# 組織雙元性

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

【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.

【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.

【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

【對組織有利不代表對社會有利】對組織的一部分有利的東西並不總是對另一部分有利。What is good for one part of the organization is not always good for another part. 對組織的一部分有利的東西並不總是對另一部分有利。What is good for one part of the organization is not always good for another part.

【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.

【這邊點出探索難以存活的原因】探索在組織中更難存活：回報不確定、時間拖延、責任分散，因此學習傾向自然會偏向 exploitation。這造成路徑依賴與學習短視（short-termism）。📌 **重點提醒**：討論了「正向回饋循環」讓組織愈來愈會 exploit、愈不敢 explore。

【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.

【研究討論了知識的發展與組織成為相互學系的影響】2. 知識發展中的相互學習:組織的知識和信念透過各種形式的指導、灌輸和示範傳播給個人。2. Mutual learning in knowledge development:The knowledge and beliefs of the organization are transmitted to individuals through various forms of guidance, indoctrination and demonstration.

【組織信念受個人信念與相互學習的機制所影響】同時，組織規範也不斷適應個人信念。At the same time, organizational norms continue to adapt to individual beliefs. 這種相互學習的形式不僅對參與其中的個人，也對整個組織產生影響。This form of mutual learning has an impact not only on the individuals involved, but also on the entire organization.

【圖一 學習率的影響】先前的研究表明，較慢的學習速度能夠更好地探索可能的替代方案，並在專業能力的發展中實現更好的平衡。Previous research suggests that slower learning rates enable better exploration of possible alternatives and a better balance in the development of professional competence. 個體的緩慢學習能夠更長時間地保持多樣性，從而提供探索機會，使組織代碼中的知識能夠改進。Slow learning by individuals maintains diversity longer, providing exploration opportunities that allow knowledge in the organization’s code to improve.

【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

【競爭優勢來自於學習、分析、模仿、再生Learning, analysis, imitation, regeneration, and technological change】學習、分析、模仿、再生和技術變革是任何旨在提升組織績效和增強競爭優勢的努力的重要組成部分。

4. Small Models and Ancient Wisdom Learning, analysis, imitation, regeneration, and technological change are important components of any effort to improve organizational performance and enhance competitive advantage.

每一項都涉及適應，以及探索與利用之間的微妙權衡。Each involves adaptation, and a subtle trade-off between exploration and exploitation.

【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.

## Unpacking Organizational Ambidexterity: Dimensions, Contingencies, and Synergistic Effect2009

【BD】balance dimension of ambidexterity (BD) 二元性平衡維度 (BD)

BD corresponds to a firm's orientation to maintain a close relative balance between exploratory and exploitative activities, whereas CD corresponds to their combined magnitude. BD 指的是企業在探索性活動和利用性活動之間保持相對平衡的傾向，而 CD 指的是兩者的綜合強度。

一個是關於探索與深化利用之間的相對平衡，我們稱之為\*\*「欸的平衡維度（Balance Dimension, BD）」**；— 另一個則是指探索與深化兩者的總體投入程度，我們稱之為**「雙元性的結合維度（Combined Dimension, CD）

【CD】mbidexterity combination dimension二元性組合維度

【BD+CD的共同效益】我們發現，除了它們各自獨立的效應之外，同時保持高水準的 BD 和 CD 還能產生協同效益。我們也發現，BD 對資源受限的公司更有利，而 CD 對擁有更多內部和/或外部資源的公司更有利。We also find that BD is more beneficial to resource-constrained firms, whereas CD is more beneficial to firms having greater access to internal and/or external resources.

【二元性的優點】文獻中普遍認為，二元性企業是指既能利用現有能力，又能探索新機會的企業，並且實現二元性能夠提升企業績效和競爭力。The general agreement in this literature is that an ambidextrous firm is one that is capable of both exploiting existing competencies as well as exploring new opportunities, and also that achieving ambidexterity enables a firm to enhance its performance and competitiveness.

【March1991認為他們應該被視為一整體】March（1991）首次將探索和利用這兩個概念引入管理學文獻時，他認為它們應該被視為一個連續統一體的兩端。When March (1991) first introduced the twin concepts of exploration and exploitation to the management lit erature, he argued that they should be viewed as two ends of a single continuum. In March's characterization,exploration and exploitation place inherently conflicting resource and organizational demands on the firm.

【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.

【對二元姓不同的解讀讓研究無法取得一個核心的統一言論】對「二元性」的不同解讀，使得管理者在多大程度上應該關注在探索和利用之間取得平衡，或試圖同時最大化兩者變得模糊不清。In particular, the varying interpretations of ambidexterity leave it unclear to what extent managers should be concerned with achieving a balance between exploration and exploitation or attempt to maximize both simultaneously.

【BD、CD都對企業績效有貢獻但作用的方式不同】二元性與企業績效之間的關係比以往理解的更為複雜，因為儘管二元性維度（BD）和二元性維度（CD）都對企業績效有所貢獻，但它們的作用過程卻截然不同In particular, the varying interpretations of ambidexterity leave it unclear to what extent managers should be concerned with achieving a balance between exploration and exploitation or attempt to maximize both simultaneously.

【BDCD聯合起來的效果比獨自效應更高】更具體地說，我們認為，BD二元性會減少過度參與**開發exploitation**而損害績效的影響（從而損害探索），反之亦然；而**CD二元**性則透過產生更大的互補資源池來提升企業績效，這些資源池可以在兩者之間相互利用More specifically, we argue that whereas BD reduces the performance damaging effects of overengagement in exploitation to the detriment of exploration or it vice versa, CD enhances firm performance through the generation of a greater pool of complementary resources that may be leveraged across both. 我們也提出，除了各自獨特的獨立效應之外，**BD and CD和持續發展的結合將產生協同績效效益**。我們認為，這種協同效益的產生，是因為在這種情況下，現有知識和資源能夠得到更充分的利用，吸收並整合成新的能力，而**新知識和資源也能更充分地強化並融入現有能力庫**。We also propose that over and above their unique independent effects, when integrated, concurrent high levels of BD and CD will yield synergistic performance benefits. We reason that such synergistic benefits arise because, in such cases, existing knowledge and resources can be more fully employed to absorb and be combined into new capabilities, and new knowledge and resources can also, to a fuller extent, strengthen and be integrated into the existing pool of competencies.

【當企業資源足夠，探索與利用之間的權衡競爭與綑綁效果將會變低】Additionally, **our findings indicate that when firms have access to sufficient resources**, trade-offs between exploration and exploitation may not be binding constraints

【視為一個整體的雙元性如下文獻】由於探索和發展概念之間的關聯性，研究人員已開始使用「二元性」作為一個整體概念來表示企業在探索和開發方面的雙重取向例如，Gibson and Birkinshaw 2004，He and Wong 2004，Lubatkin et al. 2006，O'Reilly and Tushman 2004，Tushkin et al. 2006，O'Reilly and Tushman 2004，Tushman and O'Reilly 6）Owing to the linked nature of the exploration and exploitation constructs, researchers have started using ambidexterity as an integral concept to denote a firm's dual orientation with respect to exploration and exploitation (e.g., Gibson and Birkinshaw 2004, He and Wong 2004, Lubatkin et al. 2006, O'Reilly and Tushman 2004, Tushman and

O'Reilly 1996). In line with this haracterization, there exists a broad consensus among definitions of ambidexterity that it somehow relates to the simultaneous pursuit of exploration and exploitation.

【1996第8頁的二元性定義】關於二元性的定義普遍認為，它在某種程度上與同時追求探索和發展相關。例如，Tushman 和 O'Reilly（1996，第 8 頁）將二元化組織定義為「能夠同時實施漸進式（即開發性）和革命性（即探索性）變革的組織」。For instance, Tushman and O'Reilly (1996, p.8) define anmbidextrous organization as one that is "able to implement both incremental (i.e., exploitative) and revolutionary (i.e., exploratory) changes."

1996的原文在這：為了長期保持成功，管理者和組織必須靈活變通—能夠同時實施漸進式變革和革命性變革。To remain successful over long periods, managers and organizations must be ambidextrous—able to implement both incremental and revolutionary change

1996原文2 在產業轉型時期，管理者必須做好蠶食自身業務的準備。Managers must be prepared to cannibalize their own business at times of industry transitions

1996原文3任何公司的歷史上至少都會有一個時刻，你必須進行重大變革才能提升到更高的業績水平。錯過這個時機，你就會開始走下坡路“There is at least one point in the history of any company when you have to change dramatically to rise to the next performance level. Miss the moment and you start to decline.

【2004 he 二元性定義】He 和 Wong（2004，第 483 頁）認為**二元化組織「能夠同時進行探索和發展」**。He and Wong (2004, p. 483) suggest they are "capable of operating simultaneously to explore and exploit."

【2005 第524頁】Smith 和 Tushman（2005，第 524 頁）將其描述為「既能探索又能發展」的組織。Smith and Tushman (2005, p. 524) describe them as organizations designed such that they "can both explore and exploit."

【2006 第二頁】Lubatkin 等人（2006，第 2 頁）將其定義為「能夠以同等的靈活性開發現有能力和新機會」的企業。Lubatkin et al. (2006, p.2) define them as firms "capable of exploiting existing competencies as well as exploring new opportunities with equal dexterity."

【雙元的判斷標準】A 公司在探索性方面得分為 10，在利用性方面得分為 5，而 B 公司在探索性和利用性方面均得分為 5。Company A scored 10 on Exploration and 5 on Exploitation, while Company B scored 5 on both Exploration and Exploitation. 哪家公司更有二元性？Which company is more dualistic?

如果將「雙元化」概念化為探索與利用之間的平衡，那麼B公司比A公司更具「雙元化」特徵。另一方面，如果將「雙元化」概念化為探索與利用的綜合量，則得出相反的結論，A公司被認為比B公司更具「雙元化」特徵。這種概念上的差異可能導致對「雙元化」概念的不同操作

與「平衡」觀點相對應，可以**將「雙元化」操作化為探索與利用的絕對差值**（He and Wong 2004），在這種情況下，**B公司將被認為擁有更高的「雙元化」**特徵。However, **corresponding to the "combined" view,** ambidexterity can be operationalized as the product (Gibson and Birkinshaw 2004, He and Wong 2004) or sum (Lubatkin et al. 2006) of exploration and exploitation, and in either case Firm A would be characterized as having greater ambidexterity.

【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.

【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).

【過度利用、開發exploitation的風險:技術過時、過於僵化】當企業的開發規模遠遠超過其探索規模時，企業很可能面臨過時的風險。More specifically, when a firm's magnitude of exploitation well exceeds that of its exploration, the firm is likely to be subject to the risk of obsolescence

【過度探索exploration的風險:忽略現在的收益】相反，如果企業過度強調探索而忽視開發，則會增加其無法從昂貴的搜尋和實驗活動中獲取收益的風險。Conversely, when a firm overemphasizes exploration to the exclusion of exploitation, it increases its risk of failing to appropriate returns from its costly search and experimentation activities

 BD 指的是企業在探索與深化之間保持適當比例，有助於降低績效風險。

 過度偏向 exploitation，會導致能力老化、路徑依賴與僵固（rigidity）。

 過度偏向 exploration，則會面臨高風險投入卻無法回收的困境。

【雙方的平衡是雙元性研究的核心】探索與利用之間的平衡是組織二元性概念的核心。As a consequence, these researchers see a balance between exploration and exploitation as central to the notion of organizational ambidexterity.

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.

【Discussion】

【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.

【對於規模較或資源受限的企業，高BD能帶來高績效】對於規模較小或資源環境受限的企業而言，維持探索與深化之間的平衡（即高 BD）會帶來最大的績效效益。In this respect, we find that firms that are relatively resource constrained due to their small size or scarce operating environments benefit the most from achieving a close balance of exploration and exploitation (i.e., high BD).

【對於規模較或資源受限的企業，偏重任何一方可能提高績效下降的可能】於這些資源較少的小型企業，若同時在探索與深化上投入過高（即高CD），反而與績效下降有關Conversely, as noted above, among relatively small firms, high CD (i.e., high exploitation and exploration) is associated with lower performance (Figure 2(c)).

【資源足夠成為雙元性被克服的關鍵】綜合這些研究發現可得出結論：只要企業能取得充足的內部或外部資源，則探索與深化之間的取捨限制是有可能被克服的Together, these findings indicate that trade-offs between exploitation and exploration may be surmounted provided a firm has access to sufficient internal or externally located resources.

【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.

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

這一篇主要是針對企業在技術創新的策略中，如何根據探索與深化的架構進行策略資源配置，來對企業銷售業績產生效益

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。

【**創新探索定義+深耕運用定義**】探索指的是企業進行搜尋、發現、實驗、冒險與創新等行為；而深化利用則包括改良、執行、效率、生產與選擇等行為（Cheng & Van de Ven, 1996；March, 1991）Exploration implies firm behaviors characterized by search, discovery, experimentation, risk taking and innovation, while exploitation implies firm behaviors characterized by refinement,implementation, efficiency, production and selection (Cheng and Van de Ven 1996, March 1991)

【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,

【深耕報酬更加確定，回報時間較短】相較之下，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.

【探索與深化的定義區別】

There is a tension between exploration and exploitation. adaptation to existing environmental demands may foster structural inertia and reduce firms’ capacity to adapt to future environmental changes and new opportunities**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（Hannan & Freeman, 1984）

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）。

若偏向過度探索exploration，將同樣具有毀滅性：「…失敗導致搜尋與改變，進而再次失敗，最後進入無止境的探索循環Levinthal & March（1993）On the other hand, Levinthal and March (1993) have argued that the balance can also be skewed towards excessive exploration that is equally destructive: “… failure leads to search and change which lead to failure which leads to even more search, and so on” (p. 105).

