Influential Article Review- A Report on the Role of NK Landscapes

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This paper examines strategy and organization. We present insights from a highly influential paper. Here are the highlights from this paper: The NK landscape methodology has been used by much research in strategy and organizations, and the concept of "landscape" has become a popular business idea. Despite such popularity, exactly what NK landscapes are and how they work is typically obscure to all but a small specialist audience. This technical note clarifies the NK landscape methodology by explaining how an NK landscape is computed. This note also discusses ways in which NK landscapes are represented and used in research. The aim of this note is enabling more researchers to engage more deeply with the work that relies on the landscape concept. For our overseas readers, we then present the insights from this paper in Spanish, French, Portuguese, and German.

SUMMARY

- Understanding the NK landscape methodology. The NK landscape methodology allows modeling the performance of a general class of systems. Although originally developed to model biological systems , the NK methodology has been used extensively to model firms and products . Arguably, this methodology has been appealing to modelers of organizations, as it provides novel ways to formally analyze core organizational issues such as bounded rationality, modularity, interdependence, and organizational search.
- The NK landscape methodology encompasses a family of models. This note explains how to compute a standard NK landscape and gives pointers to papers that have extended the standard model.
- An NK landscape is a function that maps the state of a system onto a measure of its performance, which is customarily called fitness. The system is assumed to have N components, and each component can exist in a number of states. For example, imagine a portable computer made of N = 3 components—screen, battery, and CPU—and suppose that each component can exist in one of two states: the screen can be small or large, the battery can be low capacity or high capacity, and the CPU can be slow or fast.
- It is sometimes useful to represent NK landscapes as hypercubes, where each node represents a position and each link a connection between neighboring states . The hypercube representation of the landscape for our example appears in Fig. 2. One can think of hypercubes with more than N = 3 dimensions as graphs where each node has N neighbors .

- Figure 2 can be used to illustrate how a boundedly rational actor may search in the landscape. Such an actor is usually conceptualized as not being able to «see» the whole landscape. Instead, the actor can only see the positions that are close to its current position and pick the best among these, a process akin to «hill climbing.» In other words, when trying to pick what is the configuration with the highest fitness, a boundedly rational actor cannot just jump to the best position or global peak in Fig.
- Some applications of the NK landscape methodology. The NK landscape methodology has been popular with the strategy and organizations literatures because it captures fundamental ideas of these literatures, namely, that system-level outcomes depend on the performance of multiple interacting components, and thus, successfully managing such a system requires paying close attention to managers' cognitive and organizational limitations. Paradoxically, although organizations are complex, the NK landscape methodology offers a simple way of investigating such complexity.

HIGHLY INFLUENTIAL ARTICLE

We used the following article as a basis of our evaluation:

Csaszar, F. A. (2018). A note on how NK landscapes work. Journal of Organization Design, 7(1), 1–6.

This is the link to the publisher's website:
https://jorgdesign.springeropen.com/articles/10.1186/s41469-018-0039-0

INTRODUCTION

NK landscapes are commonly mentioned in the strategy and organizations literature. In fact, over 70 published management papers have developed NK models (see the excellent survey by Baumann et al. 2018) and many articles and books use the idea of "landscape" to talk about phenomena such as search, exploration, imitation, competition, fit, and organization design (the "landscape" idea has even made it to the cover of an MBA strategy textbook; see Ghemawat 2010).

Despite this popularity, there is much misunderstanding regarding NK landscapes and how they operate. For example, many believe that NK landscapes are simply a three-dimensional surface (like the ones in Fig. 3a, b). This state of affairs is probably due to the page-length constraints of journals—a 30-page paper cannot devote five pages to describing its base model. Hence, every author of an NK paper hopes that its readers will already understand NK landscapes at the necessary level, while in reality very few do. Typically, the only who can engage at a deep level with an NK paper are those that have developed their own NK models. This is an unfortunate scenario; it is like the only who could understand a linear regression were those who have programmed their own. It is also an unnecessary state of affairs, as NK landscapes are simple mathematical objects, which only require basic arithmetic to be understood.

The goal of this short note is to explain clearly how an NK landscape is computed. Understanding this is useful, as a similar computation is shared by all NK models. Most NK models do not differ significantly in how the landscape is constructed but on the search process that occurs on the landscape (hence, papers usually only explain in detail their unique search process). However, all the results in an NK paper stem from the interaction between the landscape and the search process (in this way, NK models are an embodiment of "Simon's scissors" principle; Simon 1990). Thus, having a clear understanding of how the landscape is constructed is necessary to understand the results of an NK paper. The goal of this note is to serve as a reference of this core component of all NK papers. The hope of this note is to enable more researchers to engage at a deeper level with the work that relies on the landscape concept.

