

## Chapter 02 Sources of Innovation

### True/False

1. If an individual knows a field too well, it can stifle creativity.

Answer: True

Difficulty: Medium

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2. An individual with only a moderate degree of knowledge of a field will be able to produce more creative solutions than an individual with extensive knowledge of the field.

Answer: True

Difficulty: Medium

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3. An organization's overall creativity level is a simple aggregate of the creativity of the individuals it employs.

Answer: False

Difficulty: Medium

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4. Monetary rewards undermine creativity by encouraging employees to focus on extrinsic rather than intrinsic motivation.

Answer: True

Difficulty: Hard

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5. Inventors tendency toward introversion cause them to be good at manipulating concepts.

Answer: True

Difficulty: Medium

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6. The qualities that make people inventive also make them entrepreneurial.

Answer: False

Difficulty: Easy

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7. Innovation often originates with those who create solutions for their own needs.

Answer: True

Difficulty: Medium

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8. User innovators typically create new product innovations in order to profit from the sale of the innovation to customers.

Answer: False

Difficulty: Medium

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9. The terms research and development represent different kinds of investment in innovation-related activities.

Answer: True

Difficulty: Easy

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10. The science-push approach to research and development argued that innovation was driven by the perceived demand of potential users.

Answer: False

Difficulty: Medium

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11. Firms form alliances with competitors to jointly work on an innovation project or to exchange information.

Answer: True

Difficulty: Easy

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12. The intellectual property policies of a university embrace both patentable and unpatentable innovations.

Answer: True

Difficulty: Easy

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13. Incubators are regional districts, typically set up by government, to foster R&D collaboration between government, universities, and private firms.

Answer: False

Difficulty: Medium

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14. The decline in the government share of spending on R&D is largely due to the rapid increase in industry R&D funding rather than a real decline in the absolute amount spent.

Answer: True

Difficulty: Medium

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15. Collaborative research is prohibited in high-technology sectors.

Answer: False

Difficulty: Medium

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16. Knowledge that cannot be readily codified is called explicit knowledge.

Answer: False

Difficulty: Easy

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17. Proximity and interaction can directly influence firms' ability and willingness to exchange knowledge.

Answer: True

Difficulty: Medium

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18. Knowledge that is explicit requires more frequent and close interaction to be meaningfully exchanged than knowledge that is tacit.

Answer: False

Difficulty: Medium

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19. Tacit knowledge is knowledge that can be documented in written form.

Answer: False

Difficulty: Easy

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20. The degree to which innovative activities are geographically clustered is independent of the national differences in the way technology development is funded or protected.

Answer: False

Difficulty: Medium

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**Multiple Choice**

21. Which of the following is considered to be a novel idea?

- a. A detergent that is advertised as a very effective stain-remover
- b. A company announces that it has produced a recreational hovercraft for kids
- c. An announcement by a cell phone company that it now offers free text messaging
- d. An announcement by a college that it will install artificial turf on its football field

Answer: b

Difficulty: Hard

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22. The term \_\_\_\_\_ indicates that the product is novel to the individual who made it, but known to everyone else.

- a. discovery
- b. reinvention
- c. creativity
- d. innovation

Answer: b

Difficulty: Easy

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23. Erison Group, an advertising company, wants to hire an individual for the post of creative head. Which of the following is the characteristic that the company has to look for while recruiting for that particular post?

- a. An individual who completely adheres to the existing logic and paradigms and has extensive knowledge of the field
- b. An individual who has low tolerance for ambiguity, and avoids taking risks
- c. An individual who has a moderate degree of knowledge of the field, but is intrinsically motivated
- d. An individual who prefers to look at problems in conventional ways

Answer: c

Difficulty: Hard

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24. Which of the following is characteristic of successful inventors?

- a. They specialize solely in a single field rather than several fields simultaneously.
- b. They are curious and more interested in solutions than problems.
- c. They blindly accept the assumptions made in previous work in the field.
- d. They seek global solutions rather than local solutions.

Answer: d

Difficulty: Medium

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25. Which of the following is an example of user innovation?

- a. Samuel has invented a detachable bicycle in order to make profits by selling it to a reputed bicycle manufacturing firm.
- b. Sandra, an engineer, has developed a device that helps track the location of her teenage daughter's car.
- c. Jessica, an ace designer for a clothing brand, has been asked to work on a dyeing technique that changes fabric color according to the room temperature.
- d. Ivan, a scientist at a reputed pharmaceutical company, has developed an anti-inflammatory drug for the company to commercialize.

Answer: b

Difficulty: Hard

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26. Which of the following is an example of applied research?

