# 智能產業
# Smart Industry

| 1. 錶殼打磨 - 磨床機器人手臂<br>Watch Case Polishing - Grinder Robotic Arm | | |
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| 問題<br>Problem | ● 工廠工作環境惡劣<br>● 勞動力成本不斷上漲<br>● 手工打磨質量不穩定 | ● Unsatisfactory working environment in the factory<br>● Rising labour cost<br>● Unstable manual polishing quality |
| 解決方案<br>Solutions | ● 智能打磨機器人<br>● 離綫計算機 3D 仿真路徑規劃<br>● 壓力傳感器控制打磨力度 | ● Smart grinding/polishing robotic arm<br>● Offline programming to generate 3D motion paths numerically<br>● Pressure sensor to control polishing pressure |
| 效益<br>Impact | ● 智能自動化打磨技術可應用於多種行業的打磨工序，尤其是曲面產品的打磨，如眼鏡打磨、鐘錶打磨、餐具打磨、首飾打磨等<br>● 為企業解決成本上升和勞動力短缺的問題<br>● 可提高生產效率和產品質量，避免人爲錯誤造成生產浪費和職業安全問題 | ● Smart automatic grinding/polishing technology can be applied in various industries, especially products with curves, such as glasses, watch cases, tableware, and jewellery, etc<br>● Solved the problems of rising costs and labour shortage<br>● Enhanced productivity and product quality; and eliminated production waste and safety issues arising from human errors |

| 2. 小智 - 服務機械人<br>Xiao Zhi - Service Robot | | |
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| 問題<br>Problem | ● 服務業人手短缺<br>● 難以提供 24 小時服務 | ● Labor shortage in service industry<br>● Difficult to provide 7 x 24 service |
| 解決方案<br>Solutions | ● 服務機械人<br>● 人臉識別，語音對話，導航能力<br>● 連接網路，提供資訊 | ● Service robot<br>● Facial recognition, voice recognition and navigation function<br>● Connect to the Internet to provide information |
| 效益<br>Impact | ● 廣泛應用在內地各個行業:<br>● 銀行: 理解各客戶的目的，提前分流，並印刷等候編號<br>● 保安：利用人臉識別進行身份認證<br>● 書局：連接書局數據庫，提供語音查詢及介紹 | ● Widely applied in various industries in the Mainland:<br>● Bank: divert customers according to the purpose of their visits, and print waiting number<br>● Security: facial recognition for enhanced access control |

# 智能產業
# Smart Industry

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| | ● 醫院：提供初步分流及導航服務<br>● 機場：查詢天氣及航班資訊、導航服務 | ● Book store: provide vocal enquiries and information via connection to its database<br>● Hospital: triage support and provision of navigation service<br>● Airport: weather and flight enquiries, and provision of navigation service |

| 3. 智能產業廊<br>Smart Industry One | | |
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| 問題<br>Problem | ● 隨著個人化、款多量少的市場趨勢，加上智能技術的急速發展，不少大型生產商已在其供應鏈引入「工業 4.0」概念<br><br>● 企業須儘早制定「工業 4.0」的策略，逐步改造流程、配置自動化設備及智能系統，為邁向「工業 4.0」打穩基礎 | ● Many large manufacturers have already incorporated the ”Industry 4.0” (i4.0) concept in its supply chain to cope with the market trend of personalization and “high-variety, low-volume production”, as well as the rapid development of smart technologies<br>● Businesses must formulate their own i4.0 strategies, and gradually reform their workflows and install automation and smart systems to prepare for their swift migration to i4.0 |
| 解決方案<br>Solutions | 「智能產業廊」全面展示「工業 4.0」智能工廠的運作，向業界推廣智能製造的核心技術及運作模式 | “Smart Industry One” demonstrates the operation of an i4.0 smart factory to promote the core technologies and operation of smart production to the industries |
| 效益<br>Impact | ● 提高生產靈活性及生產效率<br>● 透過「智能產品」、「智能製造」、「智能物流」及「智能服務」革新營商模式<br>● 為日常生活帶來許多便利 | ● Enhanced production flexibility and efficiency<br>● Reformed business model through realization of “Smart Product”, “Smart Manufacturing”, “Smart Logistics” and “Smart Service” along the value chain<br>● Greater convenience to daily life |

