



To Seek Program Accreditation, Innovation, or Both?—Examining the Interdependencies in High-Reliability Health Care Organizations

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Abstract In dynamic markets, organizations have to be ambidextrous to adapt to constant change. Simultaneously, organizations are increasingly required to adopt quality management accreditation. Standardization through accreditation bares the risk of limiting an organization’s dynamic capabilities. In this study, we aim to evaluate the determinants of organizational decision-making to seek accreditation and pursue innovation activities, whether accreditation and innovation activities help organizations reach their strategic goals, and if accreditation affects the ability to achieve ambidexterity. We explore these relationships in high-reliability health care organizations. We conducted semi-structured interviews with 11 physicians and 14 quality managers in hospitals that provide specialized cancer care in Germany. In an inductive grounded theory approach, we develop a conceptual model of the relationship between accreditation and innovation activities. We find that hospitals engaged in both activities to achieve quality and financial goals. For smaller hospitals, accreditation was a necessary condition to be able to compete in market environments. Regardless of competition, smaller hospitals benefitted from a positive effect of accreditation on incremental process and product innovation. For larger hospitals, obtaining accreditation was a necessary condition to acquire additional funding, but the influence on innovation activities was limited because these were already being pursued with high intensity. Ideally, program accreditation and innovation activities

Availability of data Interview data is available upon request.

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can be aligned to achieve superior quality and financial performance through organizational ambidexterity. Organizational decision-makers must align both activities while taking account of costs and benefits. Policy makers can support access to high quality care by setting incentives to acquire accreditation.

Keywords Grounded theory · Accreditation · Certification · Innovation · Hospitals · Cancer

1 Introduction

High-reliability organizations are characterized by hyper-complexity, high frequency of decisions, strong interdependence, large number of decision-makers and many critical outcomes (Tolk et al. 2015; Vogus and Rerup 2018; Weick and Sutcliffe 2015). Typical high-reliability organizations are air traffic control, nuclear power plants and hospitals, which we study (Tolk et al. 2015). Events such as the Covid-19 pandemic highlight that especially health care providers often act in highly dynamic environments and need to respond immediately to adapt to changes in organizational structure and evolving clinical evidence, part of which health care providers contribute themselves by developing new technology and procedures from clinical practice, and conducting clinical trials (Agha and Molitor 2018; Behrens et al. 2022). This requires balancing exploitative and exploratory innovation activities in line with organizational ambidexterity theory.

Simultaneously, organizations are increasingly required to adopt quality management practices and quality management accreditation in particular to satisfy customer and regulatory requirements (Benner and Tushman 2003). Many health care systems have implemented systems to increase levels of transparency about the quality of care provided by individual hospitals as regulatory measure, thus facilitating competition among them (Salampessy et al. 2020). A frequent element of such systems is hospital program accreditation, which can be offered, for example, by professional associations and has emerged as a measure to verify a hospital's compliance with quality standards and to communicate this compliance to stakeholders (Greenfield and Braithwaite 2009). As accreditation requires the adoption of predefined guidelines, it can be considered an exploitative activity. For hospitals, accreditation is a strategic tool to attract patients and referring providers. Therefore, it can be used to remain competitive in the market and support long-term survival (Staines 2000).

Hospitals pursue ambidexterity and standardization through accreditation to meet organizational strategic goals, and both activities consume substantial resources (Anderson et al. 1999; European Commission 2020). Although innovation activities and program accreditation can be (and often are) sought at the same time, both strategies have generally been analyzed in the literature separately. It is hardly known what determines the uptake of accreditation in high-reliability organizations and how standardization through accreditation affects an organization's pursuit to achieve ambidexterity. This is especially relevant as accreditation in high-reliability organizations serves not only a strategic purpose of the organization. Accreditation is

highly desirable from a customer's perspective, as possible errors in service provision may have disastrous consequences.

To help fill this research gap, we conducted a comparative case study of specialized cancer care departments in German hospitals. We defined the following research questions: (1) What are the determinants of an organization's decision to seek program accreditation and pursue innovation activities? (2) In how far do program accreditation and innovation activities help organizations reach their strategic goals? (3) Does accreditation affect the ability of organizations to achieve ambidexterity? We chose specialized cancer care departments in hospitals as our setting because there is a high level of activity related to program accreditation and innovation in this specialization in Germany. We used data from in-depth interviews of hospital physicians and quality managers to develop a conceptual model of the relationship between program accreditation and innovation activities, including determinants of both measures at the environmental and organizational levels.

We contribute to knowledge about high-reliability organizations in organization theory. In line with Bradley et al. (2007), we develop a theory on how organizational and environmental characteristics determine the decision for accreditation in high-reliability organizations. We consider accreditation as an exploitative measure and evaluate the impact of accreditation, and standardization in general, on an organization's ability to achieve ambidexterity in a dynamic environment. In this context, we consider quality and financial performance as equally relevant outcomes.

Our findings are relevant for organizational decision-makers and policy makers who are seeking to ensure high quality in dynamic environments. The former must allocate resources effectively to pursue the strategic goals of their organizations. Understanding how standardization and innovation activities interact can help them align both measures and identify where improvements, or even synergies, might be possible. Policy makers, in turn, must ensure high quality service provision of high-reliability organizations, while keeping the burden for organizations and society as low as possible (European Commission 2020). Understanding the determinants of program accreditation improves the ability of policy makers to increase the uptake of accreditation. While doing so, understanding intra-organizational interactions between standardization and innovation activities is paramount to promote both activities to best effect.

