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A strategy map as a framework of a shared mental model for interactive control systems

Mapa strategii jako schemat współdzielonego modelu mentalnego dla systemu kontroli interaktywnej

Abstract. Nowadays, companies operate in an extremely turbulent environment with conditions of substantial gaps in knowledge about future events (the Knightian uncertainty). Therefore, there is a need for more flexible management control systems. Referring to Simons' levers of control (LOC) framework, now there is a need to use more extensively belief systems and interactive control systems that would enable the organizational learning process. The aim of this paper is to discuss the role of a strategy map as a framework of a shared mental model for interactive control systems in the context of increasing uncertainty. This article is a review-based study and suggests some preliminary proposals for further research. The review covers the literature on management control systems, levers of control (in the including of interactive controls), balanced scorecards, strategy maps, mental models, and organizational learning. The review is mainly qualitative; however, it is supported to some extent by quantitative bibliometric analysis. This co-word analysis applies VOSviewer v.1.6.17 software. The situation of increasing Knightian uncertainty calls for the more extensive use of interactive control systems. A strategy map fits this new demand - it enables understanding strategic assumptions, structuring the problems, discussing, and gaining knowledge. Therefore, it facilitates innovations, organizational learning, and refining strategies in an ongoing process. A strategy map can be seen as a cognitive mapping tool. It is a set of hypotheses that can be empirically tested through strategy implementation, thereby enabling strategic learning (including so-called double-loop feedback learning). Such a double-loop learning mechanism allows for the iterative crafting of an organizational strategy that could be more resilient in a turbulent environment. To be the basis of an interactive control system, it is crucial for the "buy-in" of the strategy map by employees. Thus, there is

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a great role in the convergence of mental models of an organization's members as a result of "strategic conversation". The product of such an organizational learning process is a common, shared mental model. This model must be developed, disseminated in the organization and accepted by employees, and then refined through active learning.

Key words: interactive control system, balanced scorecard, strategy map, mental model, organizational learning

JEL codes: M10, D80

Synopsis. Obecnie przedsiębiorstwa działają w niezwykle burzliwym otoczeniu w warunkach znacznych luk w wiedzy o przyszłych zdarzeniach (tj. knightowskiej niepewności). W związku z tym istnieje potrzeba stosowania bardziej elastycznych systemów kontroli zarządczej. W nawiązaniu do schematu czterech dźwigni kontroli Simonsa (*levers of control* – LOC) istnieje obecnie potrzeba szerszego wykorzystania systemów przekonań i interaktywnych systemów kontroli, które umożliwiłyby proces organizacyjnego uczenia się. Celem niniejszego artykułu jest omówienie roli mapy strategii jako ramy wspólnego modelu mentalnego dla interaktywnego systemu kontroli w kontekście rosnącej niepewności. Niniejszy artykuł ma charakter przeglądowy i zawiera pewne wstępne propozycje dalszych badań. Przegląd obejmuje literaturę dotyczącą systemów kontroli zarządczej, dźwigni kontroli (w tym kontroli interaktywnej), zrównoważonej karty wyników, map strategii, modeli mentalnych i organizacyjnego uczenia się. Przegląd ma głównie charakter jakościowy, jednak jest w pewnym zakresie wsparty również ilościową analizą bibliometryczną, w tym analizą współwystępowania słów (co-word analysis) do której zastosowano oprogramowanie VOSviewer v.1.6.17. Sytuacja rosnącej knightowskiej niepewności wymaga obecnie szerszego zastosowania systemów kontroli interaktywnej. Mapy strategii wpisują się w to zapotrzebowanie – umożliwiają one bowiem zrozumienie założeń strategicznych, strukturyzację problemów, dyskusję, pozyskiwanie wiedzy. Mapa strategii może być postrzegana jako narzędzie mapowania poznawczego. Stanowi ona zbiór hipotez, które mogą być empirycznie testowane poprzez wdrażanie strategii, umożliwiając tym samym strategiczne uczenie się (w tym tzw. uczenie się na zasadzie podwójnej pętli sprzężenia zwrotnego). Taki mechanizm podwójnej pętli uczenia się pozwala na iteracyjne tworzenie strategii organizacji, która może być bardziej odporna w turbulentnym otoczeniu. Podstawą interaktywnego systemu kontroli jest poczucie własności mapy strategii wśród pracowników. W związku z tym dużą rolę odgrywa zbieżność modeli mentalnych członków organizacji w wyniku „dialogu strategicznego". Produktem takiego procesu organizacyjnego uczenia się jest wspólny, podzielany model mentalny. Model ten musi zostać wypracowany, upowszechniony w organizacji i zaakceptowany przez pracowników, a następnie udoskonalony poprzez uczenie się przez działanie.

Słowa kluczowe: system kontroli interaktywnej, zrównoważona karta wyników, mapa strategii, model mentalny, organizacyjne uczenie się.

Introduction

Recently we have been witnessing events called mega-crises, Black Swans, or unknown unknowns[1] [Ansell and Boin 2019]. At the beginning of the third year of the COVID-19 pandemic, the world is experiencing another crisis due to full-scale Russian aggression in Ukraine, which additionally raises concerns about food security. Overall, it is becoming clear that the Knightian uncertainty[2] [Knight 2009] will be with us for longer. Thus, the current approaches to management control systems (MCSs)[3] should be rethought from the perspective of the need for viability and resiliency due to the challenge of "unknown unknowns".

MCSs could play two roles: to support the achievement of organizational goals as well as to be enablers for solving problems and for searching for opportunities [Simons 1995, Ahrens and Chapman 2004, Mundy 2010]. According to Zimmerman [2011], these two roles could be differentiated as ex-ante uses (decision management) and ex-post uses (decision control)[4]. The ex-ante role calls for giving employees sufficient autonomy to improve decision-making and reduce uncertainty [Sprinkle 2003]. Thus, this role is particularly important to face the present challenge of mega-crises.

These two roles of MCSs could also be referred to as the levers of control (LOC) by Simons [1994, 1995]. Simons' framework comprises four categories of control systems: belief systems, boundary systems, diagnostic control systems, and interactive control systems. According to Simons [1995], managers decide which of these systems will catch the most attention at a given time, depending on the particular conditions of time and place. For example, both belief systems and interactive systems play an ex-ante role (decision-facilitating). They facilitate employee engagement and enable innovation [Bisbe and Otley 2004, Tuomela 2005].

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[1] Unknown unknowns are the most serious category of risks. Such kind of risk means a situation that was unexpected and therefore was not even considered. The term was popularized by United States Secretary of Defense Rumsfeld [Department of Defense 2002].

[2] Uncertainty in the Knightian meaning is the substantial lack of knowledge about the possible events in the future, as contrasted to the quantifiable risk, which allows, e.g., to calculate of expected value, etc., and what makes it insurable. A similar meaning (without referring to Knight) is present in the concept of the world risk society of Beck [1992, 2008, 2009, 2020]. According to Beck, as modernization progresses, it is being increasingly overshadowed by its side effects of itself, namely by risks generated by techno-economic development. Such global dangers, according to Beck, consist of ecological, biomedical (vide COVID-19), financial, military (vide war in Ukraine), terrorist, and informational risks [Beck 2009]. All of them exhibit some common features: delocalization (causes and consequences of them are global), incalculability (their consequences are uncertain in principle), and non-compensability (e.g., nuclear plant catastrophe or terrorist attacks are not insurable) [Beck 2008, 2009, 2020].

[3] Examples of MCSs are budgeting, economic value added (EVA), activity-based costing (ABC), and balanced scorecard (BSC) [Wenisch 2004].

[4] Decision management serves to communicate specialized knowledge about one part of the organization to another part. Decision control serves as the measurement of performance [Zimmerman 2011].

In 2022 there was the 30th anniversary of the introduction of the balanced scorecard (BSC) by Kaplan and Norton [1992] in their seminal paper. The BSC, since its introduction, has met with high interest. According to a global study by Bain & Co., the BSC is listed in the sixth position among the most widely used management tools around the world and the third position in Europe. The usage rate of balanced scorecards in big companies is 39% in North America and 44% in Europe [Rigby and Bilodeau 2015]. Thus, the BSC is one of the most popular management methods worldwide. Is this method still adequate for the present challenge of the predominant uncertainty?

Initially, the balanced scorecard was introduced as a performance measurement system [Kaplan 2010]. In their early publication, the creators of the BSC described it as "a coherent set of performance measures" [Kaplan and Norton 1993, p. 134]. Thus, referring to the LOC framework, the BSC was introduced as a diagnostic control system [Pietrzak 2013]. From this perspective, the BSC could be perceived as supporting the mechanistic view of the organization [Henri 2006, Cooper and Ezzamel 2016]. The mechanistic view dominates traditional managerial, financial, and economic thinking about organizations [Pietrzak 2017]. In this view, firms and other types of organizations are viewed as machines. They operate clockwork-wise within the directions set out by executives' command as well as rules and procedures, and employees are seen as parts of the mechanism. Based on this image of organizations, we expect them to operate with precision, regularity, reliability, speed, and efficiency [Morgan 2006]. However, "when unexpected problems arise, the organizational response often is ignorance since there are no ready-made responses" [Wenisch 2004, p. 24].