# 智能產業
# Smart Industry

| 4. 網絡安全服務<br>Cyber Security Service | | |
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| 服務範圍<br>Service Scope | ● 為各大、中、小企業提供資訊及網絡安全風險評估、檢視等服務<br>● 通過分析安全評估結果，提供設計、預防及改善建議，亦可提供資訊網絡安全培訓和協助實施各安全建議工作<br>● 提供協助制定和測試網絡安全事故處理及業務持續計劃等服務 | ● Information security risk assessment and audit for companies of different sizes<br>● Analysis of security reviews; recommendations on the design, prevention and improvement plans; cyber security training, and implementation of the security plans<br>● Consultancy on cyber security incidents handling and testing; formulation of Business Continuity Plan |
| 效益<br>Benefits | ● 了解公司面對的網絡安全風險及系統漏洞<br>● 改善和加強公司對網絡攻擊的防備能力<br>● 事故或災難發生時，能有效及迅速地處理，使業務能持續運作，避免造成更大損失或影響公司聲譽 | ● Thorough understanding of the cyber security risks and system vulnerabilities of the company<br>● Improved and enhanced defence readiness for cyber attacks<br>● Effective and fast response to cyber security incidents for business continuity, containing losses or damage to the company's reputation |

| 5. 先進 3D 打印應用<br>Advanced 3D Printing Applications | | |
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| 問題<br>Problem | ● 缺乏高端 3D 打印技術知識<br>● 需加快產品設計周期 | ● Lack of knowledge on high-end 3D printing technologies<br>● Need to speed up product development cycle |
| 解決方案<br>Solutions | ● 「3D 打印體驗廊」提供一條龍 3D 打印顧問服務及技術支援<br>● 全方位展示不同 3D 打印方案和一系列由入門到專業級的 3D 打印機及相關設施 | ● "3D Printing One" provides one-stop 3D printing consultancy services and technical support<br>● A showcase of comprehensive solutions and a selection of 3D printers ranging from elementary to professional levels; and related facilities |
| 效益<br>Impact | ● 「3D 打印體驗廊」軟硬設備齊全，專家經驗豐富<br>● 讓各界運用革命性科技，活現創新意念，推動香港創新文化<br>**成功案例**<br>● 協助本地建築師打印未來火星基地設計模型獲取美國太空總署榮 | ● "3D Printing One" houses a full spectrum of software and hardware, with a wealth of 3D printing experts and solid experience in technology application<br>● Visitors can use this revolutionary |

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| | 譽獎<br>● 生產力局自行研發的行業性專用 3D 打印機 (例如：食品 3D 打印機、3D 骨科填料打印系統) | technology to give life to their creative ideas<br>**Success cases**<br>● Assisted a HK architect to 3D print a Future Mars model that went on to receive an Honorable Mention from NASA, US<br>● Industry specific 3D printers developed by HKPC (e.g. 3D Food Printer, 3D printing system for artificial and osteo-conductive bone-graft fabrication) |

| 6. 混合式金屬 3D 打印<br>Hybrid Metal 3D Printing | | |
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| 問題<br>Problem | ● 製造商需面對消費者對高度個人化及高精密產品的熱烈需求<br>● 製造商需加快產品注塑週期<br>● 傳統模具中的冷卻通道不足夠 | ● Growing consumer appetite for highly customized and high precision products<br>● Manufacturers need to shorten mould injection cycle<br>● Insufficient cooling channels in traditional moulds |
| 解決方案<br>Solutions | ● 隨形冷卻技術中心提供高效能、經濟的隨形冷卻水道製造綜合方案<br>● 協助廠商進入高速增長的個人化設計及高精密產品市場，例如：精密模具、汽車零部件、醫療義肢、貴金屬珠寶及高端電器用品等 | ● Conformal Cooling Technology Centre provides an integrated solution for the fabrication of efficient and economical conformal cooling channels<br>● Significantly lowers the technology barrier for manufacturers in tapping the fast growing markets of customized designs and high precision items such as automotive parts, medical prosthetics, precious metal jewellery and high-end electrical appliances |
| 效益<br>Impact | ● 業界在中心的支援下，可改進模具冷卻水道設計，縮短 30%至 40%注塑時間，並提升注塑質素<br>● 協助廠商解決技術問題，服務超過 110 個客戶，每年節省超過 1.5 億港元成本<br>● 發明專利授權 17 項 | ● Shortened injection cycle by 30% to 40% with improved mould quality at competitive costs<br>● Helps manufacturers overcome technical obstacles and has served more than 110 clients with over $150M cost saving per annum<br>● Over 17 invention and utility patents granted |

