數位創新編輯區888

數位創新展現出與傳統創新不同的特徵樣態，以下舉分散式創新（Distributed Innovation）與組合式創新（Combinatorial Innovation），分別反映數位科技在創新實踐中的特性與設計邏輯。

* **分散式創新（Distributed Innovation）**

分散式創新強調創新主體與活動不再集中於單一組織或部門，而是由眾多異質（Heterogeneous）參與者所共同構成的創新網絡所驅動（Lusch & Nambisan, 2015），因創新主體朝向更少的預定義（Predefined）與更分散的方向轉變（Satish Nambisan,2017），導致多元化資源來源與知識異質的特性，間接提升了組織資源整合與動態協調的困難度（Yoo & Boland, 2012）。分散式創新的參與者組成具有高流動性與變異性，其加入與退出會因應目標、能力、資源與動機的變化而隨時調整（Lusch & Nambisan, 2015）。因此，當分散式創新缺乏有效協調機制，過度的異質性與無邊界的創新反而可能導致混亂與管理失靈（Yoo & Boland, 2012），促使組織必須發展知識整合機制與共通語言，才能在多元創新中維持策略一致性（Nambisan et al., 2017）。

* **組合式創新（Combinatorial Innovation）**

組合式創新則聚焦於數位元件、模組與功能的重組應用，企業利用既有模組結合嵌入式數位功能，創造出新產品與服務（Yoo & Boland, 2012）。此類創新具有高度延展性與不確定性，產品在使用者介入後仍可以持續演化，形成「永遠不完整」的數位產物（Yoo & Boland, 2012），如智慧型手機於購買後仍須使用者自行安裝應用程式與設定個人化功能，手機在完整生命週期中都是不完整的，因為使用者會繼續新增和刪除應用程式與裝置設定（Yoo & Boland, 2012）。組合式創新使創意將不再只是單純地傳播，而是在傳播過程中發生變異和發展（Yoo & Boland, 2012），這意味者數位化的複雜性增強，因產品、系統等可以輕鬆地被編輯與修改，這種變動同時也帶來對應的故障風險（Yoo & Boland, 2012），因而需要新形式創造和制約，確保組織能夠控制突發情況卻不限制創新發展（Yoo & Boland, 2012）。

整體而言，分散與組合特性不僅揭示了數位創新的多元來源與開放模式，也凸顯數位技術所驅動的知識、價值與功能重構邏輯，並挑戰企業在資源協調、治理結構與創新節奏上的傳統規範。

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1. 創新擴散與數位創新起源

【傳播訊息被個別接收者視為新事物】Diffusion research is also distinctive in that the communication messages of study are perceived as new by the individual receivers. 傳播研究的另一個獨特之處在於，研究的傳播訊息被個別接收者視為新事物。（來自《Diffusion of Innovations》，Everett M. Rogers, Arvind Singhal, and Margaret M. Quinlan，2014）

【論中提到:創新仍不斷湧現】Innovations continue to be generated and studied. More scholarly attention needs to paid to the consequences of technological innovations. P430創新仍在不斷湧現和研究中，學術界需要更多關注技術創新的後果。（來自《Diffusion of Innovations》，Everett M. Rogers, Arvind Singhal, and Margaret M. Quinlan，2014）

【創新需考慮文化，改革對象面對創新可能出現惰性和抗拒】此外，創新傳播實踐需要越來越多地承認和重視本土智慧和解決方案的作用。事實上，本地產生的創新不僅更有可能符合當地文化，也更有可能被潛在的採用者所接受。當採用者被外部說服接受外部專家的觀點時，他們往往會表現出惰性和抗拒情緒Also, diffusion of innovations practice needs to increasingly acknowledge and value the role of indigenous wisdom and solutions. Indeed innovations that are generated locally are not just more likely to be culturally appropriate, but also more likely to be owned by the potential adopt ers. When adopters are externally persuaded to buy into the vision of an outside expert, they tend to demonstrate inertia and resistance（來自《Diffusion of Innovations》，Everett M. Rogers, Arvind Singhal, and Margaret M. Quinlan，2014）

【起源】企業面臨越來越大的壓力，需要應用數位技術來更新和轉變其商業模式。Organizations are under increasing pressure to apply digital technologies to renew and transform their business models（來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

1. 數位創新與數位轉型定義、關聯、起源、定義與基本要素

數位技術已經超越了內部維度，滲透到公司的產品和服務領域（ [Yoo、Boland、Lyytinen 和 Majchrzak，2012 年](https://www.sciencedirect.com/science/article/pii/S0007681314001256" \l "bib0150)）（來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【數位技術的獨特屬性使得新型創新過程特別快速且難以控制和預測】（來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【作者引用[Nambisan】的話 等人。 （2017：223）](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0370) 表示，“迫切需要對數位創新管理進行新穎的理論”，以更充分地應對數位世界中創新過程的快速變化的性質。For instance, [Nambisan et al. (2017: 223)](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0370) say that “[t]here is a critical need for novel theorizing on digital innovation management” that deals more adequately with the rapidly changing nature of innovation processes in a digital world（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【數位物質性】普及數位技術的一個顯著特徵是將數位功能融入到先前僅具有純物理性質的物體中A defining characteristic of pervasive digital technology is the incorporation of digital capabilities into objects that previously had a purely physical materiality. 例如，在螺絲起子上添加軟體應用程式或在衣服上添加醫療感測器。物理物質性是指可以看到和觸摸的人造物，通常很難改變，並且蘊含著地點和時間的感覺。例如，鞋子具有物理物質性，因為它們可以穿，很難變成螺絲刀，並且承載著穿著它們的適當用途和環境的社會意義。相較之下，數位物質性是指融入人造物的軟體透過操縱數位表示所能做的事情。微晶片的跑鞋具有數位物質性，因為它可以以數位格式記錄運動的表現形式，而沒有晶片的跑鞋則不能。 Examples would include adding software applications to a screwdriver or adding medical sensors to clothing. Physical materiality refers to artifacts that can be seen and touched, that are generally hard to change, and that connote a sense of place and time. For example, shoes have physical materiality because they can be worn, are hard to convert into a screwdriver, and carry social meanings of appropriate uses and settings for wearing them. Digital materiality, in contrast, refers to what the software incorporated into an artifact can do by manipulating digital representations. A running shoe with a microchip has a digital materiality in that it can record representations of movement in a digital format, whereas one without the chip cannot（來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【數位的定義】【作者引用[Nambisan】的話 等人。 （2017：224）](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0370) 數位創新是在廣泛的創新中使用數位技術：我們將「數位」一詞理解為從主要的類比資訊轉換為電腦理解的二進制語言。For [Nambisan et al. (2017:224)](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug#bb0370) digital innovation is the use of digital technology in a wide range of innovations: We understand the term “digital” as the conversion from mainly analog information into the binary language understood by computers（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【數位特性】數位技術的基本獨特屬性包括可重新編程功能（由馮諾依曼架構實現）和資料同質化(homogenization)（由 0 和 1 位元離散表示資料實現）The fundamental, unique properties of digital technology include reprogrammable functionality (enabled by its Von Neumann architecture) and data homogenization (enabled by discrete representation of data in bits of 0 and 1) (**[Yoo et al. 2010](https://pubsonline.informs.org/doi/full/10.1287/orsc.1120.0771" \l "B77)**)（來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【數位的特性】可塑性（例如可重新編程性）、同質性（例如標準化軟體語言）和可轉移性（例如易於轉移任何物件的數位表示）是融合數位*和*物理物質性的技術的核心，從而實現、限制人類行為，同時也與人類行為交織在一起The malleability (e.g., re-programmability), homogeneity (e.g., standardized software languages) and transferability (e.g. ease of transferring digital representations of any object) is at the heart of technologies meshing digital, *and* often physical materiality, thereby enabling, constraining, but also interwoven with, human action（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【數位的特性：可塑性】這種快速發展得益於數位技術的可塑性：即易於重新配置Ultimately this rapid pace is enabled by the malleability of digital technologies: the ease with which they can be reconfigured [Yoo et al., 2010](https://www.sciencedirect.com/science/article/pii/S0007681314001256" \l "bib0155))（來自《Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation》，D. Nylén and J. Holmström，2015）

【數位產品特性】數位化產品的獨特特性－它們具有可塑性malleable、可編輯性edit able、開放性open、可轉移性transferable等Unique characteristics of digital artifacts—they are malleable, edit able, open, transferable, etc. （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【作者引用別人的話：數位科技特性】另一方面，數位化創新透過數位技術固有的優勢，如同質性homogeneity、可重編程性reprogrammability和關聯性associativity，為企業引入新的元素，包括產品、服務、架構，甚至新的商業模式On the other hand, digital innovation introduces new elements to companies, including products, services, architectures, and even new business models, through the inherent advantages of digital technology, such as homogeneity, reprogrammability, and associativity (by Endres et al., **[2021](https://onlinelibrary.wiley.com/doi/full/10.1002/mde.3507?saml_referrer" \l "mde3507-bib-0015)**).（來自《Digital technology adoption, digital dynamic capability, and digital transformation performance of textile industry: Moderating role of digital innovation orientation》，Lei Shen, Xi Zhang, Hongda Liu，2021）

【數位創新定義】數位創新是關於新產品和服務的創造和付諸行動Digital innovation is about the creation and putting into action of novel products and services（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【作者融合別人的話定義出數位創新】數位創新是關於在特定環境下對新產品、新流程、新服務、新平台甚至新商業模式的協同協調digital innovation is about the concerted orchestration of new products, new processes, new services, new platforms, or even new business models in a given context ([Nambisan et al., 2017](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0370); see also [Hargadon & Douglas, 2001](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0235)).（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【作者認為數位創新是】數位創新是指在創新過程中運用數位技術。Digital innovation is the use of digital technology during the process of innovating在數位創新中，數位技術和相關的數位化流程構成了新理念及其發展、傳播或吸收的內在組成部分。in digital innovation, digital technologies and associated digi tizing processes form an innate part of the new idea and/or its development, diffusion, or assimilation. （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【數位創新定義】數位創新的學術定義通常包含兩個部分：數位技術和創新。Academic definitions of digital innovation usually contain two components: digital technology and innovation. （來自《Digital technology adoption, digital dynamic capability, and digital transformation performance of textile industry: Moderating role of digital innovation orientation》，Lei Shen, Xi Zhang, Hongda Liu，2021）