【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.。

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

這是一篇綜述review

【1996, Tushman and O’Reilly對雙元性的定義】

In 1996, Tushman and O’Reilly proposed that organizational ambidexterity—defined as ‘’能夠同時追求漸進式和非連續式創新與變革，源自於在同一家公司內擁有多種相互矛盾的結構、流程和文化。The ability to simultaneously pursue both incremental and discontinuous innovation and change results from hosting multiple contradictory structures, processes, and cultures within the same firm.”

【March james1991的觀點】James1991指出企業面臨的根本性適應性挑戰在於既要充分利用現有資產和能力，又要進行充分的探索，以免因市場和技術變革而變得無足輕重In a seminal article (1991), James March noted that the fundamental adaptive challenge facing firms was the need to both exploit existing assets and capabilities and to provide for sufficient exploration to avoid being rendered irrelevant by changes in markets and technologies

【March james1991的觀點】利用的重點在於效率、控制、確定性和減少差異，而探索的重點在於搜尋、發現、自主性和創新。In his view, exploitation was about efficiency, control, certainty and variance reduction, while exploration was about search, discovery, autonomy and innovation他認為.「組織面臨的基本問題是，充分利用現有資產和能力以確保其當前的生存能力，同時投入足夠的精力進行探索，以確保其未來的生存能力」(**也就是說 利用代表現在，****探索代表未來**) The basic problem confronting an organization is to engage in sufficient exploitation to ensure its current viability and, at the same time, devote enough energy to exploration to exploration to ensure its future viability (1991, p. 105)

【雙元性被認為是生存的必要條件】基於開發和探索需要不同結構這個概念，有些作者認為，為了長期生存，組織需要兼顧兩者。Based on the idea that different structures are required for exploitation and exploration, several authors suggested that for long-term survival, organizations needed to accommodate

Both

【Tushman and O’Reilly (1996)】組織需要同時進行探索和開發，才能實現雙元化Tushman and O’Reilly (1996) proposed that organizations need to explore and exploit simultaneously, to be ambidextrous.

【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.】

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【**偶然看到的一篇，討論二元策略於創新**】**Ambidextrous Organizational Culture, Contextual Ambidexterity and New Product Innovation: A Comparative Study of UK and Chinese High-tech Firms** (1996)**，他討論的是創新，放進endnote裡面了**

它裡面回顧提到的可以用來加進來【情境二元性（即在業務部門內同時進行探索和利用）不僅是可能的，而且是企業成功的必要條件，特別是在高科技公司中，這些公司往往別無選擇，只能利用現有能力獲取短期商業利益，同時探索新能力以取得長期成功However, recent research suggests that contextual ambidexterity (i.e. simultaneous exploration and exploitation within a business unit) is not only possible but also a necessity to business success, especially in high-tech firms that often have no choice but to exploit existing competences for short-term commercial benefits and simultaneously explore new competences for long-term success

還有這兩個，我看到的Building ambidexterity into an organization2004原文裡面的，endnote沒有pdf因為沒辦法下載，但下面是原文我確定

【成功的公司注重兩點】成功的公司不僅靈活、創新、積極主動；他們還善於利用其專有資產的價值，快速推出現有的商業模式，並降低現有營運的成本。換句話說，他們擁有一種同樣重要的能力，我們稱之為協調 ——清楚地了解如何在短期內創造價值，以及如何協調和簡化活動以實現該價值Successful companies are not just nimble, innovative and proactive; they are also good at exploiting the value of their proprietary assets, rolling out existing business models quickly and taking the costs out of existing operations. They have, in other words, an equally important capability we call alignment — a clear sense of how value is being created in the short term and how activities should be coordinated and streamlined to deliver that value Building ambidexterity into an organization2004

【對利用的定義與看法】利用=**過度注重協調，短期結果可能看起來不錯，但產業的變化遲早會讓你措手不及**。Focus too much on alignment and the short-term results will look good, but changes in the industry will blindside you sooner or later.來自 Building ambidexterity into an organization2004

【對探索的定義與看法】探索=同樣，過度專注於等式的適應性方面意味著以**犧牲今天的業務為代價來打造明天的業務**。Similarly, too much attention to the adaptability side of the equation means building tomorrow’s business at the expense of today’s. 來自Building ambidexterity into an organization2004

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【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. For example, the meta analysis by Tarba and colleagues (this issue) shows that the effects of ambidexterity are stronger for technology firms than those in manufacturing. Finally, as suggested by March (1991), the evidence is that either the under- or over-use of ambidexterity comes at a cost (e.g., Benner & Tushman, 2002; Mitchell & Singh, 1993; Wang & Li, 2008)

【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)

【這篇論文的P12】提到【Organizational Ambidexterity in Action: How Managers Explore and Exploit2011，摘錄如下】這一觀點來看，雙元性的關鍵在於組織能否「感知並掌握新機會」，透過同時進行探索與利用來實現，而這本質上是一個「領導問題」而非純粹的結構安排（O’Reilly & Tushman, 2011From this perspective, the key to ambidexterity is the ability of the organization to sense and seize new opportunities through simultaneous exploration and exploitation. This is, at heart, a leadership issue more than a structural one (O’Reilly & Tushman, 2011

【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）

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

【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

# 可供性實現

## Affordance Theory and How to Use it in IS Research Olga Volkoff and Diane Strong 2017

雖然行動的可能性在資訊系統研究中很重要，但實際採取的行動及其結果也同樣重要。While the possibility of action is important in information systems research, the actions actually taken and their consequences are equally important

1因此，Strong 等人發現，他們必須清楚地區分可供性本身（目標導向行動的可能性）、可供性的實現（實際採取的行動）以及這些行動的結果。

Thus, Strong et al. found that they must clearly distinguish between the affordances themselves (the possibilities for goal-directed action), the realization of the affordances (the actions actually taken), and the outcomes of those actions

2其次，雖然在任何特定時刻，接觸技術的都是個體，但該個體又是各種組織結構的一部分，從從事集體任務的本地工作組，到構成現代組織的龐大的多層級層級結構。Second, while at any given moment it is the individual who engages with technology, that individual is part of a variety of organizational structures, from local work groups engaged in collective tasks to the vast multi-level hierarchies that make up modern organizations.每個行動者不僅有許多目標，從個人目標到與任務相關的目標，而且還受群體和組織目標的影響。Not only does each actor have many goals, ranging from personal goals to task-related goals, but they are also influenced by group and organizational goals.

3第三，不僅有多個行為主體使用一個複雜對象，而且任何對象-行為主體關係中都存在著多種可供性，我們稱之為可供性束(affordance bundles)（Strong 等人，2014）。

Third, not only do multiple agents use a complex object, but there are multiple affordances in any object-agent relationship, which we call affordance bundles ( Strong et al., 2014 ).

【這篇作者概括的六項原則】

【原則 1】：記住，可供性源自於使用者/工件關係，而不僅僅是工件本身。Principle 1: Remember that affordances arise from the user/artifact relationship, not just the artifact itself.因為作者很容易陷入將可供性視為技術特徵的語言和論證。It is easy for authors writing about affordances to fall into language and argumentation that treat affordances as features of technology.

【原則2】：區分可供性與其實現。Principle 2: Distinguish affordances from their implementation.

可供性是指針對行為主體目標採取行動的可能性，指的是功能（功能可供性的用途或行動的目的），也就是說，可供性是實現目標的可能性。

Affordance refers to the possibility of taking action towards the agent's goal, which refers to the function (the purpose of the affordance or the purpose of the action), that is, affordance is the possibility of achieving the goal.

實現是具體行動本身的，與結構而非功能有關。結構關注的並非行動的目的，而是構成行動的實際行為配置 (Burton-Jones and Gallivan, 2007; Morgeson and Hofmann, 1999)。Realization, as the action itself, is concrete and is concerned with structure rather than function. Structure is not concerned with the purpose of the action, but with the actual configuration of behaviors that constitute the action (Burton-Jones and Gallivan, 2007; Morgeson and Hofmann, 1999).

【原則 3】：關注行動本身，而非採取行動後所達到的狀態或條件。

Principle 3: Focus on the action itself, not the state or condition that is achieved after the action is taken.

可供性=關注的是潛在行動，而非採取行動後所達到的狀態或條件Affordances focus on potential actions rather than the states or conditions that are achieved after the actions are taken.

直接具體結果=是可供性實現後達到的狀態。The immediate concrete outcome is the state achieved after the affordance is realized

問題在於人們常常因為已達到的狀態忽略實現的【過程】：問題在於，當我們關注已達到的狀態或條件時，這項研究與資訊系統影響研究幾乎沒有什麼區別，尤其是，我們可能會忽略理解技術和使用者行為的作用，即提供解釋力的相關機制，而解釋力正是使用可供性理論的核心貢獻。The problem is that when we focus on achieved states or conditions, this research differs little from research on the impacts of information systems. In particular, we may overlook understanding the role of technology and user behavior, the relevant mechanisms that provide explanatory power, which is the core contribution of affordance theory.

【原則4】：為可供性選擇合適的粒度等級。

Principle 4: Choose the appropriate level of granularity for affordance.

【關注可供性的多層次遞進】，gibson舉例說，蘋果在某個層面上賦予人類進食的可能性，但這是由咬、咀嚼和吞嚥等較低層次的可供性構成的。For example, he says that an apple gives humans the possibility of eating at one level, but this is made up of lower-level affordances such as biting, chewing, and swallowing. 同樣，使用電子郵件系統的個人不僅擁有溝通的可能性，而且還擁有先撰寫訊息再發送訊息的可能性。Likewise, individuals using electronic mail systems have the possibility not only to communicate, but also to compose messages before sending them.

【可由小到大，也可以從大到小往抽象的可供性論述】

適當的分析層次取決於目前的問題。The appropriate level of analysis depends on the problem at hand. 當然，正如可供性可以分解為較低層次的可供性一樣，可供性也可以聚合為較高層次、通常更抽象的可供性。Of course, just as affordances can be decomposed into lower-level affordances, affordances can also be aggregated into higher-level, often more abstract affordances.

【原則 5】：辨識所有顯著的功能可供性及其交互作用。Principle 5: Identify all significant affordances and their interactions.

除了嵌套在任何功能可供性中的功能可供性之外，還有許多其他功能可供性，它們源自於科技產品與參與者之間的關係。In addition to the affordances nested within any affordance, there are many other affordances that arise from the relationship between technological products and actors.這些功能可供性並非獨立存在，而是相互作用的。These affordances do not exist independently but interact with each other.

【複雜的可供性需要考基礎可供性實現來堆疊出網絡】通常，較複雜的功能可供性（例如監控）依賴於更基本的功能可供性（例如資料輸入）的成功實現，從而產生一個功能可供性依賴網路 (Strong et al., 2014)。Typically, more complex affordances (e.g., monitoring) depend on the successful implementation of more basic affordances (e.g., data entry), resulting in an affordance dependency network (Strong et al., 2014).

【可供性相互依存也可能相互干擾】功能可供性可能支援其他功能可供性，也可能幹擾其他功能可供性，進而引發許多有趣的研究問題。Affordances may support other affordances or interfere with other affordances, which raises many interesting research questions.

【原則 6】：社交力量的重要性、辨識影響功能可供性實現的社會力量。Principle 6: Identify the social forces that influence the realization of affordances.

這是因為功能可供性並非憑空實現，而是在社會情境中實現。Functional affordances are not realized in a vacuum, but rather in social contexts. 因此，行為體所在群體所產生的社會力量也會影響任何功能可供性如何實現、實現得如何，甚至能否實現。Therefore, the social forces generated by the group to which the actor belongs will also affect how any functional affordance is realized, how well it is realized, or even whether it can be realized.

個體功能可供性是由一個行為體獨立於其他行為體而實現的；共享功能可供性是由許多人以相似的方式實現的；而集體功能可供性則涉及許多人為實現共同目標而採取不同的行動。

Individual affordances are realized by one actor independently of other actors; shared affordances are realized by many people in a similar way; and collective affordances involve many people taking different actions to achieve a common goal.

【結論】

透過可供性理論，我們終於找到了一種方法，能夠具體化技術，同時將社會背景融入中層社會技術理論中。Through affordance theory, we finally found a way to reify technology while integrating social context into middle-level sociotechnical theory

有意識地表達與這些可供性相關的預期結果，有助於分析使用者是否有效地實現了這些可供性。Consciously articulating the expected outcomes associated with these affordances can help analyze whether users effectively implement these affordances.

【可供性使技術操作的結果與過程更成功的價值】識別可供性組合及其依賴關係，有助於解釋相互依賴關係如何阻礙預期效益的實現，或突顯可能幹擾實現的外部因素。Identifying combinations of affordances and their dependencies can help explain how interdependencies may impede the realization of intended benefits or highlight external factors that may interfere with realization.

同樣，發現未被識別的可供性或許可以解釋意外和非預期的結果。Likewise, discovering unrecognized affordances may explain unexpected and unintended results

整體而言，如果運用得當，可供性理論可以幫助研究者為管理者創造一套新的解決實際問題的槓桿。Overall, if used properly, affordance theory can help researchers create a new set of levers for managers to solve practical problems.

## A Theory of Organization-EHR Affordance Actualization2014

我們發現可供性相關文獻存在三個面向的空白：(1) 可供性潛力實現過程的理論；(2) 組織情境中的可供性；以及 (3) 相互關聯的可供性組合的理論。

In the process of constructing an affordance-based theory of IT-related organizational change based on field data, we found that there are three gaps in the affordance literature: (1) theory of the process of realizing affordance potential; (2) affordances in organizational contexts; and (3) theory of interrelated affordance combination

我們的可供性實現觀點考慮了 IT 產品的物質性、IT 帶來組織效應的不確定性過程、IT 相關變革過程的多層次性，以及管理者和使用者作為變革推動者的意向性，從而探討了 IT 在組織中效應理論的重要標準。

Our affordance realization perspective considers the materiality of IT products, the uncertain processes through which IT brings about organizational effects, the multi-layered nature of IT-related change processes, and the intentionality of managers and users as agents of change, thereby exploring important criteria for theories of IT effects in organizations.

