AMIA
INFORMATICS PROFESSIONALS. LEADING THE WAY.

5A: Strategic Planning

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Clinical Informatics
Board Review Course

Clinical Informatics Subspecialty Delineation of Practice (CIS DoP)

Domain 1: Fundamental Knowledge and Skills (no Tasks are associated with this Domain which is focused on fundamental knowledge and skills)

Clinical Informatics

K001. The discipline of informatics (e.g., definitions, history, careers, professional organizations)
K002. Fundamental informatics concepts, models, and theories
K003. Core clinical informatics literature (e.g., foundational literature, principle journals, critical analysis of literature, use of evidence to inform practice)
K004. Descriptive and inferential statistics
K005. Health Information Technology (HIT) principles and science
K006. Computer programming fundamentals and computational thinking
K007. Basic systems and network architectures
K008. Basic database structure, data retrieval and analytics techniques and tools
K009. Development and use of interoperability/exchange standards (e.g., Fast Health Interoperability Resources [FHIR], Digital Imaging and Communications in Medicine [DICOM])
K010. Development and use of transaction standards (e.g., American National Standards Institute X12)
K011. Development and use of messaging standards (e.g., Health Level Seven [HL7] v2)
K012. Development and use of ancillary data standards (e.g., imaging and Laboratory Information System[LIS])
K013. Development and use of data model standards
K014. Vocabularies, terminologies, and nomenclatures (e.g., Logical Observation Identifiers Names and Codes [LOINC], Systematized Nomenclature of Medicine --Clinical Terms [SNOMED-CT], RxNorm, International Classification Of Diseases[ICD], Current Procedural Terminology [CPT])
K015. Data taxonomies and ontologies
K016. Security, privacy, and confidentiality requirements and practices
K017. Legal and regulatory issues related to clinical data and information sharing
K018. Technical and non-technical approaches and barriers to interoperability
K019. Ethics and professionalism

The Health System

K020. Primary domains of health, organizational structures, cultures, and processes (e.g., health care delivery, public health, personal health, population health, education of health professionals, clinical research)
K021. Determinants of individual and population health
K022. Forces shaping health care delivery and considerations regarding health care access
K023. Health economics and financing
K024. Policy and regulatory frameworks related to the healthcare system
K025. The flow of data, information, and knowledge within the health system

Domain 2: Improving Care Delivery and Outcomes

K026. Decision science (e.g., Bayes theorem, decision analysis, probability theory, utility and preference assessment, test characteristics)
K027. Clinical decision support standards and processes for development, implementation, evaluation, and maintenance
K028. Five Rights of clinical decision support (i.e., information, person, intervention formats, channel, and point/time in workflow)
K029. Legal, regulatory, and ethical issues regarding clinical decision support
K030. Methods of workflow analysis
K031. Principles of workflow re-engineering
K032. Quality improvement principles and practices (e.g., Six Sigma, Lean, Plan-Do-Study-Act [PDSA] cycle, root cause analysis)
K033. User-centered design principles (e.g., iterative design process)
K034. Usability testing
K035. Definitions of measures (e.g., quality performance, regulatory, pay for performance, public health surveillance)
K036. Measure development and evaluation processes and criteria
K037. Key performance indicators (KPIs)
K038. Claims analytics and benchmarks
K039. Predictive analytic techniques, indications, and limitations
K040. Clinical and financial benchmarking sources (e.g., Gartner, Healthcare Information and Management Systems Society [HIMSS] Analytics, Centers for Medicare and Medicaid Services [CMS], Leapfrog)
K041. Quality standards and measures promulgated by quality organizations (e.g., National Quality Forum [NQF], Centers for Medicare and Medicaid Services [CMS], National Committee for Quality Assurance [NCQA])
K042. Facility accreditation quality and safety standards (e.g., The Joint Commission, Clinical Laboratory Improvement Amendments [CLIA])
K043. Clinical quality standards (e.g., Physician Quality Reporting System [PQRS], Agency for Healthcare Research and Quality [AHRQ], National Surgical Quality Improvement Program [NSQIP], Quality Reporting Document Architecture [QRDA], Health Quality Measure Format [HQMF], Council on Quality and Leadership [CQL], Fast Health Interoperability Resources [FHIR] Clinical Reasoning)
K044. Reporting requirements
K045. Methods to measure and report organizational performance
K046. Adoption metrics (e.g., Electronic Medical Records Adoption Model [EMRAM], Adoption Model for Analytics Maturity [AMAM])
K047. Social determinants of health
K048. Use of patient-generated data
K049. Prediction models
K050. Risk stratification and adjustment
K051. Concepts and tools for care coordination
K052. Care delivery and payment models