2 Conceptual Background

The pursuit of innovation activities is a strategy to sustain organizational performance and achieve high quality (Jansen et al. 2006; Salge and Vera 2009). In the hospital context, innovation relates to new products, services, processes, or organizational structures (Salge and Vera 2009). In 2020, the United States (US) Food and Drug Administration approved 53 novel drugs and granted 34 premarket approvals for medical devices, and the five-year average for these was 46 and 34, respectively (Darrow et al. 2021; Mullard 2021). Hospitals are required to be innovative by adopting these technologies; they often act as innovators themselves by initiating and participating in the development of new products and processes (Agha and Moli-

tor 2018; Hicks and Katz 1996; Thune and Mina 2016). Generally, in innovation research, both activities are referred to as exploitation and exploration. Exploitation focuses on the introduction and refinement of existing knowledge for efficiency purposes and certain short-term profit, thereby supporting incremental innovation. In contrast, exploration focuses on the discovery of new solutions and involves risk taking and experimentation. It aims at uncertain long-term profits driven by radical innovation (March 1991).

Many scholars argue that organizations, which balance exploration and exploitation in some way show better performance than those that focus mostly on one or the other (He and Wong 2004; Junni et al. 2013; March 1991). These organizations are called ambidextrous, referring to the ability to use both hands equally well. Ambidexterity can be achieved by performing exploration and exploitation either in separate business units (structural ambidexterity) or within a single business unit (contextual ambidexterity) (Anzenbacher and Wagner 2019; Koster and van Bree 2018; Martini et al. 2015), as well as simultaneously or in a cyclical manner (Simsek et al. 2009). However, different requirements of exploration and exploitation create tension when pursuing ambidexterity (Cao et al. 2009).

Supporters of structural ambidexterity argue that exploitative activities like process management reduce an organization's potential for radical innovation that is necessary to adapt to a dynamic environment, so that exploration and exploitation have to be separated (Benner and Tushman 2003). Supporters of contextual ambidexterity argue that pursuing exploration and exploitation in the same business unit is possible when an ambidextrous organizational culture is present (Khan and Mir 2019; Wang and Rafiq 2014). However, environmental dynamism was associated with fewer product innovation output when pursuing contextual ambidexterity, suggesting that structural ambidexterity is beneficial in a dynamic environment (Khan and Mir 2019).

The literature identifies an impact of available resources on innovation output for both strategies. For structural ambidexterity, in organizations with scarce resources it is worthwhile to keep a balance between both activities. When resources are sufficient, organizations can concentrate on the combined magnitude of exploration and exploitation activities across business units in order to be more innovative (Cao et al. 2009). For contextual ambidexterity, availability of organizational and environmental resources positively affected product innovation output (Khan and Mir 2019; Wang and Rafiq 2014). While organizational and environmental resources decrease the managerial tensions that arise when pursuing ambidexterity, decision-makers need to make compromises when managing the tension between exploration and exploitation in complex, professional, hierarchical and dynamic environments (Burgess et al. 2015).

Regarding the ability of innovation activities to support the strategic goals of an organization, Salge and Vera (2009, p. 56) point to that empirical and theoretical evidence for a positive effect of innovativeness on organizational performance is "less conclusive than commonly assumed". Aiming at quality goals, the introduction of new diagnostic and therapeutic procedures increased quality of care received by most cancer patients during the last decades (Faivre-Finn et al. 2002; Lichtenberg 2014).

Program accreditation generally defines quality standards. Once achieved, accreditation signals to stakeholders, such as customers and policy makers, that the accredited department or organization is in compliance with these standards. Depending on the specifications of a program, different programs are referred to as accreditation or certification. While accreditation acknowledges the capability of providing a product or service according to a certain quality standard, certification acknowledges the compliance with standards in the production process, therefore ensuring the quality of a product or service (e.g. ISO:9001) (Kelly 2007). Regarding health care, the use of the terminology in the literature and in practice is inconsistent and there is substantial overlap between accreditation and certification programs. Since many guidelines are not binding in the context of treatment processes, we use the term accreditation rather than certification although both terms are considered interchangeable. A related example is accreditation of cancer programs at hospitals, treatment centers, and other facilities by the multidisciplinary Commission on Cancer (CoC) in the US and Puerto Rico (Bilimoria et al. 2009). Generally, accreditation schemes involve an initial process to assess whether the organization in question meets the predefined requirements; subsequently, the organization must document adherence to these requirements continuously to retain the accreditation status. Therefore, accreditation programs consume considerable administrative resources (Anderson et al. 1999). In the context of hospitals, accreditation programs can reduce technical efficiency at least temporarily when accreditation programs require a high bureaucratic effort (Lindlbauer et al. 2016).

The management literature suggests that accreditation decisions are often made in close context with strategic decision-making in the organization and motivators to seek accreditation differ by strategic goals. For example, a strategic focus on quality competition was identified as a driver for certification of quality management systems in manufacturing firms (Anderson et al. 1999). Firms used ISO:9000 certification as an external signal to show compliance with government and customer requirements. For the service sector, Pekovic (2010) identified a significant positive effect of a strategic focus on customer orientation and quality improvement on ISO:9000 certification status. At the same time, a strategic focus on innovative performance had a negative effect on certification status.

Whether accreditation is capable in achieving strategic goals generally depends on the motives for accreditation and the design of accreditation programs. Terziovski and colleagues (2003) suggest that business performance increases in organizations in which the motivation to get accredited was an increase of customer focus, a continuous improvement strategy, or the reaction to environmental factors. In health care, the accreditation of treatment programs increased quality of care. In Germany, patients treated in accredited organ cancer centers had better survival rates, improved quality of life, and better surgical outcome compared to patients treated in non-accredited centers (Beckmann et al. 2011; Butea-Bocu et al. 2021; Richter et al. 2021; Völkel et al. 2019; Weissflog et al. 2012). A cost-effectiveness analysis conducted by Cheng et al. (2021) found longer survival and lower treatment costs for patients that were treated in accredited colon cancer centers.