CONCLUSION

The NK landscape methodology has been popular with the strategy and organizations literatures because it captures fundamental ideas of these literatures, namely, that system-level outcomes depend on the performance of multiple interacting components, and thus, successfully managing such a system requires paying close attention to managers' cognitive and organizational limitations. Paradoxically, although organizations are complex, the NK landscape methodology offers a simple way of investigating such complexity.

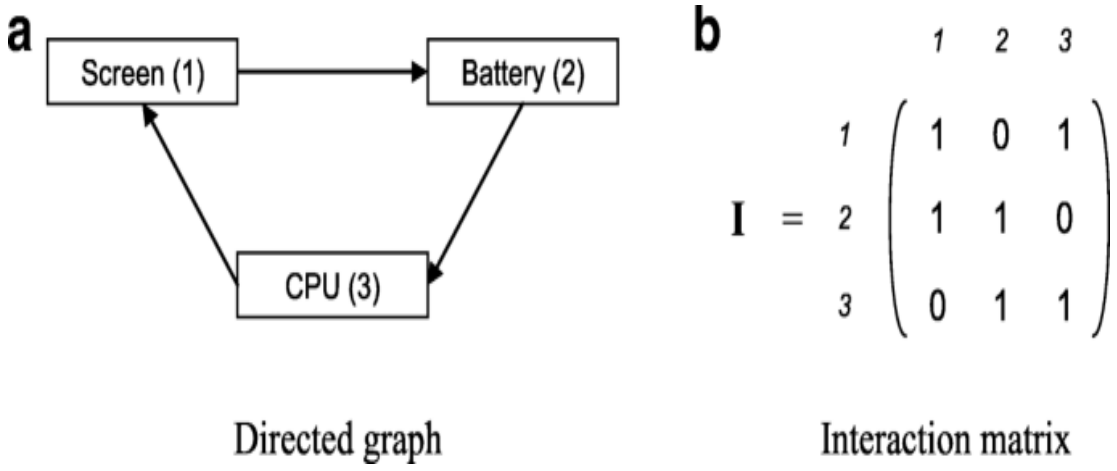
Armed with this methodology, researchers have been able to investigate many phenomena, including the search for dominant designs (Levinthal 1997), imitation and replication of strategies (Rivkin 2000; Csaszar and Siggelkow 2010), competition (Lenox et al. 2006; Adner et al. 2014), the use of analogies and other mental representations by managers (Gavetti et al. 2005; Csaszar and Levinthal 2016), and the ways in which different actors can "shape" the firms' environment (Levinthal and Warglien 1999; Gavetti et al. 2017; Li and Csaszar 2018).

The NK landscape methodology has contributed greatly to the organization design literature. Some questions that have been addressed include how different organizational structures affect firms' ability to explore (Siggelkow and Levinthal 2003; Siggelkow and Rivkin 2006; Levinthal and Workiewicz 2018), to escape competency traps (Siggelkow and Levinthal 2005), and to deal with complex and turbulent environments (Ethiraj and Levinthal 2004; Siggelkow and Rivkin 2005). It has also increased our understanding of the effects of different interaction patterns (Rivkin and Siggelkow 2007) and incentive structures (Ethiraj and Levinthal 2009). The NK methodology is a valuable methodological addition to the organization design toolbox, as it allows delving into the central question of organization design—how different decision-making structures perform under different environments—while avoiding organization design's severe empirical constraints.

Since its introduction to the strategy and organizations literatures more than 20 years ago (Levinthal 1997), research based on NK models has produced a steady stream of new insights; it is therefore likely that NK models will continue enriching our research landscape.

