

## Lectio praecursoria

# Modularity in health and social services: Perspectives in Organization and Management

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Finnish society is facing an interesting and burning topic: organization and management of health and social services. Organizations providing health and social services have confronted changes in their operational environment. For example, ageing, technological and biotechnological achievements in medicine, and customers' increasing expectations constitute challenges due to the scarce resources of public economy.

Due to the demographic change and people's increased expectations more services are needed. This increasing demand for heterogeneous services should be met. Luckily there are numerous providers in medicine and in medical field that are more than eager to meet the heterogeneous needs with new and more effective guidelines, care protocols, and devices. Unfortunately, new medical innovations are seldom cheaper than the current practices. Therefore growing demand and providers willingness to respond to demand is one of the factors affecting the increasing costs in health and social services.

The above-mentioned changes in operational environment cause challenges to health and social services management. Managerial challenges together with the accusation of the public sector being inefficient have led to requirements for changes in the organization and management of health and social services.

Greenwood and Miller (2010) argue that organizations can tackle the challenges by managing the organizational design. In order to overcome the challenges and to improve efficiency and effectiveness, many changes in organizational structures, as well as in

managerial practices, have been made in health and social services organizations. As a part of their organizational design, health and social services organizations have applied structures and practices from other disciplines, such as from manufacturing. These practices have been for example process structures and lean management.

Also modularity can be considered as one of such practices that originate from manufacturing and operations management and has been applied to other disciplines. It is obvious, of course, that the most extensive literature on modularity exist in product construction and design and probably the most typical examples of modular product and production can be found from the computer and automotive industry.

More recently the idea of modularity has also been applied in services and their delivery processes. There has been a growing interest to apply modularity to information systems, service-oriented architectures and logistics. However, despite the increasing number of studies in service modularity, academic discourse concerning the application of modularity in the health and social services context is still quite scarce.

## WHAT IS MODULARITY?

What actually is modularity? On the one hand, modularity can be understood as a form of design with a high independence of components and standard interfaces between them. On the other hand, modularity can be understood as a strategy for organizing complex products and

processes efficiently. It can also be understood as a conceptual tool, that allows to capture the benefits of modularity.

The characteristics of modularity – the independency of the components, decomposable architecture, and the compatibility of the components – describe the general nature of the concept.

Independency of the components means that the internal structural elements are strongly connected with each other while weakly connected with elements in other modules, thus strong interdependencies between modules are avoided. Modules are independent units which act together as a larger system.

Decomposable architecture means that complex entities can be decomposed into smaller, more manageable units. In addition to decomposability, the compatibility of components is also important in modularity. Modular architecture enables components to be flexibly mixed and matched in order to create unique bundles.

Compatibility is enabled through interfaces between modules. Interfaces define the communication between modules and the way in which modules are connected with each other. They enable subsystem independence while at the same time they support subsystems working as a whole.

### **TAKING ADVANTAGE OF MODULARITY**

The extant literature describes several benefits that can be received from modularity. It is said that modularity supports the organization of complex products, services, processes, and organizations in an efficient manner by decomposing tasks into smaller and simpler activities. Standard product architecture and shared interfaces enable flexibility and large reusability of components across the product families. This facilitates the economies of scale and scope, and has thereby potential to bring cost savings.

Other benefits of modularity are related to the design and the development of new products, services, and processes. Decomposability and independence across modules allow the simultaneous implementation of several development and design processes. Parallel

development processes are likely to reduce the development and testing time of new modules. In addition, decomposability supports outsourcing, which then allows firms to take advantage of a wide range of capabilities beyond their own organizational boundaries and leave the independent development and design work to suppliers.

Also customers can receive benefits from the modularity. These benefits are typically related to the increased variety in products and services and the increased choice options.

This all sounds fascinating and promising from the perspective of health and social services. Based on the extant literature it seems that modularity has potential to alleviate many of the challenges health and social services confront.

### **THINGS TO CONSIDER IN APPLICATION**

However, when organizational design and managerial practices are applied in new context, such as health and social service context in this case, it is important to carefully consider what possible factors might promote or prohibit the application. Managers need to be familiar with the context and the characteristics of it.

It is said in fact, that modularity might suit some contexts better than others. Schilling and Steensma (2001) describe factors that support or prevent the application of modularity. According to them, three factors – heterogeneity of input and demand, the urgency of the context and technological change – essentially support the application of modularity in products. Further on, the heterogeneity of input and demand, the availability of standards, the speed of technological change, as well as competitive intensity act as catalysts towards modular organizations.

In addition to environmental circumstances, it is important to consider the nature of the services provided. It is argued that health and social services context has special characteristics that separate it from the other service contexts. Health economics identifies special characteristics such as uncertainty, asymmetry of information and externalities. Also other special characteristics are mentioned. These are for example strong regulation, complex

environment, and unclear outcomes, to mention only few.

Due to the ethically sensitive nature of health and social services, the imprudent application of new organizational structures and managerial practices might have serious consequences. It is important to critically evaluate and carefully considerate on how the organizational structures and managerial practices, found useful in other contexts, work in health and social services.

### **THE AIM AND THE PURPOSE OF THE STUDY**

Thereby, the purpose of the study was to increase the understanding concerning modularity and the possibilities of applying it in the health and social services context. In addition, the purpose was to shed light on the viewpoints that are worth taking into account when considering the application of modularity in the health and social services context.

The aim of the study was to analyze, on the one hand, (I) the way in which modular structures in products, services, processes and organizations, are applied in the health social services context and, on the other hand, (II) what advantages and possible barriers, as well as (III) managerial concerns might occur if modularity is applied in the health and social services context.