With the strategic potential as exploitative activity and high public interest in widespread dissemination, accreditation has to be considered by organizations that

aim to be ambidextrous. Standardization through accreditation is related to an increase of certain innovation outcomes. Standardization of processes changed employees' perception of organizational processes and led to an increase in process innovation (Terziovski and Guerrero 2014). Additionally, even though process management activities like accreditation are based on established knowledge, they are open to incremental innovation (Benner and Tushman 2003). While incremental innovation is more beneficial in stable environments (Benner and Tushman 2003) it can be considered a valuable part of innovation activity to increase organizational performance and quality.

From a conceptual perspective, the conceptual and empirical arguments suggest that program accreditation could interfere ambidexterity in different ways. Program accreditation as an exploitative measure and exploratory activities may contradict each other due to their different structural requirements. Whereas exploration requires a degree of flexibility to develop new products and processes, program accreditation aims at a high degree of standardization to reduce variation and errors in processes (Terziovski and Guerrero 2014). This standardization was argued to have a negative impact on radical innovation, which is needed to adapt in dynamic environments like health care systems, and the creation and adoption of product innovation (Benner and Tushman 2003; Terziovski and Guerrero 2014). The proposed separation of exploration and exploitation towards structural ambidexterity to protect exploratory activities from these effects is not feasible in the context of health care organizations. Innovation often arises from clinical practice. Health care professionals have to conduct exploration and exploitation in the same context requiring contextual ambidexterity.

When organizations try to keep a balance between exploration and exploitation, the pursuit of accreditation might shift the balance in favor of exploitation. The use of organizational resources for accreditation could make it more challenging for organizations with limited resources to restore this balance (Cao et al. 2009). Accreditation might therefore increase the tension between exploration and exploitation.

In summary, innovation activities and accreditation as an exploitative measure are important strategies in high-reliability organizations to keep up quality and meet customer and policy requirements. While structural ambidexterity is proposed to prevent negative effects of standardization on exploratory activities in dynamic environments, this approach is not feasible in organizations in which exploitation and exploration originate in the same departments. The theoretical arguments warrant an investigation of the determinants that facilitate accreditation and the impact of accreditation when pursuing contextual ambidexterity.

3 Methods

3.1 Setting

We studied the relationship between program accreditation and innovation activities in the context of specialized cancer care. With regard to accreditation activities,

data collection and analysis focussed on a targeted accreditation program for Organ Cancer Centers (OCC) in Germany, introduced by the German Cancer Society (German: Deutsche Krebsgesellschaft) in 2003. Breast cancer was the first tumor site to be accredited. The program was gradually expanded (Kowalski et al. 2017) and covered 7 organ systems as of 2021 (OnkoZert 2022). OCCs are accredited networks of inpatient and outpatient health care providers that are specialized in diagnosing and treating cancer patients based on the latest clinical evidence and quality standards. They form the lowest tier of a three-tiered accreditation system in cancer care. Accreditation of multiple OCCs is required for accreditation in the two upper tiers, which comprise Oncological Centers and Comprehensive Cancer Centers. Accreditation is possible regardless of hospital ownership type (i.e., private for-profit, private not-for-profit, or public). Accreditation of OCCs is not tied in any way to additional funding. Initial accreditation is granted by an external auditing organization (OnkoZert) and followed by annual surveillance audits. There is a high level of acceptance and implementation among hospitals in Germany, and 263 breast cancer centers and 285 colorectal cancer centers had been accredited by July 2020 (Deutsche Krebsgesellschaft e. V. 2020). The guidelines for accreditation are defined by the professional associations relevant to the specific tumor sites. The guidelines specify treatment standards, as well as requirements for staffing, infrastructure, caseload, and research (Kowalski et al. 2017). Similar accreditation programs exist in other countries, such as those offered by the CoC in the US and Puerto Rico.

3.2 Data Collection and Sample

For our comparative case study, we conducted semi-structured interviews with quality managers and physicians working in hospitals with accredited OCCs. We chose this approach for several reasons: First, conducting semi-structured interviews makes it possible to assess how interviewees define innovation, which is necessary for interpreting interview data. Often, the assessments of innovation deviate from the classification in the literature. For example, some interviewees did not consider incremental innovation or process innovation relevant. In these cases an open conversation enables the interviewer to intervene by focusing on underrepresented types of innovation. Second, because accreditation and innovation are generally emotional topics from a change management perspective (Alkhenizan and Shaw 2012; Berwick 2003), we felt that it was necessary to give interviewees the chance to describe their experiences and thoughts regarding their daily work. Third, the use of a semi-structured approach allowed us to engage in more natural conversations with informants, enabling them to provide additional information relevant to our research questions (Galletta 2013). Lastly, most hospitals that provide specialized cancer care in Germany are accredited or certified by multiple organizations, such as the International Organization for Standardization (ISO) or the Cooperation for Transparency and Quality in Healthcare (KTQ). Our decision to use semi-structured, in-depth interviews allowed us to ask specifically about OnkoZert accreditation and therefore increase the validity of our results. We guaranteed anonymity to interviewees to help prevent social desirability bias.

Based on the conceptual background, we developed an interview guide (Online Resource 1). This included questions about the strategic goals of the department, the level of innovation activities, and the strategic goals related to these. In addition, interviewees were asked about their perceptions of the value of accreditation of OCCs, the underlying strategic goals of their department, and the impact of accreditation status on their department's innovation activities and strategic goals.