APPENDIX

FIGURE 1
DIRECTED GRAPH AND INTERACTION MATRIX CORRESPONDING TO THE COMPUTER EXAMPLE



a Directed graph. b Interaction matrix

FIGURE 2
HYPERCUBE REPRESENTATION OF THE NK LANDSCAPE IN THE EXAMPLE

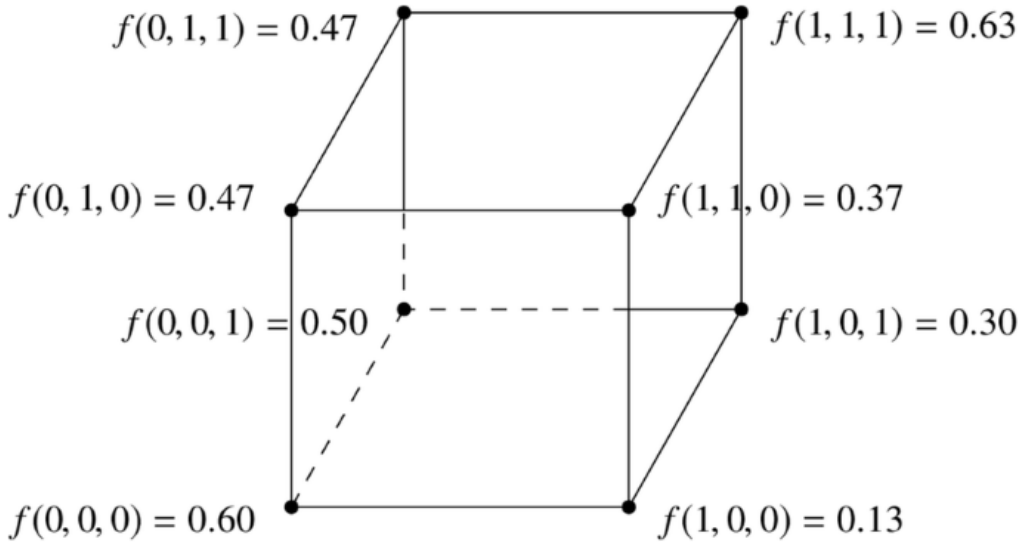
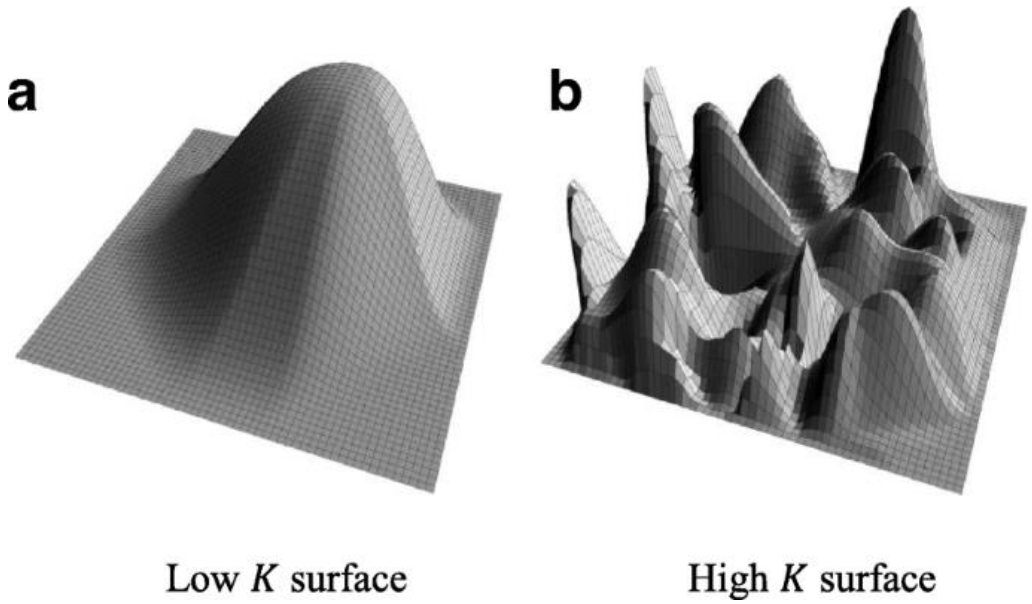


FIGURE 3
GRAPHICAL REPRESENTATIONS OF NK LANDSCAPES



a Low K surface. b High K surface

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TRANSLATED VERSION: SPANISH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSION TRADUCIDA: ESPAÑOL

A continuación se muestra una traducción aproximada de las ideas presentadas anteriormente. Esto se hizo para dar una comprensión general de las ideas presentadas en el documento. Por favor, disculpe cualquier error gramatical y no responsabilite a los autores originales de estos errores.

