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How Should Organizations Promote Equitable Distribution of Benefits from Technological Innovation in Health Care?

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Abstract

Technological innovations typically benefit those who have good access to and an understanding of the underlying technologies. As such, technology-centered health care innovations are likely to preferentially benefit users of privileged socioeconomic backgrounds. Which policies and strategies should health care organizations adopt to promote equitable distribution of the benefits from technological innovations? In this essay, we draw on two important concepts—*co-creation* (the joint creation of value by multiple parties such as a company and its customers) and *digitalization* (the application of new digital technologies and the ensuing changes in sociotechnical structures and relationships)—and propose a set of policies and strategies that health care organizations could adopt to ensure that benefits from technological innovations are more equitably distributed among all target populations, including resource-poor communities and individuals.

Introduction

In the past decade or so, the health care industry has seen a rapid infusion of a wide range of digital technologies and associated innovations—from enterprise-level systems such as electronic medical records (EMRs), e-prescribing systems, and patient portals, to personal health systems such as personal health records and personal health mobile apps. There is emerging consensus among researchers and policymakers that these health information technologies do have a positive impact on many different health care outcomes including efficiency and effectiveness of care, access to care, patient involvement in care, patient satisfaction, and preventive care [1-4].

At the same time, benefits from such new technologies and associated solutions are in general likely to accrue to those who have access to and good understanding of those technologies. Early evidence does indicate that the benefits from health care technological innovations preferentially accrue to users from privileged socioeconomic backgrounds and those with higher levels of e-health literacy (i.e., the ability to use digital technologies to find relevant health information and apply the knowledge gained to improve health or address a health issue) [5-7]. If this evidence is correct, then what

policies and strategies should health care organizations (HCOs) adopt to ensure that the benefits from health care technological innovations are more equitably distributed among all target populations, including resource-poor communities and individuals?

In this essay, we address this question by drawing on two important concepts from research on innovation management and digital technologies: *co-creation* and *digitalization*. We briefly describe these two concepts and then identify three foundational themes that emerge from their joint consideration. Based on these themes, we propose a set of policies and strategies that would allow HCOs to play a more proactive role in ensuring that the benefits from technological innovations are more equitably distributed among all target populations.

Co-Creation and Digitalization

Co-creation. Co-creation relates to the joint creation of value by multiple parties—for example, by a company and its customers [8]. It implies a shift from merely *consulting* with a set of external stakeholders (e.g., users or customers) to actively *collaborating* with them in identifying problems and developing solutions. With the emergence of the internet and other digital technologies (e.g., mobile computing), the scope and depth of such customer involvement in innovation has changed radically [9]. It has become possible for customers to engage in all the phases of innovation—from ideation, to design, to development, to implementation, to support [9]—and to contribute to a greater level of innovativeness, faster turnaround, and enhanced perceptions of a product's quality and satisfaction with a firm [10-12]. For example, BMW, the German automaker, set up a co-creation lab (a virtual environment with online design tools for customers to develop their innovative ideas) that led to the generation of over 400 design ideas related to interior design, urban mobility, telematics, and driver assistance systems, many of which were incorporated by the company in its future cars [13]. Similarly, in the public sector, such initiatives have ranged from Boston's Citizens Connect initiative (which allows citizens to identify and report civic problems using a mobile app) to the Danish government's Climate Consortium Denmark (a series of workshops to bring together citizens, businesses, and experts in co-creating new strategies to combat climate change while driving new business growth) [14]. Numerous other examples of such consumer-led co-creation exist in the private sector [10] as well as in the public sector (citizen co-creation) [14, 15].

The co-creation perspective has also been applied to the health care context and implies the promise and potential of embracing health care consumers (i.e., patients) as partners in innovation and value creation [16-18]. Such co-creation approaches could enable HCOs to develop more innovative value-added services at lower costs and improve patients' experiences with those new offerings [16]. For example, when launching a new weight loss drug, GlaxoSmithKline (GSK) invited 400 overweight men and women to use the drug and to share their drug-related experiences by participating in its online

community. The new knowledge generated from those consumer interactions was instrumental in the design of the educational materials that accompanied the drug as well as in the creation of templates for individualized or customized treatment plans (which was crucial for the success of this drug). Importantly, such knowledge also enabled consumers to manage the learning curve associated with the drug, thereby enhancing consumer satisfaction with the new treatment and creating positive perceptions regarding the quality of the new product [16].