We piloted the interview guide with one quality manager and one physician to ensure its completeness and clarity in its use of terminology. Because this led only to minor adjustments in wording, we included the pilot interviews in our data set.

The interviews were conducted online or by telephone by one author and lasted between 14 and 79 min (mean: 42 min). The author recorded each interview after obtaining permission to do so, as well as written consent from each interviewee to participate in the study. We transcribed the interviews using the online transcription software Amberscript¹ and subsequently checked these manually for correctness.

To control for differences in regional and organizational characteristics, we took a heterogeneity sampling approach, selecting hospitals in different states, in rural and metropolitan areas, and of varying size (by number of beds). We focused on hospitals accredited for the diagnosis and treatment of breast and/or colon cancer because accreditation for these tumor sites was introduced early and has a high uptake among German hospitals, potentially offering us a wide range of interview partners. We sent interview requests by email to 137 physicians and 69 quality managers in 92 hospitals across Germany between May and August 2020. Quality managers are usually involved in the accreditation process and are also concerned with innovation strategies for quality improvement from a managerial perspective. The invited physicians were all involved in both medical and managerial tasks in their respective department, including the accreditation process. Two to three weeks after the initial invitation, we sent an email reminder or called the invitees personally. In total, we interviewed 11 physicians and 14 quality managers in 19 hospitals (Table 1). Interviews were conducted between June and September 2020. When we reached theoretical saturation in our coding of the data, we stopped sending interview requests and reminders.

Whereas the work of the participating quality managers was usually not limited to a single department, participating physicians were affiliated with nine accredited colorectal cancer centers and two accredited breast cancer centers. Five physicians were auditors of OnkoZert themselves. All interviewees could be considered experts in their field. The majority of interviewees experienced their organization both before and after it obtained accreditation, or had worked previously in a similar organization that was not accredited. Twelve interviewees were working in hospitals that had 300–800 beds, and 13 interviewees worked in hospitals with more than 1000 beds. In the following, we consider hospitals with fewer than 800 beds as small and more than 1000 beds as large. According to the classification of Germany's Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR), fifteen hospitals were located in urban areas, four in urbanized areas. Table 1 summarizes the characteristics of the interviewees and their organizations.

¹ <https://www.amberscript.com/en/>.

Table 1 Characteristics of interviewees and their hospitals ($N=25$ interviewees)

Characteristics of interviewees		<i>N (%)</i>
<i>Profession</i>	Physician	11 (44)
	In colorectal cancer centers	9 (36)
	In breast cancer centers	2 (8)
	Quality Management	14 (56)
<i>Auditing for OnkoZert</i>	Yes	5 (20)
	No	20 (80)
Characteristics of hospitals		<i>N (%)</i>
<i>Ownership</i>	Private non-profit	10 (53)
	Public	7 (37)
	Private for profit	2 (10)
<i>Hospital beds</i>	300–399	3 (16)
	400–499	2 (11)
	500–599	–
	600–799	5 (26)
	800–999	–
	> 1000	9 (47)
<i>Teaching status</i>	Yes	19 (100)
	No	–
<i>Region type</i>	Urban region	15 (79)
	Urbanized region	4 (21)

3.3 Data Analysis

We used the method proposed by Gioia et al. (2013) to structure our analysis of interview data into four stages ranging from the raw transcripts to the conceptual model. Coding was performed using MaxQDA 2020. For first-order coding, one author read all interview transcripts and used short phrases (i.e., first-order concepts) to code the passages related to the broader topics of the study: strategic decision making, innovation and accreditation. Although these phrases were quite specific in the beginning, similar phrases were joined, over time, to form more general statements. During the coding process, we recognized an increasing theoretical saturation of first-order codes related to our research questions (Glaser and Strauss 1967). This step in our analysis yielded 362 codes in total.

To ensure the credibility of our interpretations and coding of the data, a second author coded a subset of interviews. We compared the codes of both authors and discussed differences until consensus was reached. Because the codes assigned by both authors were very similar, we concluded that the first-order coding had a high degree of objectivity.

We then aggregated the first-order concepts into second-order themes by assigning each code to up to three themes (Fig. 1). This resulted in a set of 81 second-order themes. All authors individually clustered the themes into broader dimensions by grouping themes and assigning overarching categories. These clusters were subsequently discussed to identify similarities and address differences. Finally, the

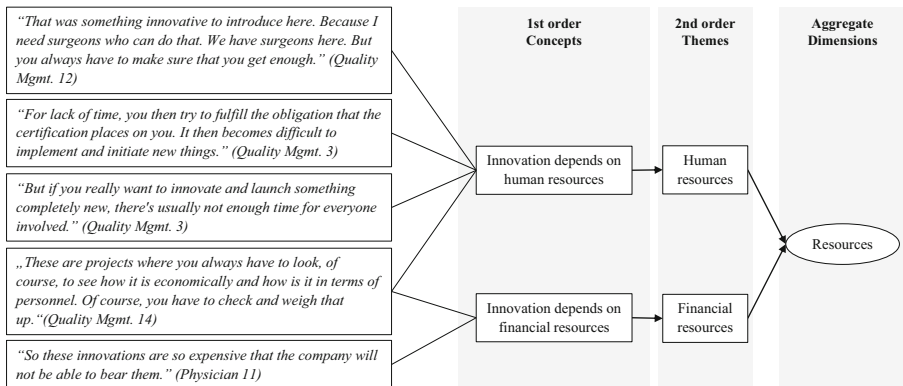


Fig. 1 Simplified data structure of representative comments, first- and second-order coding leading to the resource dimension

dimensions were combined with the aim of achieving the highest level of agreement among all authors.