The emergence of Black Swans challenges this mechanistic view. Over-emphasizing a diagnostic control contradicts the need to create new knowledge and innovations [Chiesa et al. 2009, Lill and Wald 2021]. In times of omnipresent uncertainty, something more reasonable than a mechanistic approach to strategic management could be a rather organismic approach [Morgan 2006], according to which organizations are open systems that must fit the environment while balancing internal subsystems. When the environment is going through substantial changes, the organization needs to be able to question whether what and how it is doing is still appropriate. In other words, it should be able to learn what could be expressed as the brain metaphor [Morgan 2006]. Learning and adaptation to the environment could be much easier and faster if the strategic plan is not overloaded with too many details and numbers, which have to change accordingly to the adaptation.

As the application of the BSC developed widely, it evolved [Kaplan and Norton 2004]. During its 30-year evolution, the balanced scorecard developed into an integrated set of tools and approaches, which creates a "management system that links strategy formulation and planning with operational execution" [Kaplan and Norton 2008, pp. 7–8]. Thus, a balanced scorecard, formerly used diagnostically, started to be used by some applicants more as an interactive control system. Compared to diagnostic systems, interactive control systems are characterized by more intensive and bottom-up communication between the top management and employees in contrast to diagnostic systems [Simons 1995]. This communication provides the foundation needed to utilize creativity [Lill and Wald 2021]. The application of interactive control systems enhances the ability to take advantage of emerging opportunities and deal with strategic uncertainty [Simons 2000].

According to Cooper and Ezzamel [2016], although the creators of the BSC refer to the need for double-loop learning based on feedback, they did not develop this issue seriously. Thus, Cooper and Ezzamel [2016] call for greater democratic dialogue within an organization between those who contribute to its success. In our opinion, this call is particularly important nowadays in times of increasing uncertainty when managers are forced to tackle situations when full information is not available and when there are complications and ambiguities [Spender 2014]. Therefore, a more evolutionary, processual, and interactive management control system is needed. It should enable a permanent organizational learning process.

However, the challenge is to make learning not only an individual but also an organization-wide process. Organizations are, in fact, communities or mini-societies. Therefore, analogously to societies, organizations build up their own specific cultures. Adaptation to a turbulent environment requires changes, and for the effective transformation of an organization, one should change the organizational culture [Morgan 2006]. Culture is something that cannot be imposed by command but is something that is built up by social interactions. Important aspects of these interactions are common mental models shared by organization members. Such patterns create cognitive matrices consisting of a set of assumptions called "the theory of the business" [Drucker 1994] or "the business idea" [van der Heijden 1998]. In the balanced scorecard methodology, "the theory of the business" is embedded in the strategy map. A strategy map outlines the pathways of the organization's journey to the desired future by defining what it wants to do to successfully implement a strategy [Niven 2008]. Strategy maps visualize the organizational future in the simple form of a one-page picture. Thus, a strategy map as the basis of a shared mental model could be helpful for organizational (and, therefore, common) learning.

The aim of this paper is to discuss the role of a strategy map as a framework of a shared mental model for an interactive control system in the context of the contemporary increase of Knightian-type uncertainty. The authors will attempt to answer the following research questions:

1. How uncertainty challenges the management control systems (in particular, how should dynamic tension between Simon's levers of control be shaped against the high degree of uncertainty)?
2. What role in this dynamic tension could be played by the balanced scorecard and by the strategy map in particular?
3. What does it mean that a strategy map could be a base of a mental model, and what is the role of a mental model in strategic learning?
4. Why the strategic learning should be organizational learning in times of Knightian uncertainty, and why the convergence of individual mental models into commonly shared mental models is important?

The paper is organized as follows. The introduction states the problem undertaken and the aim of the paper, and the research questions. Section 1 presents the information about data and methods. Section 3 covers the initial literature review in which we try to define the research gap, which justifies our future effort. Based on insights gained from this initial literature review, using a strategy map as a basis for interactive control systems as well as a framework of a mental model for strategic conversation is discussed in Sec-

tion 4. Section 5 proposes the strategy map as the basis of organizational learning. Section 6 highlights the role of the sharing of mental models of strategy in common learning in organizations. The paper ends with final remarks.

Materials and methods

The article results from the author's study of the literature on the subject. Firstly, the initial literature review is done qualitatively. However, a quantitative bibliometric method supports this part of the review. We follow He [1999, p. 137], who claims that "scientists attach particular importance to text (…). Therefore, (…) following the texts is another way to map the dynamics of science". After that, the study continued with the qualitative review and discussion of the literature relevant to the research gap identified in the initial review. Both the quantitative and qualitative study of literature regard issues such as management control systems, levers of control (including interactive controls), balanced scorecards, strategy maps, mental models, and organizational learning. Therefore, it is based mainly on the literature from the borderline of management accounting and strategic management. This article is a review-based study and suggests some preliminary proposals for further research.

Regarding the bibliometric part of the review, we apply the co-word analysis, which is based on counting the frequency of co-occurrence and co-absence patterns of pairs of words appearing in the analyzed text. Co-word analysis enables us to show the socio-cognitive structures and their evolution based on data from a set of documents. Such items are clustered into groups and displayed on network maps [He 1999, Ronda-Pupo and Guerras-Martin 2012]. By comparing the network maps for different periods, the dynamic of ideas could be cached – "co-word analysis seeks to extract the themes of science and detect the linkages among these themes directly from the subject content of texts. (…) this enables us to (…) detect the dynamics of science" [He 1999, pp. 137–138]. The co-occurrence of words may not only signal the existence of sub-areas of research, but on the other hand, it also makes it possible to identify the research gaps, which could help guide the further development of a given research area. The analysis can be performed at the level of different text elements: titles, abstracts, keywords, and the corpus of the text, and it could also be based on various combinations of these elements.

For co-word analysis in this paper, the authors applied the VOSviewer v.1.6.17 (Visualizing Scientific Landscapes) open-source software developed at the Center for Science and Technology Studies (CWTS) by Leiden University in the Netherlands. The cluster analysis method incorporated in this tool was developed by Zhu et al. [2009]. Data for the study were collected from the Web of Science database. Next to Scopus, Web of Science is recognized as the world's most comprehensive bibliographic database in terms of subject coverage. A key issue in performing database queries is defining keywords that identify all publications that are relevant to research purposes. The individual databases for the query "all fields" were created for the following keywords: balanced scorecard, strategy map, management control systems, and levers of control. The time range of publication was from 1990 until 2022. The databases included all types of publications, e.g., scientific articles, proceeding papers, book chapters, and books. Maps were developed using VOSviewer by importing the entire text file with saved records from the WoS database.

Defining the research gap

As we already mentioned in the introduction, given the uncertainty created by Black Swans and the need for resiliency, management practices should be modified accordingly. In such a number, the approaches to management control systems (MCSs) should be rethought from the perspective of the need for resiliency due to the challenge of mega crises. According to Otley: "management control systems provide information that is intended to be useful to managers in performing their jobs and to assist organizations in developing and maintaining viable patterns of behavior" [1999, p. 364]. MCSs focus on two roles: ex-post–decision control, performance management, and ex-ante–decision management, and sharing knowledge [Simons 1995, Ahrens and Chapman 2004, Mundy 2010, Zimmerman 2011]. From the perspective of the purposes of this paper, this ex-ante role is crucial because it is helpful to face the present challenge of uncertainty [Sprinkle 2003]. Since Simons' both seminal paper [1994] and book [1995], the important body of knowledge connected with the so-called LOC (levers of control) framework has been developed[5].

Simons defined an MCS as "the formal, information-based routines and procedures used by managers to maintain or alter patterns in organizational activities" [Simons 1987]. He proposed to call MCSs levers of control, which comprise four control systems: beliefs, boundary, diagnostic and interactive. Belief systems are "used by top managers to define, communicate, and reinforce the basic values, purpose, and direction for the organization. Belief systems are created and communicated through formal documents such as credos, mission statements, and statements of purpose" [Simons 1994, p. 170]. They are used to provide and reinforce the basic values, purpose, and direction of the organization [Simons 1995], without "prescribing the precise nature of the activities" towards achieving this purpose [Mundy 2010, p. 501]. Thus, they encourage the explorative approach and enable the creation of new knowledge [Chiesa et al. 2009, Ylinen and Gullkvist 2014]. Belief systems are particularly important to organizations operating in uncertain conditions and undergoing change [Bruining et al. 2004, Speklé 2001].