Digitalization. Digitalization relates to the "*sociotechnical process* of applying digitizing techniques to broader social and institutional contexts" [19]. The concept of digitalization goes beyond digitization (i.e., digital conversion), emphasizing the changes in sociotechnical structures and relationships triggered by the infusion of new digital technologies and applications [20, 21]. Such changes might include new business models, new intermediaries (e.g., data analytics portals, crowdsourcing platforms), and new collectives (e.g., online communities). And, in some cases, these changes in sociotechnical structures might lead to new innovations, reflecting the inherent generativity of digital technologies [21]. For example, data portals and other intermediaries established to collect and analyze data from personal health and wellness devices (such as Apple Watch and Fitbit®) have in turn given rise to new health care offerings. For example, Apple HealthKit helps integrate personal health data with enterprise-level electronic health records and allows for diagnosis. Thus, the reconfiguring of the underlying sociotechnical relationships between new (digital) products and services and users (or consumers) calls for organizations to better understand how their health care offerings fit into and refashion the everyday life of consumers. More broadly, the digitalization perspective implies the need for HCOs to look beyond the immediate offering or technology artifact (e.g., patient portal) and consider how the technology redefines consumers' relationships and exchanges with peer consumers as well as the HCO (and other institutions) to better understand the adoption, use, and value derived from such offerings.

Foundational Themes: Educate, Engage, and Evolve

Health care organizations deploy new technologies and solutions to ensure efficient and effective health care delivery to *all* of their customers and to promote the well-being of all individuals and communities. However, as noted previously, consumers who have better access to and understanding of the new technologies and who are well positioned in the emergent sociotechnical structures are likely to benefit more from the health care innovations. And certain sections of the consumer population—for example, individuals in resource-poor communities, seniors, or the aged with limited education, and consumers in regions with limited access to the internet and other foundational digital technologies—are likely to be at risk of not benefiting from these valuable innovations [6, 7]. It thus becomes incumbent on HCOs to adopt proactive strategies to ensure equity in the distribution of benefits from their technology-centered health care innovations.

Importantly, such equitable distribution of benefits would not only serve to fulfill HCOs' mission of enhancing individual and societal health and well-being but also advance their business goals by ensuring a larger customer base for new offerings.

The joint consideration of co-creation and digitalization implies three important themes—*educate, engage, evolve*—that together could inform HCO strategies and policies.

- *Educate*. Knowledge about health care problems and solutions is heterogeneous, dynamic, and distributed among different stakeholders (including different sets of patients). For example, patients from a specific background (say, those with low e-health literacy) might possess unique knowledge about their needs (say, the need for additional help in interpreting online health data and test results) and how potential solutions might (or might not) fit the everyday context in which they would be used. To enhance innovation success, knowledge must flow both ways: HCOs need to educate consumers on the innovation *and* consumers need to educate HCOs on the context of their everyday usage of the innovation.
- *Evolve*. New (digital) technology-based innovations bring about changes in sociotechnical structures, and these changes in turn modify the ways in which new technologies are developed, perceived, or used by health care organizations and their consumers. For example, new wearable devices such as Fitbit and the personal health data they provide have not only led to the creation of data portals and other intermediaries but also forced HCOs to reevaluate how physicians should use such consumer-owned data in diagnosis and treatment [22, 23]. Such gradual co-evolution of the innovation and its associated sociotechnical structures could continue over the lifetime of the innovation. Thus, HCOs need to be cognizant of these dynamics and adapt their strategies and practices appropriately.
- *Engage*. Health care consumers' involvement in innovation allows them to be active players—rather than bystanders—in the reshaping of the sociotechnical structures associated with the infusion and adoption of new digital technologies and innovations. For example, with the emergence of wearable devices, consumers have created several online forums to identify and discuss key usage-related issues and problems and, importantly, to develop and offer free solutions to some of those problems (e.g., apps to export data to specific software platforms or to integrate data with EMR data, and so on). Such active consumer engagement in various phases of innovation, in turn, would enable HCOs to be more proactive about building and supporting the appropriate infrastructure to enhance innovation success.

Strategy and Policy Guidelines for Health Care Organizations

Based on the above foundational themes, we suggest a set of policies, strategies, and

practices for HCOs to ensure that the benefits from innovations do flow to all the target populations, including resource-poor communities and individuals.

Establish a portfolio of mechanisms to educate (and learn from) diverse sets of health care consumers. HCOs should establish varied mechanisms to enable peer-driven consumer education about the innovation and its associated benefits. Studies indicate that such peer-based initiatives could help assuage consumers' issues and concerns related to an innovation, as they perceive peer consumers as "one of us" and hence their inputs to be more trustworthy [10, 24]. More importantly, such initiatives allow peers to share critical insights on the changes they made in their particular usage context to enhance the benefits they derive from the innovation [10, 24, 25]. Given the relatively high penetration of mobile technologies and social media among all sets of consumers—for example, a 2017 Pew Research Center report indicates a sharp uptick in both smartphone ownership and social media usage among both lower-income Americans and those aged 50 and older [26]—an effective way would be to utilize social media platforms and online communities to serve as the venue for knowledge sharing and peer education. Forums that cater to specific target populations (e.g., based on socioeconomic background) or focus on specific health care concerns (e.g., obesity) would likely experience higher levels of participation and knowledge sharing [16]. HCOs might also need to provide additional innovation-related information (e.g., on how consumers might use an innovation with other complementary innovations to maximize benefits) and set up special incentive systems (e.g., community recognition or more tangible rewards such as discounts on HCO offerings for consumers who offer help and guidance to their peers in online forums) to promote continued consumer interactions [10].