# 智能產業
# Smart Industry

| 7. 智能導電纖維<br>Smart Conductive Fiber | | |
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| 問題<br>Problem | 寒冷天氣所穿著的戶外服飾通常都非常笨重，令運動和戶外工作的人士及軍人都非常不便。 | Outdoor clothing for extreme cold weather is usually bulky and too clumsy for sportsmen, outdoor workers and military personnel |
| 解決方案<br>Solutions | ● 利用離子體金屬鍍膜技術製作導熱布<br>● 可用於製造發熱功能紡織品 | ● Heat conductive fabric developed by plasma-assisted metal deposition technology<br>● Applied in the production of thermal garments |
| 效益<br>Impact | ● 離子體金屬鍍膜技術是環保的生產工序，無需用水及沒有廢氣排放<br>● 導熱布質感柔軟，可於 5 分鐘內達到攝氏 37 度 | ● A waterless and zero-emission green production process<br>● The heat conductive fabric is flexible and can reach 37°C in less than 5 minutes |

| 8. 應用於矽膠產品的等離子體表面處理技術<br>Plasma Surface Treatment Technology for Silicone Rubber Products | | |
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| 問題<br>Problem | 矽膠材料被廣泛應用於各種產品，然而其表面品質會逐漸退化，靜電附著灰塵的問題特別嚴重 | Silicone has a variety of applications. However, their surface properties will deteriorate over time and are especially prone to electrostatic adhesion of dust |
| 解決方案<br>Solutions | ● 利用等離子輔助化學氣相沉積對矽膠製品進行表面處理<br>● 不需要使用危險化學品為原料，並且沒有排出有害化學廢物<br>● 處理過程能大幅降低製品的表面靜電特性，從而提高其抗灰塵性質 | ● Use of Plasma-Enhanced Chemical Vapor Deposition for surface treatment of silicone products<br>● No harmful chemicals are required as raw materials, and no discharge of hazardous chemical wastes<br>● Significantly reduces the electrostatic charging characteristics of the surface of the treated products, thereby enhancing their anti-dust property |
| 效益<br>Impact | ● 可應用於不同矽膠產品，包括眼鏡架、奶嘴、呼吸器、耳機保護套等等<br>● 獎項：<br>- 第 45 屆日內瓦國際發明展 - 金獎 (2017)<br>- 香港工商業獎: 設備及機器設計優異證書 - 矽膠產品之防塵表面處理設備 (2014)<br>● 專利： | ● Applicable to different silicone products, including eyeglass frames, pacifiers, resuscitators, earphone covers, etc<br>● Awards:<br>- 45th International Exhibition of Inventions Geneva - Gold Medal (2017)<br>- Hong Kong Awards for Industries: Equipment and |

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| | 中國實用新型專利 CN202279857U 及 CN202297756U | Machinery Design Certificate of Merit - Equipment for Anti-dust Surface Treatment on Silicone Products (2014)<br>● Patent:<br>PRC utility model patent no.: CN202279857U & CN202297756U) |