Boundary systems are "used by top managers to establish explicit limits and rules" [Simons 1994, p. 170] and to "define and communicate specific risks to be avoided" [Simons 2000, p. 764]. Typically, boundary systems are defined in negative terms [Simons 1994], and thus could fail to give enough freedom for opportunity-seeking behavior, and some potentially feasible modes of conduct may remain unexplored [Curtis and Sweeney 2017, Rodan 2005]. Thus, the effectiveness of boundary systems depends on the ability to do the ex-ante catalog of acceptable and unacceptable behavior [Mundy 2010]. Therefore, behavioral rules and limits are questionable in conditions of a great deal of uncertainty [Bedford 2015].

[5] The LOC framework has gained a prominent position. According to Kruis et al., "the impact of the Levers of Control (LOC) framework on the accounting literature is undeniably large" [2016, p. 27]. In WoS, there are 5,180 citations connected with the phrase "levers of control" (taking into account journals with more than 20 citations). They occur mainly in accounting journals. Only two journals: "Accounting, Organizations and Society and Management Accounting Research" count for 35% of these citations.

Diagnostic control systems are, according to Simons, "used to monitor organizational outcomes and correct deviations from preset standards of performance" [1994, p. 170] and as "feedback systems [they are] used to track variances from preset goals and manage by exception" [Simons 1994, p. 171]. Diagnostic systems compare actual results against planned targets [Simons 1995, Abernethy and Brownell 1999] and foster efficiency gains under circumstances of high task security [Bedford 2015]. Diagnostic control systems could be based on both financial data indicating when economic expectations of investors are met as well as non-financial metrics securing control of critical success factors, which enable the achievement of financial targets [Perera and Harrison 1997, Abernethy and Lillis 2001, Tuomela 2005]. On the other hand, there is the risk of overemphasizing the role of measurable aspects of firm performance [Muller 2018] and overly orientating on targets [Chiesa et al. 2009]. Moreover, diagnostic systems are strongly embedded in a mechanistic approach to the organizations, which manifests in tight control and highly structured top-down[6] communication [Henri 2006, Cooper and Ezzamel 2016]. Therefore, overly relying on such systems could preclude creative behavior, open discussions, and gaining new knowledge [Wenisch 2004, Chiesa et al. 2009, Lill and Wald 2021].

In contrast to the diagnostic control systems, the interactive ones are strongly based on bottom-up communication [Simons 1994, 1995]. They are "used by top managers to regularly and personally involve themselves in the decision activities of subordinates" [Simon 1994, p. 171], while "the purpose of making a control system interactive is to focus attention and force dialogue and learning throughout the organization" [Simon 1994, p. 171]. Interactive control systems are crucial safeguards against "strategic uncertainties" [Simons 1994, p. 171], which require autonomy [Silaen and Williams 2009], intensive use of different sets of knowledge, including tacit knowledge [Gupta and Wilemon 1990, Abernethy and Lillis 1995, Speklé 2001, Turner and Makhija 2006], critical reflection [Matsuo and Matsuo 2017] and innovation [Abernethy and Brownell 1997, Bisbe and Otley 2004]. "The purpose of interactive processes is to debate or challenge the underlying assumptions and action plans that drive an organization's activities" [Mundy 2010, p. 501]. In doing so, executives can stimulate the emergence of new strategies [Simons, 1995, Bisbe and Otley 2004]. Interactive control systems require an awareness of significant strategic uncertainties that may affect the achievement of goals [Marginson 2002, Bisbe and Otley 2004, Mundy 2010]. The use of interactive control systems enhances the dynamic capability to take advantage of new opportunities and overcome strategic uncertainty [Simons 2000].

As one can find from the discussion above, Simons' four levers of control complement each other, and managers could benefit from using each one of them [Widener 2007]. All of them, taken jointly, create a ''dynamic tension between opportunistic innovation and predictable goal achievement that is essential for positive growth" [Simons 1995, p. 153].

This is the task of managers to decide which of these systems will catch the most attention at any given time [Simons 1995]. Our thesis is that recently, due to COVID-19 and the war in Ukraine, the awareness of the Knightian [Knight 2009] uncertainty sub-

[6] According to Muller, sometimes, the demand for performance metrics from the top of the organization flows from the ignorance of top managers about the organizations they manage [Muller 2018].

stantially increased and that now the dynamic tension will shift towards beliefs systems and interactive control systems, which facilitate and enhance employee engagement, market orientation, entrepreneurship, innovativeness and organizational learning [Bisbe and Otley 2004, Tuomela 2005, Henri 2006].

In 2022 there was the 30th anniversary of the introduction of the balanced scorecard, which since its introduction has met with high interest – in 2015, it occupied the sixth position among the most widely used management tools worldwide, according to [Rigby and Bilodeau 2015]. According to Tuomela [2005], the discussion of MCSs and strategy, as well as their relationship, has intensified after the introduction of a balanced scorecard. Initially, the BSC falls naturally into the category of diagnostic control systems. Although the creators of the BSC declared its evolution towards an integrated management system that links strategy with operational execution [Kaplan and Norton 2004, 2008] and therefore, it could be used as an interactive control system, the vast majority of literature treats the BSC more as a performance measurement system, namely a diagnostic control system [Tuomela 2005, Kumar et al. 2021].

These observations are confirmed by bibliometric co-words analysis. Figure 1 illustrates the co-occurrence network map based on 4840 scientific papers, monographs, and book chapters (from the Web of Science database), which include the "balanced scorecard" phrase in the title, abstract, keywords, or the corpus of the text. The links in the network depict a strength, represented by a positive numerical value. This value represents the appearance of the pairs of words or phrases in analyzed papers. The higher this value, the stronger the link – namely, frequency of appearance (the number of publications in which two terms occur together).

The most frequently appearing in-text co-words or phrases are: management (strength = 3194), performance (2430), framework (2091), strategy (1918), and performance measurement (1774). Thus, even though the strategic potential of the BSC is recognized, issues important for the interactive control system role are less frequently undertaken (innovation = 1004; knowledge = 512; knowledge management = 367). Issues such as learning or organizational learning, even if mentioned[7] are, in fact, marginal in this body of literature. At first glance, it is surprising, taking into account that Kaplan and Norton declared the importance of strategic learning. Some critics claim, however, that the BSC is overly reliant on top-down management [Norreklit 2000, Cooper and Ezzamel 2016]. This approach may not fit the learning requirements in the organization's real social context and in a dynamically changing environment. Cooper and Ezzamel [2016] claim there is a need for more dialogue and democratic deliberation within an organization.

Considering that interactive control systems are used to provoke discussion about uncertainties and to learn new responses to the turbulent environment, this lack of emphasizing learning issues is striking. What is more, up to now, nearly two decades after the publication of the third book by Kaplan and Norton [2004] entitled "Strategy Maps", such a phrase[8] does not appear in the co-words network of the "balanced scorecard" (Fig. 1). Nevertheless, despite the still huge popularity of the BSC, one could find that according to the newest study of Bain&Co., this popularity appears to be on a decline [Rigby and

[7] A network map illustrates a limited number of the most relevant words.
[8] "Strategy map" or "strategy maps".

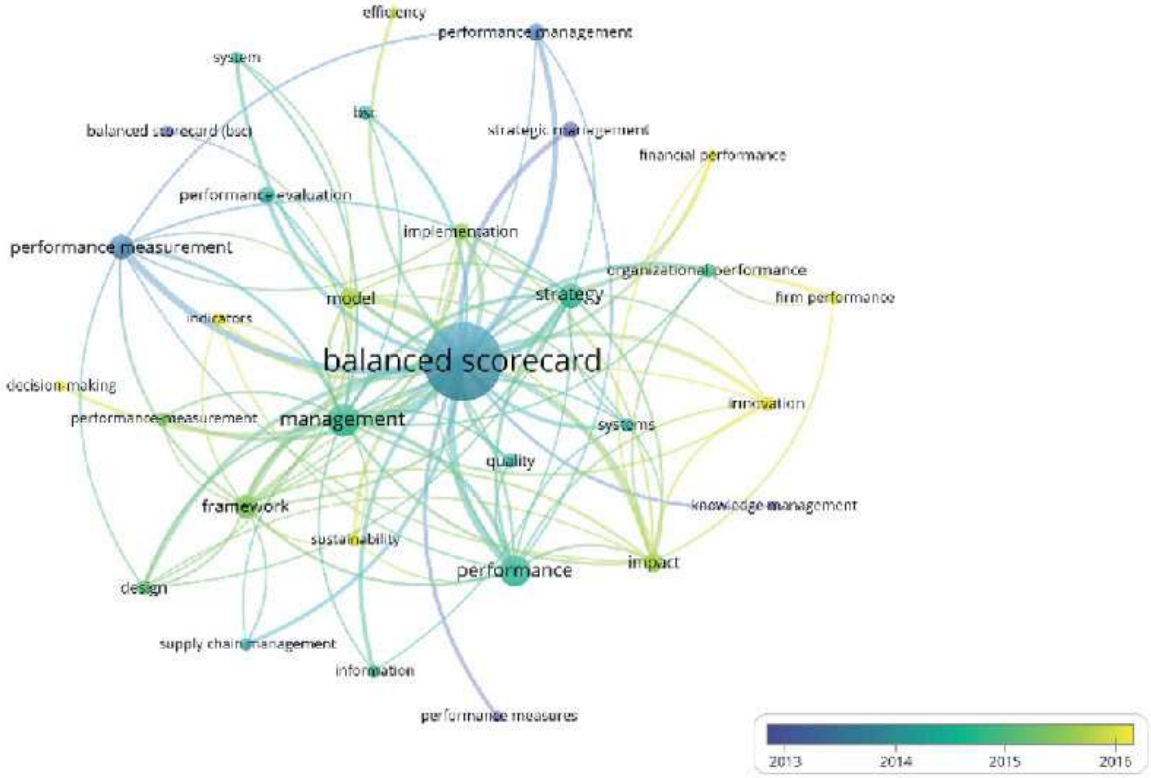

Figure 1. Network map of items co-occurrent with the "balanced scorecard" phrase (N = 4,840 scientific texts from Web of Science database)

Rysunek 1. Mapa współwystępowania słów z frazą "zrównoważona karta wyników" (N = 4840 tekstów naukowych z bazy Web of Science)

Source: based on WoS with the application of VOSviewer.