Establish a portfolio of mechanisms to engage with diverse sets of health care consumers in innovation. HCOs should establish diverse online and offline mechanisms to engage with different target populations of health care consumers in developing and implementing technology-centered innovations. Such mechanisms include web-based forums for consumers to report problems with existing HCO offerings, e-petitions that allow consumers to express their collective opinions on desired services, innovation jams or online brainstorming sessions that engage with a broad set of consumers on specific health-related issues, and participatory design workshops that allow for community-level consensus on the design of solutions to specific problems [14]. These mechanisms can be customized to target specific sets of consumers and their engagement in specific phases of the innovation process. For example, consider an HCO trying to enhance the diffusion of its patient portal among customers with limited e-health literacy. The HCO could conduct a participatory design workshop at the local community center (that would make the process accessible to all) and focus on developing a deeper understanding of the challenges that those customers face in using the patient portal. Importantly, the workshop would also serve as the venue for community members and the HCO to come together in designing new processes (and solutions) that would enhance the innovation's

fit with the community's local context. Thus, the broader objective of these mechanisms is to embrace the consumer community as an equal partner in identifying problems and in solving them and, in the process, ensuring a better fit between the innovation and the consumers' own context.

Establish mechanisms to enable the co-evolution of the innovation and its associated social or institutional context. HCOs should establish mechanisms that would help consumers "visualize" and interpret the potential interdependencies between an innovation and their own immediate social or institutional context. Given the advances in digital technologies, it has become easier and more cost effective to build "virtual experience centers" that allow potential users to "experience" new services or technology-based innovations before they purchase or adopt them [27, 28]. For example, a gamification approach has been used to educate nurses about the workflow changes needed for EHR adoption [29]. Such virtual experiences would be particularly useful to consumers with limited technology resources or e-health literacy to answer questions such as: "How would this innovation fit with the everyday context in which I would use it?" "What specific benefits would I get?" "What changes would I need to make to derive them?" The broader objective should be to enhance the "trialability" of new technology-based solutions that in turn would enable potential users to better understand and adapt the innovation by making appropriate changes in their usage context (e.g., workflow changes to accompany EHR adoption).

Adopt an ecosystem perspective when developing and implementing health care innovations. HCOs and their innovations do not exist in a vacuum; rather, they coexist with a community of interacting and interdependent entities. An *ecosystem perspective* acknowledges this fact and offers an organizing structure for an ensemble of actors (e.g., patients, health care agencies, community-based nonprofits) to come together and co-create service offerings. It calls for: (a) building and sustaining a community of (consumer) innovators and promoting a shared perspective on their environment (a "shared worldview"), and (b) defining and implementing an "architecture of participation" that offers a clear set of rules and guidelines for knowledge sharing and collaborative innovation [14].

Adapt the HCO organization to engage with health care consumers. HCOs need to adapt their internal structures and processes to effectively link the "internal" (e.g., employees, business processes) with the "external" (patients and their communities). It ensures that the insights about problems (or solutions) gained from interactions with patients are acted upon by the HCO and result in viable new services, policies, or offerings. Such adaptations of internal structures and processes might include dedicated staff positions (e.g., to connect specific patient communities with internal innovation teams) and new processes (e.g., to evaluate patient ideas and suggestions and enhance transparency related to innovation activities). If such changes are not made to internal structures and

processes to adapt them for patient engagement, external ideas are likely to experience a "slow death," and, more importantly, lack of results are likely to discourage patients from future engagement [14].

Position consumer co-creation as part of a broader HCO initiative. HCOs need to view the consumer co-creation approach as part of their broader patient-centered initiatives. Doing so would allow HCOs to support and evaluate such initiatives, not as stand-alone activities, but as important ingredients in their overall approach to fulfilling the core agenda related to patient care—for example, providing equality in health care delivery or enhancing patient self-care. Organizations that embed consumer co-creation activities within their overall customer relationship management framework would be able to find synergies with other customer-centered initiatives (for example, with initiatives to enhance patient experience and satisfaction) and, importantly, make such efforts more meaningful to both the internal participants (HCO employees) as well as the external participants (patients) [10].

Conclusion

New digital technology-based health care innovations portend considerable benefits and value to health care consumers across the spectrum. At the same time, if left to chance, those benefits are unlikely to reach certain segments of the consumer population, particularly consumers in resource-poor regions and communities. In this essay, we proposed that strategies and policies that place central importance on consumers and on the sociotechnical changes unleashed by new digital technologies could help HCOs play a more proactive role in ensuring that the benefits from technological innovations are more equitably distributed among all target populations.

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