CO-CREATING HEALTH

ABSTRACT

PURPOSE:

Several authors have recognized the lack of service research contributions in health, although it has been considered a topical context. The purpose of this paper is to examine service in the context of health.

APPROACH

We compare the frequently cited premises in recent service research (S-D logic) to one of the most cited models in health economics, the Grossman model. We present a model of co-creation of health outcomes and discuss resource integration, phenomenological value and co-creation in the health context.

FINDINGS

In comparing the two approaches, we found that while the Grossman model and S-D logic differ in their perceptions of value, both understand the individual as an active 'integrator of resources'. In resource integration, the models used in health economics have primarily focused on the direct service output effect, and have not accounted for co-creation between the health provider and customer.

RESEARCH IMPLICATIONS

We propose a model of co-creating health outcomes. This model extends Grossman's original model and reflects the foundational premises of S-D logic in the context of health. The implication for future research is that predictions based on the new model should be analyzed. Empirical testing of the model in different kinds of health service settings is warranted.

ORIGINALITY

This study is the first to study service in the context of health by comparing the foundational premises of S-D logic to health economics. The model presented enables the analysis of the co-creation of health and its measurable outcomes.

Key words: Co-creation, health, S-D logic, Grossman model, value
Paper type: Conceptual

CO-CREATING HEALTH

INTRODUCTION

Healthcare is one of the largest clusters of economic activity in developed countries (Reinhardt et al. 2002). Currently, most health-improving efforts are channelled through healthcare service systems. What compromises our health has changed dramatically over the last decades, as chronic conditions, obesity, and other lifestyle-related conditions, have increased rapidly. The focus of health creation is increasingly centred on the individual.

The 'co-creative nature' of health outcomes has long been recognized in clinical literature. However, co-creation is not planned for, nor managed sufficiently, in healthcare service provision. Individual health is a complex outcome that is affected by numerous resources over a lifetime. Healthcare service systems mainly provide reactive care, although most health is proactively co-created outside the healthcare service system. Behavioural choices are the most important factor contributing to the individual's health creation (McGinnis et al. 2002). Health has been discussed in the service-dominant (S-D) logic literature (McColl-Kennedy et al. 2009; Bitner et al. 1997). However, limited empirical research on co-created health outcomes has been presented. Several authors have recognized the lack of service research contributions in health, despite the fact that it has been found to be a significant application area.

The purpose of this paper is to examine service in the context of health. We draw on the premises of S-D logic and examine them in comparison to health economics. In order to do so, we compare the frequently cited S-D logic premises in recent service research to one of the most cited models in health economics, the Grossman model of demand for health (Grossman 1972). Both the foundational premises of S-D logic, as well as the Grossman model, have been cornerstones in their own research field. S-D logic has boosted service research since the article which introduced it in 2004 (Vargo & Lusch 2004). By the end of 2010, over 1600 articles had been published that referred to the original 2004 article introducing S-D logic. The Grossman model (1972) has been markedly influential in health economics, the original article having been cited over 2300 times.

This paper is organized as follows. In the next section we compare the foundations of the Grossman model to the foundational premises of S-D logic in order to synthesize similarities and differences in their approaches to service, its resource integration, value and co-creation. Then we extend the original Grossman model and present a model of co-creation of health outcomes. We intend to provide a conceptual model which enables empirical modelling and testing of the co-creation of health outcomes. Finally, we conclude by summarizing the comparison of the two approaches, discuss the modified model and present ideas for future research.

HEALTH ECONOMICS AND S-D LOGIC

Health in behavioural sciences has inspired a variety of theories and approaches. Relatively little attention has been paid by economists to the role of other determinants of health outside the healthcare service system. Health economics is the discipline of economics applied to the topic of health and is exerting an increasing impact on decisions in healthcare. Health economics has been mainly healthcare economics. Two distinct branches of economics are reflected in health economics: the use of economic theory to

explain and to predict the operation of the healthcare systems, and the use of theory to facilitate decision making on the most efficient use of resources (Kernick 2002).

Studies of health consumption and production in health economics date back to the household production framework (Becker 1965) and the model of demand for health (Grossman 1972). These positivist models were designed to give explanations of consumer behaviour where health is jointly produced and has utility for the individual. In health economics literature, the production of health has typically been explored in two distinct domains: i) the production of healthcare (service) where the standard methodology has its foundations in the microeconomic theory of production. This methodology has been used to study the various characteristics of organizing, e.g. the production of hospital and primary care service; ii) the production of health based on Grossman's model.

