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Citation for the original published paper (version of record):

Åhlin, P., Hermansson, S., Almström, P. (2025). Focused operations to improve the patient flow in full-service healthcare organisations. Production Planning and Control, 1-20.
http://dx.doi.org/10.1080/09537287.2025.2591893

Production Planning & Control
The Management of Operations

ISSN: 0953-7287 (Print) 1366-5871 (Online) Journal homepage: www.tandfonline.com/journals/tppc20

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To cite this article: Philip Åhlin, Simon Hermansson & Peter Almström (26 Nov 2025): Focused operations to improve the patient flow in full-service healthcare organisations, Production Planning & Control, DOI: 10.1080/09537287.2025.2591893

To link to this article: https://doi.org/10.1080/09537287.2025.2591893

PRODUCTION PLANNING & CONTROL
https://doi.org/10.1080/09537287.2025.2591893

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Focused operations to improve the patient flow in full-service healthcare organisations

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ABSTRACT

Full-service healthcare providers struggle to enhance productivity due to their complexity. To address this, we studied how greater operational focus could improve their productivity. After conducting a systematic literature review, we created a framework aimed at fostering focused healthcare organizations. We applied this framework in a case study of a full-service provider, analyzing care processes by patient volume and variety. Our findings reveal that blending simple and complex care processes lowers flow efficiency while segmenting them into either high-volume, low-variety (focused) and low-volume, high-variety (general) significantly improves productivity. Our framework serves as a tool for healthcare managers to define strategic directions, evaluate operational focus, and implement streamlined operations. It aids in resource allocation by differentiating between processes needing flexible staffing and those that can be optimized, decreasing overtime costs and preventing staff burnout. We recommend that full-service providers embrace a dual-focus model to better manage complexity and enhance operational efficiency.

ARTICLE HISTORY
Received 15 November 2024
Accepted 13 November 2025

KEYWORDS
Swift and even flow; focused factory; throughput; productivity; efficiency

1. Introduction

At the heart of modern healthcare systems, hospitals provide an array of medical, therapeutic, diagnostic, and surgical services. However, ever-rising patient volumes, ageing populations, and increasing clinical complexity place immense strain on hospitals today (World Health Organization (WHO), 2024). One of the most visible consequences of such strain—one that is also becoming critical in many countries—is the growth in wait times for appointments, surgeries, and treatments (OECD 2022). Addressing those delays is challenging, for expanding the capacity of hospitals is often restricted by financial limitations and chronic staff shortages (Scheffler and Arnold 2019). In response, policymakers and healthcare managers have increasingly focused on improving productivity and sought out ways to treat more patients using the same or even fewer resources (Johnson, Burgess, and Sethi 2020). Per the theory of swift and even flow (TSEF), the productivity of hospitals requires minimising delays as well as variation in patient flows (Schmenner and Swink 1998). However, applying such principles in hospitals remains difficult due to the inherent complexity of care delivery. Unlike standardised manufacturing environments, hospitals have to handle a broad spectrum of diseases, conditions, and patient pathways (Glouberman and Mintzberg 2001, Persis et al. 2022), which, in a certain sense, turns them into immensely complicated processing plants (Rechel et al. 2010).

Indeed, one approach to improving operational efficiency that has recently gained attention is conceiving healthcare facilities as focused factories. That conceptualisation, originally developed in the manufacturing sector (Skinner 1974), suggests that concentrating on a narrow set of tasks can increase quality, lower costs, and boost efficiency (Hyer, Wemmerlöv, and Morris 2009, Kc and Terwiesch 2011, Thirumalai and Devaraj 2024, Vissers, Bertrand, and DE Vries 2001). In healthcare, the concept has largely been applied to specialised hospitals and medical clinics, who treat homogeneous patient groups (Kc and Terwiesch 2011, Pieters, Van Oirschot, and Akkermans 2010). Such providers enhance their operational focus by selectively admitting more profitable and more manageable cases, unlike full-service hospitals, which are required to offer a broad range of diagnostic, therapeutic, and emergency services across multiple medical disciplines (Ding et al. 2020, Kc and Terwiesch 2011, Thirumalai and Devaraj 2024).

As a consequence, full-service hospitals are often left to care for more complex and severely ill patients, which makes efficient care delivery increasingly difficult (Thirumalai and Devaraj 2024). Among other constraints, hospitals operate under the influence of political reforms that increasingly tie funding to performance targets, including wait times for first-visit appointments and surgeries, which has sharpened their focus on high-volume patient groups and early stages of care (Rönnerstrand and Oskarson 2020). Worldwide,

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/09537287.2025.2591893.

nationally imposed standardised care pathways (e.g. for cancer) additionally force clinics to prioritise cancer patients while potentially neglecting others (Olsson 2020).

Beyond that, the profession-driven healthcare environment, in which the specialisation of physicians often clashes with administrative and political priorities, complicates the design of healthcare services (Glouberman and Mintzberg 2001). For that reason, many healthcare professionals have chosen to leave full-service providers for specialised facilities that offer better pay and less stressful conditions, in a trend that has only exacerbated the pre-existing capacity crisis (Dabhilkar and Svarts 2019, Ding 2024, Strumann et al. 2022).

Despite the potential of the focused factory approach, research has been limited on how the approach can be adapted to full-service hospital settings that need to accommodate patient diversity and complex care processes. To date, most studies have investigated specialised providers, thereby leaving a gap in current understandings of how operational focus might be achieved in full-service hospitals. In response, the objective of our study was to explore how operational focus can be enhanced in full-service healthcare organisations as a means to improve productivity despite patient complexity. More specifically, we aimed to (1) explore how the concept of the focused factory has been applied in healthcare to achieve operational focus, (2) examine the current state of operational focus in a full-service provider, and (3) investigate how the concept can be adapted to fit complex hospital environments. To achieve those aims, we conducted a systematic literature review and, based on our findings, developed a framework that applies the concept of the focused factory in healthcare. After that, we conducted a single-case study on a full-service medical clinic to analyse its patient processes and assess how our framework could guide improvements in the clinic's operational focus.

2. Theoretical framework

2.1. Theory of swift and even flow (TSEF) and focused operations

The TSEF, as defined by Schmenner and Swink (1998), unifies what are commonly referred to as the laws of operations management (Onofrei et al. 2020, Seuring 2009). According to Schmenner and Swink (1998), traditional microeconomic theory is useful in understanding how labour and capital inputs translate into productivity but contributes little to multiple aspects of factory floor operations—for example, variability in quality and demand, workforce organisation, and process bottlenecks. The TSEF does not disagree with microeconomic theory but does emphasise the fundamentals behind what makes processes swift and even (i.e. productive) as *the* prerequisite of all economic success (Schmenner 2015). The theory advocates not only creating focused cells of production to increase productivity but also grouping similar products together to reduce variability and complexity (Devaraj et al., 2013, Onofrei et al. 2020, Wikner et al. 2017). The ultimate origin of focus in operations is the division of labour, and in his book *The Wealth of Nations*, Adam Smith (1776) presents the benefits of specialisation that allow firms to efficiently turn resources into products. In follow-up, Wickham Skinner (1974) argues in his pioneering article *The Focused Factory* that firms need to prioritise between cost, quality, speed, and flexibility and that neglecting to do so—that is, sacrificing performance in some objectives in order to excel in others—will ultimately make them second-best in them all. The core idea of focus is thus to reduce complexity and excel by concentrating on fewer tasks (Pieters, Van Oirschot, and Akkermans 2010). As a case in point, cellular manufacturing, a within-plant application, reveals that the concept of the focused factory is also applicable to smaller units and designed to exploit similarities in how information is processed, how products are made, and how customers are serviced and to closely locate people and equipment needed to produce similar types of products (Hyer, Wemmerlöv, and Morris 2009, Wikner et al. 2017).

2.2. Pathways, service lines, and specialised facilities

Focus projects in healthcare often take the form of clinical pathways (CPWs), also called "care pathways" and "clinical protocols". CPWs are structured, multidisciplinary care plans that outline essential steps in treating specific patient groups with particular clinical conditions over a defined period (Lawal et al. 2016). CPWs aim to improve medical quality by standardising best practices, reducing variation, cutting costs, and optimising outcomes for specific patient groups (Rotter et al. 2010). The development of CPWs has taken inspiration from the critical path method used in manufacturing and in implementing CPWs for specific diseases, which requires clearly identifying tasks within care processes (Luo et al. 2021). We argue that CPWs represent a bottom-up approach to achieving operational focus, one tailored for specific patient groups and implemented by professionals to enhance the quality of care. That view is supported by the work of Bjurling-Sjoberg et al. (2018), who have explained that although clinical guidelines are typically developed in top-down fashion, care pathways often emerge from the bottom-up as a means to fit local service configurations precisely. Evidence also suggests that CPWs improve medical quality, reduce costs, and shorten the length of stay for targeted patient groups (Luo et al. 2021, Rotter et al. 2010). However, recent studies have identified crowding-out effects, in which improvements for one patient group create disadvantages for another, and shown that patient groups with clear CPWs experience shorter wait times at the expense of others (Olsson 2020).

Focus projects can also be driven by organisational and economic factors, particularly through the development of hospital service lines that group patients with similar needs and co-locate the resources required to treat them. Service lines are typically developed around specific services (e.g. cardiac or orthopaedic care), market segments (e.g. adults or children), or a combination thereof (Hyer, Wemmerlöv, and Morris 2009). Similar to managing product portfolios in manufacturing, hospitals may assess their services by focusing on ones essential to long-term success while de-prioritising less valuable ones (Ding 2024). Regarding the outcomes of service lines, research has shown a mixed picture, with some studies revealing little to no improvement in performance (Byrne et al. 2004, Hyer, Wemmerlöv, and Morris 2009), while others suggest increased efficiency through specialisation (Ding 2014, Mcdermott and Stock 2011). Added to that, for-profit hospitals are more likely to develop service lines based on profitability and, as a consequence, often avoid complex patient groups.

A higher-level approach to achieving focus in healthcare involves designing specialised facilities, including specialty hospitals (e.g. cardiac hospitals) and ambulatory surgery centres, which aligns with the concept of the focused factory (Dabhilkar and Svarts 2019, De Regge et al. 2016). In recent decades, those specialised facilities have emerged alongside traditional full-service hospitals as alternative care settings and concentrate on specific operations that are detached, independent, planned, repetitive, and predictable and involve patients with low comorbidity (Dabhilkar and Svarts 2019). The goal, as in developing service lines, is to reduce complexity by focusing on a limited set of operations (Karvonen et al. 2022). Concentrating resources in narrow areas allows employees to develop tacit knowledge and coordinate care processes more efficiently (Ding 2024, Zepeda, Nyaga, and Young 2021, De Regge, Gemmel, and Meijboom 2019). We argue that developing service lines and specialised facilities represents a top-down approach to operational focus that is consistent with the concept of the focused factory. Studies by Kc and Terwiesch (2011) and Kuntz, Scholtes, and Sülz (2019) have additionally suggested that specialised facilities generally outperform full-service hospitals in terms of quality, throughput, and cost. The underlying premise is that concentrating cases in one or a few service area(s) enables staff to manage clinical conditions more efficiently (Zepeda, Nyaga, and Young 2021). Indeed, other studies have highlighted that specialised facilities improve medical quality, enhance patient satisfaction, and offer lower-cost services (Hyer, Wemmerlöv, and Morris 2009).

