Environmental Risk Planning and Performance: A Public Healthcare Sustainability Balanced Scorecard Case Study

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Abstract
This study explores how the sustainability balanced scorecard (SBSC) incorporates endogenous (actions created by an organisation) and exogenous environmental risk (actions or events external to an organisation) factors. The study's motivation is the traditional balanced scorecard's (TBSC's) limited ability to capture organisational environmental risks and resource resilience actions effectively. Public healthcare organisations' use of TBSC suggests its sensitivity to healthcare organisations' external and internal environment changes, but with limited investigations. Data collected by interviews from a large Australian regional public health organisation were thematically analysed. The findings suggest SBSC is a more useful tool than TBSC in recognising and distinguishing a public healthcare system's internally generated endogenous environmental practices, such as disposal of surgical waste products, and exogenous environmental risk factors including climate change impacts, natural disasters, and pandemics. The study provides two important contributions. First is a preliminary guide to identify and monitor actions that mitigate exposure to exogenous environmental risks and build resilience. Second, a new direction for the SBSC's theoretical development is identified by the findings, highlighting the use of the fifth perspective to monitor the response to exogenous conditions and resilience of the organisation to such risks.

Keywords: Sustainability Balanced Scorecard (SBSC), Balanced Scorecard (BSC), Public Healthcare, Environmental Risk, Climate Change, Performance Measures, BSC Four Perspectives, SBSC Five Perspectives

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1. INTRODUCTION

The traditional balanced scorecard (TBSC) has been successfully applied in the public sector by expanding its focus to include relevant non-financial metrics suitable for government agencies and other public organisations (Kaplan & McMillan, 2021). Many researchers have identified the potential benefits of a BSC in health organisations (e.g., Amer et al., 2022). However, Purbey et al. (2007) found that a performance measurement system for healthcare processes should consider an organisation's outside and inside environmental changes. Sariacomo et al. (2021) suggest there is a need for rigorous and robust research because investigations on natural disasters are still underdeveloped. Further, Purbey et al. (2007) recognised that TBSC's (Kaplan & Norton, 1992) lead indicators have not been fully developed because they lack measures relevant to several stakeholders, including the environmental/community perspective.

Since 2002, there have been attempts to include measures for an environmental/community perspective, and literature has labelled these extended foci as Sustainability Balanced Scorecard (SBSC) (e.g., Sands et al. 2016). The current study focuses on two sources of environmental impacts (internal and external factors) within an SBSC. First, the organisation's operational impact on the environment. In particular, hospitals create a substantial volume of dangerous and non-harmful output, which has undesirable environmental impacts. Second, the environment impacts on the organisation's operations. These include natural environmental factors, such as weather, floods, bush fires, and the COVID pandemic, all experienced globally since 2019. However, there is little research examining whether healthcare organisations specifically differentiate between endogenous (internal) environmental factors and exogenous (external) environmental events (Solomon et. al., 2011) in the adapted SBSC. Consequently, limited instructive guidelines are provided to public sector managers in regards to recognising and employing adequate environmental performance indicators to aid resource resilience monitoring (Perotto et. al., 2008).

This research study provides a preliminary exploration of the role of the SBSC in recognising the impact of exogenous environmental events on organisational resource resilience. The research was conducted prior to and during the COVID pandemic and therefore provides a unique opportunity to understand SBSC's mechanism role in extraordinary environmental conditions more fully. Regular and recent incidents within Australia, such as bushfires in multiple geographic locations, regional flooding events,

cyclones, storms, and tornado activity, provide examples of other relevant exogenous environmental aspects of conditions that warrant further attention. In addition, some exogenous occurrences, such as bushfires or flooding, are regional Australian characteristics (McKnight & Linnenluecke, 2019), whereas others, such as a pandemic, have a widespread commonality. Consequently, it may be argued that an organisation needs to extend its SBSC to include the environmental perspectives relevant to a broader community of stakeholders (Freise & Seuring, 2015; Salim et al., 2019). However, there has been little consideration in prior studies of how SBSCs are used to distinguish between exogenous and endogenous environmental factors.