INTRODUCCIÓN

Los paisajes NK se mencionan comúnmente en las literaturas de estrategia y organizaciones. De hecho, más de 70 artículos de gestión publicados han desarrollado modelos NK (ver la excelente encuesta de Baumann et al. 2018) y muchos artículos y libros utilizan la idea de "paisaje" para hablar de fenómenos como la búsqueda, exploración, imitación, competencia, ajuste, y diseño de organización (la idea "paisaje" incluso ha hecho que sea a la portada de un libro de texto de estrategia MBA; véase Ghemawat 2010).

A pesar de esta popularidad, hay mucho malentendido con respecto a los paisajes NK y cómo operan. Por ejemplo, muchos creen que los paisajes NK son simplemente una superficie tridimensional (como las de la Fig. 3a, b). Este estado de cosas se debe probablemente a las restricciones de longitud de página de los diarios: un documento de 30 páginas no puede dedicar cinco páginas a describir su modelo base. Por lo tanto, cada autor de un artículo NK espera que sus lectores ya entiendan los paisajes NK en el nivel necesario, mientras que en realidad muy pocos lo hacen. Típicamente, los únicos que pueden participar a un nivel profundo con un papel NK son aquellos que han desarrollado sus propios modelos NK. Este es un escenario desafortunado; es como si los únicos que pudieran entender una regresión lineal fueran aquellos que han programado la suya propia. También es un estado innecesario de las cosas, ya que los paisajes NK son objetos matemáticos simples, que sólo requieren la aritmética básica para ser entendido.

El objetivo de esta breve nota es explicar claramente cómo se calcula un paisaje NK. Comprender esto es útil, ya que todos los modelos NK comparten un cálculo similar. La mayoría de los modelos NK no difieren significativamente en cómo se construye el paisaje, sino en el proceso de búsqueda que se produce en el paisaje (por lo tanto, los papeles generalmente sólo explican en detalle su proceso de búsqueda único). Sin embargo, todos los resultados en un papel NK provienen de la interacción entre el paisaje y el proceso de búsqueda (de esta manera, los modelos NK son una encarnación del principio de "tijeras de Simon"; Simon 1990). Por lo tanto, tener una comprensión clara de cómo se construye el paisaje es necesario para entender los resultados de un documento NK. El objetivo de esta nota es servir como referencia de este componente básico de todos los documentos NK. La esperanza de esta nota es permitir que más investigadores participen a un nivel más profundo con el trabajo que se basa en el concepto de paisaje.

CONCLUSIÓN

La metodología del paisaje NK ha sido popular entre la estrategia y las literaturas de las organizaciones porque captura las ideas fundamentales de estas literaturas, a saber, que los resultados a nivel del sistema dependen del rendimiento de múltiples componentes que interactúan, y por lo tanto, la gestión exitosa de dicho sistema requiere prestar mucha atención a las limitaciones cognitivas y organizativas de los gerentes. Paradójicamente, aunque las organizaciones son complejas, la metodología del paisaje NK ofrece una forma sencilla de investigar esa complejidad.

Armados con esta metodología, los investigadores han sido capaces de investigar muchos fenómenos, incluyendo la búsqueda de diseños dominantes (Levinthal 1997), la imitación y la replicación de estrategias (Rivkin 2000; Csaszar y Siggelkow 2010), competencia (Lenox et al. 2006; 2014), el uso de analogías y otras representaciones mentales por parte de los gerentes (Gavetti et al. 2005; Csaszar y Levinthal 2016), y las formas en que los diferentes actores pueden "dar forma" al entorno de las empresas (Levinthal y Warglien 1999; 2017; Li y Csaszar 2018).

La metodología del paisaje NK ha contribuido en gran medida a la literatura de diseño de la organización. Algunas cuestiones que se han abordado incluyen cómo las diferentes estructuras organizativas afectan la capacidad de las empresas para explorar (Siggelkow y Levinthal 2003; Siggelkow y Rivkin 2006; Levinthal y Workiewicz 2018), para escapar de las trampas de competencia (Siggelkow y Levinthal 2005), y para hacer frente a entornos complejos y turbulentos (Ethiraj y Levinthal 2004;

Siggelkow y Rivkin 2005). También ha aumentado nuestra comprensión de los efectos de diferentes patrones de interacción (Rivkin y Siggelkow 2007) y estructuras de incentivos (Ethiraj y Levinthal 2009). La metodología NK es una valiosa adición metodológica a la caja de herramientas de diseño de la organización, ya que permite profundizar en la cuestión central del diseño de la organización (cómo funcionan las diferentes estructuras de toma de decisiones bajo diferentes entornos), evitando al mismo tiempo las severas restricciones empíricas del diseño de la organización.