2.3. Volume and variety

Christensen and Jason (2009) have identified the coexistence of two fundamentally misaligned operational models as the root cause of managerial complexity in healthcare. One is the value-adding process for standardised, routine treatments for patients with well-organised conditions, while the other is the solution shop for complex and hard-to-diagnose patients. In turn, Kuntz, Scholtes, and Sülz (2019) have argued that the two models are challenging to combine and, for that reason, that it is important to separate complex patient groups and care processes from the simpler, standardised ones in order to improve operational efficiency. The idea of separating the complex from the simple—a pillar of the focused factory (Skinner 1974)—has been developed by Hayes and Wheelwright (1979) to describe the need to match the focus of products with the focus of processes for a full and complete operational focus. The product–process matrix, illustrated in Figure 1, is thus a classical framework in operations management that emphasises the need to coordinate market strategy and production strategy in order to become competitive (Ahmad and Schroeder 2002, Hayes and Wheelwright 1979).

The product–process matrix showcases how a process can be designed in numerous ways but that only one or a few designs guarantee the best fit between operational resources and external requirements. The optimal design is defined by the process's relationship to the volume and variety of its products and/or services and has to follow those dimensions in order to become economically viable and technically feasible (Holweg et al. 2018). When the variety of products or

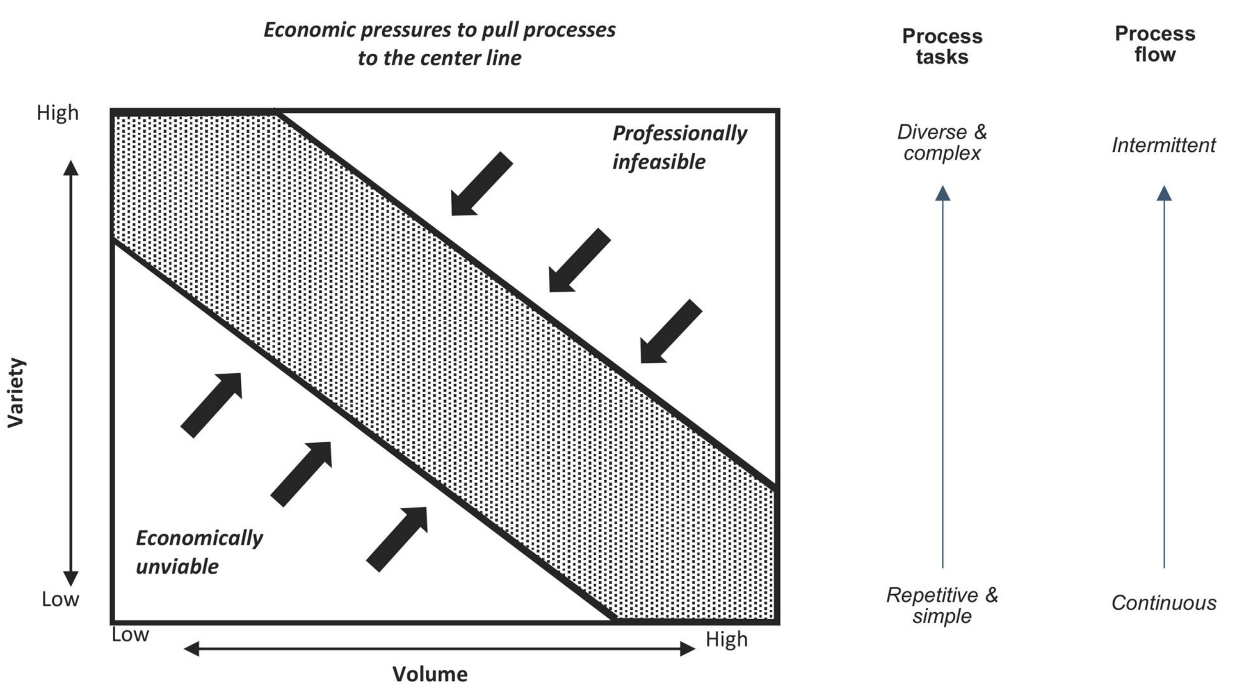


Figure 1. The product–process matrix adapted to a healthcare context.

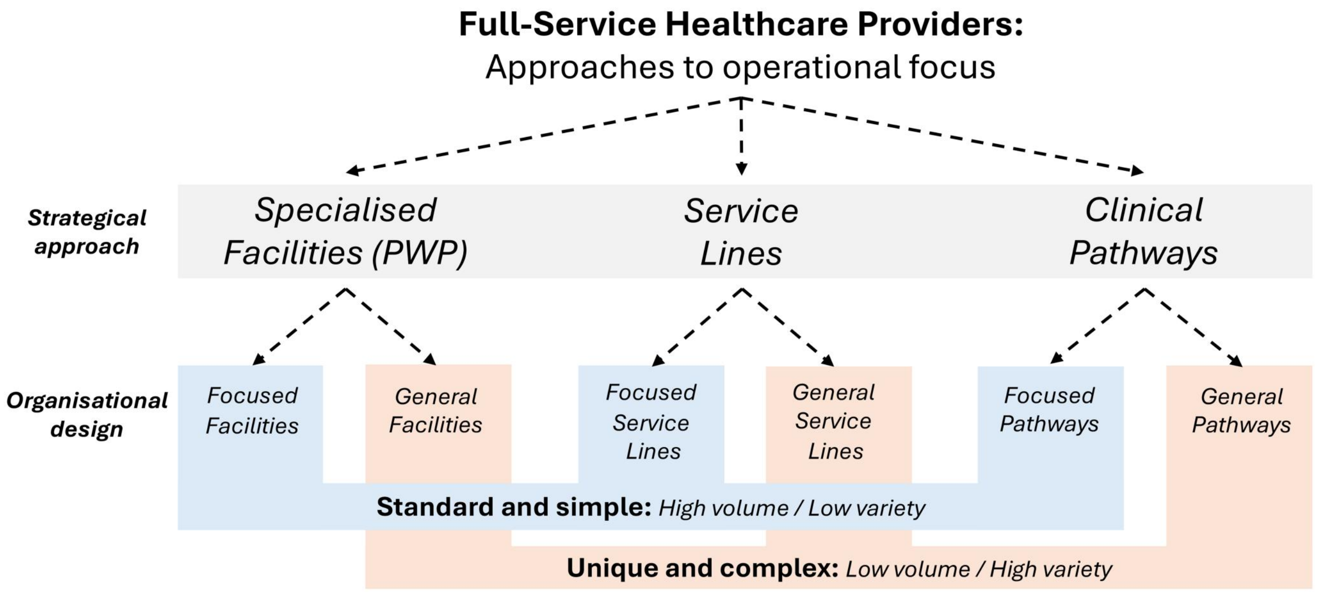


Figure 2. Approaches for focus for full-service healthcare providers.

services within a process increases, the tasks therein subsequently change from repetitive and simple to diverse and complex, while the flow of the process changes from continuous to intermittent (Holweg et al. 2018). We argue that separating patients with well-organised conditions from complex, hard-to-diagnose patients, as suggested by Christensen and Jason (2009) and Kuntz, Scholtes, and Sülz (2019), can be supported by using the process–product matrix. At the same time, to adapt the matrix to a healthcare context, we have chosen to change the dimension "technically infeasible" (i.e. machines or technological setups cannot switch quickly enough between various operations) to "professionally infeasible" (i.e. healthcare professionals' skill set is too narrow to efficiently care for such a large, highly diverse population of patients).

2.4. A model for operational focus

Previous research on approaches to operational focus in healthcare has highlighted both bottom-up initiatives, such as clinical pathways, and top-down structural solutions, such as service lines and specialised facilities (see Section 2.2). At the same time, research on volume and variety (see Section 2.3) underscores the need to align patient groups and care processes, since high-volume, low-variety cases benefit from standardised pathways and specialised settings, whereas low-volume, high-variety cases require more flexible, generalist structures. Building on these insights, we propose a model (Figure 2) that distinguishes between focused facilities, service lines, and pathways (i.e., repetitive and standardised processes serving high-volume, low-variety patient groups) and general facilities, service lines, and pathways (i.e., diverse and complex processes serving low-volume, high-variety patient groups). A full-service provider may adopt either approach—or a combination of them—but must clearly define what is considered focused and what remains general in order to avoid the inefficiencies of mixing incompatible operational models.

3. Research design and methodology

Due to the limited empirical research on applying operational focus in full-service healthcare organisations, we conducted an exploratory mixed-methods, single-case study. Such an approach is suitable when the purpose of research is to answer "how" questions, unravel complex elements (Eisenhardt and Graebner 2007, Yin 2018), and develop theory (Edmondson and Mcmanus 2007, Gioia, Corley, and Hamilton 2013). In particular, case research is suitable when little is known about a phenomenon, for it allows a single case to provide an in-depth understanding of a specific problem and context (Flyvbjerg 2006). Yin (2018) has identified three types of case studies—exploratory, explanatory, and descriptive—in which the exploratory stage, prior to developing theory, aims to "uncover areas for research and theory development". Mixed-methods approaches, which necessarily combine quantitative and qualitative methods, are valuable for comprehensively addressing research questions (Clark and Ivankova 2016). Whereas a qualitative approach offers deeper insights into real-world problems, quantitative research can help to reveal broader trends (Guetterman, Fetters, and Creswell 2015). Although statistical generalisations cannot be drawn from single cases, the single-case study approach is appropriate for exploring an underexamined phenomenon instead of seeking generalisation (Ketokivi and Jokinen 2006). Considering all of the above, our study proceeded in three sequential steps. First, we conducted a systematic literature review to investigate the application and implementation of the concept of the focused factory in healthcare. The review served as a preface to the case study at a medical clinic, which examined how the clinic organises patient processes in consideration of patient volumes and variety. Third and last, we integrated the insights from the literature review with the case study's findings to explore how existing knowledge on achieving operational focus at specialised facilities can enhance the operational focus of full-service healthcare providers.

3.1. Systematic literature review

We conducted our systematic literature review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses—that is, the PRISMA statement (Moher et al. 2009). The search for literature was performed in the PubMed, Scopus, and Web of Science databases for relevant English-language articles published through 31 December 2023. We began by identifying suitable Medical Subject Headings (MeSH) and related free-text keywords for an initial search of PubMed. Ultimately, we selected a broad combination of keywords, including terms related to "hospital" or "healthcare" and "focused factory" or "focused factories". The search string was next adapted for Scopus and Web of Science. Table 1 lists the full searches that we used. In the first round of screening, we read titles, keywords, and abstracts to make an initial selection. Generous early inclusion criteria were followed, including being peer-reviewed and relating to our research's aims. In the second round of screening, all remaining articles were examined in detail according to predefined inclusion and exclusion criteria, also shown in Table 1. For inclusion, the articles had to meet four criteria: contain an abstract, be written in English, explore the application and implementation of the concept of the focused factory in healthcare, and be published on or before 31 December 2023. Articles were excluded if they addressed primary care or care within a rehabilitation setting; examined healthcare processes not related to the patient process at hospitals (e.g. healthcare providers with only diagnostic or laboratory processes); described theories, methods, or models without empirical data; were editorials or policy statements without immediate empirical support; or were literature reviews. The inclusion–exclusion process was designed to select empirical studies that explicitly examined the application and implementation of the concept of the focused factory in healthcare to enhance operational focus. In the endeavour, our experience working with patient flows at hospitals (i.e. PÅ and SH) and studying healthcare productivity (i.e. PA) reduced the risk of errors in the selection process. The two rounds of screening articles yielded a highly relevant set of studies for the review and synthesis. Any disagreements regarding which articles to include or exclude throughout the selection process were resolved in discussions with all authors.