Therefore, this research investigates the following research question:

RQ: How can exogenous and endogenous environmental factors be integrated in the sustainability balanced scorecard to improve environmental resource resilience performance in a public healthcare setting?

The paper has the following structure: Section 2 discusses organisations' internal environmental (endogenous) actions and non-organisational impacts from (exogenous) environmental events. Section 3 outlines the findings, and section 4 provides conclusions and directions for future development.

2. THE ENVIRONMENTAL DIMENSION: ENDOGENOUS AND EXOGENOUS FACTORS

Broadly speaking, the environment encompasses natural resources and their use, nature, and natural processes (Hristov et al., 2019). Langfield-Smith et al., (2018) offered a limited definition of environmental performance by stating it relates to an organisation's behavioural actions on the environment, because performance goes beyond the outcomes of natural resources, people, and other living organisms.

An example of this limited description of sustainable enterprises emphasises "the internalisation of … environmental concerns into business operations" (Le Roux & Pretorius, 2019, p 823). The reason for this limited description is that these characterisations do not distinguish between environmental outcomes that originate from endogenous environmental factors and exogenous conditions (Lin-Hi & Blumberg, 2018). These activities are either generated within organisations or are events outside of the organisations' control, including others' mediations. The following

discussion is dissected into endogenous and exogenous factors and the different foci of the traditional and sustainability BSC.

2.1 Endogenous Factors: Organisational Environmental Actions

Organisational endogenous environmental activities are produced by an organisation's business operational actions (e.g., Rondinelli & Vastag, 1996; Vastag Kerekes & Rondinelli, 1996) and typically comprise outcomes from operations such as material scrap, water and energy consumption, waste production, and air emissions (Journeault, 2016). Organisational endogenous environmental outcomes can be managed because there are usually alternative outcomes (Kruglanski, 1975).

Endogenous environmental actions constitute occurrences to the environment as a consequence of organisational endeavour. These actions are perceptions, attitudes, and organisational practices prompted by management (Hagigi & Sivakumar, 2009). Routine organisational practices such as supply chain processes are implicit in altering social features and diminishing environmental quality (Forino & von Meding, 2021). It is therefore important for organisations' environmental activities to be assessed, observed, and communicated (Henri & Journeault, 2008). Multiple environmental metrics may need to be created to observe and regulate their environmental obligations (Delmas & Blass, 2010).

Qualitative and quantitative environmental metrics can be incorporated into management or operational performance (Langfield-Smith et al. 2018). Effective environmental management performance indicators can help organisations evaluate environmental efforts by connecting a sustainable strategy to relevant business activities (Hristov et al., 2019). Ideally, the SBSC, linked meaningfully to a strategy map, incorporating environmental goals, provides a useful means to monitor, improve and understand organisational resource performance, such as energy and water consumption as well as waste creation (Feldman, 2012; Nielsen & Roslender, 2015). This evaluation process provides a conduit to monitoring environmental performance, which can be conceived of as "a firm's effectiveness in meeting and exceeding society's expectations with respect to concerns for the natural environment" (Judge & Douglas, 1998, p. 245).

2.2 Exogenous Factors: Non-Organisational Environmental Events

In contrast to environmental actions, which are generated internally from the organisation's business activities, non-organisational environmental activities originate from outside sources (e.g, Hagigi & Sivakumar, 2009).

Sargiacomo (2015) considers exogenous intervention factors to be extraordinary conditions, noting that they "cause uncertainty because it is unclear when an item should be considered both unusual and infrequent"(p 68). Examples of exogenous extraordinary conditions are provided in literature: human drama, plagues, famines, natural disaster, heatwaves, droughts, and water scarcity (Beck, 1992, Giannakis & Papadopoulos, 2016); episodic events (Nishii et al., 2008); terrorist attacks, refugee and immigration emergencies, the eruption of new pandemics, wars or Brexit (Steccolini, 2019). The occurrence of such extraordinary exogenous environmental events for business may prevent or delay the organisation from achieving their predefined targets (Freise & Seuring, 2015).