- a. A study on Abraham Maslow's hierarchy of needs theory
- b. A study on the acidic nature of phenols
- c. A study on the ways to increase employee retention in the software industry
- d. A study on the structure of neutrons, electrons, and protons

Answer: c

Difficulty: Medium

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27. Susan, a biologist, works in the research and development department of a chemical company. The company has assigned her to study the reproduction processes of various insects to develop an effective technique to control insect damage to crops. The type of research Susan is engaged in is called \_\_\_\_\_ research.

- a. basic
- b. applied
- c. exploratory
- d. quantitative

Answer: b

Difficulty: Hard

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28. \_\_\_\_\_ approach to research and development assumed that innovation proceeded linearly from scientific discovery, to invention, to engineering, then manufacturing activities, and finally marketing.

- a. Demand-pull
- b. Market-pull
- c. Supply-push

d. Science-push

Answer: d

Difficulty: Easy

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29. Which of the following is the correct sequence of steps for the science-push approach to research and development?

- a. Customers express an unmet need, R&D develops the product to meet that need, the product is manufactured, and finally the marketing team promotes the product.
- b. Scientific discovery leads to an invention, the engineering team designs the product, it is manufactured, and finally the marketing team promotes it.
- c. Marketing discovers a need, R&D comes up with the product concept which is refined by engineering, the manufacturing team produces it, and finally the product is sold.
- d. Manufacturing sees a way to improve a product, the engineering team redesigns it, and finally the marketing team creates awareness about the improved product.

Answer: b

Difficulty: Hard

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30. Breaking Ventures Inc. realized that most parents are worried about their teenage children going out on their own. Based on this information, the company developed a device that could be fixed into the concerned person's cell phone, and this device helped parents keep track of their children's location. This approach to research and development is referred to as \_\_\_\_\_.

- a. demand-pull
- b. supply-push
- c. science-push
- d. research-pull

Answer: a

Difficulty: Hard

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31. The demand-pull approach to research and development refers to:

- a. research and development that focuses on developing products that are expected to increase demand in a particular market segment.
- b. research and development that begins by examining the outcomes of the firm's basic research and the potential commercial applications that may be constructed from those outcomes.
- c. research and development that focuses on developing products that are expected to decrease the demand for their substitute products.
- d. research and development that originates as a response to the specific problems or suggestions of customers.

Answer: d

Difficulty: Medium

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32. Organizations that manufacture products such as light bulbs for lamps, or DVDs for DVD players are examples of \_\_\_\_\_.

- a. moderators
- b. lead users
- c. complementors
- d. incubators

Answer: c

Difficulty: Easy

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33. \_\_\_\_\_ is the ability of an organization to recognize, assimilate, and utilize new knowledge.

- a. Cognitive ability
- b. Absorptive capacity
- c. Organizational agility
- d. Reasoning ability

Answer: b

Difficulty: Easy

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34. The president of Mountain Home University has been asked by her board of trustees to set up a separate unit to facilitate the commercialization of technology developed by the research students at the university. Such a unit is typically called a \_\_\_\_\_.

- a. strategic business unit
- b. commercialization office
- c. technology transfer office
- d. science park

Answer: c

Difficulty: Hard

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35. Which of the following is true about the Bayh-Dole Act of 1980?

- a. It made university technology transfer activities illegal and unethical.
- b. It allowed universities to collect royalties on inventions funded with taxpayer dollars.
- c. It restricted provision of patents for inventions developed at universities.
- d. It made investment in research and technology mandatory for public companies.

Answer: b

Difficulty: Medium

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36. Regional districts that are set up by the government to foster R&D collaboration between government, universities, and private firms are typically called \_\_\_\_.

- a. technological trajectories
- b. free trade areas
- c. complementors
- d. science parks

Answer: d

Difficulty: Easy

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37. In 2001, Shanghai's Municipal Government set aside 13 square kilometers of land near the Huangpu River for university laboratories and start-up firms in microelectronics, digital technology, and life sciences. The project aimed to foster research in microelectronics, the development of a technologically-advanced labor pool, and the creation of new industries in Shanghai. This project would be best termed as a(n) \_\_\_\_.

- a. complementor
- b. strategic unit
- c. science park
- d. free trade area

Answer: c

Difficulty: Hard

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38. Institutions designed to nurture the development of new businesses that might otherwise lack access to adequate funding or advices are called \_\_\_\_.

- a. complementors
- b. research collaboration offices
- c. incubators
- d. technology clusters

Answer: c

Difficulty: Easy

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39. Which of the following is true of interfirm collaborative research and development networks?

- a. Collaborative research networks are not important and viable in high-technology sectors.
- b. Interfirm networks enable firms to achieve much more than they can achieve individually.
- c. The flow of information and other resources through a network is independent of the network's size.



d. Information diffusion is fairly slow and limited in collaborative research networks with dense structures.

Answer: b

Difficulty: Medium

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40. \_\_\_\_\_ are regional groups of firms that have a connection to a common technology, and may engage in buyer, supplier, and complementor relationships, as well as research collaboration.