【作者引用別人的話：數位創新的核心是價值創造】數位化創新的核心仍是價值創造，價值創造包括提升現有價值和創造新要素，這也是創新的主要活動The core of digital innovation remains the value creation, and value creation includes two categories: enhancing the existing value and creating new elements (Kraus et al., [**2019**](https://onlinelibrary.wiley.com/doi/full/10.1002/mde.3507?saml_referrer#mde3507-bib-0026)) （來自《Digital technology adoption, digital dynamic capability, and digital transformation performance of textile industry: Moderating role of digital innovation orientation》，Lei Shen, Xi Zhang, Hongda Liu，2021）

【作者對數位創新的定義】將數位創新概念化為：利用數位技術創造（並隨之改變）市場產品、業務流程或模式。We conceptualize digital innovation as the creation of (and consequent change in) market offerings, business processes, or models that result from the use of digital technology. 包括一系列創新成果，例如新產品、平台和服務，以及新的客戶體驗和其他價值路徑；只要這些成果是透過使用數位技術和數位化流程來實現的，那麼成果本身就不必是數位化的First, our defini tion of digital innovation includes a range of innovation outcomes, such as new products, platforms, and services as well as new customer experiences and other value pathways; as long as these outcomes are made possible through the use of digital technologies and digitized processes, the outcomes themselves do not need to be digital. （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【數位創新涵蓋】涵蓋了一系列實現創新的數位工具和基礎設施、涵蓋了創新成果可能被傳播、吸收或適應特定使用環境的可能性，諸如數位平台通常遇到的問題。our definition of digital innovation includes a broad swath of digital tools and infrastructure (e.g., 3D printing, data analytics, mobile computing, etc.) for making innovation possible. Third, our definition includes the possibility that the outcomes may be diffused, assimilated, or adapted to specific use contexts such as typically experienced with digital platforms. （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【數位轉型定義】數位轉型是指多種數位創新的綜合效應，帶來新的參與者（和參與者群體）、結構、實踐、價值觀和信念，從而改變、威脅、取代或補充組織和領域內現有的遊戲規則。by digital transformation we mean the combined effects of several digital innovations bringing about novel actors (and actor constellations), structures, practices, values, and beliefs that change, threaten, replace or complement existing rules of the game within organizations and fields. （ [Krimpmann，2015 年](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0280)； [Loebbecke & Picot，2015 年](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0315)； [Mangematin、Sapsed & Schüler，2014 年](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0340)）。（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【數位轉型定義】數位轉型就是吸收數位資源，產生新的要素。但這個過程的失敗率極高，而失敗主要源自於轉型思維的限制Digital transformation is about absorbing digital resource and generating new elements. However, the failure rate of this process is extremely high, and the failures are mainly from the limitations of the transformation mindset. （來自《Digital technology adoption, digital dynamic capability, and digital transformation performance of textile industry: Moderating role of digital innovation orientation》，Lei Shen, Xi Zhang, Hongda Liu，2021）

【數位轉型的基石是企業內外部跨職能的整合與高可塑性的組織型態，並建構動態能力應對轉型】跨職能整合和可塑的內部和外部組織邊界等特徵是企業建構動態能力以迎接數位轉型的基石，重點在於組織如何建構其能力、流程和慣例以應對數位轉型how organizations structure their capabilities, processes, and routines in response to digital transformation. In this sense, characteristics such as cross-functional integration and malleable internal and external organizational boundaries are building blocks of how the firm’s structure their dynamic capabilities to embrace digital transformation. （來自《Digital Transformation and Innovation Management: A Synthesis of Existing Research and an Agenda for Future Studies》，Francesco Paolo Appio, Federico Frattini, Antonio Messeni Petruzzelli, Paolo Neirotti，2021）

【數位創新和數位轉型的核心是快速和顛覆性的變化】 Even with the rapid and disruptive changes that are said to be central to digital innovation and digital transformation these continue to be important factors in institutional change. 這些變化仍然是製度變革的重要因素。制度理論的核心原則是，由於社會文化期望的根深蒂固的性質以及合法性的重要性，新舊事物之間總是存在著相互作用。It is a central tenet of institutional theory that there is always interaction between the new and the old because of the embedded nature of socio-cultural expectations and the importance of legitimacy. （來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【數位創新和轉型是高度動態和不確定的】數位創新和轉型發生在高度動態和不確定的環境中，其中參與者之間的價值觀和利益各不相同，**控制和決策分散。**由於數位創新及其管理的「實驗」性質，參與者、他們的目標和能力都在不斷變化。 digital innovation and transformation take place in highly dynamic and uncertain contexts, where values and interests differ between actors and control and decision-making is widely dispersed. Because of the ‘experimental’ nature of both digital innovation and the management of that innovation, there are continuing shifts in actors, their goals and their competencies. （來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【數位化不確定】企業進行數位化創新時，他們面臨許多不確定性As firms engage in digital innovation, they face a number of uncertainties（來自《Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation》，D. Nylén and J. Holmström，2015）

【作者認為數位創新（如管理數位產品和創新服務時）不確定性出現在】尋求管理數位產品和服務創新時，不確定性出現在三個維度：公司的產品、數位環境和組織屬性In seeking to manage digital product and service innovation, uncertainty occurs across three dimensions: the firm's products, its digital environment, and organizational properties，因此企業在應對快速變化的數位創新格局時需要對數位創新有一個全面的認識. Therefore, firms need a holistic view of digital innovation when navigating the rapidly changing digital innovation landscape. （來自《Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation》，D. Nylén and J. Holmström，2015）

【數位創新具備融合性*convergence*和創造性*generativity*】隨著數位技術的普及，這些特性提供了開放、靈活的環境，從而產生了數位技術組織創新的兩個獨特特徵：融合性和創造性。As digital technologies become pervasive, these properties provide environments of open and flexible affordances that result in two unique characteristics of organizational innovation with digital technologies: *convergence* and *generativity*. （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【融合的實例】普及的數位技術帶來了融合，因為數位技術越來越多地嵌入到以前非數位化的實體產品中，從而創造出所謂的「智慧」產品和工具the affordances of pervasive digital technology create convergence because digital technology is increasingly embedded into previously nondigital physical artifacts, creating so-called “smart” products and tools. （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【組織的視角是多元的，涵蓋數位創新與數位轉型】we suggest that the institutional perspective is a prolific lens to study [digital innovation](https://www.sciencedirect.com/topics/social-sciences/digital-innovation) and transformation. 機構視角是研究[數位創新](https://www.sciencedirect.com/topics/social-sciences/digital-innovation" \o "Learn more about digital innovation from ScienceDirect's AI-generated Topic Pages)和轉型的豐富視角。（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【創新的概念被分為三種，作者有寫出定義】

【1資訊科技創新information technology (IT) innovation】代表組織採用和傳播新的 IT 流程、產品和服務has been used to refer to the organizational adoption and diffusion of new IT-enabled processes, products, and services(Fichman, [**2004**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0036) ; Jeyaraj, Rottman, & Lacity, [**2006**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0055) )創新是指採用一個對組織來說新的、可能由各種技術、組織和環境特徵驅動的現有 IT 工件，概念包括 IT 傳播和 IT 吸收。In this conceptualization, innovation refers to the adoption of an already-existing IT artifact that is new to an organization and that is presumably driven by various technological, organizational, and environmental characteristics. Concepts related to IT innovation include IT diffusion and assimilation（來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【2數位創新digital innovation】指的是以產品為中心的視角，涉及實體產品和數位產品的新組合以形成新產品（Lee & Berente， [**2012**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0065) ；Yoo 等， [**2010**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0127) ）在這個概念中，創新是指 IT 工件的底層架構在支援和限制新 IT 工件開發方面的作用，以及對企業內部創新的建置和管理的影響。數位創新與設計相關，但需要超越設計科學的更全面的視角來關注更廣泛的概念 The second conceptualization, “digital innovation,” is used to refer to a product-centric perspective involving new combinations of physical and digital products to form new products (Lee & Berente, [**2012**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0065); Yoo et al., [**2010**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0127)). In this conceptualization, innovation refers to the role of underlying architectures of IT artifacts in enabling and constraining the development of new IT artifacts and the implications for structuring and managing innovation within firms. Digital innovation is related to design but takes a more holistic perspective beyond design science to focus on a wider range of concepts. （來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【3 指IS創新IS innovation】第三個概念是“IS 創新”，用於表示組織內 IT 工件的應用，需要重大變革並帶來新產品、服務或流程（Fichman、Dos Santos 和 Zheng， [**2014 年**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0037)；Swanson， [**1994 年**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0113)）。這個概**念涉及與資訊科技推動的新服務開發相關的技術和組織層面的變革**。the third conceptualization, “IS innovation,” is used to denote the application of IT artifacts within organizations that requires significant change and leads to new products, services, or processes (Fichman, Dos Santos, & Zheng, [**2014**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0037); Swanson, [**1994**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0113)). This conceptualization involves technological and organizational dimensions of change associated with the development of new services enabled by information technologies. （來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【作者解釋他認為的數位創新包括圖上的四大流程】數位創新包括啟動（觸發因素、機會識別、決策）、開發（設計、開發、採用）、實施（安裝、維護、培訓、激勵）和利用（最大化回報、利用現有系統/數據用於新目的；Cooper & Zmud， [**1990**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0027) ）等活動。這四項活動不必同時出現在所有數位創新工作中，也不必以任何順序進行，並且在實踐中可能難以釐清（圖 [**1**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-fig-0001) 、表 [**1**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-tbl-0001) ） digital innovation includes activities of initiating (triggers, opportunity identification, decision-making), developing (designing, developing, adopting), implementing (installing, maintaining, training, incentives), and exploiting (maximizing returns, leveraging existing systems/data for new purposes; Cooper & Zmud, [**1990**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0027)). These 4 activities need not be present in all digital innovation efforts, need not occur in any sequential order, and may be difficult to disentangle in practice (Figure [**1**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-fig-0001), Table [**1**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-tbl-0001)). （來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

