REVIEW ARTICLE

NEED FOR BALANCED PERSPECTIVE IN HEALTH TECHNOLOGY ASSESSMENT FOR LOW- AND MIDDLE-INCOME COUNTRIES *

Songül ÇINAROĞLU **

ABSTRACT

Health technology assessment (HTA) is an important technique used for improvement of health care systems. For improving health care systems, international organizations, such as the European HTA agency, emphasizes the need for developing roadmaps for HTA, particularly for low- and middle-income countries (LMICs). HTA is a multidisciplinary research tool for health care policy analysts. Health care technologies face similar challenges worldwide. It is important to properly assess health technologies for improving health systems in LMICs. To conduct these assessments in a more coordinated manner, there is a need for a balanced perspective for these countries. To fill this void this study aimed to describe the need for roadmaps and balanced systems for assessing health care technologies in LMICs. With this regard, this study examines and synthesis the literature surrounding general picture of health economics in LMICs, HTA as a fourth hurdle in LMICs, need for roadmap and balanced systems for HTA in LMICs and adaptation of balanced scorecard to HTA studies in LMICs. In the study, HTA policies in LMICs were examined in depth and the need for a balanced perspective was emphasized. As a result of this review, it was demonstrated that it is difficult to implement the same HTA approaches in all LMICs because of differences in health care systems and policies and differences in both human and financial resources between these countries. We highlighted the importance of using guidelines and recommend using balanced systems in HTAs for health policy makers to improve HTAs in LMICs.

Keywords: *Health technology assessment, low-income countries, middle-income countries, health technologies, health economics*

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DERLEME MAKALESİ

DÜŞÜK VE ORTA GELİRLİ ÜLKELERDE SAĞLIK TEKNOLOJİLERİNİN DEĞERLENDİRİLMESİNDE DENGELİ PERSPEKTİF İHTİYACI *

Songül ÇINAROĞLU **

ÖZ

Sağlık teknolojilerinin değerlendirilmesi (STD) sağlık sistemlerinin iyileştirilmesinde faydalanılan önemli tekniklerden birisidir. Sağlık sistemlerinin geliştirilmesi için Avrupa STD ajansı gibi uluslararası kuruluşlar özellikle düşük ve orta gelirli ülkeler (DOGÜ) için yol haritası belirleme ihtiyacına dikkat çekmektedir. STD sağlık politikası analistleri için çok boyutlu bir araştırma alanıdır. Sağlık teknolojileri tüm dünyada benzer zorluklarla karşı karşıya kalmaktadır. DOGÜ'de sağlık sistemlerinin iyileştirilmesi için sağlık teknolojilerinin doğru değerlendirilmesi önem arz etmektedir. Bu çabaların daha organize bir hale getirilebilmesi için bu ülkelerde dengeli bir yaklaşıma ihtiyaç vardır. Bu nedenle bu çalışmada DOGÜ'de sağlık teknolojilerinin değerlendirilmesinde yol haritası belirlemeye duyulan ihtiyaç ve dengeli sistemlerin üzerinde durulması amaçlanmıştır. Bu amaçla bu çalışmada DOGÜ'lerde sağlık ekonomisinin genel çerçevesi, DOGÜ'lerde dördüncü boşluk olarak STD, DOGÜ'lerde STD için yol haritası ve dengeli sistem ihtiyacı ve DOGÜ'lerde STD konusundaki çalışmalarda dengeli puan cetvelinin adaptasyonu konularındaki literatür bilgisi sentezlenmiştir. Çalışmada DOGÜ'de STD politikaları derinlemesine incelenmiş ve dengeli bakış açısına duyulan gereksinim vurgulanmıştır. Sonuç olarak, sağlık sistemindeki farklılıklar ve ülkeler arasında insan kaynakları ve finansal kaynaklar açısından görülen politika ve farklılıklar nedeniyle tüm DOGÜ için aynı STD yaklaşımının uygulanmasının mümkün olmadığı söylenebilmektedir. Sağlıkta politika yapıcılara, DOGÜ'de STD'nin geliştirilebilmesi için, kılavuzlardan ve dengeli yaklaşımlardan faydalanmanın önemi tavsiye edilmiştir.

Anahtar Kelimeler: *Sağlık teknolojilerinin değerlendirilmesi, düşük gelirli ülkeler, orta gelirli ülkeler, sağlık teknolojileri, sağlık ekonomisi*

MAKALE HAKKINDA

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I. INTRODUCTION

Health care is becoming more complex with developments in medical science and clinical experiments (Khan et al., 2018). Current systems are no longer adequate for dealing with health care problems in this complex environment. Today it is not possible to classify world health, such as East versus West or North versus South (Popkin, 1998). Before the 1990s, health policies are focused on technical content and design factors, but these perspectives neglected involvement of different health care professionals and processes involved in health decision-making processes. In the early 1990s, a new health policy approach highlighted for Low- and Middle-Income Countries (LMICs). This approach requires collaborative policy making for global health care systems (Atkins et al., 2016). Global health care promotes thinking about health care systems in a broader way and how to transfer knowledge internationally. This means that different institutions and organizations will share physical, financial, and human health care resources (Mills, 2014). In this global environment, successful health care systems generally have a vision and long term aims for achieving their goals, and they take into consideration the constraints imposed by history. Building consensus at the societal level develops an autonomy in decision making, learning from experience, and achieving synergies among sectors and health care policy makers. Successful health care systems demonstrate an openness to dialogue and collaboration between public and private sectors (Mills, 2014; Braithwaite et al., 2017).