- a. Technology transfer offices
- b. Regional incubators
- c. Strategic business units
- d. Technology clusters

Answer: d

Difficulty: Easy

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41. When companies form a technology cluster it often results in:

- a. the loss of agglomeration economies.
- b. new firms being discouraged to start up in the immediate vicinity.
- c. reduced interaction and trust between them.
- d. reduced pricing power in their relationships with buyers and suppliers.

Answer: d

Difficulty: Medium

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42. The benefits firms reap by locating in close geographical proximity to each other are known collectively as \_\_\_\_\_ economies.

- a. agglomeration
- b. closed
- c. virtual
- d. shadow

Answer: a

Difficulty: Easy

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43. \_\_\_\_\_ are individuals or organizations that transfer information from one domain to another in which it can be usefully applied.

- a. Knowledge brokers
- b. Knowledge workers
- c. Complementors
- d. Category captains

Answer: a

Difficulty: Medium

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44. \_\_\_\_\_ is a positive externality from R&D resulting from the spread of knowledge across organizational or regional boundaries.

- a. Technological convergence
- b. Technological determinism
- c. Technological spillover
- d. Technological cluster

Answer: c

Difficulty: Easy

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45. A variety of rice created by Biocrop Inc., through recombinant DNA technology, was found to be rich in both carbohydrates and proteins. After the success of this rice variety, the particular technology was implemented by less-developed countries to increase the nutrient level of fruits, pulses, and greens in order to feed their malnourished children.

This is an example of \_\_\_\_\_.

- a. technological cluster
- b. technological spillover
- c. technological convergence
- d. technological determinism

Answer: b

Difficulty: Hard

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### Essay

46. You have just been given an assignment within your company to design a creativity training program. Describe the elements you would include in the program and explain the rationale of each one.

Answer: One element of a creativity training program would be to bring in a communications expert to teach managers how to encourage novel thinking and autonomy through the use of verbal and nonverbal cues. The program might also include exercises that encourage employees to consider simpler representations of a problem to avoid getting “bogged down” in the details, and develop rudimentary prototypes. The program probably should not entail extrinsic (e.g., monetary) rewards, and instead should encourage intrinsic rewards such as recognition, giving the employees considerable ownership over their projects, and emphasizing the beneficial impact new solutions have on the welfare of customers. The programs also often incorporate exercises that encourage employees to use creative mechanisms such as developing alternative

scenarios, using analogies to compare the problem with another problem that shares similar features or structure, and restating the problem in a new way.

Difficulty: Medium

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47. If you were in charge of a research and development (R&D) department for a large pharmaceutical company, would you encourage the employees to perform basic research or applied research? Provide the rationale for your answer.

Answer: The research and development (R&D) department for a large pharmaceutical company should probably encourage its researchers to do both basic research and applied research. Basic research is directed at increasing understanding of a topic or field. This type of knowledge will help the company to better understand the medical field and to come up with approaches to applied research. For example, research to understand why and how people develop diabetes would provide useful information for the treatment. Applied research is targeted at increasing knowledge for a specific application and is aimed at fulfilling commercial objectives. The development of new methods of treatment based on the findings of basic research would be the next logical step to take. This type of research would also require creativity and innovation but would be targeted at treating an illness in a certain way.

Difficulty: Hard

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48. At a retreat by the Salisbury City Council, community leaders held a discussion on attracting and developing new businesses and increasing employment rates in the city. One leader suggested that the city should consider sponsoring a business incubator. Explain what an incubator is and how this might help the city meet its goals.

Answer: An incubator is an institution designed to nurture the development of new businesses that might otherwise lack access to funding or advice. It allows companies to share costs and resources until they can stand on their own. If an incubator were started in Salisbury, it would help new businesses to grow and prosper. These businesses could then move out to locations of their own and hire local residents as employees. The city would not have to offer tax breaks or compete with other cities for the location of existing companies, but would be growing their own businesses.

Difficulty: Medium

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49. If you are looking for a location for your software development company why will you consider Silicon Valley? What are the drawbacks to this location?

Answer: A software development company would find a technology cluster such as Silicon Valley attractive because many other high-tech computer-oriented companies are

located there. The software company might be able to share information with complementors or find new employees who have been trained by other companies. Drawbacks to that location might include the fact that other companies hire away their employees or other companies might find out about proprietary technologies the company is developing. Current employees may follow the examples of others and leave the software development company to start their own company.

Difficulty: Medium

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50. Explain the concept of technology spillovers.

Answer: Technological spillovers are a positive externality from R&D resulting from the spread of knowledge across organizational or regional boundaries. Technology spillovers are a significant influence on innovative activity. The likelihood of spillovers is also a function of the nature of the underlying knowledge base and the mobility of the labor pool.

Difficulty: Easy

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