Desde su introducción a la estrategia y las literaturas de las organizaciones hace más de 20 años (Levinthal 1997), la investigación basada en modelos NK ha producido un flujo constante de nuevos conocimientos; por lo tanto, es probable que los modelos NK continúen enriqueciendo nuestro panorama de investigación.

TRANSLATED VERSION: FRENCH

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSION TRADUITE: FRANÇAIS

Voici une traduction approximative des idées présentées ci-dessus. Cela a été fait pour donner une compréhension générale des idées présentées dans le document. Veuillez excuser toutes les erreurs grammaticales et ne pas tenir les auteurs originaux responsables de ces erreurs.

INTRODUCTION

Les paysages de NK sont couramment mentionnés dans la stratégie et les littératures d'organisations. En fait, plus de 70 articles de gestion publiés ont développé des modèles NK (voir l'excellente enquête de Baumann et al. 2018) et de nombreux articles et livres utilisent l'idée de « paysage » pour parler de phénomènes tels que la recherche, l'exploration, l'imitation, la concurrence, l'ajustement et la conception de l'organisation (l'idée du « paysage » a même fait la couverture d'un manuel de stratégie mba; voir Ghemawat 2010).

Malgré cette popularité, il ya beaucoup d'incompréhension concernant les paysages NK et comment ils fonctionnent. Par exemple, beaucoup croient que les paysages NK sont simplement une surface tridimensionnelle (comme ceux de la figure. 3a, b). Cet état de fait est probablement dû aux contraintes de longueur de page des revues — un document de 30 pages ne peut pas consacrer cinq pages à la description de son modèle de base. Par conséquent, chaque auteur d'un article de NK espère que ses lecteurs comprendront déjà les paysages NK au niveau nécessaire, alors qu'en réalité très peu le font. Typiquement, les seuls qui peuvent s'engager à un niveau profond avec un papier NK sont ceux qui ont développé leurs propres modèles NK. C'est un scénario malheureux; c'est comme les seuls qui pouvaient comprendre une régression linéaire étaient ceux qui ont programmé les leurs. C'est aussi un état de choses inutile, car les paysages NK sont de simples objets mathématiques, qui ne nécessitent que l'arithmétique de base pour être compris.

Le but de cette courte note est d'expliquer clairement comment un paysage NK est calculé. Comprendre cela est utile, car un calcul similaire est partagé par tous les modèles NK. La plupart des modèles NK ne diffèrent pas de manière significative dans la façon dont le paysage est construit, mais sur le processus de recherche qui se produit sur le paysage (par conséquent, les documents expliquent généralement seulement en détail leur processus de recherche unique). Cependant, tous les résultats d'un papier NK proviennent de l'interaction entre le paysage et le processus de recherche (de cette façon, les modèles NK sont une incarnation du principe des « ciseaux de Simon » ; Simon, 1990). Ainsi, avoir une compréhension claire de la façon dont le paysage est construit est nécessaire pour comprendre les résultats d'un document NK. L'objectif de cette note est de servir de référence à cette composante fondamentale de

tous les documents NK. L'espoir de cette note est de permettre à un plus grand nombre de chercheurs de s'engager à un niveau plus profond avec le travail qui repose sur le concept de paysage.

CONCLUSION

La méthodologie du paysage NK a été populaire auprès de la stratégie et des documents d'organisation parce qu'elle saisit les idées fondamentales de ces littératures, à savoir que les résultats au niveau du système dépendent de la performance de multiples composantes en interaction, et donc, la gestion réussie d'un tel système nécessite une attention particulière aux limites cognitives et organisationnelles des gestionnaires. Paradoxalement, bien que les organisations soient complexes, la méthodologie du paysage NK offre un moyen simple d'étudier une telle complexité.

Forts de cette méthodologie, les chercheurs ont pu étudier de nombreux phénomènes, y compris la recherche de conceptions dominantes (Levinthal, 1997), l'imitation et la réplication des stratégies (Rivkin, 2000; Csaszar et Siggelkow 2010), concours (Lenox et al., 2006; Adner et coll. 2014), l'utilisation d'analogies et d'autres représentations mentales par les gestionnaires (Gavetti et al., 2005; Csaszar et Levinthal 2016), et la façon dont les différents acteurs peuvent « façonner » l'environnement des entreprises (Levinthal et Warglien, 1999; Gavetti et coll. 2017; Li et Csaszar 2018).