A predefined extraction checklist was used to capture key characteristics of articles, including title, author(s), year of publication, country of study, and intervention type (see Appendix A). By following a thematic synthesis methodology (Braun and Clarke 2006), we ensured a consistent analysis of the content and identified key themes. In thematic syntheses, articles are coded line-by-line into "free codes," which are subsequently grouped into descriptive themes based on their recurrence and further developed into analytical themes to describe specific phenomena (Dixon-Woods et al. 2005). Accordingly, one author (i.e. PÅ) coded each article and its content, while the other authors (i.e. PA and SH) assessed and evaluated the coding as it proceeded. The aim was to capture all perspectives of the application and implementation of the concept of the focused factory, and eventually, a list of important aspects was identified for each article. In the second round of coding, similar codes were analysed, discussed, and grouped based on similarity until only unique groups remained, which produced a final list of unique aspects. For a full overview of all identified codes from the process, see Table 2.

Table 1. Keyword search strategy and inclusion and exclusion criteria.

Database	Keyword Search
PubMed	("Health Care Sector"[Mesh] OR "Healthcare"[tiab] OR "Health"[tiab] OR "Hospitals"[Mesh] OR "Hospital*"[tiab] OR "Health Facilities"[Mesh] OR "Health Facilit*"[tiab] OR "Medical Clinic*"[tiab] OR "Hospital Industr*"[tiab] OR "Health System*"[tiab] OR "Patient*"[tiab] OR "Ambulatory"[tiab] OR "Inpatient"[tiab] OR "Outpatient"[tiab] OR "Surger*"[tiab] OR "Ward*"[tiab] OR "Emergen*"[tiab] OR "Acute Care"[tiab] OR "ED"[tiab]) AND ("Focused Factory"[tiab] OR "Focused Factories"[tiab])
Scopus	((TITLE-ABS-KEY (hospital*) OR TITLE-ABS-KEY (healthcare) OR TITLE-ABS-KEY (health) OR TITLE-ABS-KEY (patient*) OR TITLE-ABS-KEY (inpatient) OR TITLE-ABS-KEY (outpatient) OR TITLE-ABS-KEY (ambulatory) OR TITLE-ABS-KEY ("Medical Clinic*") OR TITLE-ABS-KEY ("Health System*") OR TITLE-ABS-KEY ("Hospital Industr*") OR TITLE-ABS-KEY (surgery*) OR TITLE-ABS-KEY (ward*) OR TITLE-ABS-KEY ("Health Facilit*") OR TITLE-ABS-KEY (ed) OR TITLE-ABS-KEY (emergen*) OR TITLE-ABS-KEY (acute AND care)) AND (TITLE-ABS-KEY ("Focused Factory") OR TITLE-ABS-KEY ("Focused Factories")))
Web of Science	(TS=(hospital*) OR TS=(healthcare) OR TS=(Patient*) OR TS=(Outpatient) OR TS=(Ambulatory Clinic*) OR TS=(Inpatient) OR TS=(Medical clinic*) OR TS=(health) OR TS=(Health System*) OR TS=(Hospital Industry) OR TS=(Surger*) OR TS=(Ward*) OR TS=(Health Facilit*) OR TS=(ED) OR TS=(Emergen*) OR TS=(Acute Care)) AND (TS=("Focused Factory") OR TS=("Focused Factories"))
Category	**Inclusion and Exclusion Criteria**
Inclusion Criteria	**The article must:** Contain an abstract; Be written in English; Exploring the application and implementation of the focused factory concept in healthcare; Have been published before 31st December 2023
Exclusion Criteria	**The article has a focus on:** Primary care or care within a rehabilitation setting; Healthcare processes not relating to the hospital patient process; Description of theories, methods or models without empirical data; Editorials or policy statements without immediate empirical support; Literature reviews

Table 2. Synthesis of literature on applications of the focused factory in healthcare.

Articles	Journals	1. Strategic focus	2. Operational focus	3. Implementing focus
Bredenhoff, VAN Lent, and VAN Harten 2010	*BMC: health services research*	• Patient group focus – 1 A • Care process focus – 1D • Patient group & care process focus 1 A/1D	• Number of patient groups – 2D • Number of medical specialites – 2E • Level of patient complexity – 2 G • Level of process complexity – 2H	N/A
Cook et al. 2014a	*American Journal of Medical Quality*	N/A	• Level of patient complexity – 2 G • Level of process standardisation – 2H • Level of process complexity – 2H	• Create clear routines within care pathways – 3B • Decide how patients will be registered – 3 C • Create tool to identify patients whose care can be standardised – 3D • Communicate patients pathway status to caregivers – 3E • Measure, report and follow-up on results – 3 J
Cook et al. 2014b	*Health affairs*	N/A	• Number of possible patient types – 2D • Range of interventions – 2 F • Level of process complexity – 2H	• Idenfiy and segment patients – 3 A • Locate similar treatments near each other for a "one-stop-shop" – 3 A • Build clear processes with protocols for each part of process – 3B • Connect IT-systems supporting patient process – 3D • Identify resource use in each process step – 3H • Give mandate to people who can advance patient process – 3I
Dabhilkar and Svarts 2019	*Operations Management Research*	• Patient group focus – 1 A • Diagnosis focus – 1 C • Knowledge focus – 1D • Procedure focus – 1D • Patient complexity focus – 1 C/1D	• Number of possible diagnoses – 2 C • Number of patient groups – 2D • Number of specialists/areas involved – 2E • Number of treatments – 2 F • Complexity and risk associated with patient group – 2 G	N/A
De Regge et al. 2016	*Acta Clinica Belgica*	N/A	• Degree of patient variety – 2 C/2D • Degree of medical specialisation – 2E • Level of standardisation – 2H • Closeness in time and space of Interventions – 2I	N/A
Huckman 2009	*Harvard Business Review*	N/A	N/A	• Set clear goals supported by whole organisation – 3E • Highlight need for individual and collective goals – 3E • Have individual KPIs in line with goals and incentives – 3E • Make everyone understand how assets and services are shared – 3 F • Set clear unit boundaries to define when assets and services are shared – 3 F • View each unit/group as perpetual works in progress – 3 J
		N/A		

(*continued*)

Table 2. Continued.

Articles	Journals	1. Strategic focus	2. Operational focus	3. Implementing focus
Hyer, Wemmerlöv, and Morris 2009	*Journal of Operations Management*		• Number of possible symptoms or diagnoses – 2 C • Level of similarity among patients – 2D • Level of dedicated physical space – 2I • Level of dedicated resources – 2 J	• Have a clearly described patient population – 3 A • Build a clear process map from start to end – 3B • Use standards and protocols for less variation and better communication – 3B • "Cross train" staff to ensure flexibility across unit – 3 F • Have vital auxilliary services in close association – 3 G • Have dedicated space for closeness and efficiency – 3 G • Build a business mindset among managers – 3I • Have sufficient resources for administration of process – 3I • Ensure sufficient resources for downstream coordination – 3I • Build a continuous improvement and "can do" culture – 3 J
Peltokorpi, Torkki, and Lillrank 2011	*Service Research & Innovation Institute (SRII)*	N/A	• Number of possible diagnoses – 2 C • Number of patient groups – 2D • Level of variation within process – 2 C/2D/DG • Level of standardisation in process or procedure – 2H	• Reduce diagnoses, symptoms and patient groups – 3 A • Reduce number of arrival categories – 3B • Define type of process or procedure to enable standardisation – 3B • Reduce capacity use and outcome variation for increased predictability – 3H
Peltokorpi et al. 2016	*International Journal of Health Care Qualtiy Assurance*	• Population focus – 1 A • Urgency-level focus – 1B • Disease or symptom focus – 1 C • Routine or protocol focus – 1D • Outcome focus – 1E	• Number of patient arrival categories – 2 A • Number of possible diagnoses – 2 C • Number of patient populations – 2D • Number of procedures or treatments – 2 F	N/A
Pieters, Van Oirschot, and Akkermans 2010	*Int. Journal of Operations & Production Management*	N/A	N/A	• Split patients into complex and simple – 3 A • Build integrated care process with clear location and single entry point – 3B • Evaluate fit between organisational and operational performance – 3E
Vissers 2006	*Int. Series in Operations Research & Management Science*	N/A	• Predictability of care process – 2 A/2C/2D/2G • Number of process steps – 2B • Amount of chronic patients without end point – 2 G • Level of process complexity – 2H • Level of shared or dedicated resources – 2I/2J	N/A

3.2. Case study

3.2.1. Case selection

Following the principles of theoretical sampling (Eisenhardt and Graebner 2007), we targeted a representative full-service medical clinic within a general hospital that offers inpatient and outpatient care for patients with acute, non-acute, and chronic conditions, including surgeries, examinations, treatments, and counselling appointments. Selecting a clinic based on those criteria allowed us to examine the operational complexity typical of full-service providers. After discussions with the board of a major hospital in northern Europe, we identified their ear, nose, and throat (ENT) clinic as an ideal setting for our study. The clinic met our criteria of providing care to a broad range of patients and thus offered a robust environment for exploring process design in complex settings. Beyond that, the clinic has recently faced common challenges, including rising costs, an inability to reach target times for appointments and surgeries, and a deteriorating work environment.

3.2.2. Case context

The case clinic is part of a large, publicly funded university hospital spread across three sites in a large Swedish municipality. The hospital functions as both an emergency hospital and a community hospital for the city, as well as a tertiary care provider for a broad surrounding region. It also has a national mandate to treat specific diseases, which attracts patients from across the country and around the world. The clinic operates at two of the hospital's sites, with seven outpatient wards and one inpatient ward. Annually, the clinic handles approximately 35,000 outpatient visits, 3000 surgeries, 1800 inpatient admissions, and 8000 emergency visits, which together cover approximately 1800 unique diagnostic codes. It collaborates extensively with other clinics on surgeries and treatments requiring coordination as well as with independent ENT specialists and centres. The clinic's management structure includes a clinic manager, a business developer, a data administrator, two chief medical officers, six medical team leaders, and a nurse unit manager for each outpatient ward and inpatient ward. Physicians are organised into medical teams, whereas nurses and other professionals are organised by physical unit. The clinic's activities are centred around six care teams: Oto, Rhino (i.e. nose), Phoniatrics (i.e. voice and speech), Audiology (i.e. hearing and balance), Laryngology (i.e. throat), and Tumour (i.e. malignant and benign cancers). Patients are assigned to teams based on their conditions or are jointly managed if their issues overlap.