Domain 3: Enterprise Information Systems

K053. Health information technology landscape (e.g., innovation strategies, emerging technologies)
K054. Institutional governance of clinical information systems
K055. Information system maintenance requirements
K056. Information needs analysis and information system selection
K057. Information system implementation procedures
K058. Information system evaluation techniques and methods
K059. Information system and integration testing techniques and methodologies
K060. Enterprise architecture (databases, storage, application, interface engine)
K061. Methods of communication between various software components
K062. Network communications infrastructure and protocols between information systems (e.g., Transmission Control Protocol/Internet Protocol [TCP/IP], switches, routers)
K063. Types of settings (e.g., labs, ambulatory, radiology, home) where various systems are used
K064. Clinical system functional requirements
K065. Models and theories of human-computer (machine) interaction (HCI)
K066. HCI evaluation, usability engineering and testing, study design and methods
K067. HCI design standards and design principles
K068. Functionalities of clinical information systems (e.g., Electronic Health Records [EHR], Laboratory Information System [LIS], Picture Archiving and Communication System [PACS], Radiology Information System [RIS] vendor-neutral archive, pharmacy, revenue cycle)
K069. Consumer-facing health informatics applications (e.g., patient portals, mobile health apps and devices, disease management, patient education, behavior modification)
K070. User types and roles, institutional policy and access control
K071. Clinical communication channels and best practices for use (e.g., secure messaging, closed loop communication)
K072. Security threat assessment methods and mitigation strategies
K073. Security standards and safeguards
K074. Clinical impact of scheduled and unscheduled system downtimes
K075. Information system failure modes and downtime mitigation strategies (e.g., replicated data centers, log shipping)
K076. Approaches to knowledge repositories and their implementation and maintenance
K077. Data storage options and their implications
K078. Clinical registries
K079. Health information exchanges
K080. Patient matching strategies
K081. Master patient index
K082. Data reconciliation
K083. Regulated medical devices (e.g., pumps, telemetry monitors) that may be integrated into information systems
K084. Non-regulated medical devices (e.g., consumer devices)
K085. Telehealth workflows and resources (e.g., software, hardware, staff)

Domain 4: Data Governance and Data Analytics

K086. Stewardship of data
K087. Regulations, organizations, and best practice related to data access and sharing agreements, data use, privacy, security, and portability
K088. Metadata and data dictionaries
K089. Data life cycle
K090. Transactional and reporting/research databases
K091. Techniques for the storage of disparate data types
K092. Techniques to extract, transform, and load data
K093. Data associated with workflow processes and clinical context
K094. Data management and validation techniques
K095. Standards related to storage and retrieval from specialized and emerging data sources
K096. Types and uses of specialized and emerging data sources (e.g., imaging, bioinformatics, internet of things (IoT), patient-generated, social determinants)
K097. Issues related to integrating emerging data sources into business and clinical decision making
K098. Information architecture
K099. Query tools and techniques
K100. Flat files, relational and non-relational/NoSQL database structures, distributed file systems
K101. Definitions and appropriate use of descriptive, diagnostic, predictive, and prescriptive analytics
K102. Analytic tools and techniques (e.g., Boolean, Bayesian, statistical/mathematical modeling)
K103. Advanced modeling and algorithms
K104. Artificial intelligence
K105. Machine learning (e.g., neural networks, support vector machines, Bayesian network)
K106. Data visualization (e.g., graphical, geospatial, 3D modeling, dashboards, heat maps)
K107. Natural language processing
K108. Precision medicine (customized treatment plans based on patient-specific data)
K109. Knowledge management and archiving science
K110. Methods for knowledge persistence and sharing
K111. Methods and standards for data sharing across systems (e.g., health information exchanges, public health reporting)