1. 聚焦數位創新介紹

【作者引arthur的話】數位產品的近乎無限的重組已成為創新的新來源。notes that the nearly limitless recombination of digital artifacts has become a new source of innovation. by Arthur WB. (2009) *The Nature of Technology: What It Is and How It Evolves* (Free Press, New York).亞瑟·WB 。 （ 2009 ） *《科技的本質：它是什麼以及它如何演變》* （紐約自由出版社）。（來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【數位技術的本質】數位技術的本質意味著它以“重組”或“組合”的方式發展。The nature of digital technology implies that it evolves in a ‘recombinant’ or ‘combinatorial’ manner. （來自《Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation》，D. Nylén and J. Holmström，2015）

【數位創新可以說成是重組資源創造新創意】數位化創新主要在於重組現有資源和知識，以激發新創意Digital innovation is largely about recombining existing resources and knowledge to spur new ideas (Avital and Te’eni 2009; Tilson et al. 2010; Yoo et al. 2012). （來自《EMBRACING DIGITAL INNOVATION IN INCUMBENT FIRMS: HOW VOLVO CARS MANAGED COMPETING CONCERNS》，Fredrik Svahn, Lars Mathiassen, Rikard Lindgren，2017）

【數位轉型，基於知識結構、能力重構、組織重組】數位轉型可以產生新的搜尋和重組流程，而這種變化的影響不是單向和明確的，而是基於知識結構、現有能力、認知和情感成本的一系列緊張關係Their analysis, based on a systematic and integrative review approach, reveals that digital transformation can engender new processes for search and recombination and that the effects of such changes are not unidirectional and unambiguous, but rather based on a number of tensions regarding knowledge structures, existing competencies, cognitive, and emotional costs. （來自《Digital Transformation and Innovation Management: A Synthesis of Existing Research and an Agenda for Future Studies》，Francesco Paolo Appio, Federico Frattini, Antonio Messeni Petruzzelli, Paolo Neirotti，2021）

【企業需要思考現有技術如何被重製、組合、利用】他們如何利用這些機會並透過**利用現有組件**創建數位產品和服務來產生聚合價值？That is, how can they exploit these opportunities and generate an aggregated value through creating digital products and services that utilize existing components? （來自《Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation》，D. Nylén and J. Holmström，2015）

【作者認為數位創新是根本性的轉型，同時也帶來擴展新機會】數位創新是新進業者利用數位技術挑戰現有企業的一種手段——最終引發行業層面的根本性轉型——但它也為現有企業提供了增強和擴展其產品和服務組合到新領域的機會。While digital innovation is a means for new entrants to leverage digital technology in order to challenge incumbent firms—ultimately causing radical industry-level transformation—it also provides opportunities for incumbent firms to enhance and expand their product and service portfolios into new domains. （來自《Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation》，D. Nylén and J. Holmström，2015）

【創新，持續的轉型過程】企業提供生成性產品，透過持續的轉型過程，刺激「新配置和新可能性」的開發In doing so, they provide generative products to stimulate development of “new configurations and possibilities” through an ongoing trans formative process (Avital and Te’eni 2009, p. 349).by From Generative Fit to Generative Capacity: Exploring an Emerging Dimension of Information Systems Design and Task Performance[M Avital](https://scholar.google.com/citations?user=-rxuqEIAAAAJ&hl=zh-TW&oi=sra), [D Te'Eni](https://scholar.google.com/citations?user=qklPJeYAAAAJ&hl=zh-TW&oi=sra)2009（來自《EMBRACING DIGITAL INNOVATION IN INCUMBENT FIRMS: HOW VOLVO CARS MANAGED COMPETING CONCERNS》，Fredrik Svahn, Lars Mathiassen, Rikard Lindgren，2017）

【學習、知識是數位創新關鍵】對於數位創新來說，學習通常是必要的。因此，知識可以成為數位業務創新能力的基礎，既可以作為推動因素，也可以作為阻礙因素。Learning is often necessary (although not sufficient) for digital innovation. Knowledge can thus underlie digital business innovation capabilities, either as enabler or hindrance. （來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【知識的來源可以源自內部或外部顧問，這些知識可以支持數位創新活動】社區中的知識共享可以支持數位創新（Huysman & Wulf， [**2006**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0053) ；Malhotra，Gosain，& El Sawy， [**2005**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0073) ；Wang & Ramiller， [**2009**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0122) ）。例如，外部顧問可以透過知識相關、激勵和溝通相關的機制與客戶進行知識共享，以促進數位創新（Ko 等人， [**2005 年**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0062)）。 Moreover, knowledge sharing in communities can support digital innovation (Huysman & Wulf, [**2006**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0053); Malhotra, Gosain, & El Sawy, [**2005**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0073); Wang & Ramiller, [**2009**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0122)). For example, knowledge sharing to promote digital innovation may occur from external consultants to clients via knowledge-related, motivational, and communication-related mechanisms (Ko et al., [**2005**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0062)). （來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【數位管理-人員】尋求利用數位技術創新產品和服務的公司需要熟悉數位技術具體性質的管理人員When working toward managing digital innovation, this is an important first step to take; firms that seek to innovate their product and service offerings with digital technology need managers well-versed in the specific nature of digital technology（來自《Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation》，D. Nylén and J. Holmström，2015）

【Innovation collaboration: internal versus external. 創新協作：內部與外部】公司必須培養在內部工作安排下運作的人員的技能和人際關係，同時也吸引外部合作夥伴和資源Firms must develop the skills and relationships of the people operating within internal work arrangements while also engaging external partners and resources（來自《EMBRACING DIGITAL INNOVATION IN INCUMBENT FIRMS: HOW VOLVO CARS MANAGED COMPETING CONCERNS》，Fredrik Svahn, Lars Mathiassen, Rikard Lindgren，2017）

【企業需要精進技術】企業也面臨著不斷了解新數位技術與其業務的關係以及發現新的創新機會的挑戰。在組織數位創新工作時，公司需要在內部和外部培養和獲得新技能，同時協調多個數位創新專案中的即興努力。 Firms are also challenged to constantly keep up-to-date with how new digital technologies relate to their business and to identify new opportunities for innovation. In organizing their digital innovation efforts, firms need to cultivate and source new skills both internally and externally while coordinating improvisational efforts in multiple digital innovation projects（來自《Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation》，D. Nylén and J. Holmström，2015）

【作者對知識的學習與管理看得極其重要】知識及其管理對於數位創新至關重要，無論是應用現有知識還是從競爭環境中的來源（例如供應鏈合作夥伴）學習。In summary, knowledge and its management appear to be critically important to digital innovation, whether applying existing knowledge or learning from sources in the competitive environment such as supply chain partners. （來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【知識引發創新】Knowledge may lead to initiation of innovations. Such knowledge gathering itself may be enabled by IT, such as crowd-sourced innovation platforms.知識可能引發創新。這種知識收集本身可以透過 IT 實現，例如**創新平台**。（來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【數位創新vs學習】數位創新涉及持續學習，透過探索新的數位技術來了解其獨特的屬性。這可能包括為現有員工建立再培訓條件和激勵措施以獲得數位技能。為此，承認整個公司組織成員自發性的數位創新措施至關重要。因此，公司應該保持警惕，並識別出那些正在偏離既定*角色、* 轉向利用數位技術進行改進的組織成員。選拔這樣的人才非常重要，以確保未來專案所需的適當技能，最終實現永續的數位創新管理。Digital innovation involves continuous learning whereby new digital technologies are explored in order to create an understanding of their unique properties. This can involve establishing conditions for retraining and incentives for existing staff to acquire digital skills. To this end, it is critical to acknowledge organizational members’ spontaneous digital innovation initiatives throughout the firm. Therefore, firms should be alert and identify organizational members that are drifting from their established *roles* toward improvising with digital technologies. Such talent is important to pick up in order to secure the appropriate skillsets for future projects, ultimately achieving sustainable digital innovation management. （來自《Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation》，D. Nylén and J. Holmström，2015）

【**能力、專注力、協作、治理**】現有企業面臨四個競爭性問題——能力（現有與必備）、專注力（產品與流程）、協作（內部與外部）以及治理（控制與靈活性）Combining extant literature with insights from the case, we argue that incumbent firms face four competing concerns—capability (existing versus requisite), focus (product versus process), collaboration (internal versus external), and governance (control versus flexibility) （來自《EMBRACING DIGITAL INNOVATION IN INCUMBENT FIRMS: HOW VOLVO CARS MANAGED COMPETING CONCERNS》，Fredrik Svahn, Lars Mathiassen, Rikard Lindgren，2017）

【數位創新管理】數位創新管理指的是有效協調數位創新所依據的**實踐、流程和原則**。digital innovation management refers to the practices, processes, and principles that underlie the effective orchestration of digital innovation. （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【Innovation capability創新能力’existing versus requisite’】Firms must develop new capabilities without jeopardizing existing product innovation practices. 企業必須在不危及現有產品創新實踐的情況下開發新的能力（來自《EMBRACING DIGITAL INNOVATION IN INCUMBENT FIRMS: HOW VOLVO CARS MANAGED COMPETING CONCERNS》，Fredrik Svahn, Lars Mathiassen, Rikard Lindgren，2017）