3.2.3. Case study: Step 1

The description in this subsection serves two purposes: to provide a clear procedure that other organisations can follow when describing or exploring the design of healthcare processes and to demonstrate how our study was conducted. The case study was performed in two steps. Step 1 involved mapping key activities of the clinic's processes and visually representing them from one (or multiple) starting points to endpoints, which captured all activities that directly impact the patient's journey. The transfer of a patient between two processes was also considered to be a starting point or endpoint. Mapping was performed in three stages. In the first stage, three researchers collaborated with two clinicians, a chief medical officer, and a medical team leader to define and visualise each of the clinic's processes. Those objectives were achieved in four 2-hour sessions involving open discussions about the definition, inclusion, and exclusion of elements in each process. Unique processes were defined as serving a distinct set of patient groups using specific resources and/or staffing competencies, with activities not performed within other processes. Altogether, 25 unique processes were identified: 19 outpatient care processes (i.e. divided among teams), an emergency care process, and four surgical processes shared between teams. In the second stage, team leaders reviewed all mapped processes that they were involved in. Although no new processes were added, removed, or renamed, many elements within existing processes were adjusted based on the team leaders' feedback. Last, in the third stage, a physical workshop was conducted with the full management team to discuss care maps and identify errors and overlaps. The workshop provided in-depth insights into team leaders' perspectives and led to some changes, not to mention valuable discussions among professionals regarding the visualised care processes. Data collection for Step 1 took place between November 2021 and March 2022.

3.2.4. Case study: Step 2

Step 2 of the case study involved analysing the variety and volume of patients across the clinic's 25 processes, with a focus on understanding each process's complexity and operational aspects. To gather data, we extracted statistics for all patients treated at the ENT clinic in 2019, which ensured representative data unaffected by the COVID-19 pandemic. The data collected included time and date of visit, diagnostic code, surgical code (if applicable), type of treatment or intervention, care profession, and physical location. Using those data, we matched patient visits with the identified care processes. For the few cases in which it was challenging to determine the care team responsible, a chief medical officer assisted in the sorting, which enabled us to create a comprehensive list of diagnoses associated with each care process. The list was subsequently reviewed by team leaders to correct any errors and misclassifications, which resulted in a finalised list of diagnoses for patients treated at the clinic, categorised according to the 25 care processes. Last, using the process maps and patient data, we analysed each care process in terms of the design and number of patients and diagnoses. Data collection for Step 2 took place between October 2022 and January 2023.

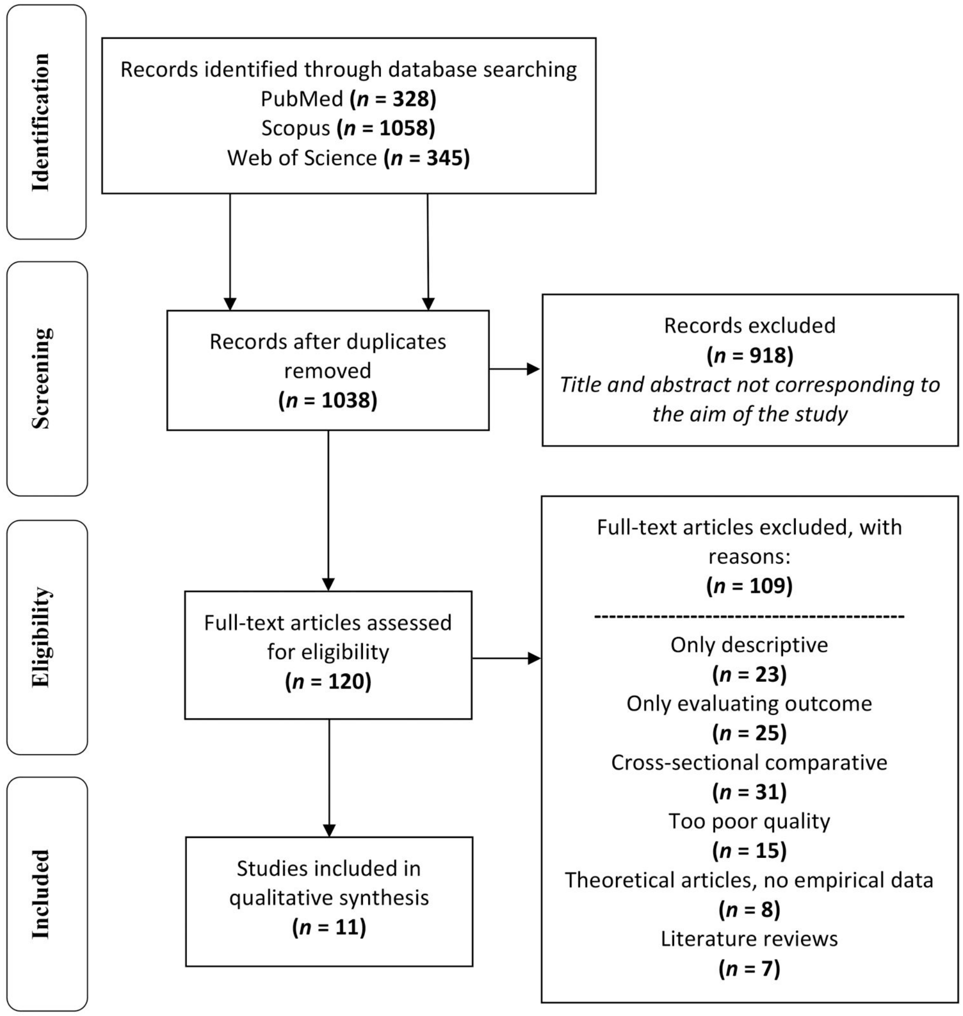


Figure 3. The literature selection process.

4. Results

4.1. Systematic literature review

Our review yielded a total of 89 articles. After duplicates were removed, 45 articles were selected for a detailed review, and only 11 articles were included in the thematic synthesis. Figure 3 depicts the full process of article selection.

The review captured articles that address the application and implementation of the concept of the focused factory in healthcare. We synthesised the findings into a framework for focused healthcare operations (FHOs), shown in Figure 4. The synthesis is presented in Table 2, where numbers 1–3 and letters A–J provide connections between every theme from each included article and the framework.

From the synthesis of the articles reviewed, we found that focus at hospitals and medical clinics is enabled through three steps. Based on the findings by Bredenhoff, VAN Lent, and VAN Harten (2010), Dabhilkar and Svarts (2019), and Peltokorpi et al. (2016), we propose that the first step to achieving focus in a healthcare organisation is developing a high-level focus strategy for the entire organisation. The strategy can target a specific patient population (**1 A**) or a specific care procedure or routine (**1B**). The treatment of specific diseases or symptoms for patients with certain diagnostic codes (**1 C**) is another option. The urgency at the patient's arrival (**1D**) and the targeted outcome at the end of the care path (**1E**) are still other examples. However, those categories are rarely mutually exclusive. In practice, hospitals often combine those focal areas—for example, by focusing on urgent orthopaedic procedures (**1B** + **1D**) for older adults (**1 A**). Therefore, organisations have to evaluate which combinations best align with their goals and constraints, including demand, available expertise, and resource limitations. Because a multidimensional focus can enhance efficiency but may increase complexity, both have to be balanced through careful operational planning.

The second step of the framework encompasses the development of operational focus by evaluating and mapping the level of focus of units and processes within healthcare organisations. Multiple studies have produced checklists to analyse the focus of units, processes, and/or pathways (Cook et al. 2014a, Cook et al. 2014b, Dabhilkar and Svarts 2019, De Regge et al. 2017, Hyer, Wemmerlöv, and Morris 2009, Peltokorpi et al. 2016, Peltokorpi, Torkki, and Lillrank 2011, Vissers 2006, Bredenhoff, VAN Lent, and VAN Harten 2010). On those checklists, the most emphasised category is the complexity of the patient process **(2H)**, in which focus

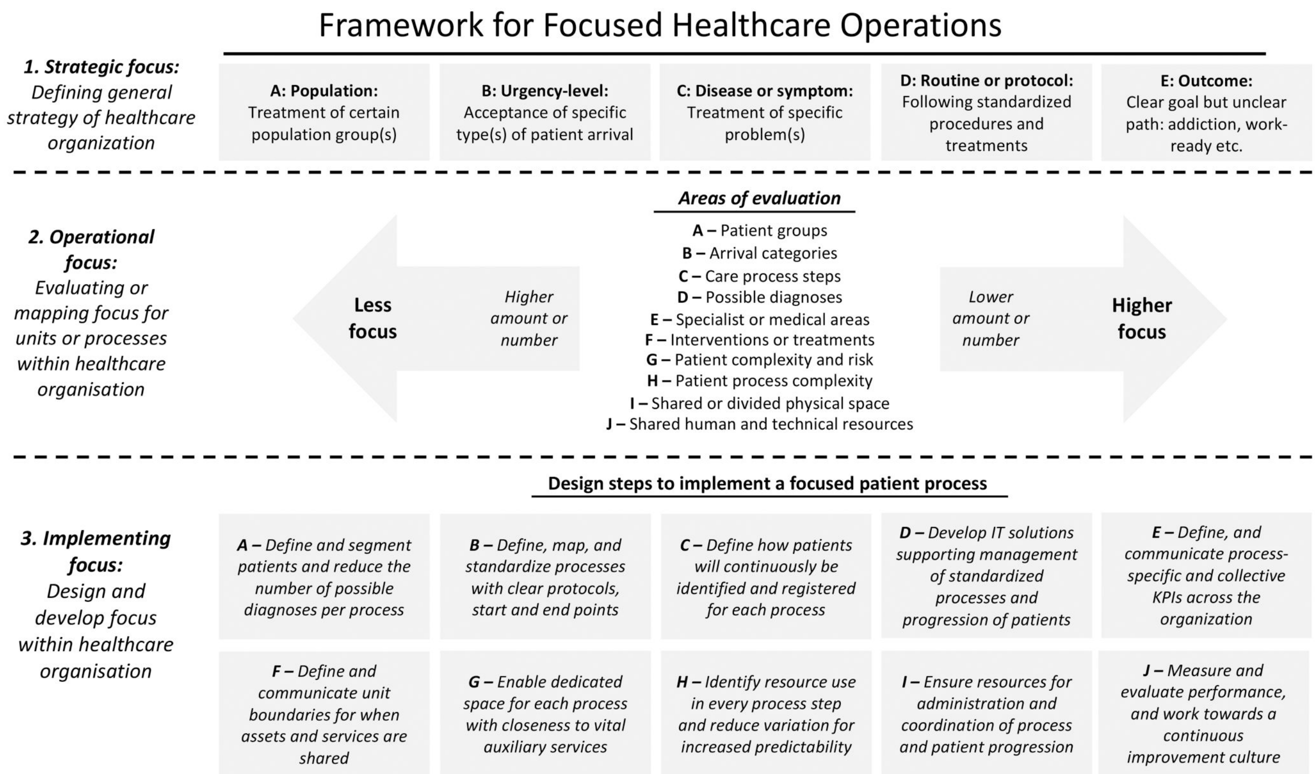


Figure 4. The focused healthcare operations (FHO) framework.

may increase by reducing the variation of the process or by increasing its standardisation or predictability. Multiple studies have highlighted the number of patient groups in the process **(2 A)** and clarified that increased focus comes with a reduction in patient groups or from gathering only one or similar type(s) of patient group(s). Several studies have also examined the number of possible diagnoses **(2D)** and described that greater focus comes from reducing the number within a care process or from only allowing patients with very similar diagnoses. Three studies have shown that reducing the number of interventions or treatments **(2E)** can boost operational focus, as can reducing specialist areas or medical areas **(2 F)**. The level of patient complexity and risk has also been highlighted **(2 G)** as an important factor, along with the level of shared or divided physical space **(2I)**. Last, the level of shared human and technical resources **(2 J)**, the number of ways to arrive at the process **(2B)**, and the number of steps in the process **(2 C)** are additionally emphasised as important aspects when evaluating and mapping operational focus. They are also interdependent. For instance, reducing the number of diagnoses (**2D**) may reduce patient complexity (**2 G**) and allow fewer interventions (**2E**). Similarly, operational focus is constrained by strategic decisions; for instance, a broad strategic focus on complex chronic diseases (**1 C + 1 G**) may require more flexible operational processes. Therefore, organisations have to consider how operational and strategic dimensions reinforce or challenge each other. Overall, despite some differences between studies, they largely corroborate each other's findings.

