital arthroscopy trainers can improve their practical skills [40]. The same effect was recently shown for virtual reality training tools [41]. Promising but not yet entirely investigated are augmented reality tools for surgical training [42]. As soon as the benefits of these tools are scientifically proven, employer's attractiveness, particularly towards young applicants, could be increased and employer branding could be strengthened.

Data protection and data security

The abovementioned use of digital support can be seen in the national as well as in the international context of legal framework provisions. The European basic regulation of data protection came into force on 25 May 2018, with alterations including information obligation, accountability, and reporting obligations [43]. In addition, e.g., hospitals in Germany with more than 30,000 cases per year, are regarded as part of the critical infrastructure, and thus have to adhere to the so-called KRITIS (German: Kritische Infrastrukturen; English: critical infrastructures) regulation implemented on 30 June 2017, which requires additional safety measurements for IT services [44] affecting several HRM processes.

Digital innovations are connected to enhanced cyber security programs, which are costly for hospitals and their funders [45]. This, as well as the practical experience and the possible security vulnerability of digital tools, will have a major impact on the use of digital innovations for hospitals.

Discussion

HRM as we know it today has been primarily shaped in the industrial sector rather than in the healthcare sector [46]. Because of the meaningfulness and functionality of the process flow, HRM has become more important for hospitals, especially in recent decades. Workflows in hospitals and especially in surgical departments have some special features which need to be taken into consideration when implementing personnel measures. A joint approach of both human resources management, general management, and the heads of surgical departments should be achieved, which should, in turn, lead to the optimum patient benefit. In other disciplines and especially in surgery, good patient care in terms of productivity and success is directly linked to knowledge, skills, and commitment of the employees. This article aims to convey an overview of reasonable approaches to implementing digital structures for HRM in surgical departments, which has gained importance with the current COVID-19 pandemic.

In general, physicians and future physicians display a positive attitude towards digitalization [47]. In most medical fields, useful digital innovations are broadly accepted and integrated into existing workflows. With the supply of well-tested and innovative IT programs, companies can make a big impact and employee satisfaction can therefore be increased.

At the same time, an increased amount of responsibility is seen, which can be shown with the messenger service WhatsApp®. International studies have shown the general advantage of communication within medical teams with this mobile application. Specifically, in the surgical field, sending photos or videos of pathologies is widely established [48, 49], but at the same time, sending patient-related data via WhatsApp® is critical in terms of legal regulations [50]. A collaboration between the HRM and IT departments could conduct employee education about data security and could provide legally approved messenger services [51].

The "well-functioning" team approach is the most commonly seen personnel strategy in surgical departments, aiming for stability, long-term orientation, and efficiency [39]. Besides this, the "intelligent organism" combining long-term orientation and (digital) innovation will become increasingly important. This type of strategy could—especially in big hospitals or hospital chains—create small interdisciplinary teams focusing on long-term orientation and innovation, while implementing new applications. This "creative evolution" is mostly seen in university hospitals with a goal to examine short-term innovative strategies within the scope of experimental approaches.

Because a sole top-down approach for the introduction of new IT solutions is not appropriate, a targeted training for and a general promotion of positive corporate culture towards digital innovation should be established to raise employees' interest in digital innovations. Instead of creating a sole crew for digital enhancement, ideas and input should also come from employees, which can then be evaluated on a short-term basis within the hospital. Facilitation of the capacity for innovation can be achieved by employing young "digital natives." To coordinate digital projects and tools, a chief digital officer can be integrated, analogously to business companies. In practice, an annual check can validate which processes and programs can be discharged, and which can be technologically improved by digitalization [52].

Furthermore, digital improvements can be used to support the qualification process of employees. With this, employee satisfaction as well as the headcount of

surgical departments can be maintained [53]. Offering eLearning as an employee benefit can be used as non-monetary total compensation. The integration of attractive digital offers and support activities for the enhancement of knowledge but also for general work-relief seems to offer relevant benefits, especially in the surgical field, to strengthen modern employer branding.

In times of the COVID-19 pandemic, national and international regulations for contact and travel restrictions have to be taken into consideration, which have already led to a vast acceleration of digitalization, also of many HRM processes [13].

Digital transformation has to be seen as a long-term process, which will open up new fields for HRM (e.g., personalized recruiting) using big data or artificial intelligence [54]. Identification of potential new digital trends will, in time, be of utmost importance for the management of hospitals.

It is of paramount importance to respect legal acts and to protect patients' as well as employees' personal data adequately [43]. In context of this, news about information leakages or hacker attacks point out the vulnerability of existing structures [55].

The financial benefit and cost-effectivity of newly introduced processes must be evaluated continuously.

The need for digital support, demanded by medical students or residents from potential employers, can be analyzed systemically to increase workplace attractiveness for the "high potentials" of the future. Besides the need of current travel and contact restrictions in the COVID-19 pandemic [56], new approaches need to be framed by HRM to establish a positive work–life balance, which can help to increase motivation and effectivity within surgical departments.

Among other aspects, modern digital employer branding and satisfied employees as brand ambassadors for their hospital as a "great place to work" can reduce the shortage of qualified staff in the long term and strengthen the hospital's competitive advantage.

Conclusion

Digital innovations show great potential for positive changes in the everyday working life of many employees in the healthcare system, and can be used as additional tools for human resource management. To achieve this, new digital tools have to be integrated deliberately within the frameworks of well-coordinated concepts. The following aspects are relevant especially for surgical departments and their prospective branding counts:

- It is essential to have a diversified online presence (a homepage in combination with social media platforms) to achieve the best institutional representation.
- The implementation of digital technologies is not the main task of HRM but should be co-designed and evaluated by the HRM department.
- A broad spectrum of digital or blended learning tools for further specialty training exists and has to be proactively developed for surgical departments.
- Companies should make an effort to effectively integrate surgical staff into digital developments as well as offer adequate training in digital security.

Conflict of interest D.A. Back, J. Scherer, G. Osterhoff, L. Rigamonti, and D. Pförringer declare that they have no competing interests.

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