【分散式創新-亂無章法的創新會造成混亂】過多的異質性和無限制的創新會造成混亂because too much heterogeneity and boundless innovation creates chaos. （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【同樣提到分散式創新，以及作者給他定義】創新主體正朝著更少預先定義、更分散的方向轉變，尤其是在技術密集型行業；這種轉變被稱為分散式創新With digital innovation, there is a shift toward less predefined and more distributed innovation agency, particularly in technology intensive industries; this shift has been referred to as distributed innovation(e.g., Lakhani and Panetta 2007; Sawhney and Prandelli 2000)，其他同樣有提到開放式創新跟網路中心式創新, open innovation (Chesbrough 2003), and network-centric innovation (Nambisan and Sawhney 2007) among others. （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【分散式創新需要整合異質知識】創新不僅日益向組織的邊緣發展，普及的數位技術所推動的分散式創新也增加了創新所需的知識資源的異質性，亦加劇了資料異質性的程度以及對知識資源動態平衡和整合的需求Not only are innovations increasingly moving toward the periphery of an organization, but the distributed innovation spurred by pervasive digital technology increases the heterogeneity of knowledge resources needed in order to innovate. the convergence of pervasive digital technology intensifies the degree of heterogeneity and the need for dynamic balancing and integration of knowledge resources（來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【分散式創新是由異構參與者組成的，帶同時又有高度動態性，因為參與者隨時可能發生變化】異質heterogeneous的參與者群體作為一個整體，通常構成了成功創新所必需的主體。重要的是，這樣的集體也具有高度的動態性，因為參與者（個人、組織等）可以根據目標的變化、新能力的需要、動機的轉變、互補能力的獲得、新的限制因素和機會的出現，或不同貢獻的獲得認可而選擇加入或退出 (by Service innovation, Lusch 和 Nambisan 2015) This heterogeneous constellation of actors as a whole often constitutes the agency necessary to innovate successfully. Importantly, such collectives are also highly dynamic in that actors (individuals, organizations, etc.) can opt in and out while their goals change, new competencies are needed, motivations shifts, complementary capabilities need to be garnered, new constraints and opportunities emerge, or varying contributions become recognized (Lusch and Nambisan 2015). （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【Combinatorial Innovation 組合創新】公司透過將現有模組與嵌入式數位功能相結合來創造新產品或服務.Increasingly, firms are creating new products or services by combining existing modules with embedded digital capabilities. （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【組合創新是不完整的】因此，對於組合創新來說，產品的邊界是不可知的，產品或服務仍然是不完整的With combinatorial innovations, then, the boundary of a product is unknowable and the product or service remains incomplete從這個方面來看，智慧型手機在首次購買時本質上仍是不完整的產品：用戶需要安裝應用程式以將新功能結合到現有產品中。事實上，它們在整個生命週期中都是不完整的，因為用戶會繼續添加和刪除應用程式並改變其功能能力In this regard, smartphones remain essentially incomplete products when they are first purchased: users need to install applications to combine new affordances into an existing product. In fact, they remain incomplete throughout their lifetime, as users continue to add and remove applications and change their functional capabilities. （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【組合創新需要新形式創造和制約，以控制突發情況卻不限制創新發展(收放都要自如)】組合創新的第二個組織意涵是組織需要投資新形式的創造力A second organizational implication of combinatorial innovation is that organizations need to invest in new forms of creativity. 組織必須建構*受約束的偶然性*環境（ [**Faraj 等人，2011**](https://pubsonline.informs.org/doi/full/10.1287/orsc.1120.0771#B32) ），從而支持分散式組織中的突發和偶然行為。In particular, organizations must build environments for *constrained serendipity* ([**Faraj et al. 2011**](https://pubsonline.informs.org/doi/full/10.1287/orsc.1120.0771#B32)) whereby emergent and serendipitous behavior is supported among distributed organizations. （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【組合創新，創新擴散中發生影響和變化】隨著組合創新的出現，創意將不再只是單純地傳播，而是在傳播過程中發生變異和發展。 Given the advent of combinatorial innovations, ideas will not simply spread but will mutate and evolve as they spread. （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【組合創新意味者數位化的複雜性增強】環境建構的產品、工具和子系統現在可以輕鬆地遷移到其他環境，因為它們透過數位技術變得更加行動化。然而，由於數位化能力的複雜性增強，這種數位組件的調動也帶來了更大的故障風險。Products, tools, and subsystems that were originally built for one context can now easily traverse to other contexts as they become more mobile through digital technology. Yet such mobilization of digital components creates greater risks of failures because of the heightened complexity of digital capabilities（來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【創新的限制與機會】與預定義的車載功能進行運行時集成，但這也為汽車打開了一扇危險的後門。由於不清楚誰是守門人(外部入侵者)，為外部創新者設計雲端解決方案非常複雜。It enabled rapid design and deployment of cloud based functions for run-time integration with predefined in car functionality, but it also opened up a dangerous backdoor to the car. Because who to trust as a gatekeeper was unclear, designing the cloud solution for external innovators was complicated. （來自《EMBRACING DIGITAL INNOVATION IN INCUMBENT FIRMS: HOW VOLVO CARS MANAGED COMPETING CONCERNS》，Fredrik Svahn, Lars Mathiassen, Rikard Lindgren，2017）

1. 管理數位創新的策略或困境

【社會對數位創新的**研究知識並不均衡**】文獻綜述表明，我們理論框架中的 7 個研究流派的知識並不均衡Our literature review reveals uneven knowledge across the 7 research streams in our theoretical framework（來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【實施困境、資金、知識】大多數企業由於嚴重的實施障礙（包括財務效益的不確定性以及專業知識的缺乏）而對啟動數位轉型進程猶豫不決However, the majority of companies are hesitant to begin their digital transformation processes due to serious implementation barriers that include uncertainties regarding financial benefits and a lack of specialist knowledge（來自《Textile Learning Factory 4.0 – Preparing Germany's Textile Industry for the Digital Future》，Dennis Küsters a, Nicolina Praß b, Yves-Simon Gloy，2017）

【作者引用[Teece, DJ](https://www.webofscience.com/wos/woscc/full-record/WOS:000438004100001)(2018) 的話說明數位轉型仰賴科技、資本、人才、知識赴能】科技、資本、人才、知識賦能的數位轉型快速發展，引領實體經濟品質、效率、動力升級 The digital transformation with empowerment of technology, capital, human resources, and knowledge has developed rapidly, leading the quality, efficiency, and power upgrading of the real economy by [Teece, DJ](https://www.webofscience.com/wos/woscc/full-record/WOS:000438004100001)(2018) (Teece, David J.)Profiting from innovation in the digital economy: Enabling technologies, standards, and licensing models in the wireless world（來自《Digital technology adoption, digital dynamic capability, and digital transformation performance of textile industry: Moderating role of digital innovation orientation》，Lei Shen, Xi Zhang, Hongda Liu，2021）

【衡量數位創新成果的方法】數位創新成果透過內部指標，例如流程重新設計和簡化（生產力）、銷售額增加、利潤率提高（盈利能力）、錯誤減少、風險緩解以及以市場為導向的指標（市場佔有率、上市時間）來衡量。Digital Innovation outcomes are measured through internal metrics (productivity, profitability, risk mitigation) as well as market-facing metrics (market share, time-to-market). （來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【人造物的有效性只有在實施過後、藉由時間慢慢浮現】在實施階段，新引入的 IS artifacts會根據具體情況隨著時間的推移而出現，並且IS artifacts的有效性只有透過這些新興過程才會為人所知（Brown & Duguid， [**1991**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0017) ；Mumford， [**2003**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0083) ；Orlikowski， [**1996**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0090) ；Pentland & Feldman， [**2008**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0093) ）An alternative perspective is that during the implementation phase, newly introduced IS artifacts emerge over time according to situational specifics and the effectiveness of the IS artifact becomes known only through these emergent processes (Brown & Duguid, [**1991**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0017); Mumford, [**2003**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0083); Orlikowski, [**1996**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0090); Pentland & Feldman, [**2008**](https://onlinelibrary.wiley.com/doi/full/10.1111/isj.12193#isj12193-bib-0093)). （來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【創新過程與結果不同】創新過程和結果是截然不同的現象，因此，創新的性質和組織之間存在相互作用，可以進行明確的理論化Innovation processes and outcomes are distinctly dif ferent phenomenon, and therefore there is interaction between the nature and organization of innovation that can be explicitly theorized，但又會因為後面提到的【創新的持續性】所以很難界定到底是創新的過程還是創新結果，使開始和結果變的不明確，作者舉例：數位基礎建（例如雲端運算）促進了產品實施計劃的快速擴展（或縮減），使得產品創意能夠透過反覆的實驗和實施循環快速形成、實施、修改和重新實施（Ries 2011），這使得特定創新過程階段的開始和/或結束變得不那麼明確new digital infrastructures (e.g., 3D printing, digital makerspaces, etc.) enable product ideas to be quickly formed, enacted, modified, and reenacted through repeated cycles of experimentation and implementation (Ries 2011), making it less clear as to when a particular innovation process phase starts and/or ends. Similarly, digital infrastructures (e.g., cloud computing) facili tate rapid scaling up (or down) of product implementation plans. （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【創新持續】即使在創新推出或實施之後，數位化產品的範圍、特徵和價值仍可能持續演進The scope, features and value of digital offerings can continue to evolve even after the innovation has been launched or implemented. （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【數位創新既依賴路徑，又具有突破性】解決方案對也可以被賦予記憶，例如對先前耦合的記憶。這使得創新既依賴路徑，又具有突破性。例如，開發人員可以使用google mapAPI在網站上插入一個提供行車路線的地圖鏈接，以解決導航問題。新的開發人員可能會在同一個應用程式中添加新功能，例如警察目擊資訊或施工警告，以解決不同的問題（例如避開超速陷阱）。每一次演進都將對過去的記憶與新的獨特的問題-解決方案對融合在一起。solution pairs can also be imbued with memory, such as memory of earlier couplings. This allows innovation to be simultaneously path dependent and path breaking. For example, a developer can use a Google Maps API to insert a link to a map providing driving directions on a website to solve the problem of navigation. A new developer may take the same app and add new features such as police sightings or construction warnings to address a different problem (of avoiding speed traps). Each evolution incorporates the memory of what has gone before with a new distinct problem solution pair（來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

1. 數位創新對平台／組織的影響與價值

【實務和導入的落差，以及企業對數位轉型的重視】儘管企業越來越警惕數位轉型帶來的大量機遇，並優先投資以填補“數位落差”，但在準備接受和利用其實現創新和價值創造的潛力方面仍有許多工作要做This shows that although organizations are increasingly alert to the plethora of opportunities digital transformation exposes them to and prioritize investments to fill in the “digital divide,” much remains to be done in terms of getting prepared to embrace and leverage its potential for enabling innovation and value creation（來自《Digital Transformation and Innovation Management: A Synthesis of Existing Research and an Agenda for Future Studies》，Francesco Paolo Appio, Federico Frattini, Antonio Messeni Petruzzelli, Paolo Neirotti，2021）