The Grossman model

Grossman's 1972 model views each individual as both a producer of health and a consumer of different types of healthcare service. Health is treated as a stock, which degrades over time in the absence of "investments" in health, and therefore health is viewed as capital. The model acknowledges that health care is both a consumption good that yields direct satisfaction and utility, and an investment good, which yields satisfaction to consumers indirectly through increased productivity. In investing in their health, individuals make tradeoffs between the time and resources devoted to their health. For instance, they weigh exercising or cooking healthy meals against other goals in their lives. Thus, individuals are seen as seeking to maximize utility by balancing their time between two competing production processes: health and other commodities. Goal prioritizations and the use of resources determine the optimal level of health that an individual will demand. The core of the Grossman model is a function where the individual combines various inputs, services including medical care, and self-administered inputs including exercise or other preventive measures to increase their health. While an individual's limited time resource can be allocated to health, time is also required in other utility increasing commodities, such as work, leisure or social activities.

Different types of healthcare service consumed by an individual are often co-produced by numerous health provider resources. For example, a diabetes care episode may include primary and secondary care, with a dietician, optometrist and numerous other resources working together to manage an individual’s condition. Although Grossman does not explicitly talk about co-production, health production is modelled as a multiproduct function produced by multiple resources.

In the Grossman model, education is regarded as a factor which increases either technical or allocative efficiency in the production of health. Modern theories of an individual’s production of health (Grossman 1972, Grossman 2000; Wagstaff 1986) suggest that individuals have different capabilities of transforming various inputs into ‘health’. Hence healthcare services are not the only inputs to enter an individual's utility function: self-administered inputs, such as lifestyle, education, habits, environment and social circumstances are also included in the utility function. Individual characteristics and other external factors beyond the influence of providers may contribute to the gains derived from the treatment, which makes it difficult to separate confounding effects from the health contributions made by healthcare organizations.

Service-dominant logic

S-D logic has focused on the fundamental change in the market from the exchange of goods to the co-creation of value. It originally presented eight (2006) foundational premises that were then extended to ten premises (2008). In their 2004 article, Vargo and Lusch call S-D logic 'service-dominant logic of marketing'. However, in "Service-dominant logic: continuing the evolution" (2008), Vargo and Lusch call the approach 'service dominant logic' and note that S-D logic is not applicable to marketing only. They further state that S-D logic of marketing is "a specific application of the logic" and that S-D logic "is a generalizable mindset from which a general theory of the market can be developed" (Vargo and Lusch 2008, p. 3). Currently, S-D logic has expanded to the study of markets and service ecosystems (Lusch et al. 2010).

In its foundational premises, S-D logic means that "a service-centred view is inherently customer oriented and relational" (Vargo and Lusch 2008, p. 7). In research and practice the call for customer orientation has also been identified in the context of healthcare. The healthcare sector has failed to achieve true customer orientation or 'patient-centricity', although it has been the industry buzzword for the last decade. Therefore, in research as well as in practice, a need for customer orientation in the context of healthcare is meaningful.

COMPARISON

We contribute to the topical discussion of service research in the context of health by comparing the foundational premises of S-D logic (Vargo and Lusch 2008) to the premises of the Grossman model. First, we focus on foundational premises #1-5, which lay the foundation for understanding what service is, its function in the economy and nature of resources. Then we discuss foundational premises # 6-10: value and value co-creation.

Service

The first five premises of S-D logic characterize the fundamental elements in service. The comparison between S-D logic and the Grossman model reflects the discussion of whether we live in a service economy (Buera & Kaboski 2009) or a manufacturing economy, where the production outputs are products or commodities.

> *FP 1__ Service is the fundamental basis of exchange.*
> *FP 2__ Indirect exchange masks the fundamental basis of exchange.*
> *FP 3__ Goods are the distribution mechanism for service provision.*
> *FP 4__ Operant resources are the fundamental source of competitive advantage.*
> *FP 5__ All economies are service economies.*
>
> (Vargo and Lusch, 2008, p. 7)

Vargo and Lusch (2008) put service in the locus of business and see all economies as service economies. In accordance, S-D logic prefers the use of 'service' (singular – a process) and distinction from 'services' (plural – output) (Vargo & Lusch 2004; Lusch & Vargo 2006; Vargo & Lusch 2008). The Grossman model indicates that consumers produce commodities with the help of goods and the allocation of their own time. Health is seen to be created as a function of health service and self-administered inputs.