在建構此表並將結果與文獻進行比較的過程中，我們遇到了三個理論問題：可供性文獻尚未發展出針對以下方面的理論：(1) 實現可供性潛力的過程；(2) 組織情境中的可供性；以及 (3) 以相互關聯的可供性束形式出現的可供性。

In the process of constructing this table and comparing the results with the literature, we encountered three theoretical issues: The affordance literature has yet to develop a theory for: (1) the process of realizing affordance potential, (2) affordances in organizational contexts, and (3) affordances as bundles of interrelated affordances.

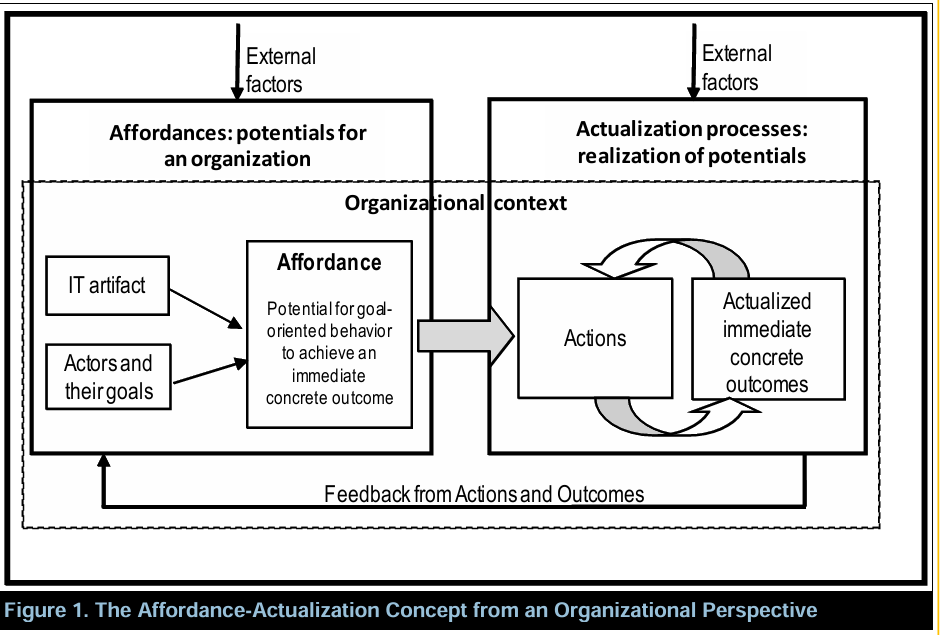
【可供性的延伸定義】我們資料中與可供性相關的概念（如表1所示）促使我們擴展了可供性的定義，以適應組織中可供性的本質；即，我們將可供性定義為「與實現直接具體結果相關的行為潛力，並源自於某個人造物(artifact)與一個或多個以目標為導向的行動者之間的關係」。

The affordance-related concepts in our data (shown in Table 1) prompted us to expand our definition of affordance to accommodate the nature of affordance in organizations; that is, we define affordance as “behavioral potentials associated with achieving direct, concrete results and arising from the relationship between an artifact and one or more goal-oriented actors.”

【可供性實現定義】Strong 等人 / 可供性-實現理論在我們的資料中，實現可供性概念中捕捉到的潛力非常重要。Strong et al. / Affordance-Realization TheoryIn our material, the potential captured in the concept of affordance is very important. 我們將實現定義為「行動者利用一個或多個可供性，透過使用技術來實現直接具體結果，從而支持組織目標」。

We define realization as “the act by which actors exploit one or more affordances to achieve direct, concrete results through the use of technology in support of organizational goals.”

【圖一，可供性實現的過程】



可供性實現的過程。這個過程是迭代的，因為個人的實現行動會產生結果，而這些直接的具體結果反過來又會提供回饋，用於（根據需要）調整個人行動以及調整產生可供性的要素。This process is iterative, as individuals’ actions to materialize produce outcomes, and these immediate concrete outcomes in turn provide feedback that is used to adjust individual actions (as needed) and to adjust the elements that produce affordances

【直接具體結果immediate concrete outcome】

直接具體結果是指透過實現而預期的特定結果，例如標準化或協調化，其被認為有助於實現組織總體目標（例如，更高品質的護理或更高效率的資源利用）。

Direct concrete outcomes are specific results that are expected through the achievement of activities, such as standardization or harmonization, that are believed to contribute to the achievement of overall organizational goals (e.g., higher quality of care or more efficient use of resources).

這一概念有三個目的。This concept has three purposes.

【首先，注視組織多層次、層級的目標定義】

直接具體結果可以在任何層面（例如，個人、團體或組織）進行定義，因此我們擴展的可供性定義涵蓋了多個層面的可供性（如第 5.3 節所述）。first, because direct concrete outcomes can be defined at any level (e.g., individual, group, or organizational), our expanded definition of affordances encompasses affordances at multiple levels (as discussed in Section 5.3 ).

【其次，直接具體結果涵蓋了可供性及其實現。】

Second, direct concrete outcomes cover affordances and their realization.

【可供性負責確認相關結果的潛在功能（並且，作為一種潛在功能，它在各個行為主體之間具有共同的含義），而結果的結構則在實現過程中顯現，並且會因執行每次實現的個人或團體而異（參見2.2節）。

Affordances determine the potential functionality of the relevant outcome (and, as a potential functionality, it has a shared meaning across actors), while the structure of the outcome emerges during the realization process and will vary depending on the person or group performing each realization (see Section 2.2).

【第三，直接具體成果充當實現行動和最終組織目標之間的中介。】

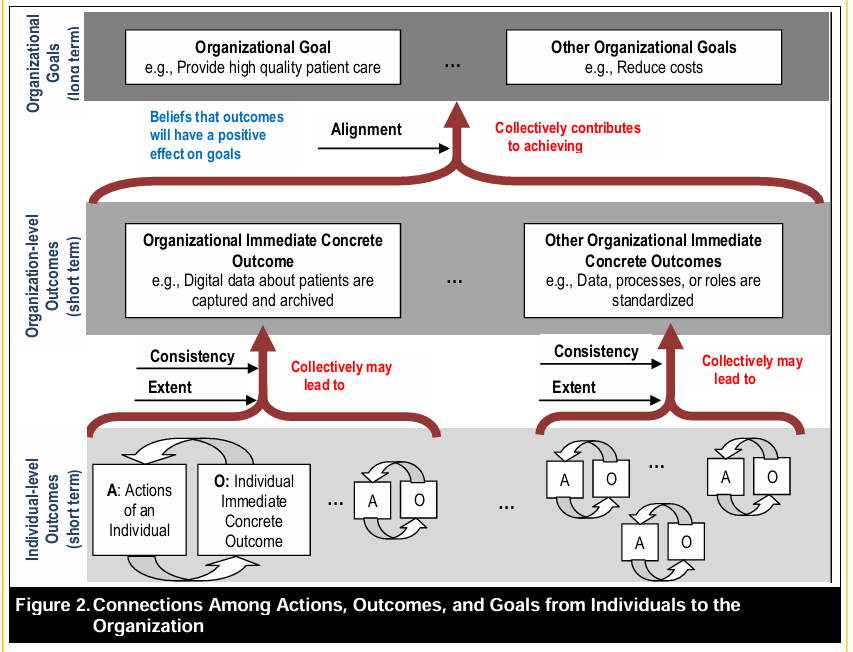
Third, immediate concrete outcomes serve as intermediaries between achieving actions and ultimate organizational goals.

圖2顯示了個人層面的直接具體結果如何聚合形成組織層面的直接具體結果，而這些直接具體結果反過來可能有助於實現組織目標。Figure 2 shows how individual-level direct concrete outcomes aggregate to form organizational-level direct concrete outcomes, which in turn may contribute to achieving organizational goals

【5.2. 可供性的實現過程The Process of Actualizing Affordances】

【學習與嘗試的過程，起初並不可知道這些可供性】雖然我們假設電子病歷使用者在實現可供性時有潛力有效地做到這一點，但他們處於一個學習過程中，可能會遇到許多障礙（例如，相當於必須學習如何爬樓梯，而不是已經知道）。

While we assume that EHR users have the potential to do so effectively when implementing affordances, they are in a learning process and may encounter many barriers (e.g., equivalent to having to learn how to climb stairs, rather than already knowing it).

【可能誤判、重新定位可供性，是非線性的過程】在此過程中，也可能出現失誤和重新定向（即，實現可供性並非線性過程，他們可能無法完全實現可供性）。

In the process, there may also be lapses and redirections (i.e., achieving affordances is not a linear process and they may not fully achieve affordances).

【多層次過程，並相互影響、環環相扣】實現，作為我們資料中的一個高層次類別，Strong 等人/可供性-實現理論同時涉及：(1) 在動態組織情境中發生的一系列個人旅程，包括使用者學習、電子健康檔案 (EHR) 發展和管理者的干預；以及 (2) 一個多層次的過程，其中許多個人的旅程相互作用並聚合形成一個組織旅程（即組織變革過程）。

Realization, as a high-level category in our data, Strong et al./Affordance-Realization Theoryinvolves both: (1) a series of individual journeys occurring in a dynamic organizational context, including user learning, electronic health record (EHR) development, and manager intervention; and (2) a multi-level process in which many individual journeys interact and converge to form an organizational journey (i.e., the organizational change process).

【個人實現可供性的過程步驟與限制不相同，速度也不同，結果也不一定相同Personal journeys in dynamic organizational contexts: realizing affordances】實現可供性我們資料中的一個關鍵主題是，實現可供性的過程是一個個人旅程（即，一個個人層面的過程，每個人在採取目標導向的行動時都會有不同的體驗）。5.2.1. Personal journeys in dynamic organizational contexts: realizing affordances A key theme in our data is that the process of realizing affordances is a personal journey (i.e., an individual-level process that each person experiences differently when taking goal-directed action). 在我們的案例點，個人以不同的速度和方式進行實現過程，且不一定經歷相同的步驟和限制，也不一定會得到相同的結果。In our case studies, individuals approach the implementation process at different speeds and in different ways, and do not necessarily experience the same steps and constraints, nor do they necessarily get the same results.

【行動者在實現的過程會先”思考結果(目標導向)”並”思考實現的過程(行動)”】

作為目標導向的行動者，個人甚至在使用 EHR 之前就開始思考他們能夠實現的結果（例如，對於醫生來說，「能夠確保為我病人看病的專科醫生能夠從我這裡獲得所有必要的信息，說明我為什麼安排病人就診」）（即從目標和可供性的角度進行思考）。As goal-directed actors, individuals begin thinking about the outcomes they can achieve (e.g., for a physician, “being able to ensure that the specialist who sees my patient has all the necessary information from me about why I am scheduling the patient’s visit”) even before using the EHR (i.e., thinking in terms of goals and affordances).

他們也會思考必須採取的行動（例如，對於醫生來說，「我必須將病人資料輸入 EHR」），以及這些行動是否會產生有助於實現目標的理想結果（例如，對於醫生來說，「這會減慢我的工作速度，分散我對病人的注意力」）（即思考實現過程）。They also think about the actions that must be taken (e.g., for the physician, “I must enter the patient’s information into the EHR”) and whether those actions will produce desirable outcomes that will help achieve their goals (e.g., for the physician, “This will slow down my work and distract me from my patients”) (i.e., thinking about the implementation process).

【組織中他人的共存必然影響可供性】Bloomfield 等人 (2010) 和 Michael (2000) 認為，其他人的共存必然會影響環境，進而影響可供性。Bloomfield et al. (2010) and Michael (2000) argue that the co-presence of others necessarily affects the environment and thus affordances.

【環境干預可以人為降低，並增加協助】在組織環境中，其他人，尤其是管理者，可以透過改變工作環境進行幹預，以提供更多支持和更少限制。

In an organizational setting, others, especially managers, can intervene by changing the work environment to be more supportive and less restrictive.

【組織的可供性實現歷程Actualization as an Organizational Journey】

雖然成功的個人歷程對於實現預期成果至關重要，但我們也需要將其與組織層面的實現歷程之間的關係理論化。5.2.2. Realization as an organizational process While successful individual processes are critical to achieving desired outcomes, we also need to theorize their relationship to organizational-level realization processes.

【將個人行動直接具體結果及合成組織的直接具體成果】基於集體構想文獻，我們將組織層面的直接具體成果（表面上看似組織層面實現過程的成果）視為集體構想，這些成果是個人行動直接具體成果的集合（見圖2）。Based on the collective vision literature, we regard direct concrete outcomes at the organizational level (which appear to be the outcomes of organizational-level implementation processes) as collective visions, which are the aggregate of direct concrete outcomes of individual actions (see Figure 2).

【個人直接具體成果的一致性、程度、協調性可用於評估組織成果】即個人實現行動及其產生的直接具體成果的「一致性」、「程度」和「協調性」（見圖2），可用於評估組織層面成果的出現。Specifically, three indicators were discovered through data analysis; namely, the "consistency", "degree" and "coordination" of individual actions and the direct concrete results they produce (see Figure 2), which can be used to evaluate the emergence of organizational-level results.

【一致性:相互強化】一致性意味著實現成果是相容的，並且可能相互強化；行動及其成果不一定相同。Coherence means that achieving outcomes are compatible and potentially mutually reinforcing; actions and their outcomes are not necessarily identical. 為了實現“採集和歸檔”，醫生使用了不同的結構，例如抄寫員、打字或口述到語音轉文本軟體中，但這些不同的操作都是為了實現相同(一致)的直接具體結果，即以數字方式採集數據和筆記。

For example, to achieve “capture and archive,” physicians used different structures, such as scribes, typing, or dictating into speech-to-text software, but these different actions all served to achieve the same immediate, specific outcome, which was to capture data and notes digitally.