The dimensions were structured into a conceptual model that was grounded in the interview data but abstracted from the particular context of any given hospital (Sonenshein 2014). We did not find substantial differences between the data obtained from physicians and quality managers, leading us to form one comprehensive model. However, the focus of each of the two groups varied somewhat insofar as physicians focused more on their department and specific innovation, whereas quality managers focused more on the hospital as a whole. This may be attributable to the different professional roles and experiences of the two groups of interviewees. We repeatedly challenged the model with the interview data and adjusted it to the statements made by interviewees. We also challenged the model with findings of relevant peer-reviewed literature outside of our research topic to increase the generalizability of the model. This led us to rename the subcategories of the resource dimensions and reshape the overall outline of the model from a cyclic to a directed outline. We assigned relationships among dimensions based on sensemaking from the interview data (Gioia and Chittipeddi 1991). We assigned relative effect sizes to the relationships as a function of the frequency of certain statements and the emphasis placed by the interviewees on these statements. To increase the reliability and validity of our interpretations, the model was discussed within the research team until consensus was reached on its content and design.

Before initiating this study, we obtained ethical approval from the Ethics Committee of the Medical Faculty of the University of Duisburg-Essen (No. 19-9012-BO). The committee raised no ethical or legal objections.

4 Findings

The conceptual model that was developed from the interviews suggests that accreditation can support organizational ambidexterity and is contingent to several

explicit determinants (Fig. 2). Decisions to pursue program accreditation or innovation activities are generally a consequence of a hospital's strategic goals. Both types of activities (accreditation and innovation) contribute to strategic goals that impact the quality of care and financial performance. The internal and external factors we identify directly and indirectly influence accreditation and innovation activities. The impact of accreditation and innovation activities on quality of care and financial performance varies across hospitals and the magnitude of the effect varies by activity. Program accreditation positively influences a hospital's innovation activities towards ambidexterity. In the following, we elaborate on these key findings along our research questions.

4.1 Program Accreditation and Innovation as Means to Achieve Strategic Goals

The conceptual model suggests that program accreditation and innovation are both means to achieve the strategic goals of the organization, but their role varied by firm size. The strategic goals of interviewed hospitals were defined at the management level. The goals were broken down at the department level to define a set of specific measures such as the modernization of infrastructure, stabilization or increase in the number of cases, specialization or centralization. The strategic goals were defined according to the organizational resources and the competitive environment. Organizational resources included tangible, intangible, financial, and human resources and were highly dependent on the financing of a hospital. Additionally, competition

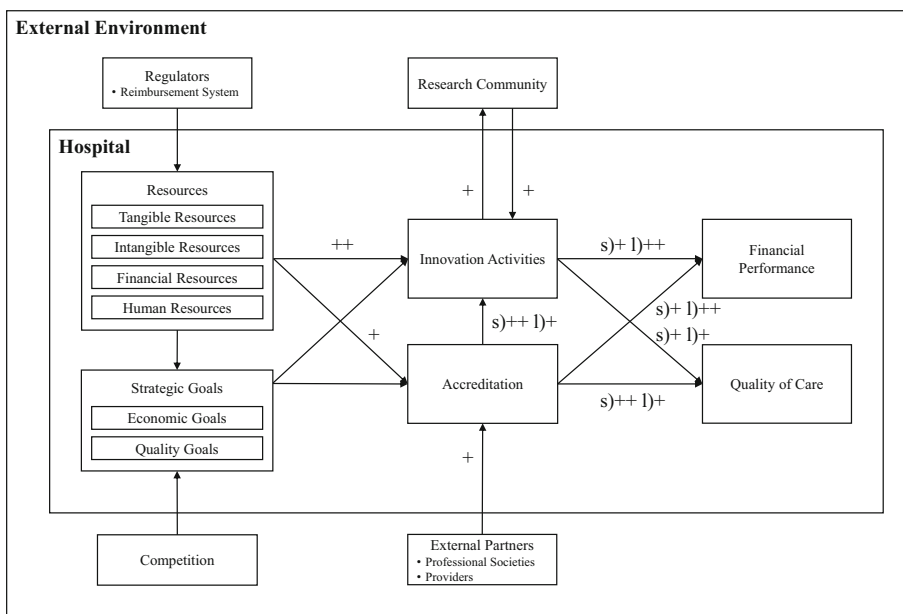


Fig. 2 Conceptual model of strategic goals, accreditation, innovation activities and performance in specialized cancer care (*s*) Smaller hospitals, (*l*) Larger hospitals, ++ Strong pos. effect, + Medium pos. effect)

within a hospital's region had a strong influence on a hospital's strategic goals. The larger the number of providers in one region, the greater the need for a hospital to build and retain a competitive advantage.

All interviewees reported that achieving or maintaining high-quality care was the main goal of their organization. Due to financial pressure, another strategic goal was economic success. As most hospitals in our sample were public or private non-profit organizations, the strategic goal was to avoid financial loss rather than to maximize profit. In line with this, most interviewees ranked high-quality care above economic success in terms of importance. A few interviewees, however, stated that there was a tension between the two goals:

“[...] competition between these two goals exists, of course. However, absolute priority lies with the clinical goals, and the economic goals have to be aligned with them.” (Physician 10)

“Yes, of course. After all, these are the classic conflicting goals of medicine. Yes, because the DRG system ultimately does not reward quality, but only quantity. And of course there is a considerable conflict of goals in daily life, every day.” (Physician 9)