La méthodologie du paysage NK a grandement contribué à la documentation de conception de l'organisation. Parmi les questions qui ont été abordées, mentionnons la façon dont les différentes structures organisationnelles influent sur la capacité des entreprises à explorer (Siggelkow et Levinthal, 2003; Siggelkow et Rivkin 2006; Levinthal et Workiewicz 2018), pour échapper aux pièges de compétences (Siggelkow et Levinthal 2005), et pour faire face à des environnements complexes et turbulents (Ethiraj et Levinthal 2004; Siggelkow et Rivkin 2005). Il a également augmenté notre compréhension des effets des différents modèles d'interaction (Rivkin et Siggelkow 2007) et des structures d'incitation (Ethiraj et Levinthal 2009). La méthodologie NK est un ajout méthodologique précieux à la boîte à outils de conception de l'organisation, car elle permet de plonger dans la question centrale de la conception de l'organisation — comment les différentes structures décisionnelles fonctionnent dans différents environnements — tout en évitant les contraintes empiriques sévères de la conception de l'organisation.

Depuis son introduction à la stratégie et aux revues d'organisations il y a plus de 20 ans (Levinthal, 1997), la recherche basée sur des modèles NK a produit un flux régulier de nouvelles perspectives; il est donc probable que les modèles NK continueront d'enrichir notre paysage de recherche.

TRANSLATED VERSION: GERMAN

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ÜBERSETZTE VERSION: DEUTSCH

Hier ist eine ungefähre Übersetzung der oben vorgestellten Ideen. Dies wurde getan, um ein allgemeines Verständnis der in dem Dokument vorgestellten Ideen zu vermitteln. Bitte entschuldigen Sie alle grammatikalischen Fehler und machen Sie die ursprünglichen Autoren nicht für diese Fehler verantwortlich.

EINLEITUNG

NK-Landschaften werden häufig in der Strategie und Organisationen Literatur erwähnt. Tatsächlich haben über 70 veröffentlichte Management-Papiere NK-Modelle entwickelt (siehe die ausgezeichnete Umfrage von Baumann et al. 2018) und viele Artikel und Bücher nutzen die Idee der "Landschaft", um über Phänomene wie Suche, Exploration, Nachahmung, Wettbewerb, Passform und Organisationsdesign

zu sprechen (die "Landschafts"-Idee hat es sogar auf das Cover eines MBA-Strategielehrbuchs geschafft; siehe Ghemawat 2010).

Trotz dieser Popularität gibt es viele Missverständnisse in Bezug auf NK-Landschaften und ihre Funktionsweise. Zum Beispiel glauben viele, dass NK-Landschaften einfach eine dreidimensionale Oberfläche sind (wie die in Abb. 3a, b). Dieser Zustand ist wahrscheinlich auf die Seitenlängeneinschränkungen von Zeitschriften zurückzuführen – ein 30-seitiges Papier kann nicht fünf Seiten zur Beschreibung seines Basismodells verwenden. Daher hofft jeder Autor einer NK-Zeitung, dass seine Leser NK-Landschaften bereits auf der notwendigen Ebene verstehen, während es in Wirklichkeit nur sehr wenige tun. In der Regel sind die einzigen, die sich auf einer tiefen Ebene mit einem NK-Papier beschäftigen können, diejenigen, die ihre eigenen NK-Modelle entwickelt haben. Dies ist ein unglückliches Szenario; es ist wie die einzigen, die eine lineare Regression verstehen konnten, waren diejenigen, die ihre eigenen programmiert haben. Es ist auch ein unnötiger Zustand der Dinge, da NK-Landschaften einfache mathematische Objekte sind, die nur grundlegende Arithmetik erfordern, um verstanden zu werden.

Das Ziel dieser kurzen Notiz ist es, klar zu erklären, wie eine NK-Landschaft berechnet wird. Dies zu verstehen, ist nützlich, da eine ähnliche Berechnung von allen NK-Modellen gemeinsam genutzt wird. Die meisten NK-Modelle unterscheiden sich nicht wesentlich in der Art und Weise, wie die Landschaft aufgebaut ist, sondern in dem Suchprozess, der auf der Landschaft stattfindet (daher erklären Papiere in der Regel nur im Detail ihren einzigartigen Suchprozess). Alle Ergebnisse eines NK-Papiers stammen jedoch aus der Interaktion zwischen Landschaft und Suchprozess (auf diese Weise sind NK-Modelle eine Verkörperung des "Simon scheren"-Prinzips; Simon 1990). Daher ist es notwendig, ein klares Verständnis dafür zu haben, wie die Landschaft aufgebaut ist, um die Ergebnisse eines NK-Papiers zu verstehen. Ziel dieser Anmerkung ist es, als Referenz für diese Kernkomponente aller NK-Papiere zu dienen. Die Hoffnung dieser Notiz besteht darin, mehr Forschern zu ermöglichen, sich auf einer tieferen Ebene mit der Arbeit zu beschäftigen, die auf dem Landschaftskonzept beruht.