Domain 5: Leadership and Professionalism

K112. Environmental scanning and assessment methods and techniques
K113. Consensus building, collaboration, and conflict management
K114. Business plan development for informatics projects and activities (e.g., return on investment, business case analysis, pro forma projections)
K115. Basic revenue cycle
K116. Basic managerial/cost accounting principles and concepts
K117. Capital and operating budgeting
K118. Strategy formulation and evaluation
K119. Approaches to establishing Health Information Technology (HIT) mission and objectives
K120. Communication strategies, including one-on-one, presentation to groups, and asynchronous communication
K121. Effective communication programs to support and sustain systems implementation
K122. Writing effectively for various audiences and goals
K123. Negotiation strategies, methods, and techniques
K124. Conflict management strategies, methods, and techniques
K125. Change management principles, models, and methods
K126. Assessment of organizational culture and behavior change theories
K127. Theory and methods for promoting the adoption and effective use of clinical information systems
K128. Motivational strategies, methods, and techniques
K129. Basic principles and practices of project management
K130. Project management tools and techniques
K131. Leadership principles, models, and methods
K132. Intergenerational communication techniques
K133. Coaching, mentoring, championing and cheerleading methods
K134. Adult learning theories, methods, and techniques
K135. Teaching modalities for individuals and groups
K136. Methods to assess the effectiveness of training and competency development
K137. Principles, models, and methods for building and managing effective interdisciplinary teams
K138. Team productivity and effectiveness (e.g., articulating team goals, defining rules of operation, clarifying individual roles, team management, identifying and addressing challenges)
K139. Group management processes (e.g., nominal group, consensus mapping, Delphi method)

Knowledge Statements from the DoP

K118. Strategy formulation and evaluation

K119. Approaches to establishing Health Information Technology (HIT) mission and objectives

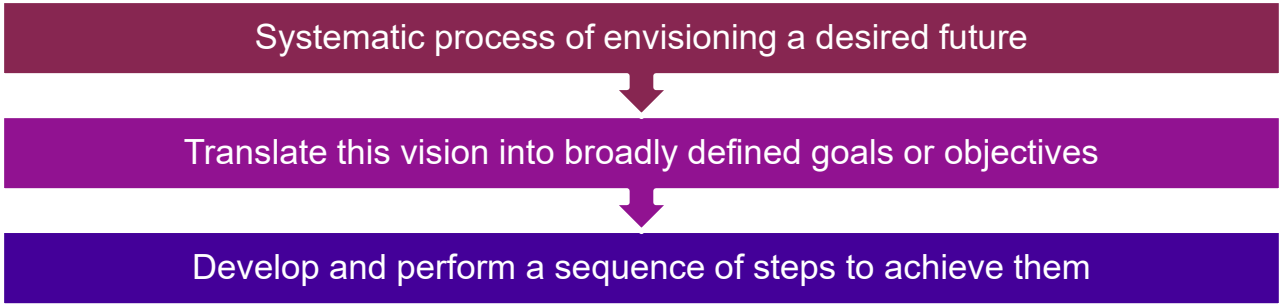
K112. Environmental scanning and assessment methods and techniques

K118. Strategy formulation and evaluation

Key Points

- Strategic Planning is basically **process redesign** and **change management** on a very large, long-term scale
  - Strategic planning models can guide strategy formulation
  - Components common between strategic planning models
  - Measuring impact of strategic planning helps secure resources for future planning
- Strategy for *information systems* must align with organizational strategy
- Environmental scanning informs long range strategic planning

Strategic Planning [Schmidt et al. 2009]



- Works backward from desired future state
- Looks at big picture
- Contrast…

Long-term planning	begins with current state and works forward to estimate future needs
Tactical planning	Focuses on achieving narrowly defined interim objectives with predetermined means

Strategic Plans

Strategic Plan

- Typical plan spans 3-5 years ahead
  - Resource-intensive
  - Provides adequate detail & contingency plans
- Alternative: small ongoing studies
  - Quick and inexpensive
  - Lack detail and sufficient contingency plans
- Unanticipated events may require revisions to the plan
  - Try to anticipate as much as possible

Strategic Information Systems Plan

- SISP
- a.k.a. **Strategic Information Management (SIM) Plan**
- Process of identifying a portfolio of computer-based applications that will assist an organization in executing its business plans and realizing its business goals.
  - [Lederer 1996]
- Very labor-intensive process

History of SISP [Mangalaraj 2014]

Era	Period	Focus
Pre-strategic era	Early to mid-1970s	Assessment of future computing needs.
Early strategic era	Late 1970s	Influenced by strategic planning, top management was involved.
Modern era	Late 1980s	Effectiveness consideration and ISP became part of business planning.
Alignment era	Late 1990s	ISP is part of the process to align business and IS strategy.
Uncertainty era	Late 2000s	ISP comprehensiveness under uncertain environmental conditions.