S-D logic claims that the service basis is not always apparent in the exchange due to complex combinations of goods, money and different actors. The Grossman model views

service from the demand perspective; what consumers demand is not necessarily the medical service, but the effect of the service in the creation of health and utility. Thus, service in the Grossman model is exogenous to the individual's utility function and has relevance only by providing necessary input (service).

The characteristics of human input in the service process are conceptually similar in S-D logic and the Grossman model. S-D logic understands operant resources as human-related competence, such as knowledge and skills. The application of operant resources is the basis for all service and the fundamental source of competitive advantage. S-D logic is primarily about value creation, rather than "production". It sees competition as being driven by the ability to cause desired change (Vargo and Lusch 2008). The Grossman model considers that "individuals inherit an initial stock of health that depreciates over time" (Grossman 1972, pp. 224-225). An individual passes away when the stock of health falls below a critical level. An individual may affect his stock of health by allocating resources to health production. Education and knowledge may enhance the efficiency of health production in the Grossman model. Finally, in the Grossman model the individual's goal is revealed through maximizing utility.

Both S-D logic and the Grossman model understand goods as being part of health, but in different ways. While S-D logic sees goods as the distribution mechanism for service provision, the Grossman model sees health as a commodity and as a capital stock, which can be used to produce an output of healthy time. As such, Grossman productizes health, which can be understood with the model's historical background dating back to the beginning of the 1970s. At that time, service research was in its infancy (Fisk et al. 1993) and it would take some years before Shostack (1977) argued that the marketing mix and the language of marketing derive from manufacturing physical goods.

While on one hand the Grossman model sees health as a commodity, the model also recognizes that health can be seen as a form of human capital, which affects a person's productivity. According to Grossman, health capital differs from other types of human capital. A person's stock of knowledge is essential for his market and nonmarket productivity: "health determines the total amount of time he can spend producing money earnings and commodities" (Grossman 1972, p. 224).

Value and co-creation

Next we discuss the foundational premises (Vargo and Lusch 2008) connected to value and value co-creation (#6-10) and compare them with the Grossman model.

> *FP6__The customer is always a co-creator of value.*
> *FP7__The enterprise cannot deliver value, but only offer value propositions.*
> *FP8__A service-centred view is inherently customer oriented and relational.*
> *FP9__All social and economic actors are resource integrators.*
> *FP10__Value is always uniquely and phenomenologically determined by the beneficiary.*
>
> (Vargo and Lusch 2008, p. 7)

Grossman models individuals who "integrate" inputs in the production of their own health. He lists medical care utilization, diet, exercise, smoking and alcohol consumption as choice variables or inputs to an individual's utility function of health (Grossman 2000). In order to create health outcomes, an individual may integrate existing resources or other actors/resources, such as the output from healthcare service.

Health economics typically refers to illness, disease and health maintenance mostly as *episodes*, which have a beginning, a diagnosis and a course of treatment. Health is seen as being produced through interaction with different types of healthcare service episodes (clinical care), but also in the individual's own health co-creation process (health behaviour). The combination and consistency of integrated resources change over time. S-D logic suggests that individuals integrate resources into their value creation.

In S-D logic the context of value creation is a network of networks, where all actors are resource integrators. Health economics literature has modelled mainly dyadic relationships in health production, although production is seen as a multiproduct function. Health economics has presented a limited discussion on resource integration in networks or ecosystems.

Individually determined value in the service experience is a relatively recent concept in service research (Vargo and Lusch 2008). Researchers in health economics have been active in trying to develop extra-welfarist measures for valuing health (EQ-5, Health Utility Index, 15-D). Health has often been associated with value (and made measurable in cardinal scales) in several streams of research. While the Grossman model was presented as early as 1972, the value concept was not explicitly discussed in it, but was formulated using the utility function (a representation of an individual's preferences). Grossman considers health broadly as longevity and illness-free days in a given year and sees health as a choice variable (Grossman 2000). Grossman models health as a resource in productivity and sees absence of sickness as a source of utility. Empirical works based on the Grossman formulation have avoided the choice of an exact definition for health by using it as a latent variable in the econometric specifications.