Seeking the accreditation of OCCs was perceived by many interviewees as an appropriate measure to achieve quality and economic goals. However, the main reasons for seeking accreditation differed substantially between smaller and larger hospitals. Most interviewees working in smaller hospitals pointed out that their organizations used accreditation primarily as a tool to increase the quality of care, to improve processes through standardization, and to communicate quality standards to stakeholders. In contrast, interviewees working in larger hospitals saw accreditation as a necessary condition to be acknowledged as an Oncological Center and Comprehensive Cancer Center in the two upper tiers of accredited cancer care in Germany. Some interviewees mentioned that being accredited as a Comprehensive Cancer Center was related to additional funding and therefore offered an additional incentive for larger hospitals to obtain accreditation. Most interviewees felt it was a necessity to seek accreditation when the competing hospitals in the same region were accredited, but only if the required financial and human resources are available:

“Well, these are of course very clear competitive goals. Yes, there are three large hospitals [...], all of which are accredited. So we can't afford not to be accredited in regional competition.” (Physician 9)

Some interviewees highlighted the importance of external stakeholders in the decision to seek accreditation. Because OCCs are accredited care networks that include inpatient and outpatient providers, the availability of providers willing to cooperate is crucial for accreditation. Additional critical stakeholders are professional societies, which define the catalogue of requirements for accreditation. The ability of a hospital to fulfill the requirements on a regular basis determines the accreditation decision.

According to interviewees, the main aim of innovation activities is quality improvement in the provision of care. However, the role of innovation differed strongly among the hospitals in our sample. Here, too, the interview data allow to distinguish

between smaller and larger hospitals. Various statements by interviewees emphasized that smaller hospitals regarded innovation as a means to improve quality and offer state-of-the-art care. Larger hospitals, such as university hospitals, however, regarded innovation activities as part of their mission, not only including the exploitation of existing innovation but also the exploration of new knowledge through clinical research.

“[Exploration] has a very high priority, because university hospitals actually have a mandate in this regard from the legislator. So: teaching, research, further development [...]” (Quality Mgmt. 6)

Additionally, some interviewees mentioned economic reasons for innovation, including the desire to increase the caseload by offering new and attractive treatment options.

The scope of both exploratory and exploitative innovation depends on available resources and reimbursement options. Some interviewees highlighted that innovation activities were associated with extensive costs or required large investments. If innovation costs cannot be compensated through sufficient reimbursement or funding, hospitals are unlikely to innovate:

“It’s not that we would [...] give unapproved drugs where there is a risk that the hospital will end up paying the bill.” (Physician 1)

In addition, innovation activity can require highly trained professionals. According to our interview data, the availability of such professionals in the hospital and in the market affects innovation activities. It was also mentioned that hospitals that were more innovative had stronger cooperation with the national and international research communities. These cooperations foster the exploration and exploitation of innovation and increase the level of innovation activities in hospitals.

4.2 Impact of Accreditation and Innovation Activities On Organizational Outcomes

The perceived impact of program accreditation on service quality depends on the initial level of quality which is often contingent on the size of the organization. Smaller hospitals experience a stronger effect on quality of care that is caused by the compliance with accreditation guidelines. Larger hospitals perceive the effect as smaller, as the provision of care is often in accordance or exceeding accreditation requirements before accreditation. In these cases, accreditation has a limited effect on the provision of high quality care.

The primary impact of accreditation on financial performance is caused by the marketing effect of the accreditation label. When hospitals communicate accreditation status to patients and referring physicians, accreditation can increase caseload of cancer treatment, which is related to higher revenues. However, evidence on this impact remains anecdotal, as hospitals cannot clearly attribute changes in caseload to accreditation status. Larger hospitals, such as university hospitals, are generally associated with high quality of care by patients and resident physicians, limiting the marketing effect of an accreditation label. Additionally, these hospitals often

provide care to more severe cases, reducing the number of potential competitors in the region. While, in larger hospitals, accreditation is less likely to increase revenues through caseload, accreditation of OCCs opens the opportunity to become accredited as Comprehensive Cancer Center. Accreditation as Comprehensive Cancer Center, in turn, can lead to additional funding intended for research.

Study participants agree that innovation activity increases quality of care. Related to findings regarding the innovative potential of accreditation requirements in different hospitals, the participating hospitals differed in their level of innovativeness. Regardless of this initial level of innovation, further innovation activity was associated with quality improvement.

4.3 The Relationship Between Program Accreditation and Ambidexterity

The conceptual model allows describing the role of program accreditation in the trajectory of ambidexterity. In organizations that are highly innovative already, accreditation has a minor impact on innovation activities. In organizations that engage in few innovative activities, the requirements of accreditation support incremental product and process innovation.

Our data shows a positive impact of program accreditation on exploitative and exploratory innovation. The impact of program accreditation on innovation activities in the hospitals in our sample was contingent on the type and extent of innovation activities undertaken before the decision was made to pursue accreditation. As an exploitative measure, accreditation has a positive impact on the introduction of incremental product and process innovation that are related to the accreditation guidelines. An example is the introduction of psycho-oncology services, which are a requirement for program accreditation in Germany. Many interviewees reported that, because their hospitals did not meet this requirement, they introduced these services before pursuing accreditation. The impact of accreditation on exploitation depends on the mismatch between accreditation guidelines and the initial situation in hospitals. This mismatch is usually bigger in smaller hospitals.

Additionally, we find a relationship between accreditation and exploration of innovation in our sample. Accreditation of OCCs requires that a certain percentage of cancer patients be enrolled in clinical trials. If this percentage is lower before accreditation is received, the accreditation can be interpreted as having had a positive influence on exploratory activity. As many interviewees in smaller hospitals reported fewer innovative activities before pursuing program accreditation compared to large hospitals, the impact of accreditation on innovation activities was greater in smaller hospitals.

“I actually believe that in hospitals that basically have an innovative approach, accreditation does not bring about change.” (Physician 2)

When organizations are capable to achieve accreditation as Comprehensive Cancer Center and acquire additional funding intended for research, accreditation of OCCs has an additional positive impact on exploration.