SISP Research Themes [Mangalaraj 2014]

Theme	Focus
Methodological	Method(s) used in the SISP
Process	Processes used in the SISP, citing that Methodological is too narrow
Factors	Factors that influence successful implementation of SISP
Organizational Impact	Successful implementation of SISP has beneficial impacts on organization
Evaluation	Producing objective quantitative measures of SISP success

Strategic Information System Plan (SISP)

Importance

- Failure to perform SISP well or at all
  - Missed opportunities
  - Duplicated efforts
  - Incompatible systems
  - Wasted resources
- [Basu et al 2002]

Success

- Based on three organizational factors
- **Organizational commitment**
  - Sufficient resources provided
  - Management intervenes in related conflicts
  - *Too much planning can be detrimental to SISP success*
- **Senior management involvement**
  - Championed by top executives who provide feedback and guidance
  - *Independently associated with SISP success (not other factors)*
  - Can't have enough (no tipping point)
- **Team involvement**
  - Plan input comes from plan implementers
  - critically important to success in many research studies

SISP – Process [Lederer 1996]

Knowledge Statements from DoP	Process step
K119. Approaches to establishing Health Information Technology (HIT) mission and objectives	1. Scope definition and organization
K112. Environmental scanning and assessment methods and techniques	2. Business and Competitive Assessment 3. Present Status Assessment (Situation analysis)
K118. Strategy formulation and evaluation	4. Information Technology Opportunities 5. Information Technology Strategies
	6. Organization Plan 7. Data and Application Plan 8. Technology Plan 9. Information Action Plan 10. Project Definition and Planning
	Post-plan evaluation and monitoring

SISP Example Content Headers [Brigl et al. 2005]

- Summary
- Introduction
- The Healthcare System and Its Environment
  - Vision, Mission, Objectives
  - Healthcare system characteristics, Organizational structure, Spatial structures (layout)
- Information management of the healthcare system
  - Organization of information management
  - Information management principles, goals and standards
- Assessment of current state (information system and organization)
- Desired target (future) state of the information system and organization
- Action Plan
- Contingency and mitigation plan for alternative scenarios
- Planned evaluation and monitoring of progress

Question

Failure to perform a strategic information systems plan would result in all of the following EXCEPT:

A. Duplicated resources
B. Missed opportunities
C. Duplicated efforts
D. Incompatible systems

Answer

Failure to perform a strategic information systems plan would result in all of the following EXCEPT:

A. Duplicated resources

B. Missed opportunities
C. Duplicated efforts
D. Incompatible systems

Failure to perform a strategic information systems plan (SISP) well or at all could result in missed opportunities, duplicated efforts, incompatible systems and wasted resources. However, it would not typically result in duplicated resources.

Strategic Planning Models

Model	Description	Pros	Cons
Organizational Pull	• Organization's objectives fully drive IT requirements • Organization pulls IT along with it • SISP developed AFTER organizational strategic plan	• Ensures alignment with organization's strategic plan	• Can be limited by organizational strategic plan • May not take advantage of technology disruptions
Technology Push	• IT pushes organization into new areas of business or service delivery • Evolving IT pushes the organization to expand and/or change business scope	• Takes advantage of technology disruptions	• If organization is too focused on IT, then opportunities outside of IT may be lost
Component Alignment	• Seven multi-aligned components • Promotes success in rapidly changing complex environments • Martin et al 1998	• Ensures alignment with organization's strategic plan	• More complex and involved to undertake

Martin JB. Creating a Strategic Plan. 2001 HIMSS Proceedings; New Orleans, LA. February 4-8, 2001.