Many LMICs are important constituents of the global environment; they have publicly funded health systems (Mills, 1998; Erlangga et al., 2019). In these countries global health care funding comes from global health care policy makers from already developed countries (McCoy et al., 2009). LMICs have different dynamics in their health sectors. Middle-income countries (MICs) often have developing or emerging economies, and they are faced with multiple challenges, financial stresses, and high levels of disease burdens in their health sectors. However, they have relatively low levels of technically efficient health care systems (Mills, 1998; Attieh and Gagnon, 2012). Global health financing authorities helps LMICs to finance their health systems, which means that LMICs are using external financial resources to meet their poor population groups' health needs (McCoy et al., 2009). Some international agencies, such as the World Bank (WB), emphasize the importance of development of private health sectors with some financial incentives; however, there is little evidence as to whether global incentives help improve health systems in LMICs or not (Mills, 1998).

Health technology assessment (HTA) is suggested by developed high-income countries (HICs) and their partners in developing countries as a new approaches to financing, organizing, and delivering health care systems (Mills, 2014; Vella Bonanno et al., 2019). HTA is a generic term and health care policy making influences HTAs in LMICs. It has been defined by the International Network for Agencies for HTA (INAHTA) as "*any intervention that may be used to promote health; to prevent, diagnose, and treat disease; or rehabilitation in long term care.*" (INAHTA, 2020). Pharmaceuticals, medical devices, treatment procedures, and organizational systems are the prior examples of health technologies (Facey et al., 2006).

The number of agencies conducting HTAs is increasing worldwide. With economic improvements and developments in new drugs, incorporating economics into HTA is becoming more important (Mathes et al., 2013; Figueroa et al., 2019). HTA is a multidisciplinary term and number of qualitative and quantitative research approaches are exists in HTA (Danko, 2014; Oliveira et al., 2019). It is necessary to focus on HTAs in LMICs for improving health care systems in these countries. The aim of this review is to present an overview of HTA policies in LMICs, emphasize limitations and recommend the use of roadmaps, guidelines, and balanced systems in HTAs for improving health care systems in LMICs. It is hoped that this can help to increase awareness of health care policy makers about developing HTAs in LMICs. This study was based on observational and theoretical process analyses of HTA implementations in LMICs and adaptation of a balanced perspective relevant to HTA. At the end of this review, a balanced HTA model has been suggested for integration of economic and qualitative assessments and balanced scorecard (BSC) perspectives, which balances financial, customer, internal business, learning, and growth. Finally, a conceptual framework for adaptation of BSC to HTA in LMICs has been discussed.

II. METHODOLOGY

The purpose of this review is to explore a comprehensive review of HTA in LMICs and the need for balanced perspective in HTA for LMICs. Given this purpose, the research questions that served as the basis of this study were:

1. What is the general picture of health economics in LMICs ?
2. Is it possible to consider HTA as a fourth hurdle in LMICs?
3. How can we integrate balanced perspective into HTA in LMICs?

The methodology for this study was a comprehensive review, analysis and synthesis of balanced perspective in HTA for LMICs. To complete a comprehensive and an integrative review of the literature surrounding balanced HTA in LMICs, the author completed an extensive review of referred publications as outlined by Torraco (2005). A broad scope of the literature using electronic databases (ABI/INFORM, ProQuest, Medline) for the keywords: *health economics in LMICs, HTA in LMICs, HTA as a fourth hurdle in LMICs, necessity for guidance* AND *balanced systems for HTA in LMICs*. The scope was limited to peer-reviewed journal articles published in English language. Grey literature conference papers are not included into this study. Thus, only articles with the key terms included for full review by the author which resulted 55 final articles for review and inclusive in the research for this study.

III. GENERAL PICTURE OF HEALTH ECONOMICS IN LMICs

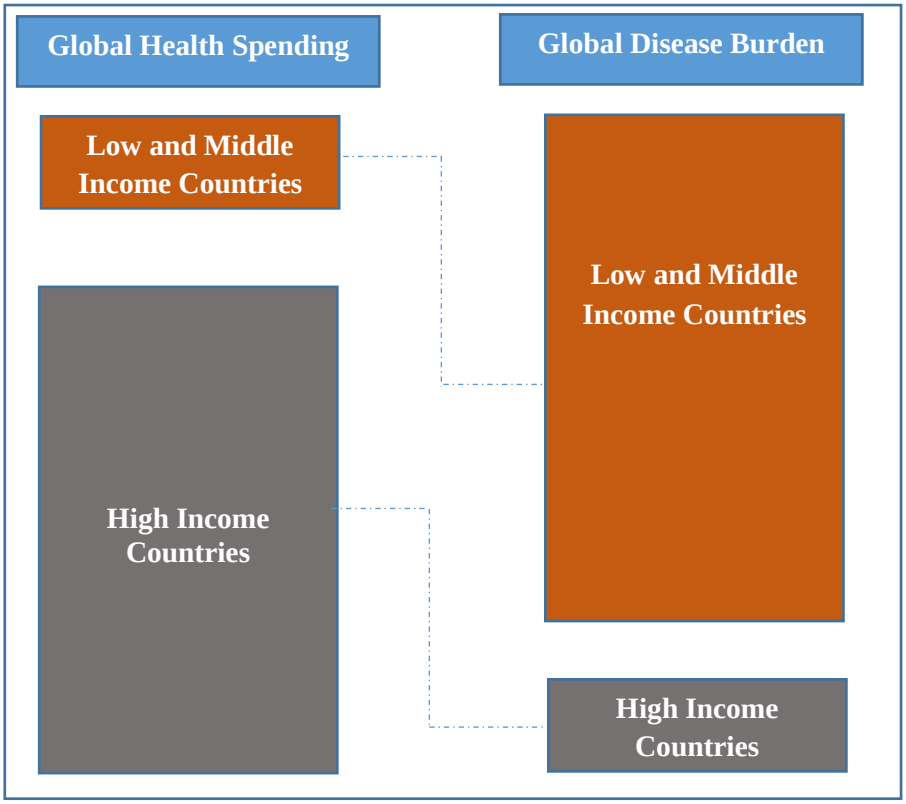
LMIC is a term referring to developing economies. It is critical to note that, development levels of countries differs with regard to their economic powers (WB, 2020). For the 2020 fiscal year, low-income economies are defined as those with a GNI per capita, estimated by using World Atlas method of $1,025 or less in 2018; lower-middle income countries are those with a GNI per capita between $1,026 and $3,995 (WB, 2020). MICs are home to seven billion people, and these countries have diverse sizes, populations, and income levels (WB, 2020). Based on WB's classification, LMICs do not have homogenous population clusters. MICs have different social, technological, and development structures; Turkey, China, Brazil, Hungary, Thailand, Malaysia, South Africa, Ukraine, Morocco, Mexico, Gabon, Nigeria and Colombia are all classified as MICs. According to this classification, some HICs show distinct middle-income characteristics; in other words, they are in a transition process. Sometimes these countries are called emerging markets (Danko, 2014).