The interview data suggests that accreditation can facilitate organizational ambidexterity in different ways. As an exploitative measure, accreditation can be used

as a structured way to introduce treatment standards based on clinical guidelines. Accreditation potentially affects the balance between exploration and exploitation towards exploitation and therefore increases the tension between both activities. However, for our study context, the design of the accreditation guidelines and the three tiered accreditation system holds the potential to promote exploration. By requiring accredited OCCs to participate in clinical trials and offering funding opportunities, accreditation promotes exploratory activities in hospitals on different levels and reduces tension between exploration and exploitation.

5 Discussion

Our conceptual model offers new insights into the determinants of program accreditation and innovation activities as transformative measures in high-reliability organizations and the relationship between them. Against what may be suggested on conceptual grounds, our conceptual model suggests that accreditation does not necessarily increase the tension between exploration and exploitation. We further find heterogeneous relationships by organizational and environmental characteristics that may depend on related social pressures within the institutional environment of the organization. This observation suggests a neo-institutional perspective in which organizations adapt practices not only for performance, but to gain legitimacy which is adopting accreditation in our case (Suddaby et al. 2013). In our research setting the differences are often attributable to organizational size that determines availability of resources and market position.

In the context of hospitals that provide specialized cancer care in Germany, smaller hospitals tend to use program accreditation to increase their competitiveness in the local market and improve the quality of care they provide. Smaller hospitals usually do not have the required infrastructure or number of patients to be acknowledged as a Comprehensive Cancer Center and, therefore, do not have a direct financial incentive to seek accreditation. Larger hospitals tend to perceive accreditation as OCC as necessity to be accredited as a Comprehensive Cancer Center, which, in turn, is related to additional funding. Therefore, even though there is no direct funding of a hospital's efforts to achieve or maintain program accreditation as OCC, there is a financial incentive for doing so for smaller and larger hospitals alike. Our results confirm findings on accreditation in the literature, including those of studies conducted outside the health care sector. These studies identified a strategic focus on quality improvement, competitive advantage, and customer orientation as drivers of the decision to obtain or maintain certification (Anderson et al. 1999; Pekovic 2010). We were unable to identify a negative effect of hospitals' strategic focus on innovation performance on accreditation status, as was identified by Pekovic (2010). Indeed, to the contrary, in our sample it was larger hospitals that used program accreditation as a means to acquire financial funding for innovation activities.

The interviewees reported that program accreditation and innovation activities had positive effects on quality of care. While our research approach does not allow us to quantify improvements in quality, these statements are confirmed by the literature

(Beckmann et al. 2011; Butea-Bocu et al. 2021; Cheng et al. 2021; Faivre-Finn et al. 2002; Lichtenberg 2014; Richter et al. 2021; Völkel et al. 2019; Weissflog et al. 2012).

The identified positive impact of accreditation and innovation activities on financial performance is attributable mostly to marketing effects, funding, and efficiency gains. While Lindlbauer and colleagues (2016) suggest that technical efficiency may decrease temporarily when organizations pursued accreditation with a high workload, our results might be explained by the motives to seek accreditation. Terziovski and colleagues (2003) suggest that customer focus, a continuous improvement strategy, and the reaction to environmental factors are effective motives for accreditation that lead to improved financial performance. These motives were mentioned repeatedly by the interviewees in our study. Our results suggest that accreditation and innovation activities qualify to achieve quality and financial goals simultaneously and reduce the tension between both organizational goals identified by the interviewees.

In smaller hospitals in our sample, program accreditation had a positive impact on incremental rather than radical process and product innovation. The positive impact of accreditation on process innovation, which supports the findings of Terziovski and Guerrero (2014), can likely be explained by the promotion of communication between disciplines and patient-centered process improvements. As the larger hospitals of our sample, including university hospitals, were more innovative in their implementation and (co-)development of new technologies and processes, the relative effect of program accreditation on innovation activities was smaller. These hospitals often exceeded the accreditation requirements by introducing highly innovative technology like robot-assisted surgery, or by developing new treatment options for cancer patients. As drivers of innovation, these hospitals are not only influenced less by the requirements of program accreditation; they actually create the evidence base that supports diffusion of innovation across other organizations and may lead to a subsequent adjustment of accreditation requirements. We could not confirm the result of Terziovski and Guerrero (2014), who identified a negative impact of certification on product innovation measured in terms of time to market. In particular, it appears that program accreditation requirements concerning patient enrollment in clinical trials may have counteracted this negative effect.

Consequently, program accreditation and innovation activities are not contradictory strategies. We did not find a negative impact of accreditation as exploitative strategy on exploratory activities and consequently organizational ambidexterity. Rather, accreditation as an exploitative activity can be combined with exploration to achieve organizational ambidexterity. Accreditation is thereby designed to support exploration at a fundamental level. In accordance with ambidexterity theory (Tushman and O'Reilly 1996), aligning both strategies has the potential to achieve superior organizational outcomes in terms of quality and financial performance. The balance between both strategies and their alignment depends on the organization: In most participating hospitals, the innovation and accreditation activities were performed in the same organizational unit, matching the concept of contextual ambidexterity. In some of the hospitals, however, clinical trial activity, and thus exploratory innovation, was centralized in a separate department, matching the concept

of structural ambidexterity and offering synergies between the exploratory activities of different hospital departments. The superiority of ambidexterity in high-reliability organizations is supported by Jansen and colleagues (2006), who found exploration and exploitation each to be more effective in different market contexts—the former being more effective in dynamic markets and the latter more effective in competitive market environments. In high-reliability organizations across the board, both types of market environment are present, suggesting that combining exploration and exploitation may have additive or even synergistic effects.