【組織效應】此外，我們關於直接具體成果的概念，以及個人層面的實現過程及其在組織情境中的直接具體成果在組織層面的湧現，為研究組織效應如何產生提供了一種多層次的方法。

Furthermore, our conceptualization of direct concrete outcomes, and the emergence at the organizational level of individual-level realization processes and their direct concrete outcomes in organizational contexts, provides a multi-level approach to studying how organizational effects emerge.

【可供性實現的討論價值】識別可供性組合及其依賴關係，有助於解釋相互依賴關係如何阻礙預期效益的實現，或突顯可能幹擾實現的外部因素。

Identifying combinations of affordances and their dependencies can help explain how interdependencies may impede the realization of intended benefits or highlight external factors that may interfere with realization.

借助這些概念和三個衡量標準，管理者可以確定何時、何地以及如何進行幹預以改善這些結果，研究人員可以研究個人行為及其直接具體結果如何有助於產生組織層面的結果，並可以建立這些變化如何發生的過程模型。

With these concepts and the three measures, managers can determine when, where, and how to intervene to improve these outcomes, researchers can study how individual behaviors and their direct, specific consequences contribute to organizational-level outcomes, and can build process models of how these changes occur.

# 可供性

## TECHNOLOGY AFFORDANCES William W. Gaver Rank Xerox Cambridge EuroPARC done

The term “affordance” comes from the perceptual psychologist J. J. Gibson [9, 10], who developed an “ecological” alternative to cognitive approaches. The cognitive approach suggests that people have direct access only to sensations, which are integrated with memories to build up symbolic representations of the environment and its potential for goal-oriented action. This account has recently come under attack, particularly for its decontextualized approach to design發展了一種“生態”替代認知方法的方案。認知方法表明，人們只有直接接觸感覺，這些感覺與記憶相整合，以建立對環境及其目標導向行動的潛在識別。這種觀點最近受到批評，特別是因其去脈絡化的設計方法。

People perceive the environment directly action, without significant in terms of its potentials for intermediate stages involving memory or inferences.人們直接感知環境以進行行動，而不需要在很大程度上考慮涉及記憶或推理的中介階段。(這一段可以直接加進去gibson裡面的【不同於傳統心理學所強調，生物需藉由生理知覺得到認知再觸發行動的線性歷程，Gibson主張可供性無需透過複雜的認知推論，是可被生物直接察覺的行動機會（Gibson, 1979, pp.127–128）。這一段】

物體的可供性，例如攀爬的可供性，是指物體和行為者的特徵。An affordance of an object, such as one for climbing, refers to attributes of both the object and the actor.

This makes the concept a powerful one for thinking about technologies because it focuses on the interaction between technologies and the people who will use them. However, the concept raises issues from many different domains: perception and action, metaphor and learning, and techniques for input and output. A simple example from everyday life can illustrate the sorts of issues that must be addressed before the notion of affordances can be made precise and useful. 這使得這個概念成為思考技術的一個強大工具，因為它專注於技術與使用者之間的互動。然而，這個概念引發了來自許多不同領域的問題：知覺和行動、隱喻和學習，以及輸入和輸出的技術。一個來自日常生活的簡單例子可以闡明在使得可供給性這一概念變得精確和有用之前必須解決的類型問題。

However, perceptual information may suggest affordances that do not actually exist; while those that do may not be perceivable. For instance, vertical doorhandles suggest pulling, but doors may be locked. 感知信息可能會暗示出實際上並不存在的可操作性；而那些實際存在的可操作性可能並不可感知。例如，垂直門把手暗示拉動，但門可能是鎖著的。

In general, when the apparent affordances of an artifact matches its intended use, the artifact is easy to operate. When apparent affordances suggest different actions than those for which the object is designed, errors are common and signs are nmessary.一般來說，當一個工藝品的顯性可操作性與其預期用途匹配時，該工藝品就容易使用。當顯性可操作性暗示著與物體設計用途不同的行為時，錯誤是常見的，標誌是必要的。

I develop the idea of affordances as properties of the environment relevant for action systems, consider how they might be perceived, and note the effects of culture on their perception. Gaver將發展可供性作為與行動系統相關的環境屬性的觀念，考慮它們可能如何被感知，並注意文化對其感知的影響

Complementarity of Action行動互補性

Most fundamentally, affordances are properties of the world that make possible some action to an organism equipped to act in certain ways可供性的定義從根本上說，可供性是世界的屬性，使得具備行動能力的生物能夠進行某些特定行動。

Affordances, then, are properties of the world defined with respect to people’s interaction with it. Gaver也認為因此，可供性是根據人類與世界互動而定義的世界特性。

感知與相互參照性Perception and Inter-referentiality

*Affordances per se* are independent of perception. they exist whether the perceiver cares about them or not, whether they are perceived or not, and even whether there is perceptual information for them or not.

可供性本身（*Affordances per se*）是獨立於感知而存在的。無論感知者是否在意它們、是否真的感知到它們，甚至是否有可供感知的資訊存在，它們都會存在。例如，一杯水即便我不口渴，仍提供「可飲用」的可供性；一顆球即使沒人看見，也提供「可投擲」的可供性；一個坑洞即使被灌木遮蔽，依然具有「可跌落」的可供性。可供性是否被察覺無礙於其存在，但正因為它們本質上關乎重要的環境屬性，所以「**需要** 被感知」

延續 Gibson 的立場，強調：**可供性不是「被看見才存在」的東西，而是「即使沒被感知，也真實存在」的潛在行動機會**。

Culture, Experience to attributes and Learning of the The actual perception of affordances will of course be determined in part by the observer’s culture, social setting, experience and intentions. Like Gibson I do not consider these factors integral to the notion, but instead consider culture, experience, and so forth as highlighting certain affordances.文化、經驗及學習的屬性以及可供性（affordance）的實際認知，無疑會受到觀察者的文化、社會背景、經驗和意圖的部分影響。像吉布森（Gibson）一樣，我並不認為這些因素是這一概念的核心，而是將文化、經驗等視為突顯某些可供性的信息。

Distinguishing affordances and the available information about them from their actual perception allows us to consider affordances as properties that can be designed and analyzed in their own terms. Learning can be seen as a process of discriminating patterns in the world, as opposed to one of supplementing sensory information with past experience. From this perspective, my culture and experiences may determine the choice of examples I use here, but not the existence of the examples themselves.可供性及其相關資訊」與「實際感知」區分開來，讓我們能夠將可供性視為一種可以獨立設計與分析的特性。學習可以被視為一種辨識世界中模式的過程，而不是僅僅以過去經驗補充感官資訊。從這個角度來看，我的文化與經驗也許會影響我在此舉例的選擇，但不會影響這些例子本身是否存在。

物質特性、物理性、物質性

**Affordances Are...**  
The concept of affordances points to a rather special configuration of properties.

It implies that the physical attributes of the thing to be acted upon are compatible with those of the actor, that information about those attributes is available in a form compatible with a perceptual system, and (implicitly) that these attributes and the action they make possible are relevant to a culture and a perceiver. 可供性的概念指涉的是一種相當特殊的屬性組合。  
它暗示了：被作用的物體之物理屬性，需與行動者的屬性相容；關於這些屬性的資訊，必須以與感知系統相容的形式呈現【這與Gibson提的：相對性互補性有關聯？】；而這些屬性及其所支持的行動，必須與某種文化與知覺者具有關聯（雖是隱含的）。

Artifacts may be analyzed to see how close they are to this configuration of properties, and thus what affordances they convey.人工物可以藉由分析其與這種屬性配置的接近程度，來判斷它提供了哪些可供性

And again, perceptual information may be misleading about the affordances of buttons; in this case the ability to move or edit buttons is not supported perceptually. 然而，再次提醒：關於按鈕的可供性，感知所提供的資訊有時可能具有誤導性；例如此處，感知上並不支援「移動」或「編輯」按鈕的能力。

可供性探索／探索性感知（exploratory perception）The notion of affordances may be extended to explicitly include exploration.

「可供性」不應只從靜態的感知中理解，某些行動可能需要透過實際的互動、探索甚至試錯才能顯現，也就是「探索性感知（exploratory perception）」

For instance, the pivoting door handle shown in Figure 4 may appear to afford grasping, but passive observation will probably not indicate the affordance of turning it or using it to open the door. However, once grasped (B), a random or exploratory press downwards will convey tactile information revealing the affordance of turning the handle. When the handle is fully turned (C), the new configuration pulling is natural. is one from which The results of a pull will indicate whether the door affords opening or not.可供性的概念可以被擴展，以明確地納入「探索」的過程。例如，圖四所示的旋轉式門把表面上似乎提供了「可握住」的可供性，但單靠被動觀察大概無法辨認其是否具有「可轉動」或「用來開門」的可供性。然而，一旦握住（B），隨機或探索性地向下按壓會提供觸覺資訊，揭示出其「可轉動」的可供性。當門把被完全轉動（C）後，新的配置自然就讓「拉開」成為一個合適的動作。接著的拉門行動將顯示該門是否提供了「可開啟」的可供性

In general, the affordances of complex objects are often grouped by the continuity of information about activities they reveal. Affordances are not passively perceived, but explored..複雜可供性是被探索的

一般來說，複雜物體的可供性通常依據它們揭示的活動信息的連續性來進行分組。可供性並不是被動感知的，而是被探索的。

This point of view leads to a reconception of metaphor which emphasizes its role as a design tool for importing consistent affordances from one domain to another. From this perspective, users need not know metaphors explicitly. Exploration of afforded actions leads to discovery of the system, rather than knowledge of the system metaphor leading to expectations of its affordances

這樣的觀點引導我們重新思考「隱喻」的角色，將其視為一種設計工具，可用來從一個領域引入一致的可供性至另一個領域。從這樣的角度出發，使用者不需顯性地理解這些隱喻，而是透過行動的探索來發現系統，而非先了解系統的隱喻，再據此產生對可供性的預期

Gibson 幾乎將可供性的研究重心放在視覺可見的部分。然而，可供性也可以透過其他感官來察覺。例如旋轉式門把的案例就指出，觸覺資訊是可供性極為豐富的來源。Gibson focuses almost exclusively on affordances which may be seen. But affordances may be perceived using other senses as well. As the pivoting handle example suggests, tactile information is a rich source of information for affordances.

We can also hear some affordances...我們也能透過「聽覺」感知某些可供性。門閂發出的聲音便可能揭示出「可開啟」這項可供性，即便該動作無法從視覺直接觀察得知。

The notion of affordances is appealing in its direct approach towards the factors of perception and action...

可供性這個概念的魅力，在於它能直接切入感知與行動的關聯因素，並使介面設計更易學、易用。

More generally, considering affordances explicitly in design may help suggest ways to improve the usability of new artifacts.

作為一種分析科技的方式，可供性能幫助我們探索物件內在的心理主張與設計背後的理據。更廣義而言，若能在設計過程中明確考慮可供性，有助於提出提升新產品可用性的策略與方法。

It can guide us in designing artifacts which emphasize desired affordances and de-emphasize undesired ones. Perhaps most important, it allows us to focus not on technologies or users alone, but on the fundamental interactions between the two.或許最重要的是，它使我們不再只聚焦於技術或使用者本身，而是聚焦於兩者之間的根本互動。

## James G. Greeno 在 1994 年發表於《Psychological Review》的論文〈Gibson's Affordances〉，屬於 Gibson 理論的延伸與整合done

**總結：快速重點導航**

| **主題** | **頁碼** | **是否必讀** | **備註** |
| --- | --- | --- | --- |
| Gibson 理論定位與反主流思維 | p.336 | 可略讀 | 若已熟悉 Gibson 可快速跳過 |
| Situativity 與互動觀點 | p.337–338 | 建議細讀 | 若關注互動與實作認知 |
| Affordance 與 Ability 相依性 | p.338 | ✅必讀 | 理論核心 |
| Constraint 理論與駕駛例子 | p.339 | 建議細讀 | 提供形式邏輯框架 |
| Affordance 在學習與推理中應用 | p.340 | ✅必讀 | 教育與數學應用 |
| Direct vs. Recognized Perception | p.341 | 建議略讀 | 可補充 affordance 感知方式 |
| 總結與未來展望 | p.342 | 可參考 | 適合結論章節引用 |

* Gibson 的早期主張：感知與運動不可切割、批判靜止觀察為主的心理學，主張感知需放入運動與互動脈絡中理解。
* 情境理論：感知為互動過程、Gibson 不主張將感知簡化為符號處理，而是強調個體與環境之間的信息變化與調節。
* 情境理論擴展：Attunement 與 Constraints、利用情境理論定義可供性為「在某些條件下能達成有效行動的前提條件」，以 constraint 為結構核心。
* 可供性與能力：Affordance 與 Ability 的共構性、強調兩者為互為依存的互動性關係，缺一不可，並非獨立存在的屬性。
* 感知可供性：直接感知與辨識、支持 Neisser 區分「直接感知」與「辨識」，強調有些可供性需透過分類與象徵處理獲得。
* 總結：Gibson 的可供性理論提供一套更能解釋行動中感知特徵的架構，並可延伸應用到認知、社會與設計中。

可供性指的是環境中某物的屬性與具備特定能力的行動者之間的互動活動之關聯；而能力則是行動者的屬性與環境中具有可供性的事物之間的互動活動的關聯。可供性與能力之間的相對性是基本的原則。沒有其中一者，就無法明確界定另一者。

* Affordances for an agent can be understood as conditions in the environment for constraints to which the agent is attuned. This broad view of affordances includes affordances that are recognized as well as affordances that are perceived directly對某個行動者而言，可供性可以理解為其所調節對應之環境條件的存在。這種廣義的可供性觀點包含了被辨識出來的可供性，以及被直接感知的可供性。
* in any interaction involving an agent with some other system, conditions that enable that interaction include some properties of the agent along with some properties of the other system. The term affordance refers to whatever it is about the environment that contributes to the kind of interaction that occurs. 在任何一個行動者與其他系統互動的過程中，使該互動成為可能的條件包含來自行動者的一些特性，及來自另一系統的一些特性。「可供性」這個詞指的是，環境中促成特定互動類型所具有的屬性。

In Gibson's view, people and animals are attuned to variables and invariants of information in their activities as they interact as participants with other systems in the world that we inhabit. 在吉布森看來，人類和動物作為參與者與我們居住的世界中的其他系統互動時，會對其活動中的資訊變數和不變量進行適應。

Greeni對可供性的定義

The term affordance refers to whatever it is about the environment that contributes to the kind of interaction that occurs. 「可供性」一詞指的是環境中促成某種互動的任何因素。

可供性與能力的概念

I prefer the term ability, although Shaw et al. (1982) preferred to coin the term effectivity for that concept. I believe my use of the term ability is also synonymous with Snow's (1992) use of the term aptitude. 我更喜歡「能力」一詞，儘管蕭等人（1982）更傾向於用「有效性」一詞來描述這個概念。我相信我對「能力」一詞的使用也與斯諾（1992）對「能力」一詞的使用同義。

Affordances and abilities (or effectivities or aptitudes) are, in this view, inherently relational. An affordance relates attributes of something in the environment to an interactive activity by an agent who has some ability, and an ability relates attributes of an agent to an interactive activity with something in the environment that has some affordance. The relativity of affordances and abilities is fundamental. Neither an affordance nor an ability is specifiable in the absence of specifying the other. It does not go far enough to say that an ability depends on the context of environmental characteristics, or that an affordance depends on the context of an agent's characteristics. The concepts are codefining, and neither of them is coherent, absent the other, any more than the physical concept of motion or frame of reference makes sense without both of them.