There are several indicators of health development in LMICs. The level of inequalities is one of the determining factors for LMICs in accessing better health care services. The reason why inequalities are of great concern for societies in the LMICs is because of illnesses faced by persons with lower incomes (Blendon et al., 2002; Hosseinpoor et al., 2012). One determining factor of health care inequalities is GNI/capita. This is the most well-known indicator of income inequality, and it can give some idea about developmental levels of health care systems in general. GNI/capital was the strongest independent predicting factor of health care variables in LMICs, followed by young female illiteracy and income distribution (Schell et al. 2006). There is increasing attention being paid to LMICs addressing health care inequalities between poor and more affluent populations. Despite studies about inequalities in health care and the burden of diseases have a long history in HICs; the number of studies about inequalities and burden of diseases are now increasing in LMICs (Houweling and Kunst, 2010; Hosseinpoor et al., 2012; Niessen et al., 2018). There is a steady decline in the burden of diseases in LMICs, such as Sub Saharan Africa. However, there is a high HIV/AIDS burden in Sub Saharan African countries. Moreover, reduction of child mortality is a central Milennium Development Goal and it is a challenge for LMICs, particularly for Sub Saharan African countries (Schell et al., 2006; Bishai et al. 2016).

On the other hand, health care policy makers face challenges in LMICs for improving health care systems' financing. The choice of financing method should provide financial protection. Community based insurance coverage is a viable option for low income countries. Many low income countries

have found that it is difficult to finance health care in a sustainable way (Ekman, 2004; Hanson et al., 2019). According to studies in the literature about access to health care services, poor populations benefit less from public spending. Moreover, poor populations spend less on health care due to economic constraints (Ensor and Cooper, 2004; Wharam et al., 2019). On the other hand, high spending on health care does not guarantee better health outcomes, but there is a consensus that spending less on health care decreases health outcomes (WHO, 2015; Cremieux et al., 1999). Despite global health spending financed by HICs, global disease burdens are increasing in LMICs. As a remarkable example of LMICs, Africa faces difficulties in health care financing. It also accounts for <1% of global health spending and contains 2% of the global health workforce. Figure 1 highlights that there is a high gap between HICs and LMICs with regard to health care spending and health care necessities (Gottret and Schieber, 2006). Poorest countries faced with high burden of diseases despite they have low level of financial resources in health care.

Figure 1. Global Health Spending and Global Disease Burden in HICs and LMICs

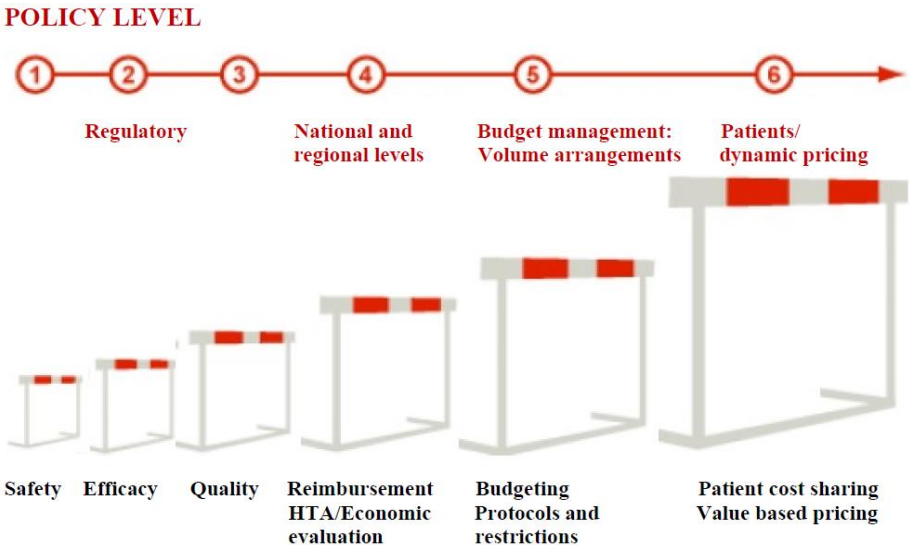


Reference: Gottret and Schieber (2006)

IV. HTA AS A FOURTH HURDLE IN LMICs

Historically, HTAs have been considered the fourth hurdle in the path to achieve market access (Figure 2). Developed and developing countries are faced with fourth hurdle during their pharmaceuticals market access process. This is a necessary step for reimbursement of new drugs. The first three hurdles includes safety, efficacy and quality of regulation processes. Apart from the first three hurdles, countries introducing the fourth hurdle have to learn the design, operation, and impact of HTA studies on health economics (Gottret and Schieber, 2006; Taylor et al., 2004; Hall, 2017).