McKnight and Linnenluecke (2016) noted that business as an ongoing concern is needed by organisations, even when business operations are being affected by natural disasters. Although organisations cannot prevent natural disasters, information is needed so that early detection of future problems can be provided to management (Carmeli & Schaubroeck, 2008). Consequently, monitoring of interactions between the environment's potential impact on an organisation's operational continuity, organisations may attempt, through their environmental performance measures, to capture potentially future problems (Olsthoorn et al., 2001).

Healthcare organisations need to prepare for the effect of the outside environmental events on their performance to enable them to minimise the severity of their impact and allow continuity of delivery of sufficient services for the community in times of need (e.g., Ginter et al., 2018). Well-designed performance measurement systems may provide additional support to organisations aiming to minimise adverse business outcomes arising from external environmental events. Rasid et al. (2017) noted that performance measurement systems should be able to evaluate usefully aspects of an organisation's external environment. As a strategy-based performance system, the SBSC constitutes an appropriate mechanism to incorporate capture significant elements of external risk management (Beasley et al., 2006). Determining a business' accomplishment may involve reacting to their changing environments, which requires flexibility metrics (Walker Jr & Ruekert, 1987). That is, it is important for organisations to include flexibility measures into their performance measurement systems so that they are able to take suitable reactions (Faturechi & Miller-Hooks, 2014).

Swamidass and Newell (1987) described flexibility performance as the effect that uncontrolled conditions have on organisational performance.

Thus, flexibility measures enable organisations to evaluate their ability to adjust to such situations (Faturechi & Miller-Hooks, 2014). It is important for managers to know that their organisation's ability remains, so they may realise its mission when challenged by disasters, attacks, or accidents (Mead et al., 2000). This requires survivability indicators that identify factors that will affect an organisation's going concern status during uncontrollable conditions, such as natural disasters (Faturechi & Miller-Hooks, 2014).

Walker and Dunn (2006) remarked that when health organisations are developing SBSC measures they need to contemplate that are linked to "environmental analysis". Environmental analysis helps define external problems and changes (Ginter et al., 2018). Healthcare providers consequently need to adjust their criteria to determine SBSC measures that may be modified to the external environment (Walker & Dunn, 2006). Walker and Dunn (2006, p 87) concluded that "[Sustainability balanced scorecard] measures should be developed to assess service delivery and effectiveness, operational performance, and the organisation's response to the environment" [parenthesis added].

Further, Purbey et al. (2007) reported that flexibility metrics aimed at future performance are missing from SBSCs. Such metrics should help managers to forecast and assess their ability to deal with changing demands for health services (Walker & Dunn, 2006). Thus, SBSC with flexibility metrics aids organisations in arranging and planning to react actively to extraordinary events (Lin et al., 2007) and appraise their organisation's disaster resilience (Ramsey et al., 2016). There is also a growing recognition that the effect of exogenous environmental factors, such as climate change, provides opportunities for organisations to improve financial and non-financial performance (Gasbarro et al., 2017).

2.3 Summary of Literature, endogenous and exogenous foci of TBSC and SBSC

In this research, we classify organisational environmental activities as endogenous factors and non-organisational environmental activities as exogenous factors. Generally, past accounting research has investigated only internally generated environmental activities (endogenous factors) (Whiteman et al., 2013). However, there is a reciprocal relationship between organisations and the environment. That is, this reciprocal relationship causes an organisation's operational activities to impact the environment, and the environment may weaken an organisation's capability to perform well (Hitt et al., 2016). Consequently, based on these prior findings, the full assessment of environmental outcomes and organisational performance

should account for this reciprocation between organisation and the environment.