| 9. 防污塗層技術<br>Anti-fouling Coating Technology | | |
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| 問題<br>Problem | 油脂和污垢影響不同產品 (金屬、布料、玻璃、陶瓷、塑料等)的功能及外觀，令產品的壽命縮短 | Grease and dirt affect the function and outlook of different products (metal, fabrics, glass, ceramic, plastic, etc) and shorten their product life |
| 解決方案<br>Solutions | ● 防污塗層技術可防止污染物在不同產品部件的表面形成，有助提高不同產品部件的耐用性，延長產品壽命<br>● 可利用噴霧、浸塗、真空等方法應用到不同產品上 | ● Anti-fouling coating technology can prevent the formation of contaminants on the surface of different product parts to extend its durability<br>● Applicable to different products through spraying, dipping and vacuuming |
| 效益<br>Impact | ● 這表面處理技術已用於新型的質量流量傳感器，防止因積累灰塵、油性及水性污染物，影響傳感器的靈敏度<br>● 防污塗層技術亦可用於各種的家電產品，包括風扇、抽油煙機等，使油性污染物變得容易清潔 | ● This surface processing technology has been used on new mass flow sensor to prevent the accumulation of the dust, oily and waterborne contaminants that affect the sensitivity of the sensor<br>● Also applicable to various household appliances, including fan and exhaust fan, making it easier to remove the oily pollutants |

| 10. 類金剛石塗層技術<br>Diamond Like Carbon (DLC) Coating Technology | | |
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| 問題<br>Problem | 摩擦力會損耗不少產品的性能，例如汽車發動機部件之間的摩擦，顯著降低能源效益 | Friction can cause a loss of performance of many products， for example, friction among motor engine parts can significantly reduce fuel efficiency |

# 智能產業
# Smart Industry

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| 解決方案<br>Solutions | 類金剛石塗層技術優異的性能顯著提高汽車發動機的效率，並減少相應的碳排放 | Diamond-like carbon coating can significantly enhance the efficiency of the automotive engines and reduce carbon emission accordingly with its superior properties |
| 效益<br>Impact | ● 同時具備厚塗層和光滑表面<br>● 適用於裝飾和功能應用<br>● 其他應用包括傳感器，半導體和電子產品 | ● Thick coating with a smooth surface<br>● Suitable for decorative and functional applications<br>● Other applications include sensors, semiconductor and electronics products |

| 11. 超臨界無水流體染色技術<br>Supercritical Fluid Waterless Dyeing Technology | | |
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| 問題<br>Problem | ● 全球最污染的工業之一 – 染色及後整理工序佔全球工業廢水兩成<br>● 自來水和污水處理的成本上漲<br>● 污染物排放管制嚴格 | ● One of the most polluting industries in the world - textile dyeing and treatment accounts for 20% of global industrial wastewater discharge<br>● Rising water and sewage treatment costs<br>● Strict pollutant emission control |
| 解決方案<br>Solutions | 發展超臨界無水流體染色技術，利用二氧化碳作為媒介，無水化綜合處理「清洗」、「染色」和「功能材料添加」三個高耗水印染工序，解決紡織業污水問題 | Supercritical fluid waterless dyeing technology – using supercritical carbon dioxide ($CO_2$) as a medium for a waterless integrated solution to the high water consuming cleaning, dyeing and functional treatment processes to tackle the sewage problem in textile industry |
| 效益<br>Impact | ● 無水染色技術是環保的紡織品處理技術<br>- 減少一半工序時間<br>- 零廢水<br>- 二氧化碳可回收再用<br>- 減少約 6 成能源消耗<br>- 使用較少化學品<br>- 較少二氧化碳排放<br>● 已建立四個系統，由實驗規模 (0.5 升) 至工業規模 (500 升)<br>● 已申請 11 項發明及實用型專利<br>● 第 44 屆日內瓦國際發明展 - 銀獎 (2016) | ● An environmentally friendly way to process textile materials<br>- 50% less in processing time<br>- No wastewater<br>- $CO_2$ recyclable<br>- 60% less in energy consumption<br>- Uses less chemicals<br>- Less $CO_2$ emissions<br>● Four systems, from lab-dip scale (500 mL) to industrial scale (500L), have been developed<br>● 11 invention and utility patents filed<br>● 44$^{th}$ International Exhibition of Inventions Geneva - Silver Medal (2016) |