Figure 2. Policy Levels of Pharmaceuticals Market Access



Reference: Rogowski et al. (2008)

The fourth hurdle has become an internationally recognized term and is understood by all stakeholders in the HTA field (Rogowski et al., 2008). HTAs are mostly based on those used in developed countries. Implementation of HTA and transparent use in most African countries is limited (Hutton et al., 2006; Kriza et al., 2014). The main paradigms of HTA are multidisciplinary, clinical efficacy and effectiveness, cost-effectiveness, and organizational and social implications. HTA has to take into consideration all aspects of health that might influence health care (Kriza et al., 2014). Furthermore, HTA is critical for pricing and reimbursement decisions in health economics and policy. The HTA paradigms specific for developed countries may not work well for LMICs because of different institutional backgrounds, because of the following reasons (Taylor and Taylor, 2009; Oortwijn et al., 2010):

- different institutional backgrounds;
- politicized decision making;
- low acceptance of methodology-heavy HTA;
- lack quality of knowledge in epidemiology;
- the quality of relevant local data;
- the scarcity of experts and capabilities and as a result of these;
- lack quality of health statistics data;
- low structure in pricing and reimbursement decision making.

For instance, if we focus on HTA for pharmaceutical marketing, even though every country needs market authorization for selling pharmaceuticals, some countries have national policy and plans describing which pharmaceuticals can be reimbursed (Danko, 2014). Over the years, economic evaluation, qualitative assessment, and balanced assessments have become main paradigms of HTA implementations for developing countries, and economic evaluation is the main factor for improving HTA implementation (Taylor and Taylor, 2009; Vella Bonanno et al., 2019).

HTA has a long history in the United Kingdom [UK], and the UK has a reference institution for an economic evaluation called the National Institute of Care and Health Excellence (NICE) (Taylor and Taylor, 2009; Deidda et al., 2019). NICE was the first international organization that provide faster access to cost-effective treatments by using evidence-based review processes in the UK. The NICE approach has become the gold standard of HTA implementation for pricing and reimbursement decisions (Sorenson et al., 2008). LMICs use the NICE guidelines and assessments for their HTA

studies. Developing and using guidelines and roadmaps for HTA is the first step of HTA institutionalization.

Some MICs institutionalize HTA systems (e.g. such as Poland, Hungary, Thailand, Brazil), whereas others use pharmacoeconomic criteria in policy making but not in a structured format (e.g. Serbia, Czech Republic, Bulgaria, Turkey). Other countries do not have professional HTA systems yet (e.g. South Africa, Ukraine, and the Gulf countries). Sub-Saharan African countries lack the capacity to undertake HTAs. South Africa employs HTA only to a small degree because of a lack of health care system capacity (Hutton et al., 2006; Hollingworth et al., 2020). Because of differences in HTA policies between countries, there is a need for roadmaps and balanced systems for HTAs in LMICs.

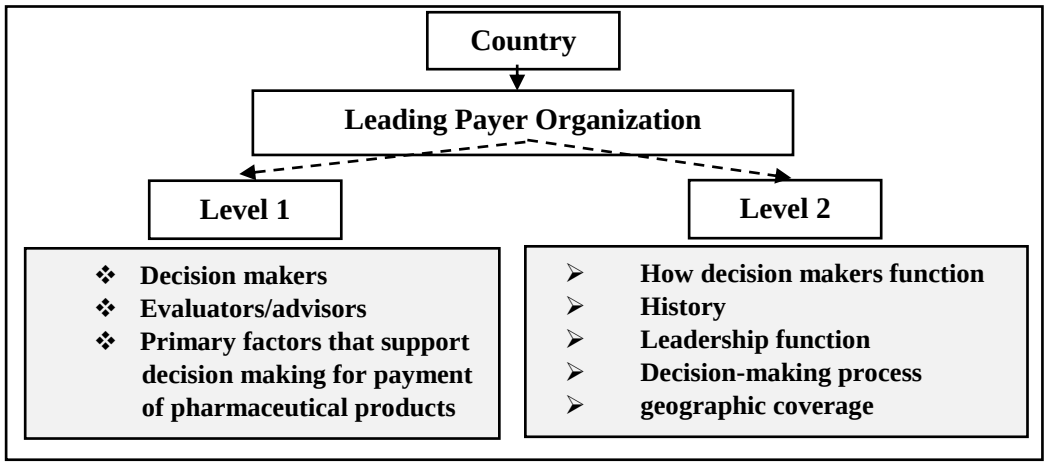
V. NEED FOR ROADMAP AND BALANCED SYSTEMS FOR HTA IN LMICs

The HTA network is a complex system with many different stakeholders and several actors exists in reimbursement decision-making processes (Kalo et al., 2013). Rapid growth of technological innovations in the medical field makes HTAs essential for the modern health care systems (NRC 2009; Hulstaert et al., 2020). To understand this complexity, system dynamics will be a helpful research method for deep understanding of complex HTA decision making environment. This method focuses on the relationships between system components and the relationships between system dynamics. This approach is essential for dealing with complexity in public health care issues in LMICs (Osipenko, 2005). HTA research and decision-making processes can easily be influenced by the preferences of donor agencies and lobby pressures from commercial organizations or global funding and donor organizations because the gap between research and practices/policies is often described as a problem in the health care sector (Kriza et al., 2014).