【作者認為數位創新與組織之間是不可分割的】數位創新並不是組織內部的真空中發生的。數位創新可被視為 IT 服務功能內組織和實施的策略性舉措。然而，現有的組織是數位創新的關鍵背景，包括商業策略、文化和做事方式，這些都會對數位創新產生重大影響。組織背景可以塑造數位創新計劃，也可以被數位創新計劃所塑造。Digital innovation does not occur in a vacuum within organizations. Digital innovation may be framed as a strategic initiative organized and effected within the IT services function. However, the existing organization is a critical backdrop of digital innovation comprising business strategies, cultures, and ways of doing things that can have a significant impact on digital innovation. This organizational backdrop can shape and be shaped by digital innovation initiatives. （來自《Digital innovation: A review and synthesis》，Rajiv Kohli, Nigel P. Melville，2018）

【數位轉型影響產業及組織】數位轉型影響產業的組織方式和企業的互聯互通方式，並帶來機會和威脅，而這些機會和威脅取決於具體的環境條件，而這些環境條件又與社會、經濟、政治和競爭環境以及企業的組織和治理結構以及企業文化有關。At the *macro-level*, digital transformation influences the ways industries are organized and companies interconnected, and offers opportunities and threats that depend on contextual conditions, which are in turn related to the social, economic, political, and competitive environment, as well as to firms’ organizational and governance structures and corporate culture（來自《Digital Transformation and Innovation Management: A Synthesis of Existing Research and an Agenda for Future Studies》，Francesco Paolo Appio, Federico Frattini, Antonio Messeni Petruzzelli, Paolo Neirotti，2021）

【制度與組織是不可分割】從制度角度來看，如果不考慮制度背景的影響，就無法理解組織。From an institutional perspective, organizations cannot be understood without taking account of the influence of this institutional context. 組織受到社會期望以及特定行動和組織方式的社會認可（合法性）的嚴重限制From an institutional perspective, organizations cannot be understood without taking account of the influence of this institutional context. Organizations are seriously constrained by social expectations and the social approval - legitimacy - of particular actions and ways of organizing ([Deephouse & Suchman, 2008](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0095); [Greenwood, Oliver, Lawrence, & Meyer, 2017](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0210)).（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【數位創新重的制度重要性】制度基礎設施將不同的參與者聯繫起來，並且至關重要的是，提供治理和監管，並建立合法的邏輯和行動方針。Institutional infrastructure links different actors and, critically, provides governance and regulation and establishes legitimate logics and courses of action. 數位創新對現有的領域層面的制度安排提出了比其他創新更大的挑戰，需要處理合法性和監管問題。some digital innovations challenge existing field level institutional arrangements more than others, having to deal with issues of legitimacy and regulation（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【配置分析Configurational Analysis】作者認為數位創新辨識問題、解決方案、技術可供性配對起來解決問題很重要。識別問題-解決方案對和技術可供性研究需要一種專注於將特定條件與特定結果相匹配，而不是解釋差異的方法。Identifying problem–solution pairs and technology affordance research creates a need for methodologies that focus on matching specific conditions for specific outcomes rather than variance explanation. （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【作者引用**Wareham2014**說的話-創新治理】科技生態系的治理機制設計並非一項簡單的任務；挑戰在於建立治理機制，適當地約束參與者的行為，但又不過度限制所需的生成水準So the design of governance mechanisms for technology ecosystems is not a trivial task; the challenge is to establish governance mechanisms that appropriately bound participant behaviour without excessively constraining the desired level of generativity. by **Technology Ecosystem Governance** **Jonathan Wareham, Paul B. Fox, Josep Lluís Cano Giner2014**（來自《EMBRACING DIGITAL INNOVATION IN INCUMBENT FIRMS: HOW VOLVO CARS MANAGED COMPETING CONCERNS》，Fredrik Svahn, Lars Mathiassen, Rikard Lindgren，2017）

【組織與科技的相互塑造】無所不在的數位科技雖然正在被組織迅速採用，但同時也從根本上重塑了組織。while being rapidly adopted by organizations, is fundamentally reshaping them. （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【數位科技的雙面性-方便與複雜、風險】數位科技的潛在優勢是真實存在的，但隨之而來的風險和複雜性也是真實的 As much as the potential benefits of digital technology are real, so too are the risks and complexity that ride with them. （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【數位創新中的標準化】數位創新的一個重要面向是標準的建構和(大眾的)接受，技術能夠實現、約束和協調眾多參與者在生態系統、領域或行業中的行動和互動，主要是由於技術建構者**其規範、價值觀或製度邏輯注入到基礎設施中**Creators of digital infrastructures seek to infuse their norms, values, or institutional logics, into the infrastructur（ [Gawer & Phillips，2013](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0175) ； [Orlikowski & Scott，2008](https://www.sciencedirect.com/science/article/pii/S1471772718300265?casa_token=7uzN0oqatksAAAAA:rROGX9TWJArl9p6FBl9MGds2NBEMypxlR2OfJVhLB4xNVyF4xDqjyTNMdxB2rGKw9x8Hlk6Wug" \l "bb0400) ）（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【作者舉蘋果的例子，可以再用簡單的方法來敘述】以蘋果公司為例，這家平台的領導者創建了一個由多種產品（如手機、筆記型電腦）、服務（如 iTunes）及其與外部開發人員等互補參與者的關係組成的生態系統。蘋果可以在某些領域定義互補參與者如何參與（例如製定規則規定外部開發者如何進入 Appstore 市場），但在其他領域則不那麼容易定義（例如與手機保護套生產商沒有直接關係）。蘋果是經濟實力雄厚的平台領導者，事實上是生態系統的「政府」。（來自《Digital Innovation and Transformation: An Institutional Perspective》，Bob Hinings, Thomas Gegenhuber, Royston Greenwood，2018）

【作者引用別人對生態系統與協調結構的各定義】Adner ( [**2017**](https://sms.onlinelibrary.wiley.com/doi/full/10.1002/smj.2904#smj2904-bib-0003) ) 在此做出了重要貢獻，他提出「生態系統由多邊合作夥伴的協調結構定義，這些合作夥伴需要互動才能實現焦點價值主張」(2017 年，第 42 頁) An important contribution here is made by Adner ([**2017**](https://sms.onlinelibrary.wiley.com/doi/full/10.1002/smj.2904#smj2904-bib-0003)), who proposed that “the ecosystem is defined by the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize” (2017, p. 42). *協調結構*被定義為“成員之間在地位和流動方面達成一致的程度”，成為企業透過“生態系統策略”追求的目標，以“確保其在競爭生態系統中的地位” *Alignment structure*, defined as “the extent to which there is mutual agreement among the members regarding positions and flows,” becomes the objective, pursued through a firm's “ecosystem strategy” to “secure its role in a competitive ecosystem” (2017, p. 47) （來自《Towards a theory of ecosystems》，Michael G. Jacobides, Carmelo Cennamo, Annabelle Gawer，2018）

1. 平台生態系的簡述

【創新協作】現有企業在擁抱數位創新時，必須接觸外部生態系統As incumbent firms embrace digital innovation, they must reach out to external ecosystems（來自《EMBRACING DIGITAL INNOVATION IN INCUMBENT FIRMS: HOW VOLVO CARS MANAGED COMPETING CONCERNS》，Fredrik Svahn, Lars Mathiassen, Rikard Lindgren，2017）

【數位平台與平台生態正在影響產業】作為技術基礎設施的數位平台及其社會參與者生態系統正在不斷改變整個產業。Digital platforms as technical infrastructures and their ecosystems of social actors continue to change entire industries. （來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【數位平台生態系統如何根據三個核心構成要素而改變】（1）平台所有權，（2）價值創造機制，以及（3）互補者自主權we use this definition to explain how different digital platform ecosystems vary according to three core building blocks: (1) platform ownership, (2) value-creating mechanisms, and (3) complementor autonomy. （來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【生態系統中需求方的價值創造是成為互補者的角色】在生態系統中，需求方的參與者透過共同創造互補產品或服務來扮演互補者的角色 In the ecosystem, actors on the demand side take the role of complementors by co-creating complementary products or services (e.g., Lucas and Goh [2009](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR57); Alt et al. [2010](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR2)). （來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【生態系統的三結構要素】最近的研究集中在生態系統的三個結構要素：活動、參與者和架構Recent studies have focused on three structural elements of ecosystems: activities, actors, and architectures (Kapoor [2018](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR49); Adner [2017](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR1)). （來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【生態系統定義】生態*系統*這個名詞源自生物學，通常指一組相互作用、相互依賴活動的企業Borrowed from biology, the term *ecosystem* generally refers to a group of interacting firms that depend on each other's activities. （來自《Towards a theory of ecosystems》，Michael G. Jacobides, Carmelo Cennamo, Annabelle Gawer，2018）

【三種生態】1商業生態系統流，以公司及其環境為中心； 2創新生態系統流，專注於特定的創新或新的價值主張以及支持它的參與者群體；以及“平台生態系統”流，它考慮參與者如何圍繞平台組織起來。“business ecosystem” stream, which centers on a firm and its environment; an “innovation ecosystem” stream, focused around a particular innovation or new value proposition and the constellation of actors that support it; and a “platform ecosystem” stream, which considers how actors organize around a platform. （來自《Towards a theory of ecosystems》，Michael G. Jacobides, Carmelo Cennamo, Annabelle Gawer，2018）

【一，商業生態系統】關注單一公司或新企業，將生態系統視為「影響企業及其客戶和供應商的組織、機構和個人的共同體」The first stream focuses on an individual firm or new venture, and views the ecosystem as a “community of organizations, institutions, and individuals that impact the enterprise and the enterprise's customers and supplies”  (Teece, [**2007**](https://sms.onlinelibrary.wiley.com/doi/full/10.1002/smj.2904#smj2904-bib-0090), p. 1325).生態系統被認為是由相互作用的參與者組成的經濟共同體，這些參與者都透過他們的活動相互影響，並考慮超越單一行業界限的所有相關參與者（來自《Towards a theory of ecosystems》，Michael G. Jacobides, Carmelo Cennamo, Annabelle Gawer，2018）