Bilodeau 2018]. One of the possible explanations is that the potential of the BSC as an interactive control system was not fully developed, which is particularly important in times of mega crises.

A strategy map, developed under the BSC methodology umbrella [Kaplan and Norton 2004], is a tool that has the potential to support the interactive role of the control system, namely the role that emphasizes learning and discussion rather than checking if results are on the planned track. According to Lueg [2015] and Lueg and Norreklit [2012], a strategy map facilitates discussion by challenging the strategic assumptions of other managers and employees in the joint process of constructing the casualties (cause-and-effect relationships) between strategic objectives. "Strategy maps foster a better understanding of the BSC among employees, create a greater commitment, reduce resistance, cultivate a feeling of fair evaluation, and are far superior to a stand-alone BSC in communicating" [Lueg 2015, p. 34].

Tuomoela [2005], as well as Naro and Travaille [2019], emphasize the decisive role of the strategic map in the ensuing organizational learning[9]. This role of strategy maps is

[9] In the two cases of industrial enterprises, which the authors studied, both companies gained the knowledge generated during the designing process of the strategy map, despite the fact that they abandoned the BSC a few years after its implementation [Naro and Travaille 2019].

crucial because a strategically oriented MCS needs to be altered if the strategy is changed [Eccles 1991, Grady 1991, Tumoela 2005]. Thus, it is highly probable that they should be altered quite often [Otley 1999], which could be problematic [Anthony and Govindarajan 1998, Tumoela 2005] without the strategy map, a "tool for ongoing discussion over long periods, and in which manager participants had the opportunity to analyze, question and importantly to refine the strategy" [Armstrong 2019, p. 741]. The study of Islam [2018] shows that strategy maps manifest high adaptability and change over time. Armstrong claims that "the strategy map represents a major contribution to the theory and practice of performance management" [2019, p. 721].

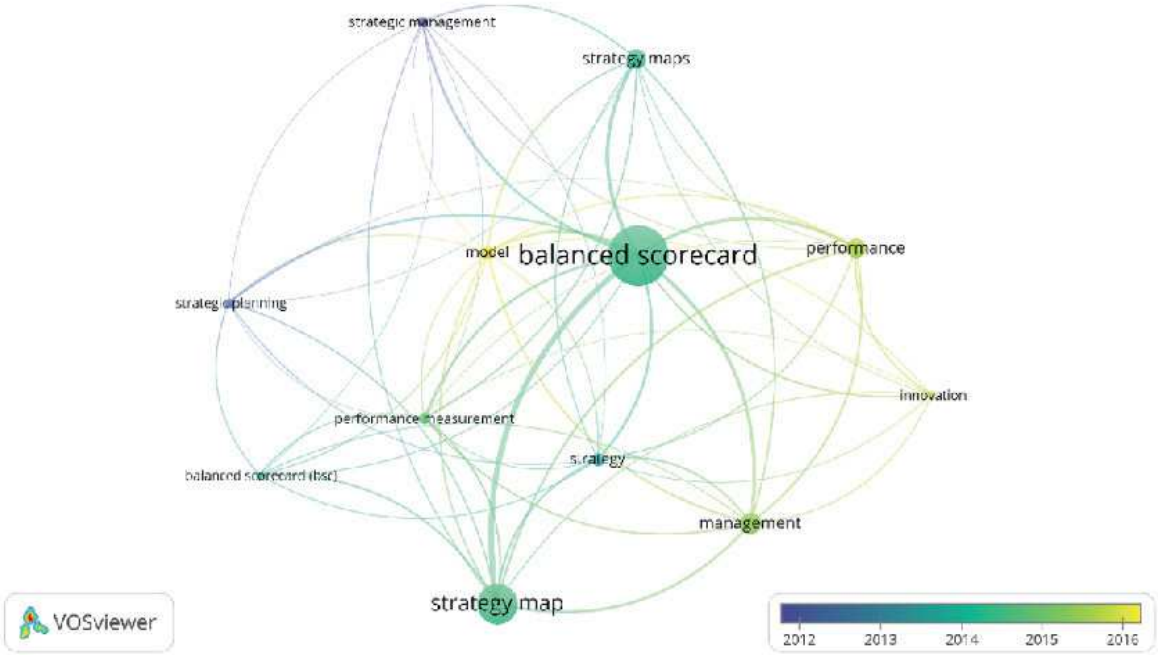

Figure 2. Network map of items co-occurrent with the "strategy map" phrase (N = 464 scientific texts from Web of Science database)

Rysunek 2. Mapa współwystępowania słów z frazą "mapa strategii" (N = 464 tekstów naukowych z bazy Web of Science)

Source: based on WoS with the application of VOSviewer.

Despite these advantages, "only a few academic studies have analyzed strategy maps" [Lueg, 2015, p. 34], and empirical research on the evolution of strategy maps is under-explored [Islam 2019]. It appears that the strategy map has not realized its potential [Armstrong 2019]. These observations are confirmed by bibliometric analysis. There are 464 scientific texts from the Web of Science database, which include the "strategy map" phrase in the title, abstract, keywords, or in the corpus of the text as compared to the number of 4,840 in the case of "balanced scorecard" (slightly less than 10%). In Figure 2 (which depicts the co-occurrence of words based on texts from WoS for the "strategy map") the oval[10], which represents the main phrase, is even smaller than the "balanced

[10] The size of the ovals illustrates the frequency of pairs of words/phrases

scorecard". In fact, the last phrase dominated the main phrase, "strategy map" in both – the size of ovals (frequency of pairs of words/phrases) as well as in the strength of links (the appearance of these pairs in texts).

The most frequently appearing co-words or phrases are: balanced scorecard (strength = = 442), management (158), model (131), performance (117), strategy (80), and performance measurement (73). It is striking, taking into account the advantages mentioned above, that there is a lack in the co-word network for such items as: learning, organizational learning, discussion, mental model, and shared mental model.

Table 1 consists of some bibliometric synthesis of the discussion above with special regard to the four items: management control systems (MCSs), levers of control (LOC), balanced scorecard (BSC), and strategy map (SM). One could notice that references to the topics mentioned above are placed on the borderline of accounting (management accounting in particular) and management (strategic management in particular). In general, the citation distribution regarding all these topics is 60 versus 40 percent, respectively. Regarding MCSs and LOC accounting, journals dominate even more (72 versus 28%). Conversely, the citations regarding BSCs and SMs[11] in the management journals slightly outnumber those in the accounting ones (54 versus 46%).

Table 1. Distribution of citations regarding management control systems (MCSs), levers of control (LOC), balanced scorecard (BSC), and strategy map (SM) across mostly referred journals
Tabela 1. Cytowania dotyczące systemów kontroli zarządczej (MCS), dźwigni kontroli (LOC), zrównoważonej karty wyników (BSC) i mapy strategii (SM) w najczęściej cytowanych czasopismach

Journal	Topic				Total
	MCS	LOC	BSC	SM	
Accounting, Organizations and Society	10 631	1 118	4 390	168	16 307
Management Accounting Research	4 045	622	2 126	125	6 918
Strategic Management Journal	1 975	244	1 824	164	4 207
The Accounting Review	1 778	–	2 181	154	4 113
International Journal of Operations & Production Management	563	–	3 160	146	3 869
Academy of Management Review	1 697	146	1 429	–	3 272
Academy of Management Journal	1 766	148	1 192	–	3 106
Journal of Management Accounting Research	1 202	102	1 654	–	2 958
Journal of Cleaner Production	740	–	1 690	133	2 563
Journal of Business Ethics	1 214	113	1 012	–	2 339
Accounting, Auditing & Accountability Journal	1 304	116	606	–	2 026
Long Range Planning	446	–	1 235	158	1 839
Total	27 361	2 609	22 499	1 048	53 517

Notes: only journals with at least 100 citations in at least 3 out of four topics (MSC, LOC, BSC, SM) were taken into account. Italic denotes accounting journals.