As S-D logic understands value as being phenomenologically and contextually determined by the beneficiary (Vargo and Lusch 2008), a service provider is not able to deliver value; it can only make value propositions. Through service propositions service providers can offer their applied resources for interactive value creation. The requirement is that the customer has accepted the provider's value proposition (Vargo and Lusch 2008). This implies that a provider cannot create or deliver value independently of the customer. Accordingly, the health outcomes are often affected by the phenomenological nature of health as a value. Health is individually determined and dependent on the context and situation. In order to co-create more health, an individual must often prioritize health over many other more tempting commodities that they at that moment value higher than creating health inputs.

The placebo effect is part of the response to almost any active medical intervention. For example, in a clinical trial one group may be given real medication while another group is given a placebo that looks just like it, in order to learn if the differences observed are due to the medication or the perception that medication has been delivered. Sometimes individuals given a placebo treatment will have a perceived or actual improvement in a medical condition. It points to the importance of perception as a type of experience and is an illustration of phenomenological value in health.

Grossman discusses in his 1972 article the distinction between health as an output and medical care as an input for the first time in health economics literature. Grossman (1972) recognized the individual as an operant 'resource integrator'. Healthcare service providers can propose medical care as an input, but cannot alone deliver health as health is dependent on numerous other factors beyond healthcare service.

S-D logic sees that the customer is always a co-creator of value, implying that value creation is interactional (Vargo and Lusch 2008). In line with the basic idea of co-creation, Grossman recognizes health creation as a sum of many inputs from multiple resources. He does not, however, explicitly describe a mechanism for co-creating outcomes, but rather specifies the provider's production process and an individual's utility function as separated and uncoordinated entities.

MODELLING CO-CREATION

To show the original Grossman model, we present a slightly condensed version of it in Figure 1, which nevertheless captures the aspects necessary for our consideration. For simplicity, we omit indices for enumerating various patient types/disease classes characterizing the different service types (y1) in a multiproduct setting. In addition, we do not focus on the dynamic or inter-temporal aspects of production (which are present in the original Grossman formulation). Hence, the models presented here are reduced to static models.

The original Grossman formulation concentrates on the individual's health production H and the utility derived (the lower part of Figure 1) from health service and other commodities (y2). Although Grossman recognizes the production of health services, it is not included in the model formulation, except for the service y1 entering exogenously into the individual's utility function. As illustrated in Figure 1, the provider's production function P(x) integrates resource inputs x = (x1….xn) to produce service output y1. Output y1 is a potential input to be integrated into the individual's health production function H(z, y1) along with self-administered inputs z = (z1…zn). An individual's utility (v) depends on health H and other commodities y2. Although the model is presented as a dyad, the production function is seen as an output of multiple service providers and products. The utility function is described as specific to an individual.

Errore. L'origine riferimento non è stata trovata.

Figure 1: Simplified Grossman model (1972)

As noted earlier, the mechanism for co-creation is not present in the model of Figure 1. In Figure 2, we propose an updated model which accounts for co-creation in the interaction between healthcare service and an individual. Co-creation may take place and impact the production function P, and utility function H, through two distinct routes. In relationship A) we place an efficiency boosting term c(z,x), which depends on the interaction (input) between the individual and the health service provider. The coupling of certain inputs can affect the production correspondences, and can be considered an additional input in the production function P, and health H (co-production, increasing technical efficiency).
Errore. L'origine riferimento non è stata trovata.

Figure 2: The model of co-creation of health outcomes (Modified from Grossman 1972)

As illustrated in Figure 2, we explore co-creation in two relationships and model the co-creation of health outcomes with the following two functions:

- *Health service provider's production function:* $y_1 = p(x, c(z,x))$ where y_1 = health service, $x = (x_1, x_2, x_3, \ldots x_n)$ inputs to provider and $c(z,x)$ = efficiency factor due to co-creational efforts

- *Individual's (health) value function:* $v = v(y_2, h(z, y_1, c(z,x)))$ where y_2 = other service/commodities, v = value, h(z,y,c(z,x)) = health production function and the individual's self-administered inputs $z = (z_1, z_2, z_3,.., z_n)$