從這個角度來看，可供性和能力（或有效性或能力）本質上是相互關聯的。可供性將環境中某物的屬性與具有某種能力的代理的交互活動聯繫起來，而能力將代理的屬性與環境中具有某種可供性的東西的交互活動聯繫起來。可供性與能力的相對性至關重要。在缺乏明確指定任何一方的情況下，任何一方都無法明確指定另一方。僅僅說能力依賴環境特徵的情境，或者說可供性依賴主體特徵的情境，是遠遠不夠的。這兩個概念相互關聯，如果缺少了另一方，它們就無法自洽，就像運動或參考系的物理概念如果沒有兩者，就無法理解一樣。

【孔徑與人可否通過的例子】

As Gibson's idea of affordances has been developed in research, it seems most productive when it is treated as a graded property rather than as a property that is or is not present.

正如吉布森關於可供性的概念在研究中得到了發展，當將其視為一種分級屬性，而不是存在或不存在的屬性時，它似乎最有成效。沃倫和黃（1987）提出了一個非常簡單的例子，涉及一個開口的可供性，它允許一個人從隔板的一側走到另一側。孔徑提供的可供性與其寬度有關，而人穿過孔徑的能力則取決於人的寬度。

【慣例的約束】可供性被慣例影響

People who share a linguistic practice are attuned to a great many constraints that include conventions of reference. 擁有相同語言實踐的人會適應許多約束，包括指稱慣例。

Constraints of this kind are obviously conditional. They only hold when participants in the conversation are attuned to a shared set of constraints. Many constraints also depend on the conversational setting. Affordance conditions for reference constraints include properties of the language that the participants use.這類約束顯然是有條件的。只有當對話參與者適應一組共同的約束條件時，它們才會成立。許多約束也取決於對話環境。

It seems clear to me that Gibson's intention was that the affordance is a property of whatever the person interacts with, but to be in the category of properties we call affordances, it has to be a property that interacts with a property of an agent in such a way that an activity can be supported. Affordances are, in this view, preconditions for activity, as I believe is made clearer when they are treated as conditions for constraints. The presence in a situation of a system that provides an affordance for some activity does not imply that the activity will occur, although it contributes to the possibility of that activity.在我看來，吉布森的意圖顯然是，可供性是人與之互動的任何事物的屬性，但要成為我們稱之為可供性的屬性類別，它必須是一種能夠與主體的屬性互動的屬性，從而支持一項活動。

從這個角度來看，可供性是活動的先決條件，我認為，當它們被視為約束條件時，這一點更加清晰。在某種情況下，一個為某些活動提供可供性的系統的存在並不意味著該活動會發生，儘管它有助於該活動的可能性。

[要去上課的人，他就勢必要進入教室、那他就會觀察到門口]

例如，如果一個人正在進行上課的活動，那麼進入教室的行為就是該活動的功能性組成部分。這將使該人注意到環境中可能為其進入教室提供可供性的各個方面，例如從走廊進入教室的門口。

【Greeno反對直接感知可供性的特徵不恰當】 In the broad meaning that I am proposing for the concept of affordance, it would be inappropriate to consider direct perception of affordances as a denning characteristic. 在我提出的可供性概念的廣義中，將對可供性的直接感知視為一個定義特徵是不恰當的

【舉mailbox的例子說明neisser(1992)對於可供性的識別認知】

The information required for that classification has to be visually available, of course, but the process of classification includes, I should think, a mental state that has the epistemic status of a symbol that designates the property of being a mailbox. A the oretical possibility that seems reasonable is that mental symbols

of that kind are products of the perceptual processes that Neisser (1992) regarded as recognition, rather than direct perception. 當然，這種分類所需的資訊必須是視覺上可獲得的，但我認為，分類過程包含一種心理狀態，這種心理狀態具有一種符號的認知地位，這種符號指明了郵箱的屬性。一個看似合理的理論可能性是，這類心理符號是知覺過程的產物，而奈瑟 (1992) 認為這個知覺過程是識別，而非直接感知。

【gibson的概念是非常有用的】

Gibson's affordances, then, have already been of great value and will support further valuable activity in our field.

## Ian Hutchby 發表於《Sociology》期刊（2001）的〈Technologies, Texts and Affordances〉，文章主旨是試圖將 Gibson 的「可供性」（affordance）概念引入社會學研究特別是科技與媒介互動的研究中

強調社會學研究對科技與媒介的「使用者—工具」關係興趣日增，但面臨「過度建構主義」問題，即過於強調社會建構，而忽略了技術本身的物質特性。

Hutchby 主張：應回到對技術媒介「能力與限制」的探討，可供性概念正提供這樣的橋梁。

討論 Gibson 的原始可供性理論，指出可供性是行動者與環境間的關係，具有「被直接感知的行動機會」特性。

【Gibson 的定義為「the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill」】

 Hutchby 提議將可供性運用於對科技互動過程的分析，尤其是話語分析與會話分析中。

 將科技視為「約束但不決定」行為的裝置；例如某些互動平台可能促進輪流發言，但不一定禁止打斷對話。

 可供性提供了兼具「物質性」與「社會互動性」的分析工具，可作為中介概念來連結技術條件與社會行動之間的關係。

【社會與技術不該被分開】

Sociologists need to see that social processes and the ‘properties’ of technological artefacts are inter related and intertwined, and need to analyse the ways in which they are. 社會學家需要認識到，社會過程與科技產品的「屬性」是相互關聯、交織的，並需要分析它們之間的關聯方式。

they all begin from the viewpoint that precisely what the characteristics of technologies are, as well as their relationship with social structures, are both socially constructed:the outcome of a whole range of social factors and processes.技術的確切特徵及其與社會結構的關係，都是社會建構的：是一系列社會因素和過程共同作用的結果。

 提醒我們科技不是中性的，也不是全然受社會建構決定的。

【hatchy認為可供性是】

This involves seeing technologies neither in terms of their ‘interpretive textual’ properties nor of their ‘essential technical’ properties, but in terms of their affordances (Gibson 1979).I will argue that affordances are func tional and relational aspects which frame,while not determining,the possibilities for agentic action in relation to an object.In this way,technologies can be understood as artefacts which may be both shaped by and shaping of the practices humans use in interaction with, around and through them這既不是從技術的「解釋性文本」屬性，也不是從技術的「本質技術」屬性的角度來看待技術，而是從其可供性（Gibson 1979）的角度來看待技術。我認為，可供性是功能性和關係性的方面，它們構成了（但並非決定了）與物件相關的代理行為的可能性。這樣，技術就可以被理解為人工製品，它既可能被人類在與技術互動、圍繞技術互動以及透過技術互動時所使用的實踐所塑造，也可能塑造這些實踐。

【討論建構主義(人類行動與塑造)與現實主義(技術能力的約束力)】

This ‘third way’ between the (con structivist) emphasis on the shaping power of human agency and the (realist) emphasis on the constraining power of technical capacities opens the way for new analyses of how technological artefacts become important elements in the patterns of ordinary human conduct.這種介於（建構主義）強調人類能動性的塑造力與（現實主義）強調技術能力的約束力之間的“第三條道路”，為重新分析技術人工製品如何成為普通人類行為模式中的重要元素開闢了道路

【用以人造物與人類實踐之間關係的本質】

But I do want to argue that a new empirical perspective is possible on the nature of the relationship between technological artefacts and human practices.可以用來理解技術製品與人類實踐之間關係的本質。

【科技做為世俗客體同時有限制、又有附能性】

But I do want to argue that a new empirical perspective is possible on the nature of the relationship between technological artefacts and human practices. That perspective needs to be grounded in a conception of the constraining,as well as enabling,materiality of the technology as a worldly object.這種視角需要建立在這樣一種觀念之上：技術作為一種世俗客體，既具有限制性，又具有賦能性。

【物質性】‘Materiality’ here need not be thought of only in physical terms. We may, for instance, think of the telephone as having a materiality affecting the distribution of interactional space, through the promotion of what can be called conversational ‘intimacy at a distance’. Likewise we can conceive of the interfaces of expert systems or internet conferencing software as having a materiality affecting navigation through a technically bounded interactional space, as people attempt to orient themselves in the sequential order of a particular interaction (Hutchby 2000). 「物質性」不必僅從物理的角度來思考。例如，我們可以認為電話的物質性會影響互動空間的分佈，因為它促進了所謂的對話式「遠距離親密感」。同樣，我們可以設想專家系統或互聯網會議軟體的介面，也具有物質性，它會影響人們在技術受限的交互空間中的導航，因為人們試圖按照特定交互的順序進行定位【是否可以說成技術影響人們的感知與操作、行動?】（Hutchby 2000）。

【技術擁有不同的可供性】The affordances of things I suggest that the answer to this question is no. The reason is that different technologies possess different affordances, and these affordances constrain the ways that they can possibly be ‘written’ or ‘read’. 原因在於，不同的技術擁有不同的可供性，而這些可供性限制了它們可能被「書寫」或「閱讀」的方式。

【可供性的相對性】

.Affordances may thus differ from species to species and from context to context. However, they cannot be seen as freely variable. While a tree offers an enormous range of affordances for a vast variety of species, there are things a river can afford which the tree cannot,and vice versa.因此，可供性可能因物種和環境而異。然而，它們不能被視為自由變化的。樹木為各種各樣的物種提供了種類繁多的可供性，而河流可以提供而樹木無法提供的東西，反之亦然。

【可供性不會變】,‘the affordance of something is assumed not to change as the need of the observer changes.The edibility of a substance for an animal does not depend on the hunger of the animal.The walk-on-ability of a surface exists whether or not the animal walks on it’(ibid.)「事物可供性」不會隨著觀察者需求的改變而改變。某種物質對動物的可食性並不取決於動物的飢餓程度。無論動物是否在其表面行走，其表面的可行走性都存在（同上）。

【補充說明直接姓】

Secondly, the view developed within cognitive psychology that the brain must play an intermediary role in perception by interpreting the images transmitted via light sources to the retina.Against this view, Gibson (1979) argued that the affordances of objects could be ‘directly perceived’: for instance, it may be that a fleeing lizard perceives the shape in front of it directly in terms of its affordance as a ‘place to hide’(while an observing human may equally characterise it as ‘a rock’)認知心理學中發展出一種觀點，認為大腦必須透過解讀光源傳遞到視網膜的圖像，在感知中扮演中介角色（認知心理學認為視覺是中介角色）。與此觀點相反，Gibson (1979) 認為，物體的可供性可以被「直接感知」：例如，一隻逃跑的蜥蜴可能直接將其前方的形狀感知為「藏身之處」（而觀察者也可能將其描述為「一塊石頭」）

【補充說明gibson可供性忽略的四個重點】我想指出吉布森對可供性解釋中有時會忽略的四個重點

1 首先，雖然吉布森的著作強調了自然物體的可供性，以及感知空間的生態學，但可供性當然有很多種類型：自然環境的可供性；人工製品的可供性；環境中其他物種的可供性；或我們自身物種的其他成員的可供性；等等。這些不同的來源的可供性可能在任何特定的行動場合相互關聯或複合。而且是物體在世界中物質存在的關係性方面

First, while Gibson’s work stressed the affordances of natural objects and the ecology of perceptual space, there are of course many types of affordances: affordances of the natural environment; affordances of artefacts; affordances of other species within the environment; or of other members of our own species; and so on. These different sources may be interrelated or compounded on any given occasion of action.