【二，創新生態系統流】集中在焦點創新以及支持該創新的一系列組成部分（上游）和補充物（下游），並將生態系統視為「企業將其各自的產品組合成一個連貫的、面向客戶的解決方案的協作安排」，focuses on a focal innovation and the set of components (upstream) and complements (downstream) that support it, and views the ecosystem as “the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution” (Adner, [**2006**](https://sms.onlinelibrary.wiley.com/doi/full/10.1002/smj.2904#smj2904-bib-0001), p. 98).此生態系統概念旨在捕捉核心產品、其組成部分及其互補產品/服務（「互補品」）之間的聯繫，這些產品/服務共同為客戶增加價值Here, the anchoring point is the system of innovations that allows customers to use the end product, rather than the firm. Accordingly, the ecosystem concept is intended to capture the link between a core product, its components, and its complementary products/services (“complements”), which jointly add value for customers. （來自《Towards a theory of ecosystems》，Michael G. Jacobides, Carmelo Cennamo, Annabelle Gawer，2018）

【三，平台生態系統】著重於一類特定的技術──平台──以及平台贊助商與其互補者之間的相互依賴關係。從這個角度來看，生態系統包括平台的贊助商以及所有補充供應商，這些補充提供者使平台對消費者更有價值The third set of studies focuses on a specific class of technologies—platforms—and the interdependence between platform sponsors and their complementors. In this view, the ecosystem comprises the platform's sponsor plus all providers of complements that make the platform more valuable to consumers (Ceccagnoli, Forman, Huang, & Wu, [**2012**](https://sms.onlinelibrary.wiley.com/doi/full/10.1002/smj.2904#smj2904-bib-0018), p. 263; Gawer & Cusumano, [**2008**](https://sms.onlinelibrary.wiley.com/doi/full/10.1002/smj.2904#smj2904-bib-0039), p. 28). Platform Ecosystems Geoffrey Parker, Marshall Van Alstyne and Xiaoyue Jiang(2017) MISQ 這篇沒有很有關聯太技術所以可以先不看，是以市場為基礎的經濟學（來自《Towards a theory of ecosystems》，Michael G. Jacobides, Carmelo Cennamo, Annabelle Gawer，2018）

【集體協作得益於知識分享和共享平台】對於創新流程而言，集體之間的協作得益於知識共享和工作執行平台（例如 GitHub）、眾包（例如 Top Coder）、眾籌（例如 Kickstarter）、虛擬世界（例如 Second Life）、數位創客空間和專用社交媒體（例如 OpenStack）等數位基礎設施能力For innovation processes, col laboration among collectives is enabled by such digital infra structural capabilities as knowledge sharing and work execution platforms (e.g., GitHub), crowdsourcing (e.g., Top Coder), crowdfunding (e.g., Kickstarter), virtual worlds (e.g., Second Life), digital makerspaces, and dedicated social media (e.g., OpenStack). （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【作者引用gawer平台定義】這裡使用的平台是「…一個建構模組，為技術系統提供基本功能，作為其他公司開發互補產品、技術或服務的基礎」（ **[Gawer 2009，第 2 頁](https://pubsonline.informs.org/doi/full/10.1287/orsc.1120.0771" \l "B33)**）。By Gawer A. (2009) *Platforms, Markets, and Innovation* (Edward Elgar, Cheltenham, Gloucestershire, UK) （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【作者引用Tiwana et al. [2010](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR91); Tilson et al. [2010](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR87)的話：數位平台是基於軟體的服務】從技術角度來看，數位平台是基於軟體的平台，即提供核心功能的可擴展程式碼庫，並輔以模組化服務The technical perspective sees digital platforms as software-based platforms, that is, extensible codebases that provide core functionality, supplemented by modular services (Tiwana et al. [2010](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR91); Tilson et al. [2010](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR87)) （來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【作者引用Lusch 和 Nambisan [2015](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR58) 的話：平台協調參與者創造價值】不同學科的學者對數位平台如何協調參與者生態系統以共同創造價值持有不同的看法（Lusch 和 Nambisan [2015](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR58) ）（來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【作者引用de Reuver et al. [2018](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR19)的話，表達平台所有者如何整合和管理平台的生態系統】社會技術觀點關注平台所有者如何整合和管理參與者生態系統The socio-technical perspective focuses on how platform owners integrate and govern an ecosystem of actors (de Reuver et al. [2018](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR19)) （來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【第三方的專業知識轉移】因為第三方通常擁有專業知識和經驗，從而實現知識轉移並提供更好的解決方案。客戶在根據自己的需求調整企業資源規劃軟體或開發供自己使用的應用程式時，可以從這些創新的互補應用程式中進行選擇。many other complementors utilize the generativity of SAP’s offerings, because third parties often have specialized knowledge and experience, leading to knowledge transfer and better solutions. Customers can choose from these innovative complementary applications when adapting the enterprise resource planning software to their own needs or developing applications for their use. （來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【作者認為平台創新策略重點在於如何設計、建構、維運】隨著這些數位平台的策略重要性日益增強，關鍵的創新要務之一是如何設計、建構和維持一個充滿活力的平台As the strategic importance of these digital platforms has grown, one of the key innovation imperatives is how to design, build, and sustain a vibrant platform. （來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【1平台管理生成性和控制力(generativity and control)】組織必須設計來管理平台中生成性和控制力(generativity and control)之間的微妙平衡。當組織對平台施加過多的控制時，它就有可能趕走第三方開發者，從而扼殺其平台的創造力。另一方面，當組織不進行任何控制時，平台就會變得過於多樣化和分散，因此對開發人員和客戶來說都變得不那麼有用；這使得公司很難從自身的創新中獲取價值Organizations must be designed to manage the delicate balance of generativity and control in the platform. When an organization exercises too much control over the platform, it runs the risk of driving out third-party developers, thus choking the generativity of its platform. When organizations do not exercise any control, on the other hand, the platform becomes too varied and fragmented and thus it becomes less useful for both developers and customers; this makes it difficult for the firm to capture value from its own innovations（來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【3創新實務活動變得普遍】第三個啟示是，隨著透過在多個產品或平台上應用相同的創新活動和知識來獲得效率，創新活動越來越變得水平化。A third implication for organizational scholars of generative platforms is that innovation activities increasingly become horizontal as efficiencies are gained by applying the same innovation activities and knowledge across multiple products or platforms.這種橫向創新活動意味著，組織不僅需要數位平台，而且必須越來越多地創建知識、技能、學習過程、結構和策略的生成平台Such horizontal innovation activities imply that not only are digital platforms needed but organizations must increasingly create generative platforms of knowledge, skills, learning processes, structures, and strategies（來自《Organizing for Innovation in the Digitized World》，Youngjin Yoo, Richard J. Boland, Jr.，2012）

【數位平台所有權權力分配】平台所有權不僅涉及擁有數位平台的法人實體；它還涉及生態系統中的權力分配，可以是集中的，也可以是分散的。它也描述了生態系統中合作夥伴之間的關係。我們發現不同的所有權模式取決於權力集中的程度，並將它們分為三種主要原型Platform ownership is not just about the legal entity that owns the digital platform; it also relates to the distribution of power in the ecosystem, which can be centralized or decentralized. It also describes the relationships among partners in the ecosystem. We found different ownership models that depend on the degree of power centralization and classified them into three main archetypes. （來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【第一，單一擁有者控制的集中式數位平台生態centralized digital platform ecosystem】有一個由單一擁有者控制的集中式數位平台生態系統，例如 Facebook、Apple iOS 行動作業系統和 SAP 雲端平台。在這種情況下，權力是集中的，只有平台所有者作為單一實體來定義、建立和維護治理機制，因此，平台所有者可以快速實施和調整治理機制，以最適合生態系統發展的方式。First, there are centralized digital platform ecosystems controlled by a single owner, such as Facebook, the Apple iOS mobile operating system, and the SAP Cloud Platform. In this case, power is centralized, and only the platform owner as a single entity defines, establishes, and maintains governance mechanisms. Thus, the platform owner can implement and adjust governance mechanisms quickly and in a way that is best for ecosystem growth. （來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【第二、聯盟數位平台生態digital platform ecosystems can be formed by consortia】其次，數位平台生態系統可以由聯盟組成，這意味著一群參與者擁有數位平台，從而建立治理機制（Bazarhanova 等人， [2019 年](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR7)）。這種所有權原型的一個例子是 Cloud Foundry，這是一個由 Cloud Foundry 基金會管理的開源、多雲應用平台即服務。與集中式數位平台生態系統相比，聯盟通常意味著權力在多個利害關係人之間的分配。這些利害關係人共同定義、建立和維護數位平台生態系統的治理機制。在 Cloud Foundry 基金會中，思科、SAP、Dell EMC、IBM、Pivo​​tal、SUSE、VMware 等參與者共同支援平台生態系統的管理。（來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【第三、點對點社群管理的去中心化數位平台生態系統 there are decentralized digital platform ecosystems governed by peer-to-peer communities.】第三，存在由點對點社群管理的去中心化數位平台生態系統。區塊鏈平台（例如以太坊或 District0x）允許創建可由社區管理的去中心化生態系統（Riasanow 等人， [2018a](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR68) ）。這種去中心化使用戶能夠直接影響生態系統的未來方向。例如，District0x 提供了一個數位平台，讓使用者以區域的形式設計和建立新的市場。當用戶將代幣投入項目時，他們就獲得了投票權。這些權利可用於參與某個地區設計變更和功能改進，並指定如何使用或分配市場產生的收入（Lestan 等人， [2017 年](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR56)）。Third, there are decentralized digital platform ecosystems governed by peer-to-peer communities. Blockchain platforms, such as Ethereum or District0x, allow the creation of decentralized ecosystems that can be governed by a community (Riasanow et al. [2018a](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR68)). This decentralization empowers users to directly influence the future direction of the ecosystem. For instance, District0x offers a digital platform that allows users to design and establish new marketplaces in the form of districts. As users stake tokens to a project, they gain voting rights. These rights can be used to participate in design changes and functionality improvements of a district and to specify how the generated revenue of a marketplace is used or distributed (Lestan et al. [2017](https://link.springer.com/article/10.1007/s12525-019-00377-4#ref-CR56)). （來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