With the same functions we can observe relationship B), where technological innovations may occur spontaneously in the interaction and lead to entirely new ways of co-creating health outcomes and new types of service (technological change, an expansion of the production possibility set). Relationship B in Figure 2 is of current interest because modern ICT technologies may enable increasingly cost-efficient ways of delivering care. Service delivery is increasingly being moved from the traditional face-to-face setting of the physician's office into asynchronous, potentially more cost-effective media that reach the individual during their daily routines. For example, mobile phone applications offer a great example of how a small device can continuously monitor several lifestyle-related factors, and link an individual's health to supporting and encouraging resources through lifestyle maintenance and social network applications. The implementation of day- and laparoscopic surgeries, innovations in telemedicine and other logistic developments are also recent examples of the changed provision of medical care due to advances in technology. Accordingly, technological innovations may enable more effective, increasingly cost-effective, and more engaging ways to promote health value creation. Co-creation may also change and enhance service offerings and experiences as an entirely new type of service may emerge as a result of customer and provider interaction.

A practical and current illustration of the co-creation model of health is service in lifestyle intervention. The basic idea of a lifestyle intervention service is to enhance individuals' health by co-creating better outcomes with them. Co-creation may imply, for example, providing information, encouragement, goal setting and feedback in interaction over a period of time. Favourable behaviour in this regard includes, for example, eating a balanced diet, engaging in sufficient physical exercise, maintaining a healthy BMI, and abstinence from smoking. These health-creating or health-destroying choices take place in everyday life. The effect on outcomes is dependent on the extent to which an individual integrates the resources into their daily practices and makes lifestyle changes accordingly. It may also occur that an individual signs up to a service but does not change his inputs to co-creation. To a large degree, good health is contributed to by an individual's own daily health behaviour (McGinnis et al. 2002).

DISCUSSION AND IMPLICATIONS FOR FUTURE RESEARCH

This paper has examined service in the context of health. We compared the foundational premises of S-D logic to the Grossman model. We found similarities and differences between the approaches to health creation, which we summarize in Table 1.

Co-creation in interaction between the provider and the customer is the most significant difference between the models compared. This already has its foundation in how service is understood. While S-D logic emphasizes the application of human resources, the Grossman model focuses on the provision of necessary input for the individual's production. Grossman does not model co-creation.

S-D logic and the Grossman model understand the value resulting from service in different ways. S-D logic understands value as a holistic and experience-based phenomenon, which is not only related to a single output or event (Vargo and Lusch, 2008). Value experiences also relate to a larger range of events than just one specific service event. Value is therefore cyclical and reconstructed based on previous experiences (Helkkula and

Kelleher 2010). The Grossman model understands value as a utility, which is a representation of preferences but may also be based on choices from a complex set of service combinations. The Grossman model considers the service outputs as exogenous to an individual's process, whereas S-D logic sees all value as co-created.

Despite the many differences, the S-D logic premises and the Grossman model also share some common features. Both recognize the human input as a key element in a service process. As S-D logic refers to operant resources as resource integrators in their health related service, the Grossman model considers the individual in allocating resources to health production and in integrating service inputs.

Table 1: Comparison of service, value and co-creation between S-D logic and the Grossman model

	S-D LOGIC	THE GROSSMAN MODEL
Orientation in science	Descriptive	Positivistic
Service	The application of operant resources (knowledge and skills) is the basis for service (exchange).	Exogenous
Nature of value / utility	Phenomenologically determined	Based on economic theory
Formulation	A set of axioms	Optimization model + comparative statics
Focus of research	Co-creation of value	An individual's behavior in the creation of health
Specific features:		
Resource integration included	Yes	Yes
Value beneficiary/preferences	Individually determined in social networks	Individual
Co-creation/interaction	Yes	No
Co-production between service providers	Yes	Yes

Implications for future research

We presented an extension of the Grossman model, *the model of co-creation of health outcomes,* which offers important new developments for future research. As outlined in Figure 2, we distinguished two separate relationships of co-creation which should be explored further. In relationship A), we have a potential explanatory factor (which is mostly omitted from previous empirical specifications) for efficiency differences in the production of health care service and health. For example, the capability for co-creation may have significant consequences in the productive efficiency and thus for designing fair funding schemes for healthcare producers. In relationship B), the research could concentrate on the diffusion of new technology and investigate the role of co-creation in the productivity

change. Relationship B is central to planning and managing preventive health service that should aim to tackle the lifestyle-related disease epidemic.