Closing the gap between health care research and technology improvements is an important problem for LMICs. This can cause ineffective use of health care resources (NRC, 2009). To effectively use LMICs health resources and capacity, use of international guidelines and roadmaps must be incorporated into HTA (Hutton et al., 2006; Koon et al., 2020). There are some international organizations which are preparing roadmaps for LMICs for HTA. The International Society for Pharmacoeconomics and Outcomes Research (ISPOR) is one of these international multidisciplinary professional membership societies. In this society, HTA special interest groups use advanced outcomes research and develop country specific health decision policies for health professionals in LMICs (Homer and Hirsch, 2005).

Figure 3 provides an overview of the HTA decision-making levels and process of the leading payer organizations. This figure helps health policy makers to understand different policy-making levels and the process of developing a roadmap for HTA. In the first level of this structure there are decision makers, evaluator/advisors, and support factors regarding payment for pharmaceutical products. In the second level of this structure we can see how decision makers function; the history of HTA; and the role of leadership, decision-making processes, and geographic coverage (Homer and Hirsch, 2005). In this second level, the health care policy maker's decision-making capability, leadership abilities, and learning from experiences from the past gains are important. Effective combination of two policy levels by health care policy makers is an essential step of determining a roadmap for HTA in LMICs.

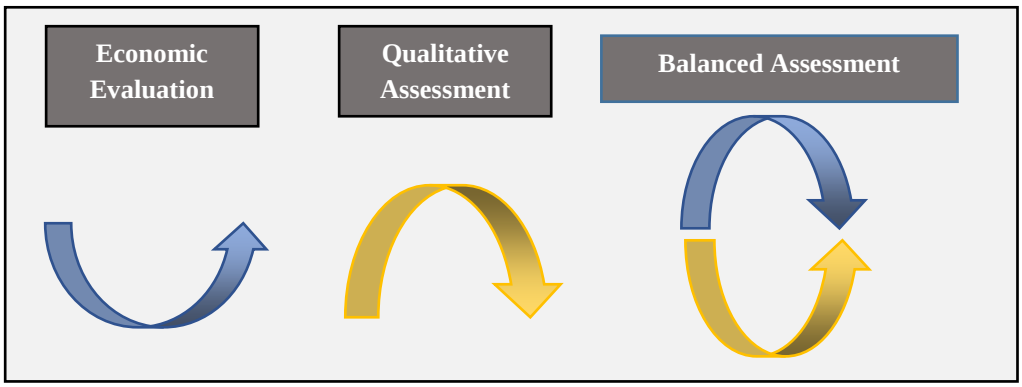
Figure 3. A Decision-Making Structure to Determine a Roadmap for HTA in LMICs



Reference: Sullivan et al. (2006)

In addition to needing a roadmap for HTAs in LMICs, there is the requirement for developing a balanced perspective. A balanced assessment is a multidimensional process that aims to incorporate strengths of economic evaluation and qualitative evaluations in HTAs. Balanced systems should consider not only cost effectiveness but also budget constraints and local health policy priority perspectives (Sullivan et al., 2006). These assessments should consider economic factors, societal impacts, health policy priorities, and should focus on collective thinking (Taylor and Taylor, 2009; Oliveira et al., 2019). Incorporating stakeholders into decision-making processes and integrating financial and non-financial dimensions improves the quality of the HTA process. Over the years, three main perspectives have emerged in health care markets. Figure 4 describes these different paradigms. One of these is economic evaluation. Economic evaluation is concerned with an evaluation of pharmaceuticals using quantitative and analytical skills. These methods mostly focus on cost-effectiveness and budget impact analysis. Another paradigm is qualitative assessment; this is mostly used in regulatory assessment processes. Qualitative assessment is inadequate in financial aspects. The last paradigm, which is an integrated approach, combines both economic evaluation and qualitative assessment methods in the HTA process (Taylor and Taylor, 2009).

Figure 4. Integration of Economic Evaluation and Qualitative Assessment with Balanced Systems in LMICs

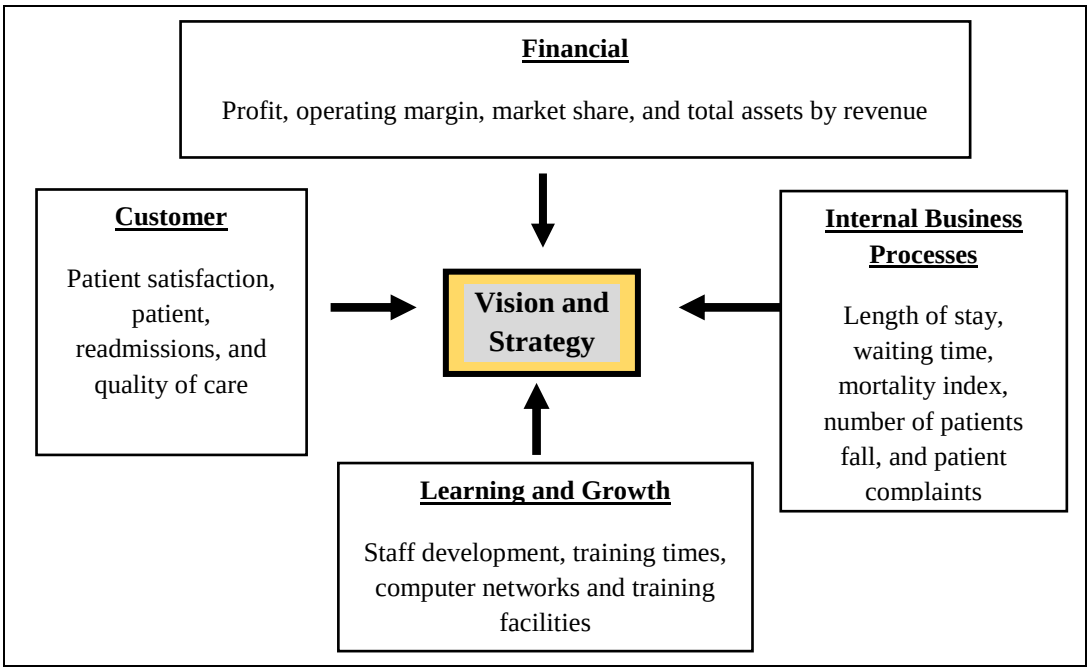


Reference: Danko and Petrova (2014)