The third and final step of the framework encompasses the design and implementation of focus and ways to successfully implement focus in healthcare organisations. Multiple researchers who have studied the topic have come to similar but sometimes diverging conclusions on how to proceed with designing and implementing focus (Cook et al. 2014a, Cook et al. 2014b, Huckman 2009, Hyer, Wemmerlöv, and Morris 2009, Peltokorpi, Torkki, and Lillrank 2011, Pieters, Van Oirschot, and Akkermans 2010). Some have developed long, elaborate lists of activities to follow, whereas others have only presented a few important categories when implementing focus in their care pathways. Moreover, those articles do not suggest any sequence to the activities but present them as equal from a temporal perspective. In our framework, to the best of our ability and drawing from experience with improvement-oriented projects, we have structured them in chronological order from the design phase to the management phase. As suggested, it is important to define and segment patients and reduce the number of possible diagnoses per process **(3 A)**, as well as to define, map, and standardise processes with clear protocols and clear starting points and endpoints **(3B).** There is also a need to define ways to continuously identify and register patients for each process **(3 C)** and to develop IT solutions that support the management of standardised processes and the progression of patients **(3D)**. Added to that, developing and communicating suitable goals and process-specific and collective key performance indicators across the organisation is important **(3E)**. There is also a need to define and communicate unit boundaries when assets and services are shared **(3 F)** and to enable dedicated space for each process with proximity to vital auxiliary services **(3 G)**. Moreover, it is important to identify resources used in every step of the process and to reduce variety for increased predictability **(3H)**, and resources need to be secured for administering and

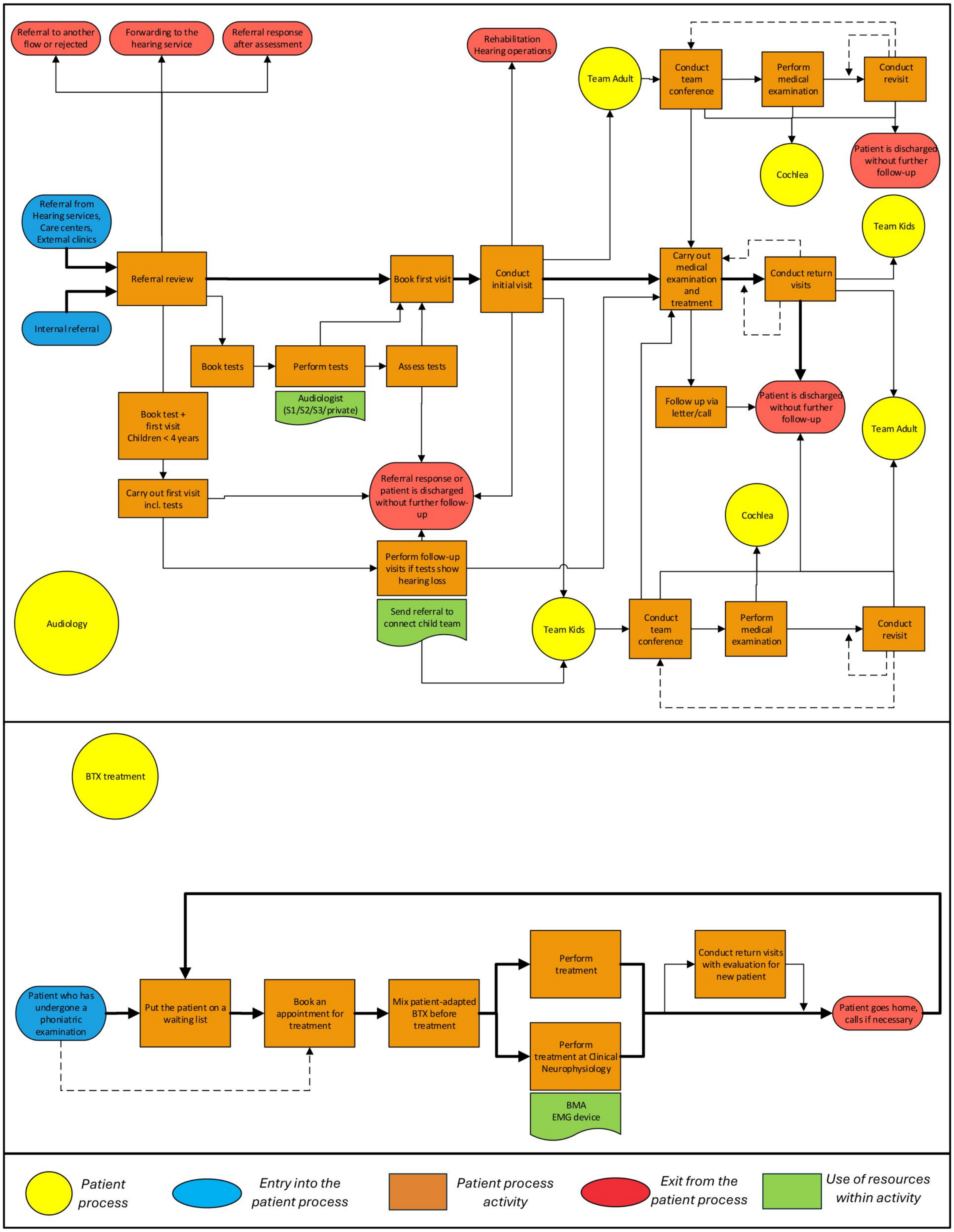


Figure 5. Patient process maps in the ear, nose, and throat clinic (i.e. the two processes audiology and BTX treatment).

coordinating processes and patients' progression (**3I**). Last, performance has to be continuously measured and evaluated, and, in turn, enabling a culture of continued improvement is pivotal (**3 J**). It is also critical to recognise that successful implementation does not merely involve static design but ongoing adaptation. Thus, performance has to be continuously measured, evaluated, and improved, which aligns with lean healthcare principles and the findings of Hyer, Wemmerlöv, and Morris (2009) and Cook et al. (2014b), who have shown that feedback loops, visual management, and daily team meetings contribute to sustained improvement.

Patient Process	Patients	Diagnoses
Emergency flow	8192	462
Audiology	7200	70
Speech Therapist examination and treatment	4939	80
Malign Tumors Standardized Pathway	3583	209
Cochlear Implant	3578	28
Lip-Jaw-Palate-Cleft	2977	41
Skopy Investigation	2560	16
Benign Tumors	2067	90
Swallowing assessment	1683	32
Chronic otitis and Otosclerosis	1449	34
Nasal Congestion	1281	7
Inpatient Surgery	1138	290
Day surgery	1064	197
Cholesteatoma	1055	13
Bone-anchored heaing aid	831	13
Chronic sinusitis and nasal polyposis	795	9
Reception surgery	565	91
BTX Treatment	332	36
Phoniatric Investigation	224	40
Policlinical surgery	123	42
Skull Base Tumor	55	8
Neurosurgical patient	45	3
Facial fracture	42	2
HHT/ Osler	35	1
Injection ENT	30	10

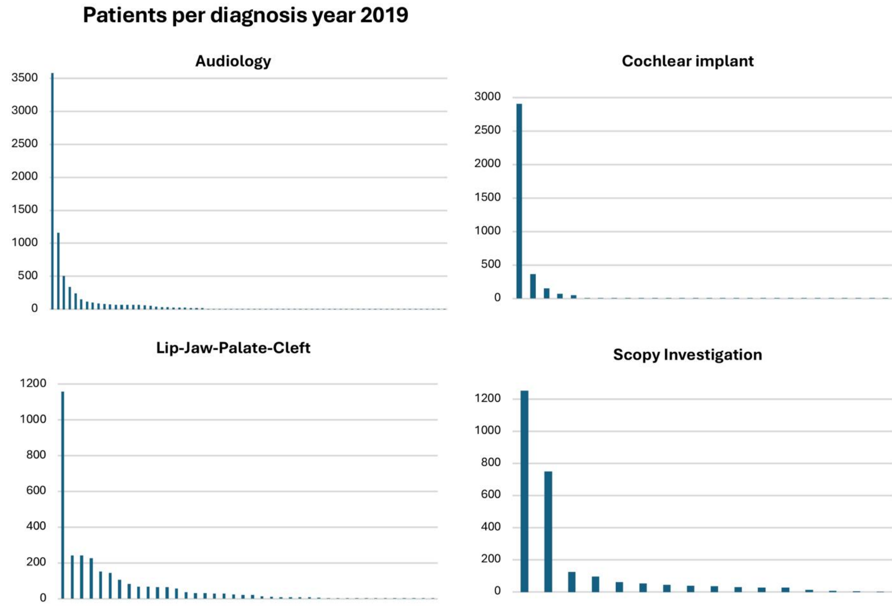


Figure 6. Volume and variety of patients at the ear, nose, and throat clinic.

4.2. Case study

4.2.1. Structure, volume, and variety

The results of the case study are presented in two steps. First, we outline the findings from our analysis of the case study, followed by the application of the FHO framework to the case. From analysing the ENT clinic, we identified and visualised, with the use of process mapping, 25 unique patient processes (see Appendix B). For each process, patient visit statistics were extracted (see Appendix C). Some processes were observed to consist of a few steps, be linear in structure, and involve minimal interaction with internal or external actors, with few backwards loops (see Figure 5, BTX treatment). Others were found to be more complex due to involving many steps, having extensive internal and external interactions, and exhibiting numerous backwards loops or iterations (see Figure 5, Audiology). The clinic's guiding principle for designing those 25 patient processes is based on four considerations: medical sub-specialty (e.g. Oto, Rhino, Phoniatrics, Audiology, Speech Therapy, or Tumour), urgency (e.g. acute, semi-acute, cancer, or planned), patient-specific needs and unusual symptoms, and specific care processes. However, the organisation also revolves around six medical teams, each responsible for one to five patient processes. The design of the main track focuses on the most common patient groups, thereby allowing rare patient groups to deviate from the main track as needed. The more unique or rare a patient's symptoms, the more deviations or sidetracks are required within the process. As a result, some processes are comprehensive, iterative, and nested, whereas others are shorter or standardised, with fewer sidetracks or iterations. Furthermore, each process's design depends heavily on insights from a few clinicians who manage them based on their long-term experience and professional networks. Clinicians also tend to view the complexity inherent in their patient processes as necessary for taking a holistic approach to meeting each patient's needs.

The number of patients treated per process was found to vary significantly, ranging from 30 to 8192 per year (*Mdn* = 1064), whereas the number of diagnoses per process ranged from 1 to 462 (*Mdn* = 34), as shown in Figure 6. Consequently, the least busy process cares for fewer than one patient per week, whereas the busiest handles 158 patients weekly. Most of the 25 patient processes involve an array of diagnoses, which suggests substantial diversity among patients. However, one or a few diagnoses are often overrepresented, as illustrated in Figure 6, which depicts the distribution of all patient visits per diagnostic code for four of the clinic's high-volume processes. As shown, significant variety exists in patient volumes and diagnoses across the clinic's processes, wherein large-volume patient groups are combined with multiple small-volume groups. That dynamic suggests the challenging operational task of providing efficient care to highly diverse patient populations with varying needs. Higher throughput could be achieved by dividing existing processes into multiple pathways, especially by isolating common, homogeneous patient groups into standardised high-volume, low-variety processes and grouping uncommon patient groups into low-volume, high-variety processes requiring greater flexibility and more expansive skill sets. As for the number of patients per diagnosis within each patient process, there is a trend showing that larger volumes are associated with greater numbers of diagnoses (see Figure 6). That result suggests that high-volume flows typically exhibit a high variety of patients and complex care processes, whereas low-volume flows exhibit less variety among patients.