The focus of the TBSC, as well as the SBSC model initially, was to monitor only organisations' environmental intervention actions but due to the dynamic and destructive nature of contemporary events, the foci was extended to incorporate events not related to that organisation's operations (Hansen & Schaltegger, 2018). Using the SBSC involves not only examining environmental organisational activities (Hahn & Figge, 2018) but also should be adapted to recognise the existence of multi-stakeholder strategies (Kaplan & McMillan, 2021). This approach infers the need for organisations to consider and map environmental factors from both an internal and external perspective. The SBSC can then be employed by organisations to emphasise not only highlighting their responsibility (Lu et al., 2018) but also reporting on environmental performance in a more refined way.

3. RESEARCH METHOD

A series of meetings with the director responsible for applying and updating the TBSC in the regional healthcare organisation helped identify and organise interviews with relevant participants, who were able to provide full and relevant responses to the research questions (Sargeant, 2012). Seventeen participants, grouped into three managerial or operational groups as illustrated in Table I, were interviewed.

Group 1 Management, finance, and accounting staff	
Interviewee code	Participant 1, 2, 3, 4, 5, 6
Group 2 Operational staff	
Interviewee code	Participant 7, 8, 9, 10, 11
Group 3 Nursing and medical staff	
Interviewee code	Participants 12, 13, 14, 15, 16, 17

Table 1. Participant Matrix

The saturation method was used to decide when to stop data collection, which occurred through two rounds of taped and transcribed interviews. The first-round interviews were conducted between January and April 2018, while the second round of interviews were conducted by email in August 2020 to maintain social distancing due to the impact of COVID-19. Participants were able to answer questions relating to the COVID-19 pandemic on a real-time basis. A sample of questions from the interview protocol is included in the Appendix.

Analytical thinking (Marshall & Rossman, 1999) and NVivo software facilitated the coding of the data. Inductive coding and thematic analysis were used to define the main themes and recognise connections between them (Joffe, 2012).

4. DISCUSSION

The data reported in this paper were collected pre- and during the pandemic, which caused significant disruption around the world in Healthcare organisations. We were particularly interested in establishing an understanding of how TBSC reporting had been used prior to the pandemic and whether these measures had been useful in facilitating the hospital's response to the pandemic. Participants in this organisation reinforced the importance of planning and reporting to improve the hospital's response in similar situations in the future. In particular, the ability to operationalise a suitable workforce in a timely manner was seen as a critical issue that could be informed via strategic planning. One participant stated that "the impacts of the pandemic, such as COVID-19, have forced us to drastically assess and plan for workforce impacts" (Participant 12). It was emphasised that these plans should include training to ensure staff are suitably prepared, equipment and resource requirements, and sufficient funding to respond to pandemics. There was general agreement that planning for these events should occur and be shown in the SBSC with specific KPI's attached to them. One participant noted that the current strategic plan had already been updated to include measures designed to return the hospital "to pre COVID-19 performance levels" (Participant 4). However, participants also noted that organisational strategies are reliant on human commitment:

> "I don't think any "strategy" can really claim responsibility for success when all strategies, in times of crisis, are founded to a large extent on good will and capability of the internal workforce" (Participant 7).

The organisation was also very responsive to updating the risk assessment as a result of the pandemic. Participants noted that the risk register already differentiated between external and internal risks but emphasised that a separate COVID-19 risk section had been added as a result of the pandemic (Participant 2). In addition, the hospital had developed a sustainability strategy early in 2020, which explicitly included a strategic imperative to "identify, monitor and respond to environmental risks". This was supplemented by a clear intent to build a more resilient and proactive organisation committed to reducing endogenous environmental factors and mitigating the effects of exogenous environmental events. To address this

objective, the organisation had developed a comprehensive plan which specified a sustainability governance structure, baseline sustainability performance measures, supported and realistic funding for sustainability actions, sustainable infrastructure capital planning, and emergency preparedness and response strategies (sourced from internal confidential document). These strategic plans provided evidence that the public healthcare provider had already recognised the importance of measuring and reporting on both internal and external environmental factors.