5.1 Limitations

Our study is subject to several important limitations, part of which are related to our study sample. As the research questions were focused on the determinants and impact of the accreditation of OCCs, we only included accredited centers in our sample. Even though most of the interviewees experienced organizations without accreditation, future research should include non-accredited centers to elaborate additional organizational and environmental factors that might prevent accreditation. Regarding our interviewees, our results may be subject to selection bias due to self-selection. The research topic might have been more attractive to hospitals with certain characteristics, for example those that perceived themselves as innovative, or whose staff had higher acceptance of accreditation. Five of the physicians we interviewed were auditors for the accreditation program and might therefore have had a special interest in our study. The selection bias might be reflected in an imbalance in our sample regarding the two chosen accreditation types. Even though we contacted colorectal and breast cancer centers, only two interviewees were affiliated with the latter. This could be due to the current state of program accreditation in breast cancer: because about 80% of breast cancer patients in Germany are already treated in accredited centers (Deutsche Krebsgesellschaft e. V. 2020), the topic may have been of lesser relevance to these centers from a strategic point of view. Nevertheless, our model is probably applicable to other cancer entities because the model dimensions are generic and not bound to certain medical specialties.

Other limitations are related to data collection and analysis. Inductive research allows for new concept development based on interview data. In comparison to a deductive approach, where a model is derived from the literature and tested with interview data, our conceptual model is specific to the setting of our study, in particular the accreditation program for OCCs. Interpretations of our results in the context of other types of accreditation programs must be made with caution. Future research should validate the study results in different organizational settings. During the coding process, we did not include a coder who was blind to our research questions. While the applied method is designed to allow for an objective and transparent model development, we cannot completely rule out the possibility of confirmation bias. Since our model builds on interviewees' perceptions, which are inherently linked to their different professional roles, it might be subject to various forms of cognitive bias related to these. We strove to address this potential issue by interviewing a mix of administrative and medical staff.

Finally, following the common terminology in the literature on innovation strategies, we distinguished between exploration and exploitation in our interview questions. Although we explained the terms to interviewees during the interviews, we recognize that, for some, it was hard to distinguish between these two types of innovation. Some innovation activities, such as clinical trials, were perceived by our interviewees either as exploration or exploitation depending on the extent of the department's involvement and the development status of the product in question. Moreover, the interview data suggest that product innovation cannot be separated from process innovation. Exploiting a new product often requires adjusting processes in health care. The absence of a clear definition of innovation made it difficult for interviewees to quantify innovation activities at their organization which limits the ability to distinguish by innovation types in our model.

5.2 Implications for Management and Policy

Our results suggest that program accreditation can be used for quality improvement in the context of high-reliability organizations in which error-free operations are critical and decisions are hypercomplex. The potential for improvement depends on the initial situation of the department. Before deciding to pursue program accreditation, hospital decision-makers should assess the availability of resources and the potential benefits of accreditation. They have to bear in mind that the use of resources for this purpose must not compromise patient care, for example by overburdening medical staff with administrative tasks. The financial implications of program accreditation are hard to quantify and probably vary according to caseload and the market environment. Whereas in areas with many competing accredited providers it might be necessary to obtain accreditation to remain competitive, in regions with only few or no accredited competitors, the financial benefits might not outweigh the costs. Importantly, public awareness of program accreditation in cancer care will probably increase as time goes on, and patients will be willing to travel longer distances to receive treatment in accredited centers. This will increase the incentives for hospitals to seek accreditation, even in areas with low competition.

There appears to be no trade-off between program accreditation and innovation activities except for the use of limited resources. Especially in competitive environments, it might be favorable to pursue program accreditation to ensure state-of-the-art quality of care before engaging in further exploitative and exploratory innovation activities. In line with the classification of March (1991), accreditation as exploitative activity can increase efficiency and secure short-term profits. These profits can subsequently be invested in the potentially more risky exploration of new knowledge.

Policy makers can support organizations in their efforts to achieve ambidexterity by ensuring that both exploitative and exploratory activities are covered when defining accreditation guidelines. Both activities must be compatible within the context of organizational resources. Because the incentives for hospitals in less competitive regions to obtain program accreditation are limited, there is the risk that patients in these regions have poorer access to accredited cancer care. Policy makers can facilitate the diffusion of accreditation in potentially undersupplied regions by set-

ting financial incentives (e.g., through additional funding) or by imposing additional requirements on the care of cancer patients. Ultimately, in our study context, accreditation as an OCC could become mandatory for the treatment of cancer patients. However, there is a risk that patients in rural areas will be undersupplied if hospitals cannot meet the related requirements. Whether the benefits of strict quality standards outweigh those of receiving cancer treatment close to home is still a matter of debate, and further research in this area is urgently needed.

6 Conclusion

The results of this qualitative study suggest that program accreditation and innovation activities as measures for organizational transformation are not contradictory strategies in the context of high-reliability organizations. Rather, strategic decision-making can align both strategies in accordance with an organization's available resources and market environment to achieve organizational ambidexterity. From a policy maker's perspective, it is desirable to improve access to accredited cancer centers for patients because accreditation is related to better quality of care. Especially in rural areas with smaller hospitals, policy makers can pursue this aim by creating incentives for accreditation, such as additional funding or imposing additional requirements for cancer care.

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Declarations

Conflict of interest T. Brand, E. Goetjes and K. Blankart declare that they have no competing interests.

Ethical standards Before initiating this study, we obtained ethical approval from the Ethics Committee of the Medical Faculty of the University of Duisburg-Essen (No. 19-9012-BO). The committee raised no ethical or legal objections. All contributors agreed to submit this paper for publication.

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