【再引入數位創新產品最重要的還是價值主張，對使用者來說】數位創新已經推動摧毀了幾種既定的工業時代商業模式，在引導公司採用這種新邏輯時，我們需要深入研究宏觀層面的描述、過去的架構問題，並考慮在數位產品和服務中體現連貫價值主張的具體方法。Indeed, digital innovation has contributed to demolishing several established Industrial Era business models. To this end, digital innovation is associated with a new logic and configuration of revenue streams. In guiding firms in this new logic, however, we need to drill down through the macro-level descriptions, past architectural issues, and consider the very concrete ways in which coherent value propositions are inscribed in digital products and services. （來自《Digital innovation strategy: A framework for diagnosing and improving digital product and service innovation》，D. Nylén and J. Holmström，2015）

【數位創新帶來的改變 產品、服務、價值創造途徑】數位創新徹底改變了新產品和服務的性質和結構，催生了新的價值創造和價值獲取途徑Digital innovation has radically changed the nature and structure of new products and services, spawned novel value creation and value appropriation pathways, （來自《DIGITAL INNOVATION MANAGEMENT: REINVENTING INNOVATION MANAGEMENT RESEARCH IN A DIGITAL WORLD》，Satish Nambisan, Kalle Lyytinen, Ann Majchrzak, Michael Song，2017）

【重要定義！！！！作者將數位平台生態系統定義為】*數位平台生態系統由平台所有者組成，平台所有者實施治理機制，以促進平台所有者與自主補充者和消費者生態系統之間在數位平台上的價值創造機制。a digital platform ecosystem comprises a platform owner that implements governance mechanisms to facilitate value-creating mechanisms on a digital platform between the platform owner and an ecosystem of autonomous complementors and consumers*（來自《Digital platform ecosystems》，Andreas Hein, Maximilian Schreieck, Tobias Riasanow,et al，2020）

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組織雙元性編輯區

------------以下------- Unpacking Organizational Ambidexterity: Dimensions, Contingencies, and Synergistic Effect2009-----------------------------------------------------------------------

三情境式雙元性

【後面的章節他在討論組織如何實現雙元性】

【這是作者說的】

* Sequential Ambidexterity循序式雙元性(分類是大家一起的)

企業會透過間歇式變革來因應環境的轉變，藉此重新調整結構與流程，這正是一種循序過程，「時間轉換（temporal shifting）」亦被視為實踐雙元性的方式之一。有關循序式雙元性的研究，通常著重於發展歷程漫長的大型企業案例firms evolve through punctuated changes in which firms adapt to environmental shifts by realigning their structures and processes, a sequential process. More recently, temporal shifting has been proposed as a way for firms to be ambidextrous，Studies of sequential ambidexterity often focus on large-scale examples with the changes taking place over long time periods

在高度抽象的層次上，企業可聲稱其在利用與探索之間轉換結構，但若要具體操作，實際轉換會是什麼樣貌？畢竟，大規模的結構性轉換可能具有高度破壞性。At a high level of abstraction, it is easy to claim that firms shift structures between exploitative and exploratory modes—but what would this mean at ground level? Major structural transitions can be highly disruptive. What does it mean to go from exploitation to exploration, or the reverse? Here the research is not fine-gained enough to provide much insight.

* 同時性或結構式雙元性（Simultaneous or Structural Ambidexterity）

另一種平衡探索（exploration）與利用（exploitation）之間權衡的方法，是同時追求兩者，透過設置獨立子單位來實現。這種方法通常被稱為「結構式雙元性」，但正如 O’Reilly 與 Tushman（2008）所指出，這不僅包括為探索與利用分設結構單位，還涵蓋彼此對應的能力、系統、激勵機制、流程與文化，每一部分都需在內部達成一致（p.192）（structural ambidexterity）A second way proposed to balance the exploration/exploitation trade-off is through the simultaneous pursuit of both using separate subunits. This approach is typically characterized as structural ambidexterity but, as O’Reilly and Tushman (2008) noted, this “entails not only separate structural units for exploration and exploitation but also different competencies, systems, incentives, processes, and cultures—each internally aligned (p. 192)

【作者對結構是雙元性的結論】結構式雙元性包含自主的探索與利用子單位、資源整合機制、賦予探索與利用正當性的願景與價值觀，以及能夠調和多元組織配置張力的領導能力Although the results are not completely consistent across studies, in general they confirm that structural ambidexterity consists of autonomous structural units for exploration and exploitation, targeted integration to leverage assets, an overarching vision to legitimate the need for exploration and exploitation, and leadership that is capable of managing the tensions associated with multiple organizational alignment

* 情境式雙元性（Contextual Ambidexterity）666

Gibson 與 Birkinshaw（2004）則提出，這種張力亦可於個人層級被調和，並以「情境式雙元性」（contextual ambidexterity）概念說明：此種雙元性乃指「在整個事業單位中，同時展現對齊（alignment）與適應（adaptability）之行為能力」（p.209）In 2004 Gibson and Birkinshaw proposed that this tension could be resolved at the individual level through what they termed contextual ambidexterity, which they defined as “the behavioral capacity to simultaneously demonstrate alignment and adaptability across an entire business unit (p. 209).” 此情境由「張力（stretch）、紀律（discipline）與信任（trust）」三要素交織而成（p.214）

【例子之一】情境式雙元性最具代表性的例子之一Flexibility versus efficiency? A case study of model changeovers in the Toyota production system1999

【作者對於情境式雙元的想法】情境式雙元性似乎能有效於穩定環境中協調探索與利用，但當企業面臨破壞式或不連續的技術與市場變化時，其運作機制便顯得不足While conceptually easy to imagine how contextual ambidexterity might operate within a given setting or technological regime, it is harder to see how it would permit a company to adjust to disruptive or discontinuous changes in technologies and markets

------------以上------- Unpacking Organizational Ambidexterity: Dimensions, Contingencies, and Synergistic Effect2009-----------------------------------------------------------------------

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【也有學者認為他們該被分開討論】或者，一些研究人員最近開始將探索和利用描述為相互獨立、相互正交的活動，以便企業可以選擇同時高水準地進行這兩項活動（Gupta等人，2006年）Alternatively, some researchers have recently begun to describe exploration and exploitation as separate, orthogonal activities, such that firms can choose to perform both activities simultaneously at high levels (Gupta et al., 2006在這一觀點中，人們強調「二元化」是指企業同時追求高水準探索和利用的能力（例如，Beckman 2006、Jansen 等人 2006、Lavie 和 Rosenkopf 2006、Lubatkin 等人 2006），而不是指企業如何權衡利弊以找到兩者之間的最佳平衡。In this view, ambidexterty has been emphasized to pertain to the capacity of a firm to pursue high levels of exploration and exploitation concurrently (e.g., Beckman 2006, Jansen et al. 2006, Lavie and Rosenkopf 2006, Lubatkin et al. 2006) rather than managing trade-offs to find the most appropriate balance between the two.

------------以上------- Unpacking Organizational Ambidexterity: Dimensions, Contingencies, and Synergistic Effect2009-----------------------------------------------------------------------

平衡專區

-----------以下------- O'Reilly & Tushman2013 Organizational ambidexterity: Past, present, and future-----------------------------------------------------------------------------

過去有學者指出雙元性與績效的研究

【過去研究的整理】

【大量實證研究整理了雙元性對企業績效存在關聯的研究】，大量證據呈現出一致的趨勢：研究顯示雙元性與企業銷售成長呈現正向關係(這是作者的結論)

【如2篇: 1 Balancing exploration and exploitation: The moderating role of competitive intensity 2 [The performance consequences of ambidexterity in strategic alliance formations: Empirical investigation and computational theorizing](https://pubsonline.informs.org/doi/abs/10.1287/mnsc.1070.0712)】

還有多項研究指出雙元性的價值通常在環境高度不確定的情況下更為明顯In addition to these, other studies of the antecedents of ambidexterity have shown that it is typically more valuable under conditions of environmental uncertainty【找Speed and Search: Designing Organizations for Turbulence and Complexity2005這篇的作者在摘要也提到他們得到的結論是【動盪環境，企業必須快速提升績效；複雜環境，企業必須廣泛搜尋；以及同時存在動盪和複雜性的環境，企業必須在速度和搜尋之間取得平衡One set pinpoints formal designs that cope well with threedifferent environments: turbulent settings, in which ﬁrms must improve their performance speedily; complex environments,in which ﬁrms must search broadly; and settings with both turbulence and complexity, in which ﬁrms must balance speedand search.】

【作者指出的結論】這些研究指出三項結論。第一，雙元性與企業績效呈現正向關係；第二，這種影響會受到企業所處環境的調節，例如在不確定性高且資源充足的情況下，雙元性較能發揮效益，這在大型企業中尤為明顯In aggregate, these studies suggest three conclusions. First, ambidexterity is positively associated with firm performance. Second these effects can be contingent on the firm’s environment, with ambidexterity more beneficial under conditions of uncertainty and when sufficient resources are available, which is often the case with larger rather than smaller firms.

【進入到結論瞜~】

【如何完成完美整合仍沒有解答】成功完成這些轉型，要求企業能在既有成熟業務中維持競爭力的同時，有效整合資源，發展出足以開拓新市場所需的新能力。然而，企業在何時、如何達成此目標，至今仍未有明確解答，值得進一步深入研究To make these transitions required these companies to simultaneously compete in mature businesses and to orchestrate firm assets to allow them to develop the requisite new capabilities to compete in new businesses. The full story about when and how they do this is still not clear and deserving of more research

-----以上------- O'Reilly & Tushman2013 Organizational ambidexterity: Past, present, and future------------------------------------------------------------------------

------------以下------- Exploration and Exploitation in Organizational Learning Author(s): James G. March1991-----------------------------------------------------------------------

【均衡兩者很重要】因此，在探索與利用之間保持適當的平衡是系統生存和繁榮的首要因素。Therefore, maintaining the right balance between exploration and exploitation is paramount for a system to survive and thrive.

【知識的對於兩者的貢獻並不均分，是導致策略難以平衡的原因之一】知識對競爭優勢的貢獻各不相同，這導致在組織環境中難以定義和安排探索與利用之間的適當平衡。Organizations often compete with each other under conditions where relative position matters. In the case of competition for dominance, the contribution of knowledge to competitive advantage varies, making it difficult to define and arrange the appropriate balance between exploration and exploitation in an organizational context.