# 智能產業
# Smart Industry

| 12. 創新骨折外支架技術<br>Novel Bone Fracture Bracing Technology | | |
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| 問題<br>Problem | 隨著人口老化，因長者骨折或骨質疏鬆引致的骨折個案持續上升。傳統「打石膏」治療方法嚴重影響日常生活，患者有可能因肘關節活動減少令肌肉萎縮，引致斷骨癒合不理想 | With an aging population, incidents of elderly and osteoporosis-related fractures are on the rise. However, the traditional plaster cast treatment seriously affects the daily life of patients. Prolonged immobility of fractured limb causes muscle shrinkage and leads to loss of fractured bone stability |
| 解決方案<br>Solution | ● 免除「打石膏」的新型骨折外支架，傷者佩戴後可以有限度活動手臂<br>● 設有內置氣囊，讓醫生調節支架接觸傷者患處的壓力，改善斷骨癒合情況<br>● 安全又癒合率高的治療方案，亦可改善患者活動能力及縮短復康時間<br>● 危急情況下提供即時保護和鞏固 | ● 'Plaster Cast-Free' bracing technology with flexible elbow joint gives patients limited mobility during treatment process<br>● Equipped with an inflatable multi-cushion cell structures for orthopaedists to adjust contact pressure of patients for effective immobilization of the fractures<br>● Provide a safe and effective treatment for arm fractures, enabling early movement and rehabilitation<br>● Suitable for on-the-spot treatment in emergencies |
| 效益/ 獎項<br>Benefits/ Awards | ● 於深圳一家公立醫院完成了為期一年的臨床醫學驗證<br>● 醫學驗證測試結果證實，新技術可有效長期固定斷骨以確保安全癒合，病者也可提早恢復關節活動能力 | ● Completed a year-long clinical performance evaluation at a Shenzhen hospital<br>● Clinical performance evaluation results confirmed that the technology could achieve safe union of the fractures, with effective immobilization control, and an early resumption of movement of the patients' adjacent joints |

# 智能產業
# Smart Industry

| 13. 腹腔鏡手術煙霧驅散技術<br>Surgical Smoke Evacuation Technology for Laparoscopic Surgery | | |
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| 問題<br>Problem | 微創腹腔手術近年愈趨普及，但微創手術期間產生的煙霧會影響醫生視野，妨礙手術進行 | The applications of laparoscopic surgery – a kind of minimally invasive surgery, are on the rise. Yet the surgical smoke generated by energy-based electrosurgical units (EUs) often blocks the view of the surgeons and interrupts the surgical procedures |
| 解決方案<br>Solution | ● 全球首創吹噴式「腹腔鏡手術煙霧驅散技術」<br>● 採用空氣動力學設計，把聚積在腹腔鏡前的煙霧吹走，令鏡頭回復清晰 | ● The world's 1st "Air-blowing" Surgical Smoke Evacuation Technology for Laparoscopic Surgeries<br>● Novel design featuring applied aerodynamic principles, instantaneously clears surgical smoke particles right in front of the laparoscope |
| 效益/ 獎項<br>Benefits/ Awards | ● 手術期間無需重覆清洗腹腔鏡上的煙霧粒子，從而縮短手術時間<br>● 能靈活配合不同生產商的腹腔鏡使用，無需改動現時的手術流程<br>● 已進行動物試驗，並取得良好結果<br>● 「第 45 屆日內瓦國際發明展」中取得「評審團特別嘉許金獎」和泰國國家研究局「最佳國際研發」<br>● 此設計已獲得專利 | ● Eliminated intra-operational laparoscope cleansing time caused by smoke particles adhesion, and shortened surgery time<br>● Support most of the common laparoscopic surgical instruments without changing the current surgical setting and workflow<br>● Conducted animal testing with good results<br>● "45th International Exhibition of Inventions Geneva" – "Gold Medal with Congratulations of Jury"; and "Thailand Award for Best International Invention" by the National Council for Research of Thailand<br>● Patent has been granted |

| 14. 業界資訊支援服務<br>Industry Intelligence Support Service | | |
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| 服務範圍<br>Service Scope | ● 為行業的特定主題，提供調查服務<br>● 通過面談或問卷調查，採集市場資料<br>● 分析資料及提供報告<br>● 通過媒體或研討會，引起公眾關注 | ● Survey service for specific themes of the industries<br>● Collection of market information through face-to-face interviews or surveys<br>● Data analysis and survey reports<br>● Promotion through the media or |