Regarding performance monitoring and reporting in the COVID-19 context, KPIs were implemented to ensure that the hospital continued to "progress internal actions which were controllable within the hospital" (Participant 2). This participant also noted that COVID-19 "has changed the way the health service operates and has made many external environmental impacts more visible" (Participant 2). This translated to a number of local and sector-wide developments. At the hospital level, there was a "greater focus on risks related to uncontrollable events and improved partnerships and collaborations with other health providers" (Participant 2). At the sector level, funding changes had been enacted to facilitate an enhanced focus on fiscal responsibility in public hospitals. Participants stated that these changes would be reflected in the future development of the SBSC with associated KPI measurement and reporting. However, this was coupled with the understanding that the social dimension, which may be the most important factor in enabling Healthcare organisations to cope with the effect of exogenous environmental events:

> It's probably beyond the means of most governments to build enough clinical service capability (workforce and infrastructure) so the reliance on social measures to 'turn the tide' will continue to increase (Participant 7).

Clearly, the question of how government interventions and broader social actions can be monitored and measured at a local level in a meaningful way provides ongoing challenges for Healthcare organisations. Furthermore, the common characteristics of pandemics, such as COVID-19, affect multiple organisational types and structures in diverse and dramatic ways. This contrasts with endogenous occurrences which may be managed effectively at a local level. Exogenous environmental events may require a comprehensive and centralised planning strategy in a corporate performance system. Thus, the SBSC may be a system that has limited weight and efficacy under uncertain settings caused by exogenous

events. The next section of the paper discusses the public healthcare provider attempts to distinguish these two types of environmental factors.

4.1. Endogenous environmental factors

Hubbard (2009) shows that the SBSC can be structured to discover how materials, energy, and water are used as well as the occurrence of emissions. The healthcare provider was designing a SBSC that actively attempts to reveal internal environmental actions:

> One of the things that we are working on at the moment is a sustainability balanced scorecard and that will include our waste …, electricity consumption, [and] water consumption and water quality. (Participant 4)

The following three sub-sections provide more details for these three endogenous environmental activities.

4.1.1. General waste and clinic waste

The potential economic benefit of waste was stressed. Participant 7 noted that "hospitals have a large amount of waste to dispose of". This participant distinguished between two specific types of waste: "There is the clinical waste which can be quite harmful, infectious diseases and then there is general waste". This respondent claimed general waste and clinical waste needed to be included in the SBSC. Economic opportunities are clearly identified as a general waste for this organisation. For example, Participant 14 observed that "[in the food area] we can easily waste four or five hundred thousand dollars a year of food". In comparison, clinical waste was more explicitly related to the organisation's social responsibility:

> From a hospital's point of view, the biggest area is probably clinical waste. Clinical waste is really those sorts of items we're looking at where there's a potential for disease transmission if someone was exposed to that waste. (Participant 9)

The problem here is "the clinical waste can't just be taken to the dump" (Participant 4) because "we have to appropriately dispose of it in a responsible and proper way" (Participant 11). As a result, "it's not a monetary value which drives waste; it's more about compliance to legal and they apply a fine" (Participant 11). Therefore, hospital waste was understood to be not only an important element of the SBSC but also an opportunity to demonstrate the organisation's social responsibility. As one interviewee indicated:

> We need to be more socially responsible and report on things like waste. I think…we should be looking outside of the traditional balanced scorecard and looking more at the things [waste]. (Participant 2).