2.可供性不只功能性functional，也包含關聯性relational 【其實就是相對性與互補性，我感覺gibson其實有提到】

可供性不僅是功能性的，而且是物體在世界中物質存在的關係性方面

Affordances are functional in that they either enable or constrain a particular organism's attempts to engage in an activity: walking, hiding, photocopying a document, and so on. Some objects, environments, or artifacts have affordances that enable certain activities, while others do not同時，可供性可以塑造出與某個行動相關的可能性條件：也許可以用一個方法來實現，但用另一種方法則不行。相較之下，關聯性則讓我們注意到，一個物體的可供性可能因物種而異。水面不具備獅子或鱷魚能夠在上面行走的可供性，但昆蟲水黽卻具備。

To Gibson's (1982:409) comment: "The walkability of a surface exists whether or not animals walk on it", we can add: the walkability of a surface is revealed when animals walk on it.Greeno說可以補充成: 無論動物是否在其上行走，表面的可行走性都存在”，我們可以補充：當動物在其上行走時，表面的可行走性才顯現出來。

3 可供性不總是直接感知，而是需要透過學習

舉相機教準的例子，若打開了相機膠捲就會傷害底片，孩子可能會了解到社會和技術規則都限制了相機門的可供性：也就是說，除非你想毀掉膠卷（並招致成年相機擁有者的憤怒），否則你不要打開它

4. 可供性是可以被設計出來的

Affordances can also be designed into the artefact.可供性也可以被設計到人工製品中

Rather than limiting our analytical gaze to the construction of descriptions and representations of technology, we should focus more on the material basis that underpins the possibilities of different courses of action associated with the artifact; it constitutes the practical framework within which technology is integrated into everyday behavior.我們不應將分析的目光局限於對技術的描述和表徵的建構，而應更多地關注物質基礎，它支撐著與人工製品相關的不同行動方案的可能性；它構成了技術融入日常行為的實踐框架。

我們必須認識到，人工製品（即人造物品）的可供性並不一定源於其物質性的自然特徵（例如，鼓槌是由堅硬的木材製成的，這一事實在其被人類製作成“擊鼓的棍子”和“戳東西的武器”的可供性中發揮了作用）

【使用科技與跟科技互動時，觀察與科技間的互動或限制很重要】

當人們透過科技、圍繞科技或與科技互動時，他們有必要找到方法來應對這些技術所能帶來的行動限制

【結論中提及：My aim has been to argue for an acceptance that our interpretations and uses of technological artefacts,while important,contingent and variable,are constrained in analysable ways by the ranges of affordances that particular artefacts possess.我們對科技產品的解讀和使用，雖然重要、偶然且多變，卻以可分析的方式受到特定產品所具備的各種可供性（affordances）的限制。

科技產品不僅取決於使用者如何利用它們；它們的組成取決於人類目標與產品功能之間的相互作用

**段落四大重點說明整理（中英對照）**

1. **多樣來源的可供性（Multiple sources of affordance）**

❝ Gibson 強調的是自然環境中的可供性，但 Hutchby 指出還包括：人工物件、他人、物種之間的可供性，這些在具體行動中是交錯且可組合的。  
✅ 適合用於**說明平台技術的複合性與多元行動誘發**。

1. **功能性與相對性（Functionality and relationality）**

❝ 可供性不只是功能性的（enable/constrain），也是關係性的——對某一物種可能具可供性，對另一個物種則否。Gibson 說「即使沒人走上去，walk-on-ability 也存在」，Hutchby 補充：只有走上去時它才「顯現」。  
✅ 適合應用於說明**可供性與使用者特性（如專業、知識、身體）之間的相依關係**。

1. **可供性的學習性與規範性（Affordances can be learned and normed）**

❝ 可供性不總是直接感知的，有些必須透過社會學習。例如孩子發現相機的門可以打開（物理可供性），但開啟會毀壞底片（社會規範限制）。  
✅ 非常適合用於說明**平台設計中的行為規則與使用者經驗如何形塑可供性的顯現與實作**。

1. **可供性可被設計（Affordances are designed）**

❝ 好的設計師會讓物件的可供性「易於被感知」（Norman, 1990），例如門把、電燈開關的設計。  
✅ 適合用於討論**數位平台或工具如何藉由設計主動創造特定互動可能性**，特別是你在分析 Frontier 或 FabriSelect 功能時的設計邏輯。

**✅ 2. 與 Gibson 可供性定義與特性相關句子：**

* **原始定義再現：**

“the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill.”

* **可供性非主觀或客觀本質：**

“Affordances are neither simply objective properties nor subjective experiences. Rather, they are relational properties.”

* **相對性（relational, not fixed）：**

可供性存在於「technology-as-used」的關係中，而非單純在於技術本身或使用者的主觀詮釋中。

* **媒介可供性（媒體實踐）：**

“the affordances of media technologies make possible a range of practices while also constraining others.”

Media technologies affordance：媒介本身如網站、聊天室、電話等具有「形塑互動可能性」的作用

結構性限制：技術設計不只是提供功能，也限制行動方式

分析單位延伸：從「生物—環境」延伸到「使用者—技術系統—話語（utterances）」

未來可應用：結合對話分析、話語分析等社會互動研究方法

utterances, or stretches of talk, are taken to be structured communicative actions that are simultaneously indexical, recipient-designed and reflexively tied to the sequential environment of their production.話語或一段對話被視為具有結構的溝通行動，它們同時具備指示性、為特定聽者設計，並且與其所產生的語境順序相互關聯。

## Donald A. Norman 的〈Affordance, Conventions, and Design〉（1999），標題為 "Affordances, Constraints, and Conceptual Models"

To Gibson, affordances are relationships. They exist naturally: they do not have to be visible, known, or desirable.

對 Gibson 而言，可供性是一種關係。它們自然存在，不必是可見的、已知的，或具吸引力的。

📝這裡強調 Gibson 認為 affordance 是一種自然存在的「環境—行動者」關係，不依賴主觀認知即可存在。

I originally hated the idea: it didn’t make sense. I cared about processing mechanisms, and Gibson waved them off as irrelevant.

我一開始討厭這個概念，因為它讓我無法理解。我關注的是訊息處理的機制，而 Gibson 卻一概視其為無關緊要。

📝Norman 表達他一開始對 Gibson 忽略訊息處理機制的立場不以為然。

A major theme of POET was the attempt to understand how we managed in a world of tens of thousands of objects, many of which we would encounter only once. When you first see something you have never seen before, how do you know what to do? The answer, I decided, was that the required information was in the world: the appearance of the device could provide the critical clues required for its proper operation.

POET 的主題之一是試圖理解：我們是如何在這個充斥著成千上萬物件的世界中應對這些物品，其中許多甚至只會遇到一次。當你第一次看到一個從未見過的東西時，你如何知道該怎麼操作？我認為答案是：所需的資訊其實就存在於世界中。物件的外觀可以提供正確操作所需的重要線索。

The designer cares more about what actions the user perceives to be possible than what is true.設計師更關心用戶認為可能的行動，而不是實際的情況。

deals with real, physical objects, there can be both real and perceived affordances, and the two sets need not be the same.涉及真實的物理物體時，既可以有實際的功能，也可以有感知的功能，而這兩者不必相同。

Although all screens within reaching dis tance afford touching, only some can detect the touch and respond to it. Thus, if the dis play does not have a touch-sensitive screen, the screen still affords touching, but it has no effect on the computer system. While the affordance has useful value in allowing people viewing the same screen to indicate regions of interest, this affordance mainly serves to make the screen-cleaning companies happy: they can sell lots of tissue and cleaning fluid. But this affordance is seldom useful to the inter face designer. 雖然所有在可觸及距離內的螢幕都可以觸碰，但只有部分螢幕能夠檢測觸碰並作出反應。因此，如果顯示器沒有觸控敏感螢幕，螢幕仍然可以觸碰，但對電腦系統沒有任何影響。儘管這種可觸碰性對於讓使用相同螢幕的人指出感興趣的區域有實用價值，但這種可觸碰性主要是為了讓清潔螢幕的公司高興：他們可以賣出大量的紙巾和清潔劑。但這種可觸碰性對於界面設計師來說幾乎沒有用處。

**Now consider the traditional computer screen where the user can move the cursor to any location on the screen and click the mouse button at anytime.**

**現在，來想像傳統的電腦螢幕，使用者可以將游標移動到螢幕上的任意位置，並隨時點擊滑鼠按鈕。**

**In this circumstance, designers sometimes will say that when they put an icon, cursor, or other target on the screen, they have added an “affordance” to the system.**

**在這種情況下，設計師有時會說當他們在螢幕上放置一個圖示、游標或其他目標時，就向系統添加了一種「可供性」。**

**This is a misuse of the concept. The affordance exists independently of what is visible on the screen.**

**這是對可供性概念的誤用。可供性本身是獨立存在的，並不依賴螢幕上可見的內容。**

**📝 Norman 在此強調「可供性 ≠ 視覺提示」，它是一種潛在的、基於物件與使用者能力的關係。**

**Those displays are not affordances; they are visual feedback that advertise the affordances: they are the perceived affordances.**

**那些畫面顯示的東西並不是可供性；它們只是宣示可供性的視覺回饋，是「可感知的可供性」。**

**The difference is important because they are independent design concepts: the affordances, the feedback, and the perceived affordances can all be manipulated independently of one another.**

**這個區別非常重要，因為這些是彼此獨立的設計概念：可供性、回饋、與可感知的可供性可以彼此獨立地進行設計與調整。**

**Perceived affordances are sometimes useful even if the system does not support the real affordance.**

**即使系統實際上不支援某項功能，可感知的可供性有時仍然具有實用價值。**

**📝 例如，按鈕看起來可以按，但其實沒連接功能。仍可能誘導使用者行動。**

**Perceived affordances are sometimes useful even if the system does not support the real affordance.** **感知的可供性有時即使在系統不支援實際可供性的情況下也會是有用的**

**例如不能說有icon介面的設計就是有可供性，因為使用者可以在其他沒有icon的地方進行點擊**

**When you learn not to click unless you have the proper cursor form, you are following a cultural constraint.** **當你學會在擁有適當的光標形狀時才點擊，你就是在遵循一種文化約束。**

**Far too often I hear graphic designers claim that they have added an affordance to the screen design when they have done nothing of the sort. Usually they mean that some graphi cal depiction suggests to the user that a certain action is possible. This is not affordance, either real or perceived. Honest, it isn’t. It is a symbolic communication, one that works only if it follows a convention understood by the user.** **太多時候，我聽到平面設計師聲稱他們在螢幕設計上添加了某種便利性，但實際上並沒有這樣做。通常，他們的意思是某些圖形描繪向用戶暗示某項行動是可能的。然而，這並不是便利性，無論是實際的還是感知的。老實說，根本不是。這是一種符號溝通，只有在遵循用戶理解的慣例時才能有效。**

**In POET, I introduced the distinctions among three kinds of behavioral constraints: physical, logical, and cultural. These are powerful design tools, so let’s be clear where each is being used.** **在 POET 中，我介紹了三種行為約束的區別：物理上的、邏輯上的和文化上的。這些都是強有力的設計工具，因此我們要清楚每一種是如何被使用的。**

**Norman 在這段強調：**

1. **設計常誤用 affordance，把圖示、游標、按鈕等視為「可供性本身」，其實它們是「可感知的可供性」或「視覺提示」。**
2. **真正的 affordance 是存在於「行動者能力」與「物體特性」之間的潛在互動可能，不一定可見。**
3. **設計師應該關注：是否讓使用者「感知到」某行為是可能且有意義的。**
4. **設計介面上使用的 conventions（慣例）、feedback（回饋）、perceived affordances（感知到的可供性）是相互獨立但需協調運作的要素。**

**Physical constraints are closely related to real affordances: For example, it is not possible to move the cursor outside the screen: this is a physical constraint.物理限制與實際可供性密切相關：例如，不可能將光標移到螢幕外面：這是一種物理限制。**

**Restricting the cursor to exist only in screen locations where its posi tion is meaningful is a physical constraint.** **限制光標僅在其位置有意義的螢幕位置上存在是一種物理限制。**

**A convention is a constraint in that it pro hibits some activities and encourages others.** Physical constraints make some actions impossible: there is no way to ignore them. Logical and cultural constraints are weaker in the sense that they can be violated or ignored, but they act as valuable aids to navigating the unknowns and complexities of everyday life.**慣例是一種限制，因為它禁止某些活動並鼓勵其他活動。物理限制使某些行為變得不可能：沒有辦法無視它們。邏輯和文化約束在某種程度上較弱，因為它們可以被違反或忽視，但它們作為導航日常生活中的未知和複雜性的重要輔助工具。**

**Cultural constraints and conventions are about what people believe and do, and the only way to find out what people do is to go out and watch them—not in the laboratories, not in the usability testing rooms, but in their normal environment.** **文化的限制和規範是關於人們的信念和行為，而了解人們的行為唯一的方法就是走出去觀察他們——不是在實驗室，不是在可用性測試室，而是在他們的正常環境中。**

**Personally, I believe that our reliance on abstract representations and actions is a mistake and that people would be better served if we would return to control through physical objects, to real knobs, sliders, buttons, to simpler, more concrete objects and actions.**

**我個人認為，我們過度依賴抽象的表徵與行動是一種錯誤；若能回到以實體物件控制系統，例如使用真正的旋鈕、滑桿、按鈕等更簡單具體的方式，對人們會更加有益。**

**But that is a different story for a different time.**

**但這是另一個主題，暫且不談。**

**Please don’t confuse affordances with perceived affordances. Don’t confuse affordances with conventions.**

**請不要混淆可供性與感知可供性，也不要將可供性與慣例混為一談。**

**Affordances reflect the possible relationships among actors and objects: they are properties of the world.**

**可供性反映的是行動者與物件之間的可能關係，它們是世界本身的屬性。**

**Conventions, conversely, are arbitrary, artificial, and learned.**

**相反地，「慣例」是任意的、人為的、且需經由學習才能習得。**

**Once learned, they help us master the intricacies of daily life, whether they be conventions for courtesy, for writing style, or for operating a word processor.**

**一旦學會這些慣例，它們能幫助我們掌握生活中的複雜事務，無論是禮節、寫作風格，還是操作文書處理軟體的方式。**

**Designers can invent new real and perceived affordances, but they cannot so readily change established social conventions.**