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| | | public seminars to raise public awareness |
| 效益<br>Benefits | ● 利用調查，更客觀地對課題進行科學化的測量<br>● 利用中立的第三方調查數據，可以更有力說服客戶或公眾<br>● 通過媒體渠道或研討會發佈調查報告，提升企業形象 | ● Objective and scientific assessment of the subject<br>● Third-party survey data more convincing to both the client and the public<br>● Enhanced corporate image with public announcement of survey results through the media or seminars |

| 15. 電子商貿服務<br>e-Commerce Service | | |
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| 服務範圍<br>Service Scope | ● 為各大、中、小企業建立企業對消費者，企業對企業及微信自營電子商貿平臺<br>● 電子商貿平臺與傳統庫存、物流、電子支付、客戶服務、信貸及會計系統整合，提供一站式多管道線上及線下銷售管理平臺<br>● 通過自營電子商貿平臺及公眾社交平臺採集大數據，分析消費者喜好、趨勢及發掘潛在商機 | ● Setting up B2C, B2B and WeChat e-commerce platforms for companies of different sizes<br>● Integrated e-commerce platforms with traditional inventory, logistics, epayment, customer service, credit management and accounting functions - providing a one-stop multi-channel O2O sales management platform<br>● Capturing big data from self-owned e-commerce platforms and other social media, and analysis on consumer preferences and sales trends to tap new business potential |
| 效益<br>Benefits | ● 透過電子媒介，創新銷售管道，接觸新客戶及增加營銷機會<br>● 建立新世代商業營運全面管理及快速回應的能力<br>● 迅速從大數據中取得有用資訊，調整營運策略，並保護公司品牌聲譽 | ● New sales channel to reach new customers and increase sales via electronic media<br>● Capability building in overall management and quick response for the new era of business operation<br>● Quick and useful intelligence from big data for business strategic adjustments and brand image protection |

# 智能產業
# Smart Industry

| 16. 知創空間<br>Inno Space | | |
|---|---|---|
| 問題<br>Problem | ● 近年，本港已成為全球其中一個增長最快的創業基地，創業社群更將成為本港「再工業化」的一股重要力量。<br>● 本港初創企業需要一個創業生態系統的平台，提供由概念至商品化各階段所需的服務和發展機遇 | ● In recent years, Hong Kong has become one of the fastest growing startup hubs in the world. The startup community is also expected to be a major force of the re-industrialization effort in Hong Kong.<br>● A platform for the Hong Kong start-up eco-system which provides the services and development opportunities for a start-up at every stage of its idea-to-commercialization odyssey is essential. |
| 解決方案<br>Solutions | ● 在香港特區政府支持下，香港生產力促進局成立「知創空間」Inno Space，分享實用技術和技能，推動科技創意轉化為工業設計及產品，支援本港的初創文化 | ● With the support of the HKSAR Government, HKPC will establish an "Inno Space" to facilitate the sharing of practical technologies and skills to promote the translation of innovative and technological ideas into industrial designs or products, and support a start-up culture |
| 效益<br>Impact | 1. **全面 (Complete)**: 提供全面的服務，將設計意念轉化為成品，投入市場<br>2. **協作 (Complement)**: 加強香港生產力促進局與其他自造空間交流協作，充分發揮各方優勢<br>3. **聯繫 (Connect)**: 與業界緊密聯繫，為創業人士和企業家創造全新的生態系統<br>4. **社群 (Community)**:促進本港初創社群發展，全力支援「再工業化」 | 1. **Complete**: To offer a complete service, from idea to industry (i2i service)<br>2. **Complement**: To strengthen the complement of HKPC with other maker spaces to leverage their complimentary strengths<br>3. **Connect**: To closely connect with the industry for the creation of a new eco-system for startups and entrepreneurs<br>4. **Community**: To promote the development of a startup community to support re-industrialization |