4.1.2. Electricity consumption

Electricity has a direct impact on costs, and some organisations focus more attention on this environmental issue (Länsiluoto & Järvenpää, 2010). For this healthcare provider, "the energy consumption would be huge" (Participant 12) and "it costs a lot of money" (Participant 4). Participant 7 valued the organisation's electricity costs:

> We pay four to five million dollars per year across the whole health service. If we could generate a seven or eight percent savings across the whole thing, that would turn into quite a lot of money and savings for the taxpayer.

The participants indicated that their healthcare employer incorporated energy consumption into the BSC "because all of that translates into an economic saving" (Participant 7). This suggests this organisation prioritised certain environmental activity with economic outcome measures over sustainability outcomes.

4.1.3. Water consumption and water quality

Alongside energy consumption, "water consumption is quite critical" (Participant 3) [and] "every drop of water is precious" (Participant 16). It is an organisation's responsibility to avoid water shortages in the community (Journeault, 2016). As one respondent reported:

> Because…we are in one of the driest continents on the planet and people underestimate how important it is for us to be conservation minded when it comes to water. Consequently, I am trying to incorporate water use … and I would like to see water consumption reflected in our sustainability balanced scorecard. (Participant 7)

However, participants highlighted the water quality issue as being more important than water usage:

> We have things like microbiological issues in water quality, which affect the health of our patients, and so we have to respond by having systems to filter water. We have to be very careful about which water we use because things like legionella and other microbiological contaminants can cause problems. (Participant 7)

> Environmental concerns for us are related to water quality. […] We have for each facility and water quality risk management plan that talks about the infrastructure, the water infrastructure at that site and then what measures we're taking to make sure we're not hurting our patients. (Participant 8)

> The priorities are saving lives, so really, when you think about managing water versus saving a life, we're going to save a life. So from a water perspective, water consumption isn't our issue, water quality is our issue. (Participant 6)

This highlighted the fine balance between some internal environmental actions, such as reducing the impacts of water quality, which can cause an increased water consumption. As one respondent said:

> From a water quality perspective, we measure regularly the quality of our water coming into the facility at different points, that we take tests of. So, in some cases we will flush an amount of water through a system to try and clean it. (Participant 8)

These comments emphasise the compromise in Healthcare organisations' internal environmental activities, which have multiple wastage outcomes and social responsibility benefits. Public organisations face contradictory pressures. Good performance and excellent water quality have been found to increase the chances of getting positive reactions from customers. (Jones, 2011). Conversely, Journeault (2016) observed that a municipality was imposing pressure on an organisation to avoid wasting water, which resulted in that organisation including only water consumption and not water quality in its BSC.

4.2. Exogenous environmental factors

This study delivered evidence that identifies "a greater focus on uncontrollable events" (Participant 2). Participant 2 also stated that "having [these] environmental … activities explicit as the intent in the [sustainability balanced scorecard] means the organisation will focus on this more" [parenthesis added]. This section identifies the priority areas as noted by the participants.

4.2.1 Climate change

Participants suggested that climate change and natural disasters require specific performance metrics. Respondents noted that their hospital's performance is acutely affected by climate change. As Participant 9 stated:

> There are a lot of bigger-picture issues that people need to start thinking about, particularly in the emergency space and the business continuity space, because climate change will have a big impact on hospitals in that area. […] [It] is something that the hospitals really need to take seriously and think about very hard and look at what they can do, both in stopping ... doing what they can to minimise global warming and things like that, but also preparing for the effects of when it does happen.