**設計師可以創造新的真實與感知可供性，但卻無法輕易改變既有的社會慣例。**

**核心觀點整理：**

* **真實可供性（real affordance）：客觀存在於物與行動者之間，無需感知也存在。**
* **感知可供性（perceived affordance）：經由視覺提示或設計，使使用者知道可以做什麼。**
* **慣例（convention）：學習而得的社會規則，雖非自然存在但對操作至關重要。**
* **設計應強調「讓可供性變得可見」，讓行動更直觀。**
* **當前設計多在虛擬環境中，物理可供性減少，需更依賴慣例與限制。**
* **優秀的設計能綜合運用以上所有元素。**

**一、Gibson 可供性理論的延伸與重釋（心理學與哲學）**

1. **Norman, D. A. (1988). *The Psychology of Everyday Things***（後來版名為 *The Design of Everyday Things*）
   * Norman 將 Gibson 的可供性概念引入工業設計與人機互動領域，並區分「真實的可供性」與「感知的可供性（perceived affordance）」，強調設計應讓使用者一眼就能理解功能。
2. **Chemero, A. (2003). *An outline of a theory of affordances*. Ecological Psychology.**
   * 主張可供性應被理解為一種「動態的關係」，並提出動態系統與現象學觀點，批判傳統靜態定義。
3. **Heft, H. (2001). *Ecological Psychology in Context*.**
   * 延續 Gibson 的思想，強調兒童發展、教育與行動導向的知覺。重新詮釋可供性為「體驗中的實用結構」。

**二、科技可供性與人機互動（HCI／設計導向）**

1. **Gaver, W. W. (1991). *Technology affordances*. Proceedings of the SIGCHI Conference.**
   * 將可供性正式應用於數位科技與人機互動，提出「可見可供性（perceptible affordances）」與「隱含可供性（hidden affordances）」的區分。
2. **McGrenere, J., & Ho, W. (2000). *Affordances: Clarifying and evolving a concept*. Proceedings of Graphics Interface.**
   * 批判 Norman 對可供性過度簡化，回歸 Gibson 的原意並提出四種類型的 affordances：**perceived, actual, correct, false**。
3. **Dourish, P. (2001). *Where the Action Is: The Foundations of Embodied Interaction*.**
   * 探討資訊科技中的可供性與行動性之關係，主張設計應以使用者的實踐為中心，從 embodied interaction 出發重新理解科技可供性。

**三、資訊系統與科技社會研究中之可供性應用**

1. **Zammuto, R. F., et al. (2007). *Information technology and the changing fabric of organization*. Organization Science.**
   * 探討資訊科技的「可供性」如何重新形構組織行動，提出資訊科技 affordance 對組織策略與結構的影響。
2. **Leonardi, P. M. (2011). *When flexible routines meet flexible technologies: Affordance, constraint, and the imbrication of human and material agencies*. MIS Quarterly.**
   * 提出「imbrication」（疊合）概念，描述人與科技如何共同構成行動實踐，科技可供性與限制共同塑造組織行為。
3. **Majchrzak, A., Faraj, S., Kane, G. C., & Azad, B. (2013). *The contradictory influence of social media affordances on online communal knowledge sharing*. Journal of Computer-Mediated Communication.**
   * 分析社群媒體的科技可供性如何同時促進與阻礙知識分享，展現可供性具有多重方向與脈絡依賴性。

## Gibson（1979）

可供性指的是環境中對某一特定生物可供的行動機會，可供性不同於價值和意義，是主觀的、現象的和心理的，，它在某種意義上是客觀的、真實的和物理的，關於環境的可供性的一個重要事實是，是一種可直接感知的環境特性，例如我們不需要辨識或認知椅子的顏色或材質，只要確保它的表面是平坦可支撐的，就可以得知她可以被坐上去。媒介、物質、表面、物體、地點和其他動物對於特定動物具有可供性。它們提供了利益或傷害，生命或死亡。這就是為什麼它們需要被感知。The medium, substances, surfaces, objects, places, and other animals have affordances for a given animal. They offer benefits or injury, life or death. This is why they need to be perceived.

相對存在的Affordance 是相對於生物而存在的，具有客觀但非抽象的性質，既非物理性質，也非主觀價值。例如太高的椅子對小孩來說不具備可供性，因為他做不上去，但對成人來說卻具備人類改造環境的目的即在於調整其 affordances，使其更適合生活與使用。」

**理論總結：affordance 不是主觀投射而是直接可感知**

**簡短說法：**

「Affordance 並非心理上的賦予或詮釋，而是動物與環境間實際存在、直接可感知的互補關係。」

**出處：**  
p. 139，"The affordances of the environment are facts of the environment... The information is in the ambient light... But what you perceive directly when you look around are the affordances of the environment."

**出處：**  
p. 130，"The human animal has altered the surface layout around him and changed the substances and the objects so as to change what they afford him."

An important fact about the affordances of the environment is that they are in a sense objective, real, and physical, unlike values and meanings, which are often supposed to be subjective, phenomenal, and mental. But, actually, an affordance is neither an objective property nor a subjective property; or it is both if you like. An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither關於環境的可供性的一個重要事實是，它在某種意義上是客觀的、真實的和物理的，不同於價值和意義，後者往往被認為是主觀的、現象的和心理的。但實際上，可供性既不是客觀屬性也不是主觀屬性；或者如果你願意，它是兩者兼具。可供性跨越了主觀與客觀的二分法，幫助我們理解其不足之處。它同時是環境的一個事實，也是行為的一個事實。它既是物理的，也是心理的，但又不是兩者。可供性同時指向這兩個方向。

SUMMARY The medium, substances, surfaces, objects, places, and other animals have affordances for a given animal. They offer benefits or injury, life or death. This is why they need to be perceived. The possibilities of the environment and the way of life of the animal go together inseparably. The environment constrains what the animal can do, and the concept of a niche in ecology reflects this fact. Within limits, the human animal can alter the affordances of the environment but is still the creature of his or her situation. There is information in stimulation for the physical properties of things, and presumably there is information for the environmental properties. The doctrine that says we must distinguish among the variables of things before we can learn their meanings is questionable. Affordances are properties taken with reference to the ob-server. They are neither physical nor phenomenal. The hypothesis of information in ambient light to specify affordances is the culmination of ecological optics. The notion of invariants that are related at one extreme to the motives and needs of an observer and at the other extreme to the substances and surfaces of a world provides a new approach to psychology. 摘要 媒介、物質、表面、物體、地點和其他動物對於特定動物具有可供性。它們提供了利益或傷害，生命或死亡。這就是為什麼它們需要被感知。環境的可能性和動物的生活方式是不可分割地結合在一起的。環境限制了動物所能做的事情，而生態學中對物種生態位的概念反映了這一事實。在一定程度上，人類動物可以改變環境的可供性，但仍然是其情境的產物。刺激中包含有關物體物理特性的資訊，並且推測有關環境特性的資訊也存在。聲稱我們必須區分事物的變數才能學習其意義的學說是值得懷疑的。可供性是與觀察者相關的特性。它們既不是物理的，也不是現象的。環境光中存在資訊以具體化可供性的假設是生態光學的巔峰。與觀察者的動機和需求在一端，與世界的物質和表面在另一端相關的恆常性概念為心理學提供了一種新的方法。

Why has man changed the shapes and substances of his environment? To change what it affords him. He has made more available what benefits him and less pressing what injures him. In making life easier for himself, of course, he has made life harder for most of the other animals. Over the millennia, he has made it easier for himself to get food, easier to keep warm, easier to see at night, easier to get about, and easier to train his offspring. 為什麼人類會改變他的環境的形狀和物質？是為了改變環境能提供給他的東西。他使那些對他有利的東西變得更容易獲得，而使那些傷害他的東西變得不那麼迫切。當然，為自己創造更輕鬆的生活，他也使大多數其他動物的生活變得更艱難。經過數千年，他讓自己獲得食物變得更容易，讓取暖變得更簡單，晚上看清楚變得更簡單，出行變得更方便，並讓他訓練後代變得更容易。

This is not a new environment—an artificial environment distinct from the natural environment—but the same old environment modified by man. 這不是一個新的環境—一個與自然環境不同的人造環境—而是同樣的舊環境被人類改造過的結果。

## 制定相關文獻

制定過程中，認知並非完全先於行動存在。人們往往在行動之後，才藉由回顧語言與行為的痕跡形成認知與詮釋的現象，因此意義建構（Sensemaking）被具有回顧特性（Retrospective）(Weick, 1979)，人們回顧時往往伴隨認知、情緒與想法的交織，而這種回顧是一種持續的過程

Karl E. Weick（1969）在經典著作《The Social Psychology of Organizing》中首次提出「制定（Enactment）」的概念，旨在解釋組織如何於不確定的環境中，透過行動（Action）建構意義（Sensemaking）。Weick主張組織並非單純回應環境（Environment）的變化，而是在行動過程中「制定」其所處的環境，亦即「行動本身即構成環境的一部分」。這顛覆了過去將環境視為獨立實體的概念，讓環境不再獨立於組織之外，成為組織成員透過日常互動與行動「制定」出來的結果，是一種「被創造的現實」。

制定過程中，認知並非完全先於行動存在。人們往往在行動之後，才藉由回顧語言與行為的痕跡形成認知與詮釋的現象，因此意義建構（Sensemaking）被具有回顧特性（Retrospective）(Weick, 1979)，人們回顧時往往伴隨認知、情緒與想法的交織，而這種回顧是一種持續的過程(何瑞萍, 2014)，並且，行動並不會完全依循固定程序，而是隨著事件推演，透過對突發情況的應對、產生調整(Orlikowski, 1996)。

根據Donald T. Campbell提出的社會文化演化模型「變異－選擇－保留」（Variation–Selection–Retention）」為基礎，Weick將模型中的「變異（Variation）」改為「制定（Enactment）」，並於1979年提出「制定－選擇－保留（Enactment–Selection–Retention）」的三階段架構。Weick主張**「**制定」是行動者採取行動，創造出可被理解的環境與情境；「選擇」代表從眾多解釋中，選出最具一致性的解釋；「保留」則是將有用的解釋和經驗內化為組織記憶，進一步影響未來的判斷與行動(Weick, 1979)。

在制定歷程中，行動不僅是認知的實踐表現，更是產生理解與意義的方式。行動者根據先前形成的認知與信念，進行回應、調整與創造，而這些行動亦反過來影響行動者對環境的理解與認知(何瑞萍, 2014)。特別是在面對高度不確定或突發情境時，人們透過試探性行動來釐清現況並獲得理解，說明行動本身即是認知的基礎(Weick, 1988)。

2015年，Weick更將此架構簡化為「說（Saying）為制定（Enacting）、看（Seeing）為選擇（Selecting）、想（Thinking）則為保留（Retaining）」(Weick, 2015)，他透過一句經典名言「*How can I know what I think until I see what I say?*我在親眼看到自己說的話之前，我怎麼知道我心裡想的是什麼？(Weick, 2015)」，來說明行動本身不只是反映內在認知，更是認知形成的起點。他強調行動與認知之間的密切關聯，組織成員透過行動來制定環境，再透過觀察結果產生選擇與判斷、並保留有效經驗，進而形塑後續行動方向(Weick, 1979, 2015)。

Barley與Tolbert延伸此觀點，認為制度不是既定的外部結構，而是行動者在實務互動中的重複實踐所產生和重現的結果(Barley & Tolbert, 1997)，換言之，無論是組織環境還是制度規則，其實都源自人們如何理解、實踐並持續形構其所處的世界。Weick透過制定解釋組織如何透過行動建構出可理解的現實，同時強調行動本身即是對環境的創造。在具體行動的同時，人們也正重新理解其所處環境，並藉此逐步形構對現實的認知(Weick, 1979, 1988, 2001, 2015)。

制定理論亦被應用於電子化政府系統導入的研究中。Chan等人（2011）以資源制定（Resource Enactment）視角分析其推動歷程，指出每階段的環境脈絡會激發特定焦點能力（Focal Capability），這些焦點能力不由單一資源形成，而是來自不同資源間的整合、互動，即所謂的共生性制定行動（Symbiotic Enactment）(Chan et al., 2011)，只有在資源相互配合下，制定行動才能實際發生。本研究亦參考Chan等人所提出的「制定與環境互構」架構圖（圖OO），以說明環境與制定之間的關係。



圖 環境與制定關係圖

### 2.1.2 制定的動態循環過程

本文採用制定理論，將不僅止於Weick所提出宏觀並抽象的「行動建構意義」概念，而是進一步聚焦於制定歷程中的三個核心構成要素：認知（Cognition）、行動（Action）與環境建構（Constructed Environment）。此三者並非單向的線性關係，而是彼此環環相扣、動態循環的歷程，解釋組織在環境中持續建構認知、實踐行動並重塑所處環境，進而展開下一輪的認知與行動過程。

制定為組織運作中的關鍵過程，行動者會根據所處情境做出反應，而這些反應又進一步改變環境情境(Weick, 1979, 2001)，而改變不來自單一理性規劃，而是源自於行動者身處的制度、文化與政治脈絡共同交互所產生的結果(Fountain, 2004)，也就是說，環境不是客觀給定，而是行動與結構之間互動後共同建構的產物(Reed, 1997)。

在Orlikowski的研究中，她發現每一次與科技的互動都是在特定時間與脈絡下進行的，因此在每次使用科技的過程，都有可能制定出不同的結構(Orlikowski, 1996, 2000)，此觀點突顯了制定並非靜態重複，而是在不同時間點與環境條件下不斷產生改變的歷程。

此外，後續學者也從不同層次延伸制定理論的應用。例如Gioia與Chittipeddi將此邏輯應用於組織改革的過程，他們改革關鍵點在於高階管理者如何建構與傳遞對於組織願景的解釋，組織改革過程涉及認知與行動之間的相互作用，以形成重複理解並產生影響的循環（Gioia & Chittipeddi, 1991）。

Giddens則從宏觀層面討論社會結構如何透過實踐被產生與再製，他認為結構不是獨立於行動者之外的靜態實體，而是人們的實踐活動所展現的結構性特質，而結構的存在形式，正是行動者根據記憶與行動實踐所反覆再製的結果（Giddens, 1984）。