In HTA, there is a need to use some strategic management tools to overcome shortcomings and look from a broader perspective. One of these tools is BSC. BSC is a strategic and flexible management tool, and this approach has been adopted by health care institutions and health provider organizations (Zelman et al., 2003; Behrouzi and Ma'aram, 2019). Kaplan and Norton (1992) originally developed this tool which comprises the following four perspectives: *financial, internal*

business, customer and learning & growth. Financial perspective is a starting point, and it is necessary to adapt other perspectives according to the organization's strategy and long term goals. Financial perspective is the most popular and is commonly used by health care organizations. Other perspectives of BSC are critical to look at health care organizations from non-financial perspective which are; *customer, internal business process and learning & growth*. Vision and strategies are at the center of this performance assessment tool (Kaplan and Norton, 1992). Literature suggested that BSC is a strategic management approach for effective management of complex health care organizations (Zelman et al., 2003). Figure 5 shows measures used in four perspectives of BSC in health care.

Figure 5. Adaptation of BSC to Health Care—Perspectives and Measures



Reference: Gurd and Gao (2008)

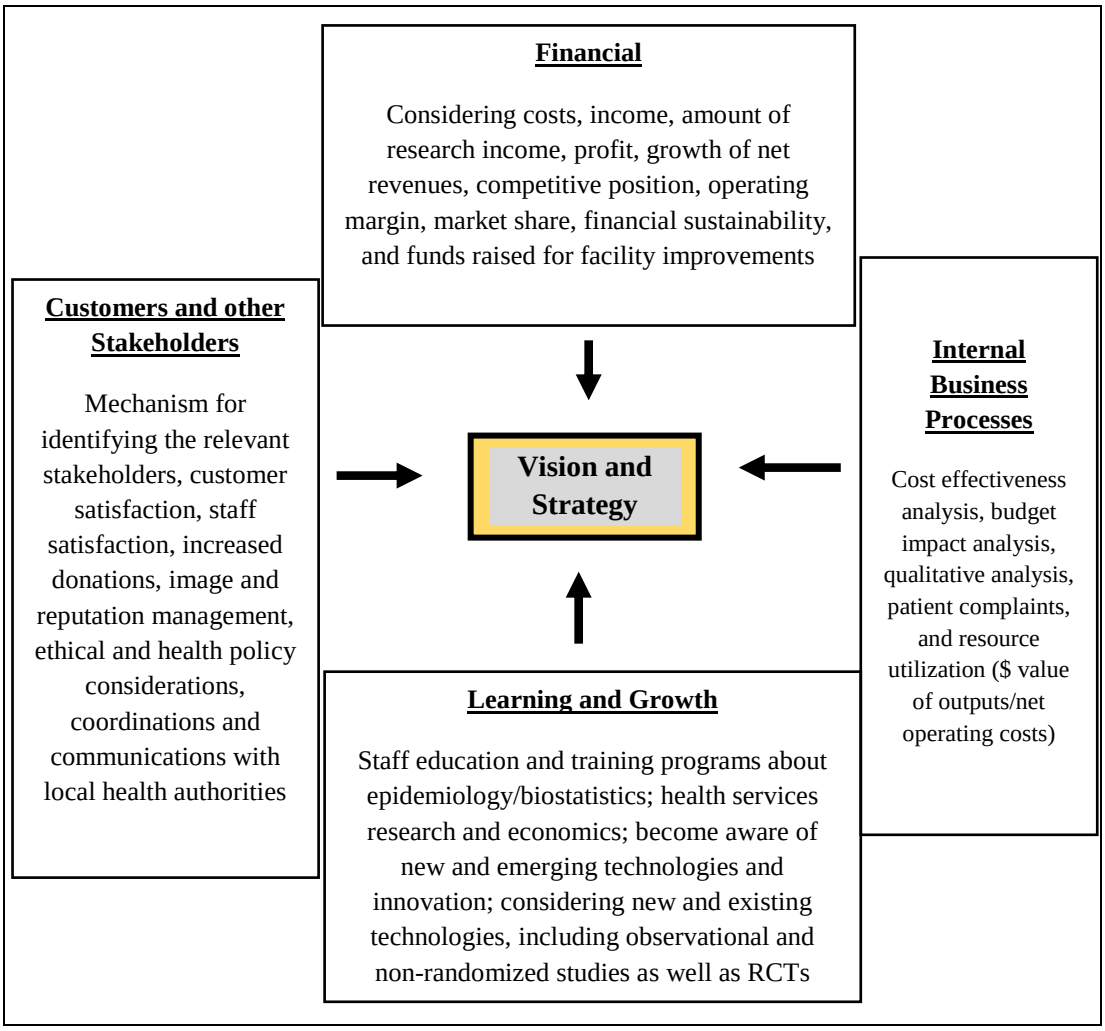
Some examples of health care applications of BSC include hospitals, both long-term and psychiatric care; insurance and pharmaceutical companies; national health care organizations; and federal and local government quality of care and outcome measurements (Grigoroudis et al., 2012). Adaptation of BSC to HTA is a challenging task for LMICs as because of high complexities in HTA market. Following section provides more information about adaptation of BSC to HTA studies in LMICs.