Our specification of a model is based on conceptual discussion, and therefore it serves as a suggestion towards empirical modelling and quantifying co-created health outcomes. Identifying the limitations of the model, we encourage researchers to further develop it conceptually and to test the model with data in the context of health economics. The model is an abstraction of a very complex phenomenon and does not take into account all determinants of health. As we have yet to incorporate an ecosystem perspective and temporal aspects into the model, this remains a challenge for future research as well.

The illustrations in the context of health imply that researchers should apply the foundational premises of S-D logic to health service processes by considering the customer as an indigenous actor in their own health creation. An example of service in lifestyle intervention illustrates co-creation of outcomes, and shows that an exogenous output to an individual's health process is not necessarily accepted, but may remain unused. This has its foundation in the different perspectives on the service and value. While the service provider considers its output as an essential input in the customer's service process, the customer may consider different types of value experiences more important and therefore the service input does not even become part of the value they experience. In the illustration, the driving force for change in the individuals' service process is their individual value experience; customers may not integrate exogenous service offerings into their health creation.

In the illustrations presented, value-in-use was also discussed through the placebo effect. An individual may experience significant value-in-use from a placebo treatment that has no proven clinical effect. This reveals that the experienced value does not even need to have its foundation in medically-approved input; value may also be based on experiences of imaginary inputs (Helkkula 2010). Therefore, an individual using a placebo pill may have as good – or even better – value experience and service output than an individual using a clinically-validated treatment.

The combination of S-D logic premises and the Grossman model opens up future avenues for health research. In Table 2 we propose meaningful research avenues and questions, which would further integrate S-D logic premises and health economics and offer managerial implications to acting health practitioners.

Table 2: Suggestions for future research combining the S-D logic premises and the Grossman model

	Challenges in combining the S-D logic premises and the Grossman model	Suggestions for research questions with the model of co-creation of health outcomes	Potential managerial implications
Service	The Grossman model considers the service provider as an exogenous provider of outputs, which become inputs in the customer's health production process. This creates a challenge in making the customer an endogenous integrator of resources within the combined service process.	How the different combinations of service: y1 = p(x, c(z,x)) affect the individual's (health) value function: v = v(y2, h(z, y1, c(z,x)))	Based on the results, a meaningful allocation of limited resources to the most efficient co-creation of health outcomes.
Value	Based on microeconomics, value is understood as a utility. Phenomenological (experiential) value is difficult to turn into economical value. This creates a gap between the two different approaches.	Comparing the effects of experiential value in relation to the economic value using an Individual's (health) value function.	Engaging customers to co-create better health outcomes based on their value experiences.
Co-creation	Not integrated in the Grossman model. To date, health economics has not discussed co-creation in its main stream research.	Empirical testing of the co-creation effect on increase in health outcomes. Evaluation of ICT-enabled service as an enabler of increasinly cost-effective co-creation.	Co-creation needs to be planned and managed in health service provision. Service can be extended outside traditional settings to everyday live.

CONCLUSION

The comparative analysis revealed that Grossman models health service as exogenous input to an individual's health creation and does not model co-creation of outcomes in a relationship between an individual and health service providers. Health however is a co-created outcome that requires the integration of multiple resources, service and self-administered. The Grossman 1972 model has been employed for decades to investigate how individuals combine various inputs and how health is produced. The Grossman model has not been further developed since its original format and there are limited empirical explorations executed based on it (Grossman 2000). In the comparison we found similarities in the two approaches and concluded that S-D logic premises should be applied in extending the model to answer the current challenges of health service.

Based on the comparison of the Grossman model and understanding current challenges due to an increase in lifestyle-related diseases, we proposed a *model of co-creation of health outcomes*. Our model extends Grossman's original model and reflects the foundational premises of the S-D logic in the context of health. This has several implications for service research in the economy of health and well-being. Our model enables the empirical exploration of co-created outcomes in health and wellness service and provides insights to resource allocation decisions. By exploring co-creation of outcomes, we seek ways to engage individuals in the prevention of illness and more cost-efficient care. Understanding co-creation is a step towards true 'patient-centricity'.

This study has practical relevance to health and wellness service providers seeking to manage and plan co-creation of health outcomes. Co-creation should be explored in relationships outside traditional health service setting that may be enabled by ICT solutions. At the societal level, the allocation of funds to caring for illnesses versus

preventive health service is a topical challenge, which benefits from an integrated approach to health and service research.

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