------------以上------- Exploration and Exploitation in Organizational Learning Author(s): James G. March1991-----------------------------------------------------------------------

------------以下------- Unpacking Organizational Ambidexterity: Dimensions, Contingencies, and Synergistic Effect2009-----------------------------------------------------------------------

【動態平衡又助於結構化控制績效風險提升企業績效】更高程度的動態平衡，或探索性活動和開發性活動的相對規模更接近，有助於透過更結構化地控制績效風險來提升企業績效。We reason that a higher level of BD, or a closer match in the relative magnitude of exploratory and exploitative activities, contributes to firm performance through more structured control of performance risk.

基於此邏輯，我們認為，如果探索與利用之間未能取得緊密的平衡，企業可能會面臨過時的風險或無法獲得相應資源的風險。相反，如果在這兩類活動之間取得更緊密的平衡，企業就可以避免或更好地管理此類損害績效的風險。Building on this logic, we reason that the failure to achieve a close balance between exploration and exploitation can leave a firm susceptible to either the risk of obsolescence or the risk of failure to appropriate. Conversely, striking a closer balance between the two types of activities enables a firm to avoid or better manage such performance-impairing risks.

【不平衡會增加風險】相反，探索性活動和開發性活動的不平衡會透過增加此類風險對企業績效構成威脅（Levinthal and March 1993, March 1991）。Conversely, an imbalance between exploration and exploitation poses threats to firm performance through an increase in such risks (Levinthal and March 1993, March 1991).

【資源可得性的是關鍵】並明確指出：**資源可得性是決定企業是否必須面對探索與深化之間取捨問題的關鍵因素**。The results reported here shed light on this ongoing debate, and they provide a strong indication that resource availability plays a pivotal role in determining whether there exists a binding trade-off necessitating a concern with finding an appropriate balance of exploitation and exploration.

【妥善管理探索與深化之間的取捨是重要的、有助於提升整體績效】在資源有限的情境下，管理者可透過妥善管理探索與深化之間的取捨來獲益；但對於擁有充足資源的企業而言，同時進行探索與深化策略不僅是可行的，亦是值得追求的目標。On this point, our results indicate that managers in resource-constrained contexts may benefit from a focus on managing trade-offs between exploration and exploitation demands, but for firms that have access to sufficient resources, the simultaneous pursuit of exploration and exploitation is both possible and desirable.

------------以上------- Unpacking Organizational Ambidexterity: Dimensions, Contingencies, and Synergistic Effect2009-----------------------------------------------------------------------

------------以下---------- Exploration vs. Exploitation: An Empirical Test of the Ambidexterity Hypoth Zi-Lin He /Poh-Kam Wong2004:下面是這篇裡面的重點

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**探索與深化之間存在張力**。一方面，為了因應當前環境需求而進行調適，可能導致組織僵化，降低企業因應未來環境變化與新機會的能力，而這探索與利用之間的張力也可能使企業陷入加速探索或加速深化的惡性循環之中

These studies have shown that exploration and exploitation require substantially different structures, processes, strategies, capabilities, and cultures to pursue and may have different impacts on firm adaptation and performance..探索與深化所需的組織結構、流程、策略、能力與文化有顯著差異，且對企業的適應與績效亦會產生不同影響。

【探索失敗的原因，是忽略深耕】許多具有創新能力的企業未能在市場上成功，其原因至少部分來自於：他們持續投入新產品與新市場的探索，但未能在熟悉的利基領域中分配足夠資源以發揮既有能力The inability of many otherwise innovative firms to achieve success in the marketplace can be traced at least partly to their tendency to constantly explore new products and unfamiliar markets without allocating enough resources to exploit their competences in a more familiar or narrower niche

【強調資源管理分配重要性】探索與深化本質上屬於不同邏輯，兩者間的張力來自於資源競爭，因此企業需進行權衡管理。兩者之間也可能產生綜效效果，若能有效進行平衡或整合，將有助於提升企業整體績效。In sum, exploration and exploitation are fundamentally different logics that create tensions.They compete for firms’ scarce resources, resulting in the need for firms to manage the trade-offs between the two.However, there may be a synergistic effect between the two, where it becomes beneficial for a firm to manage the balance and/or integration of exploration and exploitation.

【結論】高階管理者應更清楚地意識到，在探索型與深化型創新間進行資源分配的必要性。One obvious managerial implication is the need for senior managers to become more explicitly aware of the need to allocate resources between explorative versus exploitative innovation.

【導入衡量工具】高階管理者可能需要重新思考是否導入新的衡量工具，以在探索與深化兩大創新維度間更精確地進行資源配置與績效評估senior managers may need to consider introducing new metrics to prioritize resource allocation and benchmark performance along the explorative versus exploitative innovation dimensions.

【雙元性的限制】本研究除了提供雙元性潛在效益的實證支持外，亦指出雙元性本身可能存在**極限**，這或許是因為：當探索與深化都被推至極端程度時，兩者之間固有的張力將變得難以調和。  
我們同時發現，若企業在探索與深化兩者的投入皆處於極低水準，則其績效表現亦不理想，此類企業不應被視為具備雙元性。  
這些發現顯示出，**管理探索與深化的平衡是一項極為複雜且精細的任務**

Besides providing empirical evidence on the potential benefits of ambidexterity, our findings also suggest that there may be limits to ambidexterity, possibly due to the fact that the organizational tension inherent between exploration and exploitation may become unmanageable when both are pushed to extreme limits.We also find that very low levels of both exploration and exploitation may not contribute to superior firm performance, and such firms therefore should not be regarded as ambidextrous.These findings indicate the complexity and delicacy of managing the balance between exploration and exploitation.。

------------以上--------- Exploration vs. Exploitation: An Empirical Test of the Ambidexterity Hypoth Zi-Lin He /Poh-Kam Wong2004--------------------------------------------------------------------

探索與深耕專區

------------以下---------- Exploration vs. Exploitation: An Empirical Test of the Ambidexterity Hypoth Zi-Lin He /Poh-Kam Wong2004:下面是這篇裡面的重點

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【探索報酬更具變異性、回報時間也較長】The returns associated with exploration are more variable and distant in time,探索所帶來的報酬具有更高的變異性，且通常需較長時間才能實現，專注於探索的企業其績效變動幅度較大，可能會經歷巨大的成功，也可能遭遇嚴重失敗In other words, explorative firms generate larger performance variation by experiencing substantial success as well as failure,

【深耕、深化、利用exploitative報酬更加確定，回報時間較短】較之下，深化利用所產生的報酬則更為確定，實現時間也較短。專注於深化的企業則較可能取得穩定的績效表現。while exploitative firms are likely to generate more stable performance.

------------以上--------- Exploration vs. Exploitation: An Empirical Test of the Ambidexterity Hypoth Zi-Lin He /Poh-Kam Wong2004--------------------------------------------------------------------

------------以下Exploration and Exploitation in Organizational Learning Author(s): James G. March1991:下面是這篇裡面的重點

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【何謂探索、未來，定義】探索包括搜尋、變異、風險承擔、實驗、遊戲、靈活性、發現、創新等術語。Explore terms including search, variation, risk taking, experimentation, play, flexibility, discovery, innovation, and more. 專注於探索而忽略利用的適應性系統可能會發現，它們承受著實驗的成本，卻無法獲得太多收益。Adaptive systems that focus on exploration and neglect exploitation may find that they incur the costs of experimentation without gaining much benefit.

過度嘗試新方案，會減緩企業對既有能力的提升與精煉速度On the other hand, experimenting with new alternatives reduces the speed at which existing competencies are improved and refined而這探索與利用之間的張力也可能使企業陷入加速探索或加速深化的惡性循環之中（March, 1991）。

【探索的時間較長與不確定性】與進一步發展現有理念、市場或關係相比，尋求新理念、新市場或新關係的結果確定性較低，時間跨度較長，且影響更為分散。The pursuit of new ideas, markets, or relationships has lower outcome certainty, longer time horizons, and more diffuse impacts than the further development of existing ideas, markets, or relationships【探索具有脆弱性The fragility of exploration】探索的脆弱性

與利用的回報相比，探索的回報在系統上更不確定，時間上更遙遠，並且從組織上來說，與行動和適應的軌跡更疏遠。The rewards of exploration are systematically more uncertain, temporally more distant, and organizationally more distant from trajectories of action and adaptation than the rewards of exploitation.

【新技術技術較優的情況下，學會他能帶來更高的價值，同時也帶來差異性】如果一項新技術明顯優於舊技術，能夠克服不熟悉它的缺點，那麼它將提供比舊技術更高的預期價值。If a new technology is clearly superior to the old technology and can overcome the disadvantages of unfamiliarity with it, then it will provide higher expected value than the old technology. 同時，新技術經驗有限（相對於舊技術經驗）會導致差異增加。At the same time, limited experience with the new technology (relative to experience with the old technology) leads to increased variance

【定義利用】利用包括改進、選擇、生產、效率、甄選、實施、執行等。Utilization includes improvement, selection, production, efficiency, selection, implementation, execution, etc. 相反，專注於利用而忽略探索的系統可能會發現自己陷入次優的穩定均衡。In contrast, a system that focuses on exploitation and neglects exploration may find itself stuck in a suboptimal stable equilibrium

【過於拘泥於利用會帶來潛在自我毀滅性】適應環境的這些特徵導致了一種傾向，即用對已知替代方案的利用來代替對未知替代方案的探索，以提高績效的可靠性，而不是其平均值。These features of the adaptation environment lead to a tendency to replace the exploration of unknown alternatives with the exploitation of known alternatives in order to increase the reliability of performance rather than its mean. 適應性過程的這種特性具有潛在的自我毀滅性。This characteristic of adaptive processes is potentially self-destructive. 如我們所見，適應性會在相互學習的情況下降低組織學習的效果。As we have seen, it reduces the effectiveness of organizational learning in the context of mutual learning.

------------以上-- Exploration and Exploitation in Organizational Learning Author(s): James G. March1991----------------------------------------------------------------------------