VI. ADAPTATION OF BSC TO HTA STUDIES IN LMICs

HTA covers pharmaceuticals, medical devices, clinical procedures, surgical interventions, and diagnostics. Pharmaceuticals and medical devices are two main focus areas of HTA studies (Danko and Petrova, 2014). LMICs have different cultural backgrounds and management perspectives. In their own HTA studies, LMICs need to follow their own approaches in adaptation processes of BSC models (Danko, 2014; Attieh and Gagnon, 2012). During the adaptation process of BSC model to HTA, the key question according to the financial perspective is that "*To succeed financially in HTA study, how much money should we pay to this new health technology"?* The key question of customer perspective is "*To reach out our vision and strategies in the HTA market, how should we appear to patients and other stakeholders*"? According to the internal business dimension, the key question is "*To satisfy our stakeholders and customers, what business processes should we excel at"?* Finally according to the learning and growth perspective, the question is "*To achieve our vision, how will we sustain our ability to change and improve HTA"?* (Atkinson, 2006).

According to financial perspectives, ensuring financial sustainability is the main goal, and this is a well-known part of every HTA study. The second question is related to customers; this requires taking patient and society's perspectives into consideration to evaluate the value of HTA studies (Danko and Petrova 2014; Behrouzi and Ma'aram, 2019). On the other hand, questions related to internal business perspectives include not only economic evaluation but also qualitative assessment of new technologies. This multicriteria approach considers cost effectiveness, budget impact analysis, and coordination with local health care policy making and planning authorities. Figure 6 shows key adaptive measures of the four perspectives of BSC to HTA for LMICs (Drummond et al., 2012).

Figure 6. Adaptation of BSC to HTA (Perspectives and Measures) for LMICs



References: Adapted from Drommond et al. (2012); Danko (2014); Zelman et al. (2003); Gurd and Gao (2008).

In this adaptation model (Figure 6), the first perspective, which is financial, includes indicators related to costs of new HTA research and income gains. Another perspective which is internal business processes includes economic and qualitative studies in HTA research. Cost-effectiveness and a budget impact analysis are main indicators of this perspective. Not only economic analysis but also qualitative analysis and patients' complaints about internal processes are other indicators related to this dimension. The third perspective of balanced assessment is satisfying customers and other stakeholders with HTA implementations. Learning and growth dimensions of the BSC model in HTA studies is related to preparing education and training programs for the staff and ensuring that they are aware of new and emerging technologies in health care. Vision and strategies are at the center of this model. Determining vision and strategies to develop a roadmap for HTAs in LMICs is essential for

improvement of quality in HTA processes and global health systems (Drommond et al., 2012; Danko 2014; Zelman et al., 2003; Gurd and Gao, 2008).

VII. DISCUSSION

Decision making in health care is a complex process (Cleemput et al., 2008; Khan et al., 2018), and every country has different financing and health care delivery systems (Mills, 2014). Governments, patients, providers, payers, and medical technology firms have critical roles in development of global health care. In addition, policy making in health care is affected by local and global policies and planning activities. Although many countries have a public health care system, every country has its own health care system as a result of differences in politics, regularity, and population needs (Braithwaite et al., 2017). Because of the differences between countries, it is difficult to implement the same health care and technology management policy in every country (O'Donnell et al., 2009).

Technology is one of the rapidly growing and commonly used health policy areas. The main reason for the improvement in the number of health technologies is the growing importance of the quality of human life. Pharmaceutical, medical diagnosis and treatment, medical devices, and surgery are primary types of health technologies. Historically, the number of studies related to assessments of pharmaceutical and medical diagnosis/treatment is higher in comparison to studies related to medical devices and surgery (Fuchs et al., 2019). Different types of health technologies require different study designs. Randomized, controlled trials are well known study designs for HTA studies for pharmaceuticals and medical diagnosis and treatment. Apart from pharmaceuticals, medical diagnosis, and treatment, there is a scarcity in the literature about the number of studies related to medical devices' adverse effects and study designs specific to surgery when randomized controlled trials and blinding is not possible. For effectively designing HTA studies, it is important to know that this process is affected by social, environmental, and economic determinants of health care (Garrido et al., 2010). In other words, local and country-specific factors influence the HTA process. Moreover, there is a growing body of research on HTA structure, its process, and particularly, its outcomes. The main reason for this increased awareness is the effect of HTAs on health care budgets, efficiency, and societal health outcomes (O'Donnell et al., 2009).

Pharmaceuticals, medical diagnosis, and treatment are well known areas in HTA studies. All countries develop their own dynamics for selling and reimbursement of pharmaceuticals (Danko, 2014). Most developed countries' HTA studies established by government authorities have separate agencies. Government authorities play a major role in HTAs because they have access to a large number of people and it is easy for them to collect and analyze primary data collected by relevant policy questions (Garrido et al., 2010; Street et al., 2020). This process is more defined in HICs than in LMICs. There is a long way for LMICs to learn how to adapt economic evaluation in HTA, that are performed in many HICs (Kularatna et al., 2013). Furthermore, despite LMICs having higher burdens of disease and struggles to access essential medicines, fewer have their own HTA policies. In this regard, it is essential to collaborate with HICs to develop country-specific HTA policies. This encourages health policy makers to improve allocation of health care resources (Kularatna et al., 2013; Wahlster et al., 2015). It is foreseeable that the development of HTA coverage improves the quality of decision-making processes in LMICs (Danko, 2014). Moreover, with the rapidly improving complexity and technology in health care, general health care spending and modern health technologies are increasing; these are incentives to increase the number of HTA studies in LMICs (Danko, 2014; John, 2019). HTAs need an institutionalized approach and integration of different decision-making bodies to make transparent and accountable decisions (Kuchenbecker and Polancyzk, 2012; Atkins et al., 2016). Despite the increasing level of health expenditures in LMICs, there is an absence of formal HTA agencies in these countries (Danko, 2014; Babigumira al., 2016). Because of this, there is a need to increase the number of studies assessing the importance of HTAs on medical decision making in LMICs (Danko and Petrova, 2014).