Source: own based on WoS data set and VOSviewer.

[11] Regarding SM alone, this advantage of management journals is even slightly higher (57 versus 43%)

From a quantitative point of view, at first glance, the topic of the strategy map is relatively weakly developed (1,048 citations vs. 22,499 regarding BSCs[12]). More importantly, the qualitative analysis shows the substantial underdevelopment of the literature in this area. Let us explain. The LOC literature emphasizes the role of dynamic tensions between the different types of control systems according to the actual needs. Nowadays, companies have to face the mega-crises such as COVID-19 or the full-scale Russian aggression in Ukraine. Thus, this situation calls on the much more extensive use of interactive control systems than before.

Strategy maps fit perfectly with this new demand. It enables understanding strategic assumptions, structuring the problems, dialog and discussion, and gaining knowledge (including tacit knowledge) from many parts of the organization. In such a way, it facilitates innovations, organizational learning and refining strategy in an ongoing process. However, even in the relatively limited number of publications on the strategy map, these issues do not dominate. Only the issue of innovations has emerged recently (the yellow color in the network map denotes the relative novelty) in the body of literature regarding the strategy map – cf. Figure 2. One could note that the same trend of appearance of the innovation issue is also present in the body of literature regarding LOC – Figure 1.

Despite these small positive shifts, generally, the issue of organizational learning and the shared mental model is almost absent in the literature about MOS, LOC, and BSC. There are 9,679 papers and other scientific texts from WoS regarding the "mental model" phrase. In the case of "organizational learning," the number is also huge (8,087). However, the literature which has taken these issues jointly into account is relatively scant – 107 texts. There are only a few very limited positions treating these issues of organizational learning and mental models, which are crucial for crafting iterative control systems jointly with topics such as: balanced scorecards and strategy maps. Therefore, in our opinion, there is a research gap, which justifies our efforts to undertake in this paper the problem of strategy map as a framework of a shared mental model for the interactive control system.

A strategy map as a framework for a mental model of strategy

Kaplan and Norton focus mainly on the technical aspects of strategy maps [Islam 2018] while neglecting the sensemaking processes initiated by drafting, discussing, and refining strategy maps [Armstrong 2019]. Regarding Sułkowski and Lenart-Gansiniec [2021], there is no guarantee of obtaining fully reliable or cognitive-neutral data, and therefore strategic analysis methods are based on heuristic processes. Thus, strategic planning could not be fully formalized algorithmically. Moreover, such planning is, in turn, challenged by the volatility of conditions of the environment. Strategic decisions are therefore related to the process of perceiving reality. Our human minds do not reflect reality but perform a kind of cognitive reconstruction of it. Therefore, strategies and plans depend on meanings and symbols [Cohen and March 1974]. Strategic choices are made based on many factors and conditions, situational and cognitive, and on the value systems

[12] It equals less than 5% of citations regarding BSC.

of the individual and society. From this point of view, strategic management and reporting could be seen as dealing with meanings, namely sensemaking and sensegiving[13] [Gioia and Chittipeddi 1991, Rouleau 2005, Kim 2018].

In trying to implement strategy, the leaders must somewhat "infect" employees (sensegiving). This is why "cognitive leadership" [Witt 1998] is needed. In other words, leaders should provide mental models or cognitive maps, which could be proliferated and discussed among the employees through the processes of communication and education, therefore starting a "strategic conversation" within the organization. This conversation should produce an agreed "theory of the business" [Drucker 1994] consisting of the profit model, the value proposition for customers, the system of internal processes, which deliver this value, and a bundle of resources supporting such a system. Such a business model could be framed on the four perspectives of the balanced scorecard in the form of a strategy map [Lueg 2015]. According to Drucker, these crucial aspects are "assumptions that shape any organization's behavior, dictate its decisions about what to do and what not to do, and define what the organization considers meaningful results" [Drucker 1994, pp. 95–96]. A strategy map is an expression of such assumptions in the form of a cognitive map diagram.

Such a process of sensemaking and sensegiving "is something different from organizing a formal communication process and issuing instructions. […] and is, therefore, open to rival cognitive frames" [Witt 1998, p. 167]. Thus, success in such a process relies on quality, soundness, and the appeal of the ideas encapsulated in the strategy map [Niven 2008, Pietrzak 2014]. Any novel idea or conception requires acceptance by those who can affect bringing it to life. Otherwise, its potential value will never be realized. This rule is expressed in the following equation: quality times acceptance equals effectiveness. To gain acceptance for the strategy, it must be communicated. Before people can execute the strategy, they must accept it [Niven 2005]. The role of "buy-in" created through engaged participation is stressed by Armstrong [2019] and Groene et al. [2012]. The source of commitment, in this case, is not a normative power but rather a cognitive power [Witt 1999].

This is where the strategy map comes into the scene. A strategy map is a management tool developed by Kaplan and Norton [2004] under the balanced scorecard umbrella. Based on the balanced scorecard four-perspectives scheme, it can be perceived as a one-page visualization of the firm's pathway from the present to the desired future. A strategy map outlines the organizational tasks to be done to successfully implement its strategy by defining what it wants to achieve in each of the four perspectives of the BSC [Niven 2008] – Figure 3.

The important trait of the strategy map is its plainness: a one-page visualization depicts the strategic story [Smith 2007, Niven 2008]. A strategy map is a communication tool and a cognitive pattern for organization members that helps build commonly shared mental models of the organization's destination.

[13] "Sensemaking has to do with the way managers understand, interpret, and create sense for themselves based on the information surrounding the strategic change. Sensegiving is concerned with their attempts to influence the outcome, to communicate their thoughts about the change to others, and to gain their support. Although these processes appear to be conceptually different, the boundaries of each are permeated by the other" [Rouleau 2005, p. 1415].

The strategy map consists of two elements (Fig. 3):

- Strategic goals are defined for each perspective in the form of ovals with short statements of the direction of intended change; and
- Interconnections between strategic goals (cause-and-effect relations) in the form of arrows that link the ovals.

The general logic of any strategy map is as follows: if we have the right staff, organizational capital, and IT (learning and growth perspective) – we will do well the right things (process perspective) – then the customers will be delighted (customer perspective) – and we will get more profits (financial perspective) – Figure 3.

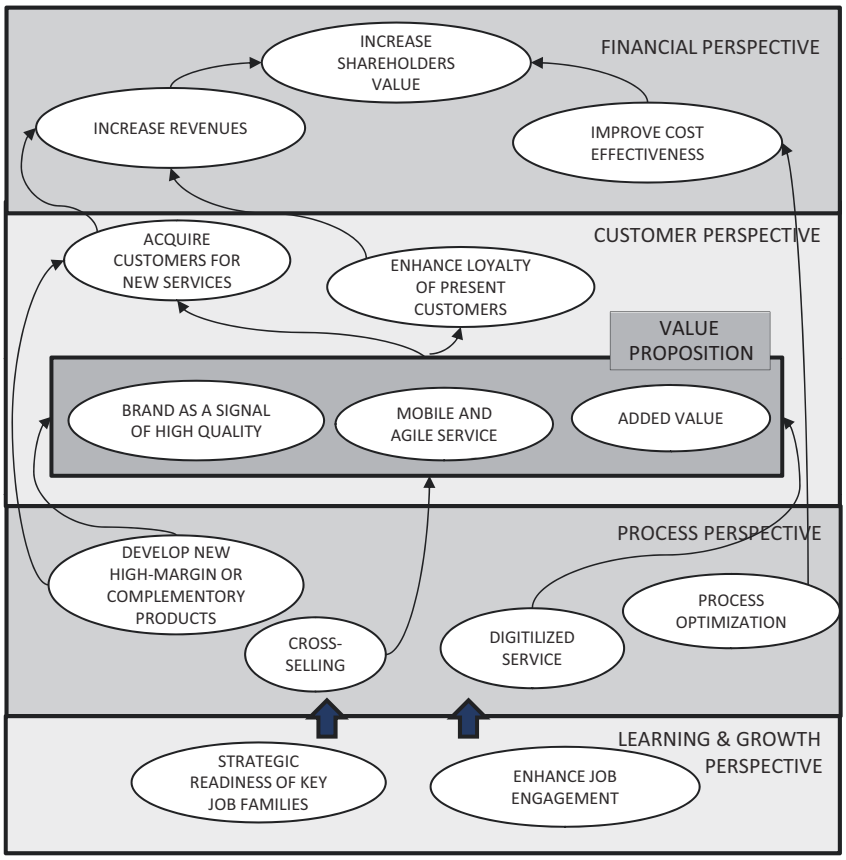

Figure 3. The building blocks of a strategy map: strategic goals and interconnections between them (example from the sector of professional services)

Rysunek 3. Elementy składowe mapy strategii: cele strategiczne i wzajemne powiązania między nimi (przykład z sektora usług profesjonalnych)

Source: own elaboration.