Weick與Putnam，更在後續的研究補充道，內容被建構的方式是解釋與理解的關鍵，若將注意力僅放在「內容本身」，而忽略產生構思的過程，便容易落入表層化的詮釋；事實上，組織行為中真正需要關注的是「內容如何被建構出來」的歷程，強調詮釋過程本身即是理解與創造的核心（Weick & Putnam, 2006）。

在創業領域中，林家五等人亦提出「創業家的釋意歷程」模型，說明創業家的行動並非預設結果，而是根據其身份認同、環境詮釋與個人脈絡所產生的認知逐步轉化而來，他指出詮釋歷程並非靜態反應，而是在回應環境的過程中不斷轉換與深化，並藉由行動來實踐與修正認知，逐步形成新的意義理解與行動方向(林家五 et al., 2004)，回應Weick所強調的：「思考激發行動，行動再觸發新的思考」。

綜合上述，制定是由認知、行動與環境三者所構成的動態系統，由於行動會創造出新的結構與限制，成為環境、情境與參考依據，進而創造出他們所面對的部分環境，這讓環境不再是被動接受的條件，而是行動的產物(Weick, 1988)，組織行動產生的痕跡又成為再認知的素材，並進一步形塑新環境，使制定歷程不斷往復展開，制定循環使組織能夠在變動環境中發展、調整與再創。本研究即提出以下循環分析架構（如圖），用以剖析數位平台開發歷程中，企業如何資源配置、制定策略進行平台發展，持續回應外在挑戰。



圖 制定循環圖

Enactment is a key constituent process of organizing (Weick, 1979, 2001; Weick et al., 2005

Enactment is coupled with the contextual environment (Weick, 1979, 2001) as human agents act in response to various environmental stimuli (Fountain, 2001; Daneels, 2003)

~~Thus, both the enactment process and the contextual environment interrelate with each other (Reed, 1997; Pawlowski & Robey, 2004因此，實踐過程和情境環境彼此相互關聯（Reed, 1997; Pawlowski & Robey, 2004）~~

~~FOUNTAIN J (2001) Building the Virtual State: Information Technology and Institutional Change. Brookings Institution, Washington, DC.~~

**~~Fountain (2001)~~**

**~~合理性確認：~~** ~~你引用她的「技術制定架構」來說明 ICT 系統如何透過制度脈絡的行動被制定出不同結果，是針對「環境如何被行動者創造出來」的補充解釋，很適合你的第三要素「環境建構」段落。~~**~~補充建議引用原句：~~**

* ~~“The enactment of ICT systems in government agencies is the result of various cognitive, cultural, structural and political ‘embeddedness’ that reside in the contextual environment.” (Fountain, 2001)~~

書中指出作者將 technology enactment framework 應用於「虛擬機關（virtual agency）」的分析，說明在網路環境下資訊與政府服務如何透過資訊科技重構，並非只是技術系統的單向實作，而是一種制度性與社會性互動過程。The technology enactment framework could be applied...”（Fountain, 2001, p. 90）技術制定架構（technology enactment framework）可應用於虛擬政府機關的實踐情境中，說明在數位化重構下政府機關的運作如何不再單純依賴正式制度與科層流程，而轉向網路與數位溝通介面的組織互動方式（Fountain, 2001, p. 90）。

"Technology enactment illuminates the struggle of organizational decisionmakers and actors to integrate the capabilities of a new information technology with their existing organizational and institutional arrangements." 技術制定凸顯了組織決策者與行動者在整合新資訊科技與原有組織與制度安排之間所面臨的掙扎與挑戰（Fountain, 2001）。

補充段落也說明：「...with little awareness or understanding of the transformative potential...」可解釋為組織成員雖實踐既定制度與流程，卻未意識到其行動實際上產生了變革性影響。“Networked computing in the Ninth Division was enacted by the organization’s members...”（Fountain, 2001）

第九師的網路計算系統是由組織成員加以制定，以維持既有的績效方案、角色定義與角色關係，試圖延續既有的制度秩序（Fountain, 2001）。

進一步描述指出，引入資訊科技後不僅改變了指揮官的角色，也使某些人員的技能需求與角色被重新定義，此過程中 enactment 不只是維持舊有制度，也促成了潛在的組織再建構。

The underlying theme is human agency (Weick, 2001; Boudreau & Robey, 2005), emphasizing the action of humans in fulfilling certain emergent outcomes. Orlikowski (2000, p. 425) noted that the notion of enactment conveys the sense of ‘to constitute, actuate, perform’ or ‘to represent in or translate into action’. It embodies ‘the central point that when people act, they bring events and structures into existence and set them in motion’ (Weick, 1988, p. 306).

**Orlikowski (1996, 2000)**

**合理性確認：**  
你引用她在 1996 年指出的行動者對科技的即時調整與實踐，符合「行動在情境中產生結構與理解」的概念。2000 年的論點「每次使用都可能制定出不同結構」進一步突顯了「行動–環境建構–再制定」的迴圈。  
**~~補充建議引用原句：~~**~~“~~~~Every engagement with a technology is temporally and contextually provisional, and thus there is, in every use, always the possibility of a different structure being enacted.” (Orlikowski, 2000, p. 412)~~

Every ‘engagement with a technology is temporally and contextually provisional, and thus there is, in every use, always the possibility of a different structure being enacted’ (Orlikowski, 2000, p. 412).  
「每一次與技術的互動都是在特定時間與脈絡下暫時性的，因此在每次使用中，總有可能制定出不同的結構」（Orlikowski, 2000, p. 412）。

**The potential of ICT systems to effect change is contingent on how they are enacted by human agents within the organizational context (Walsham, 1993; Orlikowski & Barley, 2001).**  
ICT 系統是否能促成變革，取決於其在組織情境中被行動者如何制定（Walsham, 1993；Orlikowski & Barley, 2001）。

**Boudreau & Robey (2005) demonstrated that such enactment is arbitrated by resources such as knowledge and social capital through social construction.**  
Boudreau 與 Robey（2005）指出，此種制定是透過社會建構過程中，依賴知識與社會資本等資源所仲裁的。你使用他們強調的「enactment 需透過知識與社會資本資源仲裁」觀點，說明行動不只發生，更受到社會脈絡的資源與認知條件塑造，這與你的「制定來自認知與行動交織」脈絡一致。Our results are consistent with arguments regarding the enactment of information technology in organizations and with temporal views of human agency. We conclude that an integrated technology like ERP, which potentially represents a “hard” constraint on human agency, can be resisted and reinvented in use

Managing e-Government system implementation: A resource enactment perspective

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**Conclusion**  
Through identifying the need to improve research and practice for e-Government, an investigation of an award-winning system in Singapore was conducted. This resulted in the development of a process model of resource enactment, which theorized how organizational resources might be mobilized for successful systems implementation.  
透過指出改善電子化政府研究與實務的必要性，研究團隊以新加坡一項獲獎系統為案例，進行了深入調查，並據此提出「資源制定」的過程模型，理論化地說明組織資源如何被動員以實現系統導入。

Specifically, the process model of resource enactment construed that the environmental climate at each development phase gave rise to a particular focal capability. Furthermore, the development of the focal capability was through the symbiotic enactment of resources.  
具體而言，該模型指出，在各發展階段的環境脈絡中會浮現特定的焦點能力，而這些能力的形成來自資源的共生性制定行動。chan

從認同到開創：創業家的動態 釋意歷程 From Identity to Entrepreneurship: the dynamic processes of entrepreneurs 林家五Chia-wu Lin 國立東華大學 National Dong-Hwa University 黃國隆Kuo-long Huang 淡江大學 Tamkang Univsrsity 鄭伯壎Bor-shiuan Cheng 國立台灣大學 National Taiwan Univsrsity 摘 要 早期對於創業的研究焦點大都放在分析創業家的「特質」或「分類」上， 缺乏理解創業行為之互動、動態的觀念性架構。 Weick 所提出的釋意 （ sensemaking ）概念正好可以用來理解創業家如何建構環境，形成詮釋，並 產生行動的歷程。因此，本研究嘗試建立一個動態的創業歷程模式，研究者共 對五位創業家進行半結構式的深度訪談，並且以類別與主題分析進行主要論述 抽取，最後則採用格式塔式領域分析來建立一般性模式。

1. 詮釋 詮釋又可以分為四個類別，分別為對「身份」的詮釋，對「外在環境脈 絡」的詮釋，對「個體內在脈絡的詮釋」以及對「詮釋」的詮釋（研究者以詮 釋推移來指稱）。首先，先來看對「身份」詮釋的詳細內涵。 i. 對身份的詮釋： 依據 Turner （ 1982 ）對於「自我結構」的區分，可以將「身份」區別 為「個人性身份」（ personal identity ）及「社會性身份」（ social identity ）。 所謂「個人性身份」包括，是誰的兒子（女兒），是誰的朋友，是誰的老 公（老婆）等等，隱含有「情感性」成分在內。而「社會性身份」則包括 許多社會性的角色，例如，是台灣人，是中學老師等，隱含有「工具性」 成分在內。對本研究的創業家來說，「個人性身份」包含「個性」、「出生 地區」、「同儕的角色」及「家庭中的排行」。而「社會性身份」，除了「老 闆」之外，最重要的就是「專業能力」的身份。 ii. 對外在環境脈絡的詮釋： 可以區分為三大類別，分別為「整體經濟情勢」、「競爭環境」及「未 來變化趨勢」的詮釋。「整體經濟情勢」詮釋主要就是對宏觀經濟情況的 詮釋。「競爭環境」詮釋則包含「進入障礙」、「替代產品」、「通路」、「國 內與國外市場比較」及「競爭優勢」的詮釋。「未來變化趨勢」的詮釋則 包括，「市場變化趨勢」、「產品變化趨勢」及「專業技術變化趨勢」的詮 釋。 iii. 對個體內在脈絡的詮釋： 可以簡單區分為兩個方向，分別為「過去的內在脈絡」及「現在的內 在脈絡」。「過去的內在脈絡」包含較廣，有「過去工作與創業經驗」、「過 去學習經驗」及「過去人際關係」的詮釋等。「現在的內在脈絡」則比較 單純，只涵蓋「目前生活體驗」及「家庭情況」的詮釋。 ～ 381～ 從認同到開創：創業家的動態釋意歷程 iv. 詮釋推移： 詮釋推移在內容的區分上，應該以推移後的結果來區別。可以分為三 個方向，分別為「支持性推移」、「產生行為推移」及「產生新論述的推移」。 「支持性推移」基本上是反推回去對「詮釋」做進一步的強調與澄清，而 「產生行為推移」則替代了詮釋到行動之間的直接路徑，間接地對行動發 生的影響。至於，「產生新論述的推移」則會形成與承諾性詮釋意涵相當 的，一種關於創業家理念與觀點的重要論述。 最後，從此部分的歸納，研究者進一步提出底下幾項新命題： 命題一：創業家的自我身份認同是影響其釋意歷程的核心概念。 命題二：創業家在自我身份認同的內容上，可以區分為情感取向的「個人 性身份」，以及功能角色取向的「社會性身份」。 命題三：創業家對環境脈絡的詮釋可以區分為兩大類，「內在環境」與「外 在環境脈絡」的詮釋 命題四：創業家自我身份認同的差異，會進一步影響到環境脈絡詮釋內容 的不同。 命題五：從環境脈絡所產生的詮釋，會有動態變化的情況發生。創業家會 有強調澄清既有想法的「支持性詮釋推移」，促動行動發生的「行 為產生詮釋推移」，進一步歸納演繹的「新論述產生詮釋推移」。 2. 行動 行動同樣地可以區分成幾個類別，「研發與創新行動」、「管理與領導行 動」、「產品與策略相關行動」及「生意進行相關行動」。不過，隨著前面詮釋 內容的差異，也可能導致後面行動類別的變動。 同樣地，從此部分的歸納，研究者進一步提出底下幾項新命題： 命題六：創業家的管理行動內涵主要包括，「研發創新行為」、「管理與領 導行為」、「策略規劃行為」以及「洽談生意行為」。 命題七：創業家的管理行動主要受到創業家的身份認同與對環境脈絡的詮 ～ 382～ 中山管理評論 釋所影響。同時，也受到命題五中所討論的「詮釋推移」的影響。

一 ) 與 Weick （ 1983 ）「行動脈絡中的管理思考」觀點對話 將本研究的分析結果與 Weick （ 1983 ）的論點來比照的話，發現他當時的 論點是可以在創業家的釋意歷程中獲得支持的。該篇文章的主要論點為，「在 管理行動的當時，思考也在行為上同時發生」。三項主要的論點包括： 1. 思考是一種對行動的檢驗（ thinking qualifies action ）。 2. 思考激起了行動（ thinking provokes action ）。 3. 思考強化了活動（ thinking intensifies activity ）。 就第一點來說，「思考是對行動的檢驗」將可以視為創業家釋意過程裡， 「對行動的承諾性詮釋」。回到資料中，也可以在六位創業家的釋意歷程裡， 發現他們或多或少會對已經發生的行為，形成一種對行動的辯解，甚至賦予行 動更深厚的意義。 就第二點來說，「思考激起了行動」則是創業家釋意歷程中，「從詮釋到 行動」，這兩個要素之間的連結。雖然，不見得每位創業家在「詮釋」到「行 動」之間都有強烈的連結。但是，至少大部分創業家都有發生從「詮釋」產生 「行動」的現象。 就第三點來說，「思考強化了活動」應該是相當於「創業家一般化釋意歷 程模式」中，由「承諾性詮釋」到「行動」之間的連結。不過，就資料上來看， 本研究並沒有發現創業家釋意過程裡，有此種關係連結出現。但是，如果將釋 意過程視為一個雙迴圈的詮釋循環，則理論上此種連結關係應該是存在的。