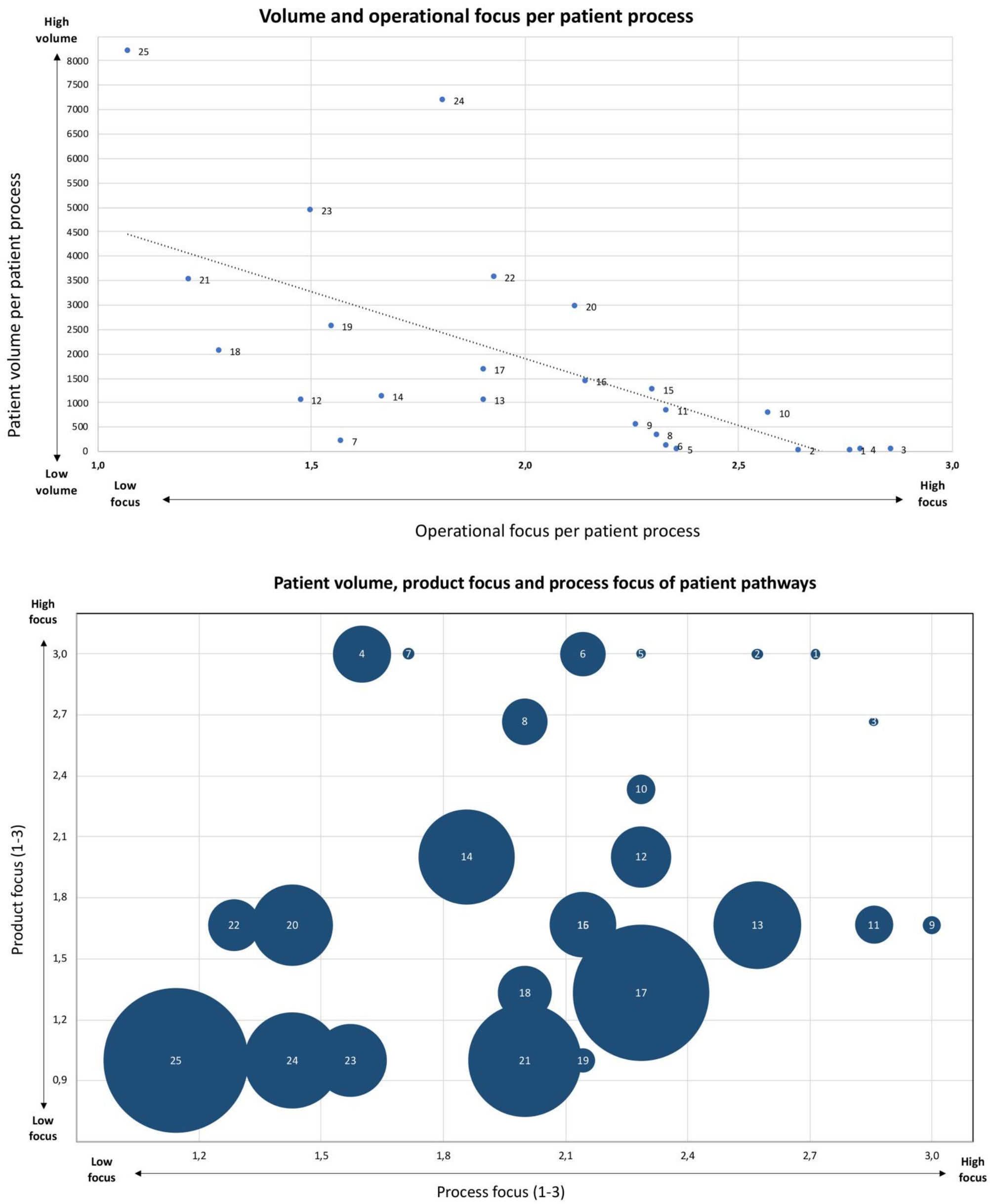
Focus Type	Process focus															Patient focus							Total focus score
Focus Categories	B		C		E		F		H		I		J		Process focus average score	A		D		G		Patient focus average score	
	Arrival categories		Process steps		Medical areas		Interventions		Process complexity		Shared physical space		Shared resources			Patient groups		Diagnoses		Patient complexity			
Focus ranges (1-3)	<2 = 3 / >4 = 1		<5 = 3 / >9 = 1		<3 = 3 / >4 = 1		<4 = 3 / >5 = 1		<4 = 3 / >6 = 1		<4 = 3 / >5 = 1		<4 = 3 / >5 = 1			<8 = 3 / >18 = 1		<13 = 3 / >36 = 1		<5 = 3 / >6 = 1			
Patient Processes	Amount	Focus Score	Amount	Focus Score	Amount	Focus Score	Amount	Focus Score	Level	Focus Score	Level	Focus Score	Level	Focus Score		Amount	Focus Score	Amount	Focus Score	Amount	Focus Score		
Facial fracture	1	3	5	3	2	3	2	3	3	3	5	2	5	2	2,7	1	3	2	3	1	3	3,0	2,9
Neurosurgical patient	1	3	3	3	3	2	2	3	1	3	5	2	5	2	2,6	2	3	4	3	4	3	3,0	2,8
Injection ENT	1	3	7	2	2	3	3	3	2	3	1	3	1	3	2,9	9	2	10	3	3	3	2,7	2,8
Nasal Congestion	3	2	8	2	1	3	4	2	3	3	5	2	5	2	1,6	4	3	7	3	4	3	3,0	2,3
HHT/ Osler	2	3	7	2	4	2	3	3	4	2	4	2	4	2	2,3	1	3	1	3	4	3	3,0	2,6
Chronic sinusitis and nasal polyposis	2	3	6	2	3	2	4	2	5	2	5	2	5	2	2,1	4	3	9	3	4	3	3,0	2,6
Skull Base Tumor	5	1	6	2	5	1	4	2	5	2	5	2	5	2	1,7	6	3	8	3	4	3	3,0	2,4
Bone-anchored heaing aid	4	2	6	2	4	2	4	2	4	2	5	2	5	2	2,0	7	3	13	2	3	3	2,7	2,3
Policlinical surgery	1	3	5	3	2	3	1	3	1	3	1	3	2	3	3,0	25	1	42	1	3	3	1,7	2,3
BTX Treatment	1	3	6	2	2	3	2	3	2	3	6	1	6	1	2,3	18	2	36	2	3	3	2,3	2,3
Reception surgery	1	3	7	2	2	3	2	3	1	3	3	3	3	3	2,9	50	1	91	1	3	3	1,7	2,3
Chronic otitis and Otosclerosis	2	3	6	2	2	3	5	2	4	2	5	2	5	2	2,3	11	2	34	2	6	2	2,0	2,1
Lip-Jaw-Palate-Cleft	1	3	5	3	4	2	4	2	4	2	1	3	1	3	2,6	11	2	41	1	6	2	1,7	2,1
Cochlear Implant	1	3	10	1	5	1	7	1	2	3	4	2	4	2	1,9	18	2	28	2	6	2	2,0	1,9
Swallowing assessment	3	2	8	2	3	2	4	2	12	1	1	3	1	3	2,1	26	1	32	2	5	2	1,7	1,9
Day surgery	1	3	9	2	3	2	3	3	3	3	6	1	6	1	2,1	92	1	197	1	4	3	1,7	1,9
Audiology	4	2	7	2	2	3	5	2	14	1	3	3	3	3	2,3	36	1	70	1	6	2	1,3	1,8
Operation	1	3	10	1	3	2	3	3	1	3	6	1	6	1	2,0	120	1	290	1	6	2	1,3	1,7
Phoniatric Investigation	4	2	8	2	4	2	6	1	6	2	3	3	3	3	2,1	24	1	40	1	7	1	1,0	1,6
Skopy Investigation	5	1	8	2	3	2	4	2	10	1	6	1	6	1	1,4	13	2	16	2	8	1	1,7	1,5
Speech therapy treatment	4	2	10	1	4	2	4	2	10	1	2	3	2	3	2,0	29	1	80	1	7	1	1,0	1,5
Cholesteatoma	5	1	12	1	3	2	7	1	4	2	7	1	7	1	1,3	8	2	13	2	7	1	1,7	1,5
Benign Tumors	3	2	14	1	4	2	6	1	9	1	7	1	2	3	1,6	24	1	90	1	10	1	1,0	1,3
Malign Tumors Pathway	3	2	18	1	6	1	9	1	12	1	7	1	2	3	1,4	86	1	209	1	10	1	1,0	1,2
Emergency flow	6	1	18	1	5	1	4	2	7	1	7	1	7	1	1,1	235	1	462	1	10	1	1,0	1,1

Figure 7. Evaluation of operational focus at the ear, nose, and throat clinic.

4.2.2. Evaluating operational focus

The FHO framework consists of three major elements: defining strategic focus, evaluating operational focus, and designing and implementing focus. Our study included only the first two elements, because applying the third step was beyond its scope. Our analysis of the first element, defining the strategic focus of the clinic, revealed it to be a typical full-service clinic, one aiming to be everything to everyone. It serves the entire population (**1 A**) within the hospital's catchment area; handles all levels of urgency (**1B**), from emergency cases to elective procedures and chronic conditions; treats a wide range of ENT-related diseases and symptoms (**1 C**) in collaboration with other providers; adheres to clinical protocols for all patient groups (**1D**), including nationally standardised cancer pathways; and focuses on long-term outcomes (**1E**) while also coordinating with multiple providers to address patients' broader social, economic, and societal needs. The clinic's strategic direction is typical of most full-service clinics, such that adopting a narrow strategic focus remains challenging.