In the study multiple research methods were used to answer these questions. A systematic literature review provided solid ground for pre-understanding the topic and supported the formulation of the research questions. Theoretical reasoning provided a general overview of the special characteristics of the health and social services context and their effect on application of modularity. Empirical studies concentrated on managerial concerns of modularity particularly from the perspective of health and social services for the elderly.

### **MODULARITY IN HEALTH AND SOCIAL SERVICES**

Related to the way in which modular structures appear in the context of health and social services, it can be argued that physical structures in products, services, processes, as well as in organizations are somewhat modular.

They can be decomposed in rather small independent units, while the challenge seems to occur in their compatibility. Particularly compatibility of information systems has been in the focus of attention in recent years. Also, regardless of attempts to create smooth care paths, the joint delivery of services has been a challenge. However, in order to guarantee smooth processes for customers, managers are increasingly emphasizing the importance of collaboration and the mutual creation of interfaces that support coherence of services. In addition, the current trend of outsourcing moves also health and social services organizations towards modularity. However, although the organizational structures might be modular, there are many challenges in managerial practices related to organizational fragmentation e.g. guaranteeing the collaboration between providers in health and social services network.

Second research question was related to advantages that modularity might bring and barriers that might occur if modularity would be applied to health and social services context. If the benefits of modularity reported in the current literature are reflected against the challenges confronted in organization and management of health and social services, it seems that modularity could be beneficial. For example, cost saving resulting from flexibility and economies of scale and scope would be probably be appreciated by health and social services managers. Moreover, enhancing innovations with a modular new service development might be useful in order to meet the heterogeneous needs of customers with more cost-effective services.

In addition, when considering the environment where modularity is said to work at its best, it is appropriate to argue that modularity suits health and social services rather well. Demand in health and social services is heterogeneous and even enhanced by the moral hazard customers and professionals place on it. Inputs are also heterogeneous, particularly in fast-developing medical technology and in medicine. In addition, the context of health and social services can be considered as urgent, especially at the customer level and products, services, and processes in health and social services are rather well standardized. These

considerations provide a good reason to assume that modularity would be advantageous in health and social services. However, when the special characteristics of the health and social services context are taken into consideration, the challenges in applying modularity become obvious. Asymmetry of information, negative externalities, as well as scarce resources, are the characteristics behind the reasons why heterogeneous inputs are restrained. In addition, extensive standardization, for example regulation in health and social services, restricts heterogeneous inputs as well as possibilities of conducting independent new services development.

The aim of the third research question was to analyze what managerial concerns related to modularity appear in the health and social services context. Managerial concerns were explored from four perspectives: new service development, standardization and customization, outsourcing, and network management.

It seems difficult for managers to apply practices that would fully support modular new service development in health and social services. The context-related characteristics prevent managers from concentrating on the outcome and from leaving room for providers for independent development work. To be precise, due to the characteristics of the health and social services context – mainly strong regulation, asymmetry of information, and unclear outcome – managers feel obligated to control the service delivery process extensively.

Standardization is an indispensable part of modularity and has multiple roles related to health and social services. Standard interfaces are considered essential elements in modularity. However, in services generally and in health and social services particularly, standard interfaces are more difficult to define than, for example, in manufacturing. Furthermore, internal design rules in modularity are said to be mainly a matter of suppliers and should not be standardized by outsiders. However, in health and social services internal design rules are also standardized extensively by regulations. This unfortunately diminishes the independence of suppliers.

Outsourcing has been a current trend in health and social services. However, outsourcing has both positive as well as negative implications. On the one hand, outsourcing brings advantages in health and social services as it supports specialization and the flexible management of resources. In addition, modularity seems to support the currently recommended practices for public procurement for innovation, such as outcome-based procurement. On the other hand, outsourcing extensively reduces the purchaser's understanding concerning outsourced services and reduces their negotiation power. Furthermore, there are context-related characteristics – such as uncertainty of demand, challenges in outcome definition and measurement, rigid regulation of the context and the complex environment – that make outsourcing complicated and partly even prohibit the public procurement of innovations.

The health and social services environment is considered highly complicated. One of the reasons for this complexity is a large number of providers, as well as a wide variety of heterogeneous services. Managers coordinate large networks and aim to ensure the quality and the safety of service processes. The extant literature on modularity describes alternative ways of managing supply chains, for example tight integration and loose coupling. In the health and social services' managers should not rely only on one management strategy, instead it would be beneficial to use different strategies for different purposes.

## CONCLUSIONS

To conclude, Greenwood and Miller (2010) argued that different organizations confront different challenges which can be responded to with particular structures and designs. This study evaluated whether the challenges that are evident in the health and social services context can be alleviated with modularity. It can be concluded that from the theoretical perspective modularity fits well in health and social services. In addition, the empirical findings concerning modularity in health and social services also indicate that modularity might be beneficial to

this context. However, the special characteristics of the health and social services context prevent some of the benefits of modularity and complicate its application.

This study contributed to the academic literature on the organization and management by describing modularity as an alternative way for organizing and managing health and social services. In addition, it contributed to the literature of modularity by exploring the applicability of modularity in the context of

health and social services. It also provided practical contribution to health and social services managers by evaluating the pros and cons of modularity when applied to this context.

#### **LÄHTEET**

Greenwood, R. – Miller, D. (2010) Tackling Design Anew: Getting Back to the Heart of Organizational Theory. *Academy of Management Perspectives*, Vol. 24 (4), 78–88.