SCHLUSSFOLGERUNG

Die NK-Landschaftsmethodik ist bei der Strategie und der Organisationsliteratur beliebt, weil sie grundlegende Ideen dieser Literaturen erfasst, nämlich dass Ergebnisse auf Systemebene von der Leistung mehrerer interagierender Komponenten abhängen, und daher erfordert die erfolgreiche Verwaltung eines solchen Systems, dass die kognitiven und organisatorischen Einschränkungen der Manager genau beachtet werden. Paradoxerweise bietet die NK-Landschaftsmethodik, obwohl Organisationen komplex sind, eine einfache Möglichkeit, diese Komplexität zu untersuchen.

Mit dieser Methode ausgestattet, konnten die Forscher viele Phänomene untersuchen, darunter die Suche nach dominanten Designs (Levinthal 1997), nachahmung und nachverfolgen von Strategien (Rivkin 2000; Csaszar und Siggelkow 2010), Wettbewerb (Lenox et al. 2006; Adner et al. 2014), die Verwendung von Analogien und anderen mentalen Darstellungen durch Manager (Gavetti et al. 2005; Csaszar und Levinthal 2016) und die Art und Weise, wie verschiedene Akteure das Umfeld der Unternehmen "gestalten" können (Levinthal und Warglien 1999; Gavetti et al. 2017; Li und Csaszar 2018).

Die NK-Landschaftsmethodik hat wesentlich zur Organisationsdesign-Literatur beigetragen. Zu den angesprochenen Fragen gehört, wie sich unterschiedliche Organisationsstrukturen auf die Fähigkeit der Unternehmen auswirken, die Sondenfähigkeit zu erkunden (Siggelkow und Levinthal 2003; Siggelkow und Rivkin 2006; Levinthal und Workiewicz 2018), um Kompetenzfallen zu entkommen (Siggelkow und Levinthal 2005) und um komplexe und turbulente Umgebungen zu bewältigen (Ethiraj und Levinthal 2004; Siggelkow und Rivkin 2005). Es hat auch unser Verständnis der Auswirkungen verschiedener Interaktionsmuster (Rivkin und Siggelkow 2007) und Anreizstrukturen (Ethiraj und Levinthal 2009) verbessert. Die NK-Methodik ist eine wertvolle methodische Ergänzung der Toolbox für organisationsentwurf, da sie es ermöglicht, sich mit der zentralen Frage des Organisationsdesigns zu befassen – wie unterschiedliche Entscheidungsstrukturen unter verschiedenen Umgebungen funktionieren – und gleichzeitig die strengen empirischen Einschränkungen des Organisationsdesigns zu vermeiden.

Seit seiner Einführung in die Strategie- und Organisationsliteratur vor mehr als 20 Jahren (Levinthal 1997) hat die Forschung auf der Grundlage von NK-Modellen einen stetigen Strom neuer Erkenntnisse hervorgebracht; Es ist daher wahrscheinlich, dass NK-Modelle unsere Forschungslandschaft weiter bereichern werden.

TRANSLATED VERSION: PORTUGUESE

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSÃO TRADUZIDA: PORTUGUÊS

Aqui está uma tradução aproximada das ideias acima apresentadas. Isto foi feito para dar uma compreensão geral das ideias apresentadas no documento. Por favor, desculpe todos os erros gramaticais e não responsacule os autores originais responsáveis por estes erros.

INTRODUÇÃO

As paisagens nk são comumente mencionadas na estratégia e literaturas de organizações. De facto, mais de 70 artigos de gestão publicados desenvolveram modelos NK (ver excelente sondagem da Baumann et al. 2018) e muitos artigos e livros usam a ideia de "paisagem" para falar de fenómenos como pesquisa, exploração, imitação, competição, ajuste e design de organização (a ideia de "paisagem" chegou mesmo à capa de um manual de estratégia de MBA; ver Ghemawatwat 2010).