The second element of the framework addresses a healthcare providers current operational focus. Following Bredenhoff, VAN Lent, and VAN Harten (2010) and consistent with theories on operational focus (Hayes and Wheelwright 1979), we distinguished categories of process focus and categories of product focus—for our context, denoted "patient focus". The only article included in the review that offers a measurement instrument is that of Bredenhoff, VAN Lent, and VAN Harten (2010), who adapted Pesch and Schroeder (1996) frequently tested, industry-developed instrument for measuring operational focus to a healthcare context. The instrument is a questionnaire on which participants provide subjective ratings for each focal category based on their knowledge of their organisation. Although the instrument offers guidance in some areas, it lacks an objective, unbiased approach to measuring each category, which was our aim. For that reason, we chose to measure each area of focus (**2 A**–**2J**) using the information given in the care maps and the extracted patient visit data (see Figure 7). For measuring the number of diagnoses (**2D**) and patient groups (**2 A**) within each process, the patient's visit data were used together with the International Classification of Diseases (ICD; (World Health Organization (WHO), 2023). The first level of ICD codes indicates unique diagnoses, whereas the second level indicates patient groups. For the remaining categories, the information given within each care map was used for measurement. Arrival categories (**2B**) were determined by the number of types of patient arrivals; care process steps (**2 C**) by the number of steps in the main process; specialist or medical areas (**2E**) by the number of medical areas involved, both internally and externally; interventions or treatments (**2 F**) by the number of physical interventions in the care maps; and process complexity (**2H**) by the number of deviations from the main process. Patient complexity and risk (**2 G**) were assessed using an average of categories **2B**, **2E**, **2 F**, and **2 G**. Last, the involvement of subspecialties and external providers in each patient process was used to measure shared or divided physical space (**2I**) and shared human and technical resources (**2 J**). Once all categories were measured, they were sorted in descending order, such that



#	Pathway	Patient volume
1	Facial fracture	42
2	Neurosurgical patient	45
3	Injection ENT	30
4	Nasal Congestion	1281
5	HHT/ Osler	35
6	Chronic sinusitis and nasal polyposis	795
7	Skull Base Tumor	55
8	Bone-anchored heaing aid	831
9	Policlinical surgery	123
10	BTX Treatment	332
11	Reception surgery	565
12	Chronic otitis and Otosclerosis	1449
13	Lip-Jaw-Palate-Cleft	2977
14	Cochlear Implant	3578
15	Swallowing assessment	1683
16	Day surgery	1064
17	Audiology	7200
18	Inpatient Surgery	1138
19	Phoniatric Investigation	224
20	Skopy Investigation	2560
21	Speech therapy treatment	4939
22	Cholesteatoma	1055
23	Benign Tumors	2067
24	Malign Tumors Pathway	3583
25	Emergency flow	8192

Figure 8. Comparison of patient volumes and operational focus.

categories with a number ending in the lower third (i.e. indicating higher relative focus) received a focus score of 3, ones in the middle a score of 2, and ones in the upper third (i.e. indicating lower relative focus) a score of 1, as shown in Figure 7. After that, the categories were divided into ones related to process focus and ones related to patient focus, and an average focus score was calculated for both. Last, a total focus score was derived by calculating the average of all categories combined.

Our evaluation of operational focus within the ENT clinic revealed that although some processes have a high and others a low focus, most exhibit a moderate focus, around 2.0 on a scale from 1.0 to 3.0 Because no process received the same focus score across all areas evaluated, the processes may have been focused in some areas but not in others.

Altogether, the evaluation enables an analysis of the clinic's operational focus and pinpoints areas where the focus is lower or lacking, both in general terms and for specific processes. By applying the FHO framework to the ENT clinic, we gained a deeper understanding of the clinic's complexity and variability beyond the mere number of diagnoses. To illustrate, we plotted patient volumes against the combined focus score from the framework (see Figure 8, upper graph), which shows that operational focus decreases as patient volume increases, as indicated by a trend line in the figure. That trendline suggests that complexity, process variety, and patient diversity grow as patient volumes increase. The results also indicate that patient processes with higher operational focus tend to have lower patient volumes, which implies limited benefit from their operational focus. In a second illustration (see Figure 8, lower graph), we plotted the score of "process focus" against "patient focus", wherein the size of the bubbles represents patient volumes for each process. The graph reveals significant variation in focus across both dimensions and confirms previous results showing that patient volume increases while operational focus decreases and that the most focused processes are typically low-volume ones. It also shows that some processes are focused in both dimensions, some in only one, and some in neither. Last, high-volume processes generally have a low product focus, although some exhibit a moderate focus, whereas many low-volume processes have a high product focus with moderate to high levels of process focus.

5. Discussion

Improving operational focus leads to increased productivity for most healthcare organisations (Hyer, Wemmerlöv, and Morris 2009, Mcdermott and Stock 2011, Zepeda, Nyaga, and Young 2021, Thirumalai and Devaraj 2024). However, increasing focus for full-service healthcare providers remains challenging because they cannot avoid having a high variety of patients and complex cases that demand extensive resources and coordination (Thirumalai and Devaraj 2024). Our framework offers a solution by allowing healthcare organisations to assess the focal level of their patient processes, which enables them to differentiate specialised from general patient groups and processes. That distinction, supported by Christensen and Jason (2009) and Kuntz, Scholtes, and Sülz (2019), makes it possible to identify areas lacking focus and to target specific areas for improvement. Unlike Bredenhoff, VAN Lent, and VAN Harten (2010), who relied on subjective self-assessment from healthcare professionals, our approach involved using process maps and patient visit data, all for a more objective assessment of focus. Even so, similar to Bredenhoff, VAN Lent, and VAN Harten (2010), we maintain that due to variations across medical specialties and national healthcare systems, the way of grading each category should be adapted to each specialty field. Thus, each hospital or clinic can determine how to measure those focal areas when evaluating their processes. In that light, the FHO framework not only evaluates focus but also facilitates strategic comparisons across processes, which can guide efforts to improve operational focus in healthcare.

A key insight from our study is the relationship between patient volumes and operational focus, as illustrated in the case study on the ENT clinic. As patient volume increases, so does variety, which reduces operational focus. Healthcare professionals might find that relationship to be self-evident, for increases in patient volumes often lead to more diagnostic codes, more process deviations, and the involvement of additional medical areas. However, the relationship runs counter to classical theory on ways to build efficient, productive processes (Hayes and Wheelwright 1979, Holweg et al. 2018, Schmenner and Swink 1998)—an area in which the ENT clinic suspects they are unsuccessful—which suggests that as volume increases, variation should decrease (i.e. focus should be higher). Drawing on Hayes and Wheelwright (1979) and Holweg et al. (2018) regarding the optimal relationship between products and processes, we visualised the relationship between patient volumes and operational focus at the ENT clinic alongside the central elements of the product–process matrix, adapted to a healthcare context (see Figure 9). The matrix illustrates that the relationship between volume and variety—in our case, focus—should move from high-volume, low-variety (i.e. high focus) along the "efficient zone" to low-volume, high-variety (i.e. low focus). Although the position of the efficient zone is only conceptual, the relationship between volume and variety, for efficient operations, has been demonstrated multiple times (Huckman 2009, Holweg et al. 2018). At the ENT clinic, however, the trend moves from low-volume, low-variety (i.e. high focus) to high-volume, high-variety (i.e. low focus), thereby shifting from economically unviable processes—"being nothing to no one"—to professionally infeasible ones—"being everything to everyone"—as indicated by the black trend line. That finding supports arguments for breaking up some of the clinic's processes and merging others to better align with the efficient zone. However, doing so may not be feasible if diagnoses are too diverse and volumes too low. Nonetheless, the increase in queue times and decrease in patient throughput observed in healthcare settings seem to be linked to that inverse volume–focus relationship.

Research on operational focus in healthcare has primarily examined how productivity is enhanced by separating more easily treated patient groups from the care of complex full-service healthcare providers (Kc and Terwiesch 2011, Pieters, Van Oirschot, and Akkermans 2010, Thirumalai and Devaraj 2024, Ding et al. 2020). Although a focused organisation may become more productive (Mcdermott and Stock 2011, Ding et al. 2020), it also risks reducing the overall performance of the healthcare system if all services and elements are not adequately considered during reorganisation (Hyer, Wemmerlöv, and Morris 2009, Kc and Terwiesch 2011, Olsson 2020, Thirumalai and Devaraj 2024, Ding et al. 2020). In response, we propose, as visualised in Figure 2, that healthcare providers distinguish focused healthcare facilities, service lines, and pathways from general ones. Applying that model to the ENT clinic reveals that the clinic's processes are not clearly divided into either being low-volume, high-variety (i.e. low focus) or high-volume, low-variety (i.e. high focus). Even the standardised patient pathway for cancer patients, as shown in Figure 8, is considered to be unfocused and highly complex, with significant variety in patients and processes. Such characteristics are troublesome, as Sales-Coll, DE Castro, and Hueto-Madrid (2023) have demonstrated, given the need for standardisation to achieve adherence to procedures, which is considered to be particularly important in cancer care.

By integrating insights from the product–process matrix and findings from the case of the ENT clinic, we developed a 2×2 matrix (see Figure 10) with two dimensions—process focus and patient focus (i.e. product focus)—each ranging from low to high. The matrix is overlaid on the bubble plot in Figure 8. In the upper left corner, we identify processes characterised by a homogeneous mix of patients served by a flexible care process, labelled "Exclusive care", in which substantial resources and flexibility are allocated to a narrow group of patients. The upper right corner represents processes with a homogeneous mix of patients served by a standardised care process, termed "Focused care", with

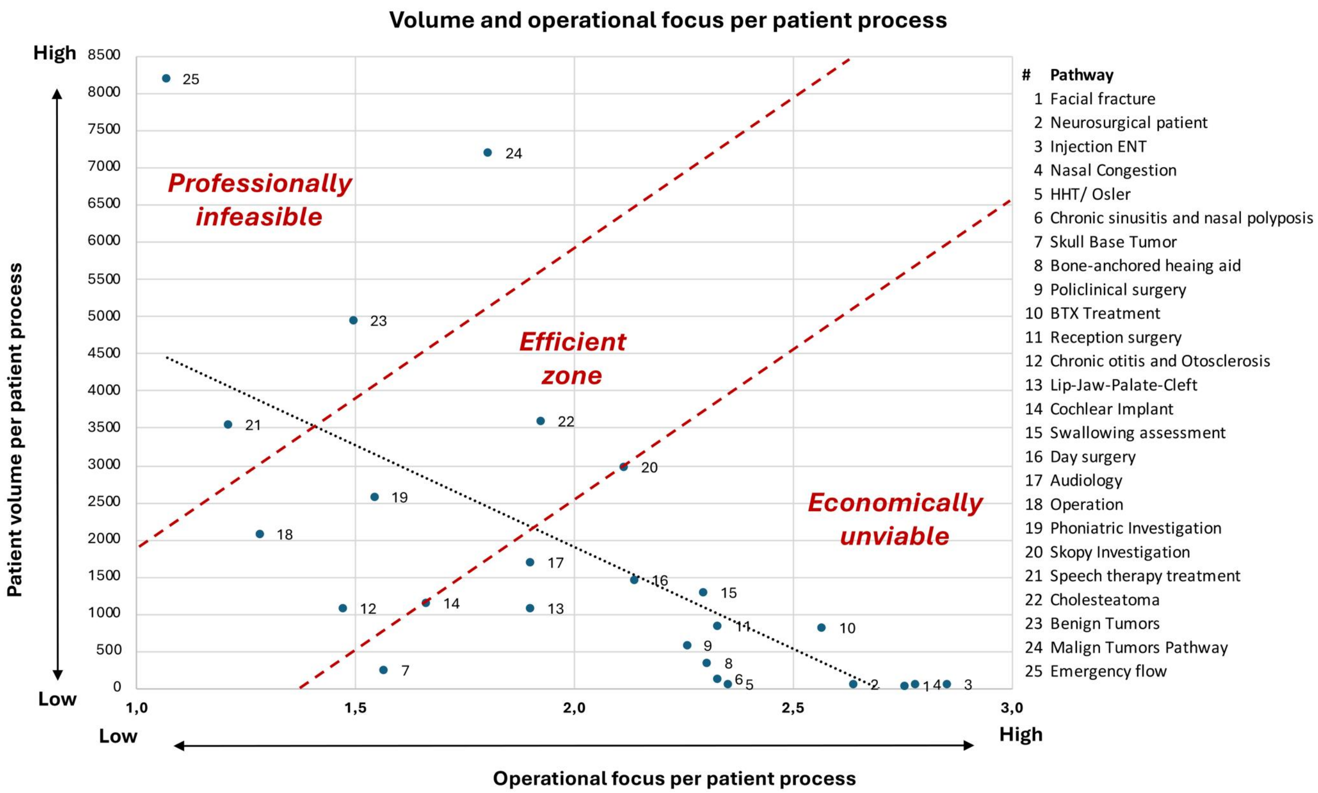


Figure 9. Efficient zone for patient volumes and operational focus.