The visualization of strategy in the one-page picture (strategy map) tells a short story that explains how to translate strategy into action [Pietrzak 2014] and therefore builds a shared mental pattern of the strategic intent. For purposes of strategic management and reporting in times of uncertainty, the challenge is to combine rationality with subjective judgment and data interpretation. This is where the idea of the mental model comes onto the scene. The mental model is a simplified but intelligent and useful representation of a complex and uncertain reality.

Due to traits of the human brain and its limited capacity for processing and memorizing information, people's actions are plagued by bounded rationality, a notion that represents real-world decision-making: intentionally rational, but only limitedly so [Simon, 1986a, 2000, Witt 1998, 1999, Witt and Zellner 2005]. Due to limitations in working (or short-term) memory, the human brain requires serial and selective information processing, which relies on cognitive cues gradually built on experience. Such cues are fundamental for intuitive judgment [Witt 1998, Simon 2000]. They are organized into larger systems – cognitive frames – formed by life-long learning and stored in long-term memory. There are further used on-demand as frames for selective usage of incoming information. From the bounded rationality of individuals taken in conjunction with the uncertainty in the environment, mental constructs arise to simplify cognition [North 2011]. Bounded rationality prevents people from tracing all imaginable details and possibilities. To cope with this limitation, we use "cognitive frames" [Witt 1998] or "mental models" [Johnson-Laird 1983].

According to Simon [1986b, pp. S210–S211], "If (…) we accept the proposition that both the knowledge and the computational power of the decision-maker are severely limited, then we must distinguish between the real world and the actor's perception of it". Mental models used by economic actors are "subjectively derived" and used in a process, that North calls "deciphering the environment", which relies on "processing the information through preexisting mental constructs" [North 2011, p. 20]. Ackerman and Eden [2010, p. 138] argue: "in an organizational setting the manager is taken to be involved actively in the psychological construction of the world rather than the perception of an objective world".

Craik [1943] first introduces the notion of the 'internal model', which represents a similar relation structure to that of the system it imitates. Johnson-Laird [1983] argues that we apprehend the world by building mental models of the relations among objects and events that concern us. "A mental model is a conceptual representation of the structure of an external system used by people to describe, explain and predict a system's behavior. (…) managers build their mental models as they interact with the business system that they manage" [Capello and Dias 2009, p. 1].

Knight [2009, pp. 102–103] argues that "life has been described as an internal adaptation to external coexistences and sequences. (…) the fundamental difference in the case of (…) conscious life is that it can react to a situation before that situation materializes; it can 'see things coming'. (…) the farther ahead the organism can 'see', the more adequately it can adapt itself". In the case of strategic management, the adaptation of an organization requires insight into the future. "We do (…) react to (…) the 'image' of a future state of affairs" [Knight 2009, p. 103].

Kelly [1955] claims that people anticipate future events through hypothesizing based on experience. These hypotheses are tested out, and subsequently, new elements are added to mental constructs. Such constructs could be visualized by cognitive mapping comprising nodes (statements) and links (causal arrows) [Ackerman and Eden 2010]. The strategy map developed by Kaplan and Norton [2004] under a balanced scorecard methodology could be seen as a form of such cognitive mapping [Dunham 2002, Ritchie-Dunham and Puente 2008, Capelo and Dias 2009, Gonzales et al. 2012].

A strategy map as the basis of organizational learning

In addition to its simple visualization of strategic intent, another feature of a strategy map is that it facilitates the process of organizational learning. Due to this feature, the strategy map is in line with Senge's [2006] concept of five disciplines as conditional for organizational learning. Every relationship between goals on the strategy map (arrows between ovals – Figure 3) is a kind of strategic hypothesis.[14] From this point of view, the mental model expressed in the form of a strategy map can be defined as a local micro-theory.

A theory is defined as a set of statements about a relevant problem. A strategy map can be perceived as an ensemble of adjudicating sentences (each "what-if" relationship is such a statement), and at this stage, they have the status of hypotheses. Thus, based on available objective information and subjective judgments, the strategy map depicts achievable results regarding the particular strategic situation. Therefore, the strategy execution becomes a form of testing the strategic hypotheses. They must undergo modifications as a result of confronting reality and an inflow of new information. In this way, conclusions can be drawn from the implementation of the strategy. Effective actions should be reinforced, while in the case of deviations, corrective steps should be taken, or the hypotheses (what-if relationships in the form of arrows – Figure 3) should be updated.

The roots of the modern scientific method date back to the 17th century, when Bacon proposed the cycle of inductive reasoning as a hypothesis – experiment – evaluation. For management, it can be slightly modified as planning – implementation and checking –adjustments. Those processes create a so-called PDCA cycle[15] [Pietrzak and Paliszkiewicz 2015] and are shown in Figure 4. During the strategy execution, some opportunities may disappear while others arise, and some action plans may become impossible or unwarranted to implement while others become viable. Consequently, an initial strategy may have to be modified [Foss and Klein 2012].

Therefore, the strategy development process has to be iterative. This process is based on assumptions, which, due to the uncertainty, are only partially correct. Strategy execution ("Do" phase) enables the ultimate test ("Check" phase) of those assumptions, and we need to conclude ("Act/adjust" phase) from this test for the next iteration of strategic planning ("Plan" phase) – Figure 4.

Thus, the idea of a strategy understood as a brilliant plan, a one-time best answer to problems, should be replaced with a different concept. Rather, the strategy should be seen as a framework whose final shape will emerge in the cyclical process of strategic learning. Such an approach resonates with a remark attributed to Eisenhower: "Plans are nothing; planning is everything" [Cowley and Domb 1997, p. 10]. In other words, strategies are built on-premises, many of which are based on judgments. However, the empiri-

[14] There are many examples of empirical testing of such kinds of hypotheses [Yeung and Berman 1997].

[15] Alternatively, the strategic learning process could be seen through the lens of David Kolb's "learning loop": formation of theory – testing – concrete experiences – observation and reflection – formation of improved theory [van der Heiden 1998].

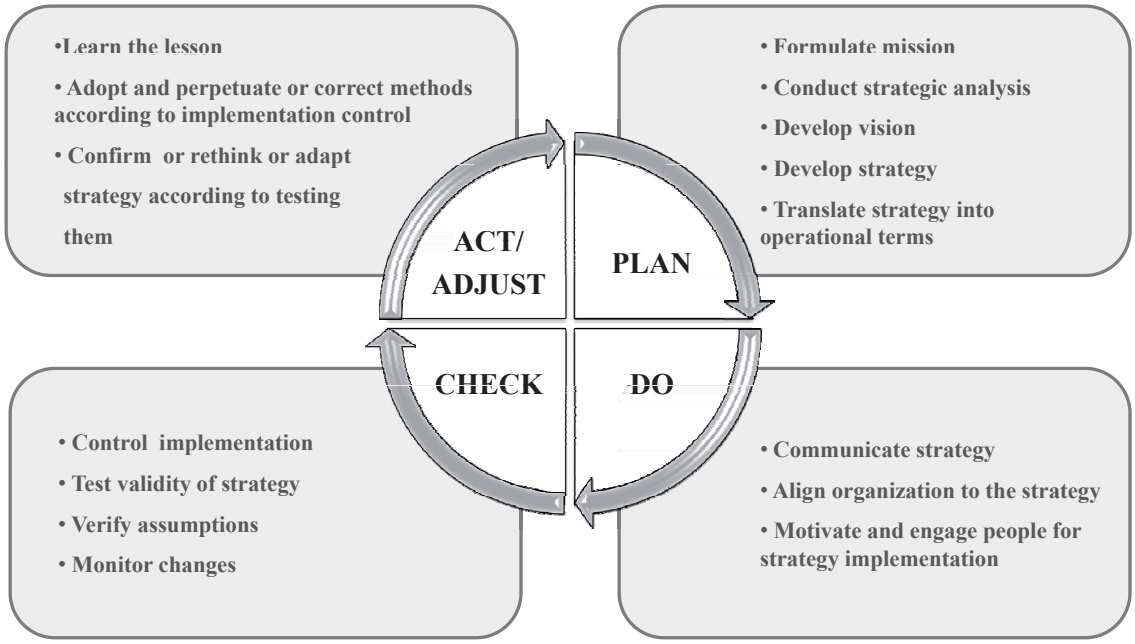

Figure 4. Strategic learning process framed on the PDCA cycle
Rysunek 4. Proces strategicznego uczenia się oparty na cyklu PDCA
Source: [Pietrzak and Paliszkiewicz 2015, p. 153].

cal tests could undermine their validity. As the circumstances and available knowledge change, the strategies should be adapted accordingly [Kirzner 2013, Simon 2000]. In such a way, strategy (the "Plan" phase) is getting an endogenous category driven by the "Act/Adjust" phase.