Apesar desta popularidade, há muito mal-entendido em relação às paisagens nk e como funcionam. Por exemplo, muitos acreditam que as paisagens NK são simplesmente uma superfície tridimensional (como as da Fig. 3a, b). Este estado de coisas deve-se provavelmente às restrições de comprimento de página dos jornais - um papel de 30 páginas não pode dedicar cinco páginas a descrever o seu modelo base. Assim, todos os autores de um artigo da NK esperam que os seus leitores já compreendam as paisagens nk ao nível necessário, enquanto na realidade muito poucos o fazem. Tipicamente, os únicos que podem se envolver a um nível profundo com um papel NK são aqueles que desenvolveram os seus próprios modelos NK. Este é um cenário infeliz; é como se os únicos que pudessem compreender uma regressão linear fossem aqueles que programaram os seus próprios. É também uma situação desnecessária, uma vez que as paisagens nk são objetos matemáticos simples, que apenas requerem que a aritmética básica seja compreendida.

O objetivo desta curta nota é explicar claramente como uma paisagem NK é calculada. Entender isto é útil, uma vez que uma computação semelhante é partilhada por todos os modelos NK. A maioria dos modelos NK não diferem significativamente na forma como a paisagem é construída, mas no processo de pesquisa que ocorre na paisagem (portanto, os jornais geralmente só explicam em detalhe o seu processo de pesquisa único). No entanto, todos os resultados de um papel NK decorrem da interação entre a paisagem e o processo de pesquisa (desta forma, os modelos NK são uma personificação do princípio da tesoura de Simão; Simão 1990). Assim, ter uma compreensão clara de como a paisagem é construída é necessário para entender os resultados de um papel NK. O objetivo desta nota é servir como referência deste componente central de todos os papéis NK. A esperança desta nota é permitir que mais investigadores se envolvam a um nível mais profundo com o trabalho que se baseia no conceito paisagístico.

CONCLUSÃO

A metodologia paisagística NK tem sido popular com a estratégia e as literaturas de organizações porque captura ideias fundamentais destas literaturas, nomeadamente, que os resultados a nível do sistema dependem do desempenho de múltiplas componentes interagindo, e assim, gerir com sucesso tal sistema

requer prestar muita atenção às limitações cognitivas e organizativas dos gestores. Paradoxalmente, embora as organizações sejam complexas, a metodologia paisagística NK oferece uma forma simples de investigar tal complexidade.

Armados com esta metodologia, os investigadores têm sido capazes de investigar muitos fenómenos, incluindo a procura de desenhos dominantes (Levinthal 1997), imitação e replicação de estratégias (Rivkin 2000; Csaszar e Siggelkow 2010), concurso (Lenox et al. 2006; Adner et al. 2014), o uso de analogias e outras representações mentais por gestores (Gavetti et al. 2005; Csaszar e Levinthal 2016), e as formas pelas quais diferentes atores podem "moldar" o ambiente das empresas (Levinthal e Warglien 1999; Gavetti et al. 2017; Li e Csaszar 2018).

A metodologia paisagística NK tem contribuído muito para a literatura de design da organização. Algumas questões que foram abordadas incluem a forma como diferentes estruturas organizacionais afetam a capacidade de exploração das empresas (Siggelkow e Levinthal 2003; Siggelkow e Rivkin 2006; Levinthal e Workiewicz 2018), para escapar às armadilhas de competências (Siggelkow e Levinthal 2005), e para lidar com ambientes complexos e turbulentos (Ethiraj e Levinthal 2004; Siggelkow e Rivkin 2005). Também aumentou a nossa compreensão dos efeitos de diferentes padrões de interação (Rivkin e Siggelkow 2007) e estruturas de incentivo (Ethiraj e Levinthal 2009). A metodologia NK é uma adição metodológica valiosa à caixa de ferramentas de design da organização, uma vez que permite aprofundar a questão central do design da organização - como diferentes estruturas de tomada de decisão funcionam em diferentes ambientes - ao mesmo tempo que evita as restrições empíricas severas do design da organização.

Desde a sua introdução à estratégia e às literaturas de organizações há mais de 20 anos (Levinthal 1997), a investigação baseada em modelos NK produziu um fluxo constante de novos conhecimentos; é, portanto, provável que os modelos NK continuem a enriquecer a nossa paisagem de investigação.