Turkey is an upper middle income country in the Eastern Europe according to the World Bank country income classification (WB, 2020) and poor in terms of adaptation of HTAs in health policy

making processes (Ozturk et al., 2017). In Turkey, successful health reforms since 2002 have increased access to health care services and medicines (Sparkes et al., 2015) During health reform period, Turkey has been faced with challanges to improve access pathway to medicine while considering the sustainability of the public pharmaceutical budget (Vural, 2017). HTA could provide rational and sustainable decision-making and could provide cheaper prices (Atikeler et al. 2020). However, current HTA environment in Turkey is scarce in resources and there is a lack support from health policy leaders. Turkey has been started to explore HTA at a national level in 2012 with a co-operation between the Ministry of Health (MoH) and England's NICE. In 2013, the MoH and the Social Security Institute (SSI) established there different HTA departments. The two offices of the MoH were placed within the Health Research General Directorate (SAGEM) and the Turkish Medicine and Medical Devices Agency (TITCK). These offices have published HTA reports on their web sites (Ozturk et al., 2017). Despite HTA has a great potential to transform health decision making, the Turkish health care system has just newly developed its HTA perspective. Clearly, HTA has been put in place recently and somehow fragmented between different institutions. HTA research and reports regarding medical devices and pharmaceuticals in Turkey have not yet been concluded. Additionally, Turkey is also a member of European Health Technology Assessment Network and have responsibilities in ongoing projects. There is still, however, a long way to go in realizing HTA potential and using HTA as a rational health policy decision making tool (Demirbas et al., 2015). In this occasion, Turkey needs to determine vision and strategy insights for developing HTA in health decision making processes. Adaptation of a well-balanced HTA perspective by considering financial, internal business processes, customer and stakeholders and learning and growth dynamics is essential to achieve high professionality in HTA. Health policy makers have to consider the costs of new HTA research and developments. These research and development activities should include evidence-based analytic techniques to quantify the relative benefits, such as cost-effectiveness analysis. The measurement of customer and stakeholder satisfactions with specific measurements is necessary for health policy makers to better understand the customer needs and to remain competitive in the HTA market. Continues education and training of health professionals in the fields of health services research and economics, innovative health technologies, incorporating advance analytical techniques in HTA processes are essential to meet the rational decision making needs of all levels and fields of health policy-making.

In the light of existing knowledge, following recommendations will be useful for LMICs to enhance the capacity and knowledge of HTA. Developed countries like UK-NICE applications are good examples that can be used by LMICs for determining a roadmap and developing guidelines in HTA studies. Increasing the number of studies and showing the benefits of HTA studies can help to improve policy makers' awareness about the importance of HTA studies in LMICs. For improving awareness, there is the need to combine qualitative and economic studies in HTA. Adaptation of balanced perspective is critical to assess HTA performance in a multidimensional perspective. Not only financial but also internal business process, customer, learning & growth perspectives are the main tenets of this performance measurement tool. Thus, it is highly advisable to incorporate balanced perspective into HTA studies. In addition to that, it is known that the main focus of HTA studies is assessing health technologies according to safety, efficacy (clinical effectiveness), and quality. Checking only safety and quality and efficacy perspectives in HTA is not enough for improving health outcomes. Comprehensive economic evaluation which is called as fourth hurdle, is a limitation for HTA studies for HICs and more so for LMICs. To overcome the fourth hurdle, there is a need for increasing the number of HTA studies, incorporating economic evaluation techniques and an interest in using advanced decision-making models and balanced systems in economic evaluation and HTA studies in LMICs. Using balanced systems will ensure a broader perspective for health care policy makers and help to assess health care technologies with economic, patient, and value-based perspectives.

This review highlights the need for a roadmap and a balanced HTA systems in LMICs. Moreover, this study contributes to the existing knowledge by providing a conceptual framework for using BSC as a strategic HTA tool in LMICs. This is particularly important for understanding multidimensional perspective of HTA. It is useful to advice for health policy makers in LMICs that, incorporating

financial and non-financial perspectives into the HTA procedures will provide many benefits for health care organizations. This will be the strategic way of effective management of scarce financial resources and rational health policy making. Moreover, if policy makers and health care planning authorities become aware of the need for HTA studies in a more coordinated and multidimensional way, the number of HTA studies will increase in LMICs.

Further studies may address the effect of roadmap implementation and balanced systems on health care outcomes in HTA studies in LMICs. This will provide health care policy makers help in HTA decision making and encourage risk sharing. Moreover, ensuring the transparency of HTA decision-making process and integrating economic evaluation with qualitative assessment are the basis of balanced systems in LMICs. It is critical to note that improvements in HTA in LMICs will serve as a tool for improving health systems and developing health technology management policies.

VIII. CONCLUSION

To conclude, despite difficulties in the implementation and development process of HTA, it is essential to adapt balanced systems in HTA for improving health care systems in LMICs. Looking at HTA from a broader perspective and not only considering financial perspective but also focusing on customers, internal business, learning, and growth perspectives can help health professionals to better manage scarce health resources. Collaborative and multidimensional perspectives will be helpful for health care policy makers and health care professionals to see the big picture and effectively manage technology and other health resources.

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