According to Sterman [2000], effective learning involves continuous experimentation. Feedback from experiments (namely impacting a system by a set of actions) informs the development of mental models for the next iteration, and so on – Figure 5. A strategy map based on a balanced scorecard is a valuable form of cognitive mapping by which the individual's mental models not only could be made explicit but also congruently aligned and encapsulated into the diagram as commonly shared mental models. The strategy map is expressed in the form of a set of hypotheses, which could be tested through the implementation of the strategy and therefore enhance strategic learning (including so-called double-loop learning).

According to Argyris and Schön [1978], in single-loop learning, the theory (here: the strategy map) – which has been steering the actions - remains stable. Any departure from the planned results is interpreted as a failure of actions done. Single-loop learning does not require validating the theory, which remains an exogenous category [Kaplan and Norton 1996, Steinmann and Schreyögg 2000]. Regarding the idea of double-loop learning, the strategy map as a kind of theory (set of hypotheses) should be tested empirically [Argyris and Schön 1978, Kaplan and Norton 1996, Steinmann and Schreyögg 2000]. Thus, the strategy should not be treated anymore as being etched on stone tablets. One arrow from feedback information goes to the action phase (single-loop learning), while the other one goes to the mental model (as expressed as the strategy map [Capelo and Dias 2009] – Figure 5.

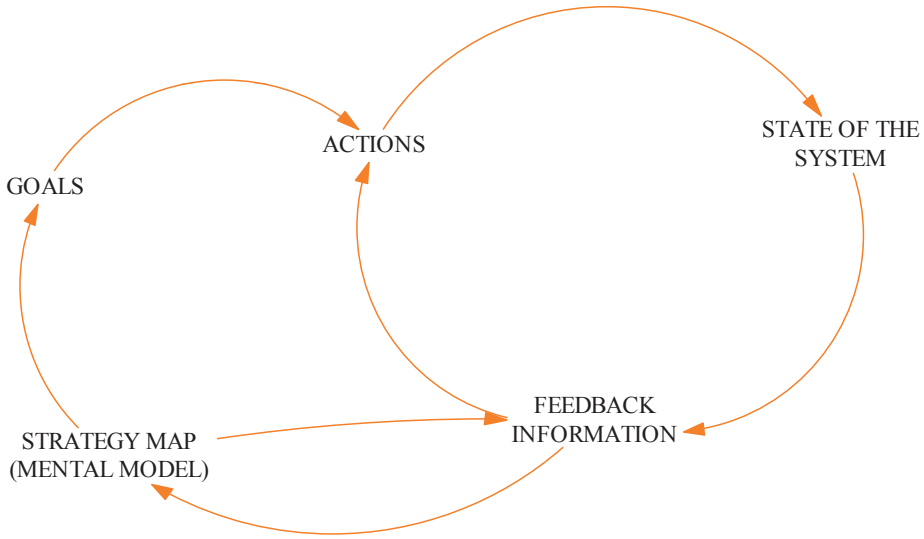

Figure 5. An interactive control system as a double-loop learning process with a strategy map as a mental model

Rysunek 5. Interaktywny system kontroli jako mechanizm uczenia się w podwójnej pętli z mapą strategii jako współdzielonym modelem mentalnym

Source: modified [Sterman 2000, p.19].

Thus, information feedback about the state of the system ("real world") not only has the potential to alter the actions but also feeds back to alter the mental model of strategy. Such a learning mechanism in which we replace an idea of a brilliant one-shot strategy with the view of strategy as a set of hypotheses (premises that have to be empirically tested) allows to iteratively build up an organization that could be more resilient and viable against the turbulent environment of present times (e.g., COVID-19, the war in Ukraine and its consequences). The balanced scorecard treated just as a set of metrics alone – a cockpit-like model "would not allow double-loop learning from strategy, and bringing the assumed cause-and-effect relationships up-front is an issue of paramount importance from the strategic learning perspective" [Tuomela 2005, p. 311].

What is worth emphasizing is that not only information feedback influences the mental model, but the link is also present in the reverse direction – Figure 5. Existing mental models influence the process of "deciphering" the real world [North 2011, p. 20]. "Deciphering" business systems means that we perceive them through filters. For example, "no one knows the current sales of their company, the current rate of production, or the true value of the order backlog at any given time. Instead, we receive estimates of these data based on sampled, averaged, and delayed measurements. (…) a measurement is an act of selection" [Sterman 2000, p. 23]. Cognitive maps frame how the world is perceived. Thus, decision-makers are more cautious about hearing the messages they are structured to hear [Hoverstadt 2010]. "Seeing is believing, and believing is seeing. They feed back on one another" [Sterman 2000, p. 24]. Hopefully, "the information systems governing the feedback we receive can change as we learn" [Strerman 2000, p. 23] – Figure 5.

The role of the sharing of mental models of strategy

The prerequisite of organizational learning is the commonly shared mental model (common cognitive frame), which addresses organizational identity and destination by answering the questions: Who are we? What is happening? How will the current situation be changed or improved? Such commonly shared organizational theory-in-use could be encapsulated in the form of strategy maps. Except in a sole proprietorship, a strategy is always a multiperson activity based on collaboration. Thus, we must somehow cope with the problem of proliferating strategic narration (in the case of a strategy map – the set of hypotheses/testable premises) within organizations. "Strategic work is the process of bringing an entrepreneurial idea into a particular socio-economic context" [Spender, 2014, p. 9]. From this point of view, leadership can be seen as the "provision and enforcement of cognitive frames" [Witt 1998, p. 166]. Let's imagine a leader with their conception of states of the world (opportunities and threats) and ways of dealing with them based on strategic judgment. This conception could be expressed as a strategy map. Such a conception has the features of cognitive frames. It can steer the behavior of the organization only if the employees decide within their areas of discretion to follow this conception in a coordinated way.

To achieve this, the conception (cognitive frame/mental model) must be proliferated within the organization and adopted by the employees [Witt 1998]. Implementing the strategy should begin with communicating and educating those people who are engaged in its execution [Kaplan and Norton 1996]. Hence, the original judgment and interpretation of the leader (or leaders) must become the object of what van der Heijden [1998] described as a "strategic conversation" – compare Figure 6.

In the case of collectivities such as organizations, one should differentiate the individuals' mental models and the common/shared mental model. According to Ackermann and Eden [2010, p. 144], "cognitive maps are those maps that attempt to represent cognition and therefore are focused on a single individual. Causal maps are those that are produced (…) from the amalgamation of cognitive maps". However, Gonzales et al. (2012) use the term cognitive map for both cases, and we will do the same.

"The complexity of problematic situations in real life stems from the fact that not only are they never static - they also contain multiple interacting perceptions of 'reality'. This comes about because different people have different taken-as-given (and often unexamined) assumptions about the world" [Checkland and Poulter 2010, p. 192]. In other words, people have different individual mental models of systems in which they operate. The challenge is the attempt to encapsulate such individuals' models in the frame of a common cognitive map, which could be a base of "questions to ask of the real-world situation. This provides a coherent structure to a discussion or debate about both the situation and how it might be changed" [Checkland and Poulter 2010, p. 192]. This could be a starting point of "a process of seeking accommodation between different worldviews. (…) It does this by helping to understand complex situations, encouraging multiple perspectives to be taken into account, and bringing rigor to processes of analysis, debate and taking 'action to improve'" [Checkland and Poulter 2010, p. 193]. This process constitutes a group learning cycle. Therefore, strategic management viewed from the perspective depicted in Figure 6 could not only produce the possibly best and more broadly approved business model but also yields a learning cycle, which would be a source of resiliency of that model in the future.

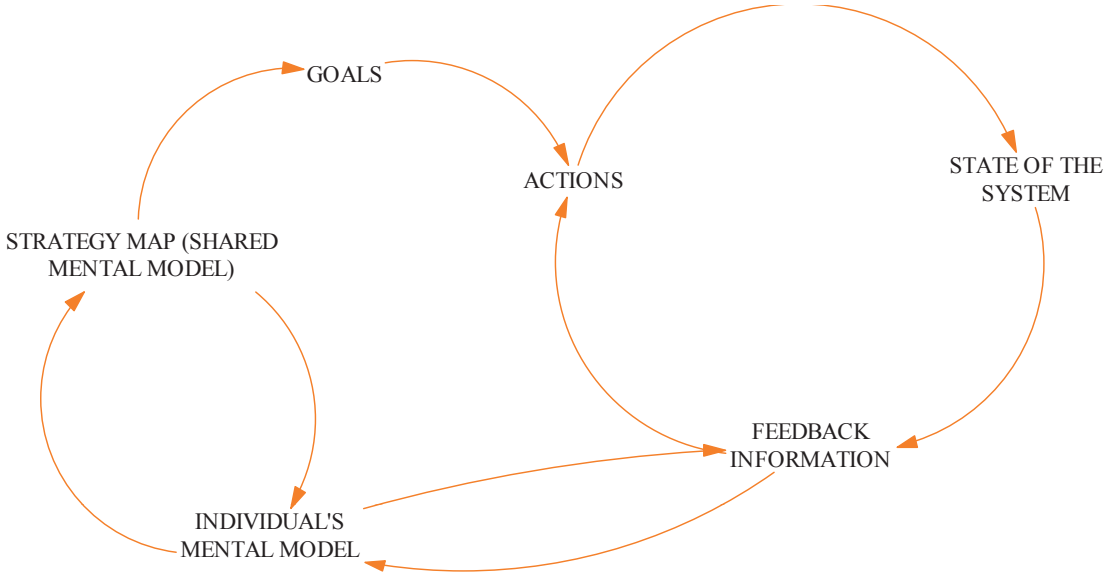

Figure 6. An interactive control system as a double-loop learning process with a strategy map as a commonly shared mental model

Rysunek 6. Interaktywny system kontroli jako mechanizm uczenia się w podwójnej pętli z mapą strategii jako współdzielonym modelem mentalnym

Source: an extended version of Figure 5.