Participants were realistic about the future implications of climate change. They said that probable impacts include higher patient admissions, more natural disasters, and different disease threats. They also observed that these impacts were already visible: "last year was a particularly bad one, we're expecting this year to be equally bad" (Participant 7). One respondent explained how this was considered a challenge:

> We have things like global epidemics, flu, and other diseases, which are microbiological phenomena that can influence our business continuity and lead to emergency preparedness. […] So, each year we have a flu season, cold and flu season. […] And that really puts pressure on our hospitals because we have so many people who are sick. (Participant 7)

From a business-as-usual context, this healthcare provider can comfortably service 500-700 patients daily. However, demand may increase to 1000-1500 patients during an influenza season. Patients, during this flu season, are concerned about waiting times (both before and after they enter the service delivery process) (Ballantine Brignall & Modell, 1998), which ultimately will reflect in their opinions about the hospital's performance. Participant 12 observed that the capability of the hospital to treat inpatients was also affected by the impact of climate change:

> We have issues with extremes of temperatures, especially heat, where the aged can't cope. We have to make sure in a hospital that we have the proper air conditioning and climate control because when our patients are sick, they're more vulnerable to temperatures, both cold and heat.

These comments signal the need for the performance measurement system to incorporate dimensions of flexibility including hospital-specific measures, such as system capacity flexibility (Morlok & Chang, 2004) and delivery speed flexibility[i] (Ballantine et al., 1998). The inclusion of

hospital-specific flexibility measures is imperative to allow organisations to manage their capacity to cope effectively for such events (Nelson et al., 2007). As two participants observed:

> [With] climate change, we can put different things in the [sustainability balanced scorecard] to help manage that externally so it doesn't impact the healthcare system. So, you could look at more primary Healthcare measures to better manage. To look at plans across five, ten years to know what you're dealing with climate change and then put in models of care in the [sustainability balanced scorecard] to help manage that so that it doesn't impact on the hospital setting. [parenthesis added] (Participant 12)

> Certainly Participant 7 and I have a plan…to develop a sustainable organisation. The sustainability [balanced scorecard] which we will be developing [includes] the climate change adaptation plan. We are … looking at a first phase risk assessment at what are some of the potential risks that we need to be aware of as an organisation in the environmental space. [parenthesis added] (Participant 3)

4.2.2 Natural disasters

The impact of natural disasters on the hospital's operations was the second non-organisational environmental event that was prioritised. It was evident the hospital identified that natural disasters may have significant operational effects as it was proactively working towards including relevant measures in the SBSC. As three respondents clarified:

> We look at supply chain issues, and then redundancies for supply. So, that's looked at from a disaster management business continuity perspective of having plans in place that if a particular facility is isolated in any way that we have the means and ways of being able to supply clinical services and then also provide the support services that help provide that. (Participant 8)

> There is a disaster plan and disaster management exercise conducted to address environmental impacts should they occur, e.g. fires, floods, major accidents, to ensure we can manage a full-scale emergency and catastrophe on larger scales. (Participant 12)

Participant 7 expounded in more detail how essential it is to collect this information:

> The world climate change results in higher frequency of flood events and in the HHH[2] roads flood all the time - more often and we can't move patients between hospitals, or we can't get food supplies into hospitals. Those sorts of factors affect whether we can continue business. So, there's business continuity effects. If we're getting more storms or more flooding…we've got facilities that are vulnerable to that. So, G [Hospital] is a good example of that. It sits right on the bank of the M River and we need to have a plan that if the flow regimes or the flooding frequencies in the M River change, our hospital might get flooded one day. What do we do about that? We don't have a plan for that at the moment. Would we have to move the hospital quickly to a different facility? […] If there was something in [sustainability balanced scorecard] that meant you recognised climate change you might have processes there about evacuations for your hospital. Or you might have processes there for services from a different location or something like that. Those processes might not exist if you don't recognise the driver of it. [parenthesis added]

In summary, evidence provided in this section shows how the hospital was acutely aware of two categories of environmental factors – organisational generated and non-organisational uncontrollable events. It is recognised that both categories must be reflected in the SBSC. The ability to observe and assess the effects of such factors was seen as the primary way to manage future adverse events. In addition, there was a general understanding that the indicators should help provide early warning information and predict future conditions and trends (Gallopin, 1997).