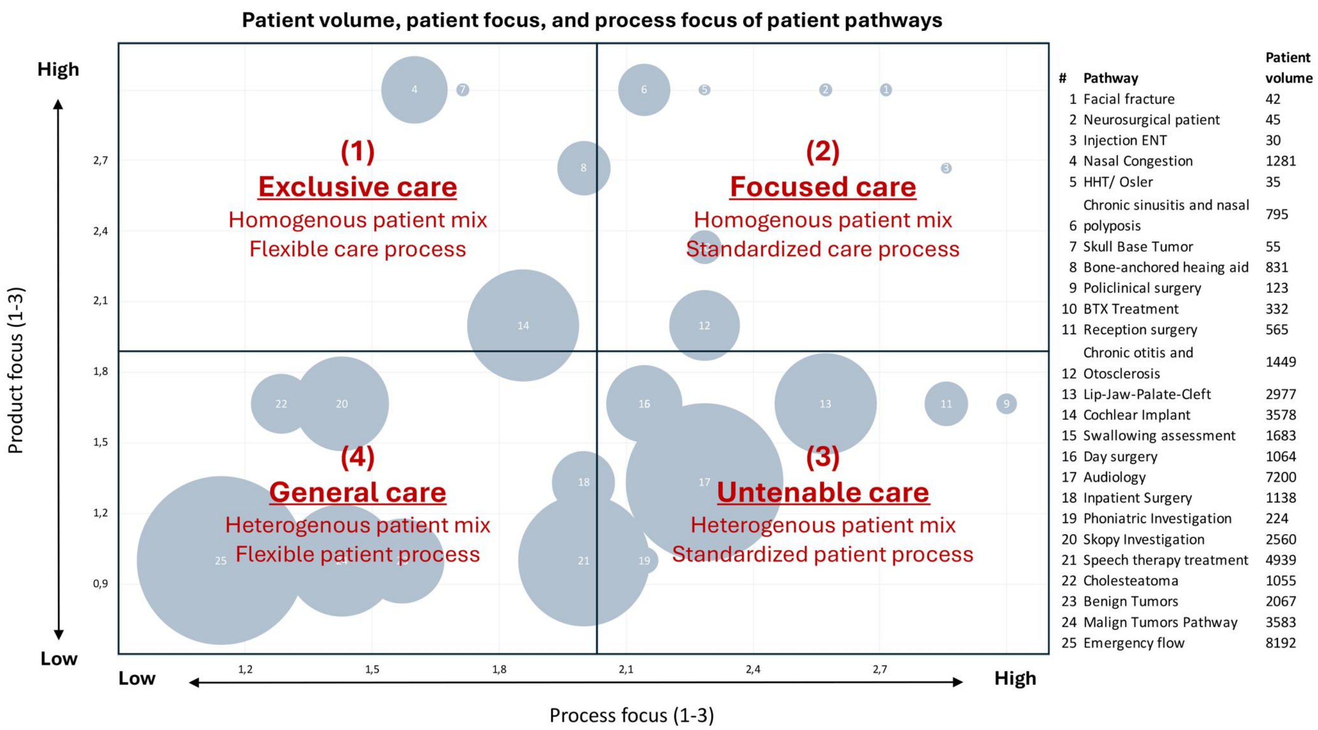


Figure 10. Four types of patient pathways.

minimal variation in patients and the design of care processes. The lower right corner features a heterogeneous mix of patients served by a standardised care process, called "Untenable care", in which a narrow set of resources in a standardised process serves a highly varied mix of patients. Last, the lower left corner represents processes with a heterogeneous mix of patients served by a flexible care process, labelled "General care", in which significant resources and flexibility accommodate a wide range of patients.

According to Hayes and Wheelwright (1979) and Holweg et al. (2018), processes should ideally fall within either "Focused care" or "General care" (i.e. squares 2 and 4).

Although the ENT clinic's processes span all four categories, most processes are "General" or "Untenable", whereas few are "Exclusive" or "Focused". As a full-service clinic at a university hospital, the clinic is expected to have some "Exclusive" processes for the most complex and high-priority cases, albeit in low volumes. Likewise, emergency flows, including those in the ENT clinic's case, are expected in "General care" due to being designed to manage a high volume of diverse ENT disorders. However, most of the ENT clinic's processes fall into squares 3 and 4, with minimal presence in square 2. That result is concerning because "Focused care" typically represents the main source of revenue, in which high-volume flows are managed at lower costs. For that reason, the clinic's processes should be reorganised. The focus-related potential of the ENT clinic lies in three areas. First, high-volume "Untenable" processes can likely be split into more homogeneous groups to create focused processes, whereas the rest may form a general process that better aligns patients' needs with the design of processes. Second, high-volume "Exclusive" processes could be further standardised to align with the patient group's somewhat homogeneous, narrow needs. Third, high-volume "General" processes could aim for greater focus in parts of the process or be divided between homogeneous high-volume patient groups and heterogeneous low-volume groups.

The complex, diverse mix of patients at full-service providers often makes care delivery cumbersome, due to requiring extensive preparation for multi-morbid patients, heavy lifting for obese patients, and significant time margins for anxious and frail patients. Consequently, a workday can become highly stressful, both physically and mentally, for healthcare professionals and managers. Outsourcing simpler, more predictable care may worsen the situation and further complicate the working environment (Thirumalai and Devaraj 2024). Therefore, it is crucial to distinguish routine, straightforward care from complex, unique cases in order to develop specialised facilities, service lines, and pathways alongside general ones, as suggested by Cook et al. (2014a). That approach allows healthcare professionals to alternate between simple, routine care and complex, unique cases, for an altogether diverse work environment that offers opportunities for improved medical quality, operational efficiency, and professional well-being. In short, because full-service providers face significant challenges in improving productivity due to the inevitable complexity of patients, the FHO framework can help them to distinguish what care should be specialised versus general, which offers a path to improving productivity while continuing to serve a diverse patient population.

Although the FHO framework provides a structured approach for evaluating focus across patient processes, the next critical step is to use those insights to drive the redesign. One effective method to that end is value stream mapping (VSM), which can help healthcare organisations to visualise end-to-end processes, identify bottlenecks, reduce waste, and streamline flows (Marin-Garcia, Vidal-Carreras, and Garcia-Sabater 2021). Another complementary approach is business process reengineering (BPR), which, similar to VSM, emphasises improving processes but aims for more radical transformation and gains in performance by fundamentally rethinking existing practices (Abdolvand, Albadvi, and Ferdowsi 2008). By mapping current patient journeys in both focused and unfocused areas, healthcare providers can identify inefficiencies that reduce focus, including unnecessary handoffs, redundant diagnostics, unbalanced resource allocation, and/or excessive wait times. Integrating VSM and BPR with the FHO framework also affords a more action-oriented improvement cycle; while assessments of focus indicate areas in which to intervene, VSM and BPR clarify ways to intervene. For instance, in a full-service clinic like the ENT clinic, mapping high-volume, unfocused pathways could reveal specific opportunities to segment patient flows or eliminate non-value-adding steps, which would enhance both focus and throughput.

6. Limitations and directions for future research

A key limitation of our research is that our findings are partly based on a single-case study, which restricts their generalisability. However, the medical clinic was carefully selected to represent a full-service hospital, which enhances the relevance of our findings to other full-service healthcare organisations. Second, the literature review was based on a search for articles in only three databases, which risked overlooking articles relevant to the objective of the review. Third, we developed a framework to help healthcare organisations to define a strategy to promote focus, evaluate operational focus, and implement changes to improve their performance and productivity. Although the framework was derived from published research and applied to a single-case study, it has not been tested or implemented, which limits its validity. Fourth, although data analysis was conducted by three independent researchers, our shared background in operations management may have narrowed our perspective and introduced potential bias in our interpretations and conclusions. Last, the absence of a validated measurement instrument for assessing focus in each evaluated is also presenting a limitation. Although such an instrument would be useful, developing one adaptable to all medical contexts remains challenging, and it might be more effective for each organisation to establish its own measurement methods.

Despite research on how focus in specialised organisations can improve performance, attention to how strategic and operational focus might impact full-service healthcare providers has been limited. In response, prospective and retrospective studies on the effects of increased operational focus in full-service settings are needed, along with interventional studies, to validate the framework by assessing its applicability and usefulness. Research on developing and testing design methodologies when redesigning healthcare processes is also needed to better enhance the operational focus of full-service healthcare providers.

7. Conclusions and managerial implications

In our study, we examined how full-service healthcare providers can improve productivity by adopting more focused operational strategies, even when serving diverse, complex patient populations. Building on prior research investigating the application of the concept of the focused factory in healthcare, we developed a framework for FHOs that enables organisations to assess and refine their focal strategies and thus optimise their operational effectiveness. In particular, it helps healthcare providers to distinguish areas best served by standardised, focused processes from ones requiring more adaptable, general approaches, which ultimately allows efficiency gains without compromising the quality of care. Applying the framework to a full-service provider, we identified a paradox: that as patient volumes increase, process complexity and variation also rise. That finding contradicts classical operations theory, which suggests that higher volumes should support process standardisation and increased focus. That paradox may help to explain increased wait times for patients and the deteriorating work conditions experienced by many healthcare professionals. Our findings suggest that to successfully apply the concept of the focused factory in full-service healthcare settings, providers need to adopt a dual-focus model that is capable of handling both routine and complex cases. We advise healthcare organisations to strategically segment their services into two categories: focused care (i.e. characterised by a narrow patient mix and a low level of variation in processes) and general care (i.e. marked by a diverse mix of patients and a high level of variation in processes). The approach enables a better alignment between patients' needs and process designs. Beyond healthcare, our findings have broader implications for service organisations that do not differentiate their processes based on complexity. Without such differentiation, those settings are also subject to rising volumes that can increase variation, reduce productivity, and create unsustainable work environments.

From a managerial perspective, it is essential for healthcare leaders to recognise the need to separate low-volume, complex patient flows from high-volume, standardised ones. Clinics should therefore actively map and document patient pathways to reduce complexity and enhance transparency. In full-service healthcare settings, care processes may become so intricate that few clinicians understand them well enough to facilitate improvement. When low- and high-volume patient groups are mixed without administrative insight, improvements in productivity may become nearly impossible without significantly increasing healthcare spending. Ignoring that possibility also exacerbates the stress experienced by healthcare professionals, who are often forced to compensate by working faster within an increasingly opaque system. Indeed, many full-service healthcare providers today suffer from low productivity and high staff turnover, which makes a significant number of processes untenable or overly generalised. In response, our framework offers healthcare managers a practical instrument to assess the degree of focus in their operations, both in terms of patient segmentation and process design. By using the instrument, managers can identify areas that lack focus, implement targeted improvements, and enhance the overall productivity of their healthcare facilities.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The only funding received, from Chalmers University of Technology, was provided to support the authors with salaries while conducting the research. In its role as sponsor, Chalmers University of Technology has not in any way been involved in or interfered with the design, execution, or presentation of the research.

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