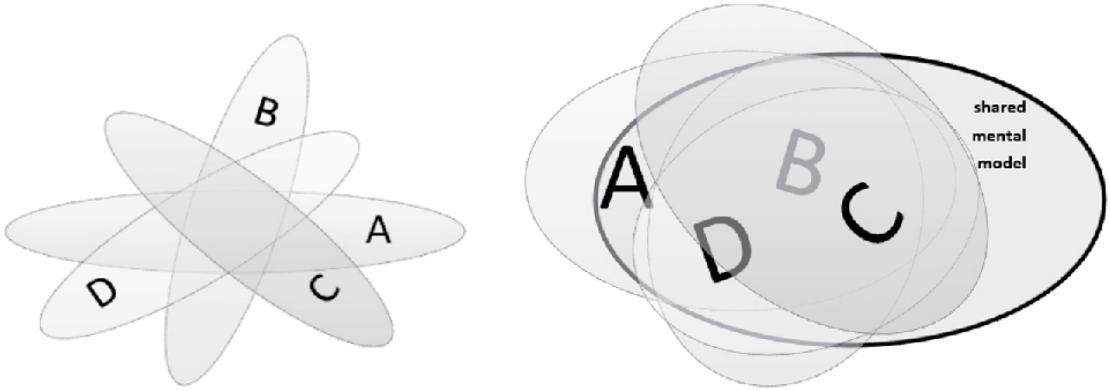

Figure 7. Individual mental models (a) with a substantial degree of divergence; (b) becoming convergent due to "strategic conversation"

Rysunek 7. Indywidualne modele mentalne (a) o znacznym stopniu rozbieżności; (b) zbieżne w wyniku „strategicznej rozmowy"

Source: modified Laukkanen [1994, p. 325].

Let us consider the simplistic situation of four team members (A, B, C, and D), all having their own mental models of the real-world situation and strategy to cope with it (symbolized by ovals) – Figure 7. Figure 7a depicts a typical initial situation when members' mental models are quite divergent from each other, with only a small fraction of the commonly shared area. The "strategic conversation" described above aims to build up commonly shared mental model by increasing the convergency of individual men-

tal models through discussions and debates in the ongoing group learning cycle (compare Figures 6 and 7b), which produces common patterns in strategic thinking within an organization, namely "dominant logic" [Prahalad and Bettis 1986].

So far, our discussion has focused on the problem from the single company perspective. However, it could be easily extended to any open systems that need to fit the changes in the environment while balancing internal subsystems, e.g., integrated supply chains. Currently, supply chains are recovering from the disruption caused by the COVID-19 pandemic and are further impacted by the war in Ukraine and its economic consequences. Therefore, there is the same need for more flexible management control systems in supply chains as is observed on the level of the single firm. Thus, we are convinced that a strategy map as a framework of a shared mental model would enable the process of "strategic conversation" and learning in supply chains. Interactive control systems based on strategy maps could be helpful in building the resilience of these cooperative structures in the context of increasing uncertainty.

Concluding remarks

The balanced scorecard, during its 30-year development, gained huge popularity and a high usage rate in big companies. However, the dynamic changes taking place in the enterprises' environment and shocks such as COVID-19 or the war in Ukraine create an urgent need for a more flexible management control system. Mega-crises like those above make it hard to justify building strategy in the form of detailed planning of dozens of metrics and targets spread within four perspectives of a balanced scorecard, which typically are then cascaded top-down to the business and support units or even into smaller departments. That implies significant costs in terms of additional workload to prepare such a widely-build diagnostic control system as well as to maintain it and in terms of the resistance against change after all this hard work is already done. This part of the BSC methodology seems to be becoming obsolete. Nevertheless, there is an interesting tool, namely a strategy map, developed under a balanced scorecard umbrella, which still seems to be very promising as a basis for interactive control systems. A strategy map develops and deploys a general vision of the strategic future; however, it is not too overloaded[16] by detailed metrics and targets as the cockpit-like BSC developed as a diagnostic control system, and therefore it is more elastic, which is crucial in times of turbulent changes and predominant uncertainty.

The strategy map shows company-specific assumptions of creating "hard" financial results from "soft" human resources – showing cause-and-effect relationships between investments in human resources development with process improvement, customer satisfaction, customer loyalty, market share, revenues, costs, and profitability. A strategy map can be therefore viewed as a mental model of the "theory of the business". In this way, it supports the process of fast strategic learning in organizations, enhancing the ability of teams to support consensus-building.

[16] Tuomela [2005] argued that problems with overly extended additional workload are alleviated when using a measurement system interactively to learn about the strategy rather than to evaluate the performance of subordinates diagnostically" [Tuomela 2005, p. 311].

The strategy map consists of a set of hypotheses that can be tested by doing, namely through the implementation of the strategy. Such testing enables strategic learning, which allows for the iterative crafting of an organization's strategy that could be more resilient and feasible in a turbulent environment. An important role in strategic management is played by the convergence of the individual mental models of the organization members as a result of ongoing dialog called "strategic conversation". The result of such a process is a commonly shared mental model, which has to be developed, disseminated within the organization, discussed and accepted by employees, and then improved in the learning by doing.

As regards the limitation of the present study, we cover several topics; therefore, some of them may not be treated deeply enough as they should. However, our ambition was to synthesize some threads of literature and to take together some, in fact, interrelated problems, which, however, are only sometimes undertaken jointly in the literature. It is clear to us that any synthesis has to be less detailed (or more superficial) than any analysis focused on any sub-topic of this synthesis. This is a trade-off we did afford. Regarding the research gap we defined in an initial literature review, we hope this trade-off between an in-depth study and a broad synthesis is justified.

Regarding the directions of future research, the authors suggest three complementary ways. The first one is conceptual. If some parts of the BSC methodology are becoming obsolete (overemphasizing the detailed diagnostic control function based on many measures and targets), one could ask about alternatives. Strategy maps are a handy tool but are still quite general. Is it possible to operationalize it without falling into the trap of executives' "cockpits" overloaded by too many metrics? In our opinion, there are already some alternative approaches available, which could probably be linked to the strategy map in a cross-fertilizing way: hoshin-kanri[17], OKRs (Objectives and Key Results), and the Agile/SCRUM approach to strategic projects management. Thus, the first desired direction of future research will be conceptual work focused on developing some eclectic system of management control, which will be more suitable to the present need for elasticity and fast learning, namely more interactive oriented.

The second one is empirical – the desired direction of future research would be to conduct more empirically oriented studies. Elaborated case studies would be welcomed, and, if possible, also quantitative field research. A detailed empirical investigation of changes in the scope of using the balanced scorecard and the role of the strategy map according to the recent mega-crises (e.g., COVID-19, the war in Ukraine) could give valuable insights. Particularly, it would be interesting to know how companies strive to build more resiliency into their management control systems.

The third one suggests the extension of the perspective. The need for strategy and flexible management control systems is the same in supply chain management as it is at the single company level. Supply chains need recovery after disruption from the dis-

[17] See, e.g., the so-called "catch ball" approach strongly recommended in the literature of hoshin kanri (the Japanese method of strategic management). The word "catch ball" assumes "tossing ideas" back and forth to finally find those that are mutually agreeable [Cowley and Domb 1997]. This term signifies the give-and-take process between and among organizational layers and refers to collaborative goal-setting based on dialog, which is crucial for people's commitment [Cowley and Domb 1997, Babich 2002]. The issue of the possible application of this process in relation to BSC in higher education is shortly discussed by Pietrzak [2021].

ruptions caused by COVID-19 and war. On the other hand, some of them are looking for redesign options due to the expected possibility of the "new Cold War" and global decoupling. It would be interesting to see further discussion on the issue of shared mental models in the process of "strategic conversation" and learning among partners in supply chains.

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