5. CONCLUSION

The purpose of the study was to explore the ways to use the SBSC in an Australian public hospital to capture and classify organisational environmental, non-organisational environmental risk, and resilience factors. This is consistent with the suggestion by Solomon et al. (2011) that the organisation's external environmental events have an impact on an organisation's performance. Respondents acknowledged that the hospital's actions and performance affected the environment and that the hospital's performance was affected by environmental events such as climate change and natural disasters. Therefore, they identified a need to manage risk and build resilience.

Participants reinforced that the hospital's TBSC needed to incorporate metrics that display the hospital's environmental practices, as well as

measures that assisted the organisation in adjusting to mitigate the impacts of climate change and natural disasters. This finding is consistent with Figge et al. (2002) recommendation that SBSC designers should trace environmental risk sources and identify obligations for environmental interventions that should reflect required actions by managers. In this study, managers wanted measures to gauge the hospital's efforts in minimising energy use, water use, and waste. They also articulated the need for metrics to monitor the hospital's attempts to build its resilience by not only adapting to climate change but also dealing with the risk of natural disasters.

This research context was undertaken to reinforce the fact that public health organisations are particularly vulnerable to extraordinary external conditions (Jacobs & Cuganesan, 2014). Research has confirmed the likelihood increase the severity of catastrophic events due to climate change, such as cyclones, bushfires, floods, and droughts (Garnaut, 2011). Public healthcare organisations need to have a comprehensive suite of operational scenarios to have the ability to conduct sustainable operations in adverse conditions is critical (Cosford, 2009).

The accounting literature recognises that environmental performance measures enable organisations to;: (i) monitor and improve environmental actions, (ii) guide the decision makers, and (iii) report environmental actions for external purposes (Henri & Journeault, 2008). This study also suggests that incorporating environmental indicators in the SBSC helps organisations adapt to exogenous environmental conditions; such as health pandemics. These findings should start a conversation to answer Steccolini's (2019) call to consider the roles of accounting under exogenous conditions.

This study is exposed to several limitations. Firstly, it involves an examination of a regional Australian public hospital over a period of two years. Different perspectives may be gained over a different time frame or in a different geographic context. The case study is limited in its generalisability and replication is not possible. Future research should identify suitable environmental performance indicators, which capture both internally generated activities (endogenous actions) and non-organisational (exogenous) events in the SBSC. The literature suggests a number of conceptual frameworks to integrate organisational environmental factors into the SBSC (Hahn & Figge, 2018). However, there is as yet no consensus on how to best integrate non-organisational environmental impacts into SBSC. In the absence of such evidence, this study's findings suggest that

exogenous non-organisational environmental conditions such as climate change, natural disasters, and health pandemics may be best contained in a separate fifth perspective and organisations' endogenous environmental practices integrated into the four original perspectives. The findings of this research support the conclusion that the two schools of thought (a four perceptive or five perspective SBSC) have good explanations for their stance. However, this research suggests that the exogenous non-organisational environmental condition risk factors should be recognised in a fifth perspective. Additionally, it is necessary to find ways to signal that the such risk factors are characterised by a high degree of uncertainty in regards to outcomes regardless of organisational actions (Kaikkonen et al., 2021).

The research findings provide both theoretical and practical implications. First, some preliminary practical guidance is provided for government healthcare organisations seeking to identify and monitor the organisation's actions to mitigate exposure to potential (a) environmental contamination created by organisations' endogenous environmental practices as well as (b) exogenous environmental risk factors. Second, this dissection into endogenous and exogenous environmental dimensions provides a new platform for future research which seeks to consider the role of the SBSC in providing avenues to mitigate the impact of exogenous environmental events. Similarly, there are important implications for future public health policy design, development, and coordinated implementation; given the recently experienced natural disasters and health pandemics. Finally, future research should examine the potential different impact of the COVID-19 pandemic on public and private healthcare operations and practices in other countries, particularly, more densely populated areas. The study provide opportunities to understand more fully the role of accounting mechanisms in extraordinary environmental conditions.

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