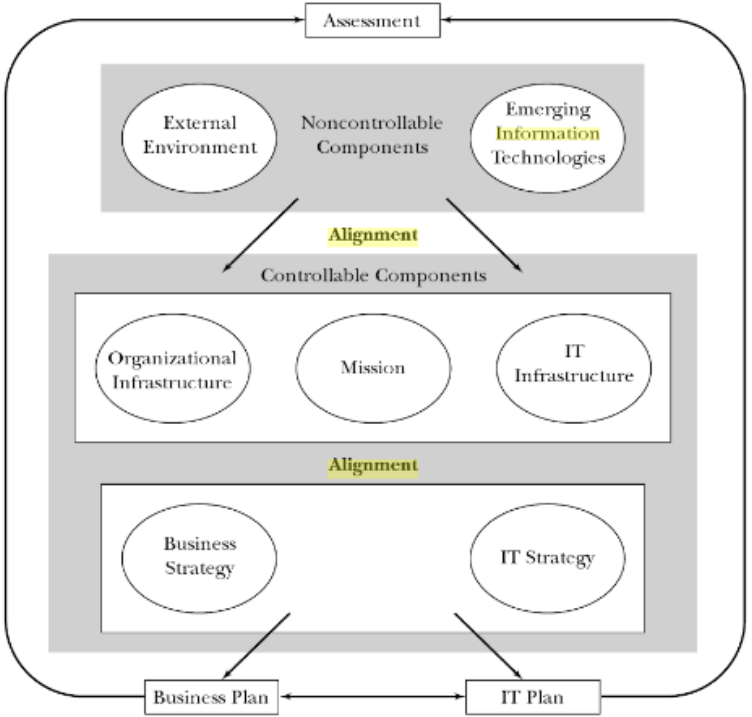
Component Alignment Model

The 7 Components of Component Alignment Model:

1. External environment (external forces affecting healthcare delivery)
2. Emerging IT (can influence mode of service delivery)
3. Organizational Mission
4. Organizational Infrastructure and Processes
5. IT infrastructure and processes
6. Organizational Business Strategy
7. IT strategy (rationale used in IT procurement and propagation)

Glaser 2002

FIGURE 2.3. COMPONENT ALIGNMENT MODEL.



Other Strategic Planning Techniques

Stages of Growth	Critical Success Factors	Competitive Forces Model	Three Emerging Forces
Value Chain Analysis	E-Business Value Matrix	Linkage Analysis Planning	Scenario Planning

[Pollack 2010]

Strategic Formulation

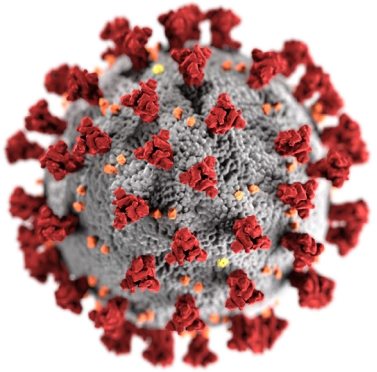
- Define desired future (target) state
  - Where should the organization be in 3-5 years?
  - Should align with Vision, Mission, Objectives
  - Should respond to the SWOT analysis by
    - Preserving Strengths
    - Resolving Weaknesses
    - Maximizing Opportunities
    - Mitigating Threats
  - Determine strategies for current → future state
  - Define incremental steps which will keep you towards the goal (not backwards!)
  - Get input/consensus from appropriate stakeholders
  - Get approvals and signatures

Action Planning and Implementation

- Create portfolio of projects for your strategy
  - Each project should bring the organization closer to future state
  - High-level estimates of time, people and money included in SISP
  - Define portfolio governance in the SISP
  - Follow all the same rules as for good project (and portfolio) management
- Alignment to organizational strategic plan will reduce deviations
- Employ all other tools in section 5 of the DoP

Contingency Planning and Mitigation

- Expect the unexpected because Murphy's Law will strike…
  - Changes in leadership, new regulations, budget cutbacks, and…pandemics
- Contingency and mitigation plans are imperative
  - Instructions on what to do for each possibility
- Change control process must be defined
  - Changes to SISP require consensus



Evaluation of SISP

- Record organizational baseline (critical)
  - Otherwise progress cannot be measured
- Criteria for success of the plan should be established and described in the SISP up front
  - Goals, metrics and control processes should be described in the SISP
- SISP should provide plan for resources, time and money to…
  - Monitor progress of the SISP
  - Detect and mitigate deviations from SISP
  - Detect contingencies and enact contingency plans as needed

K119. Approaches to establishing Health Information Technology (HIT) mission and objectives

SISP Vision and Mission

[Community Tool Box 2020]

- Critical to align SISP with organization's enterprise strategy
  - i.e., mission, vision and objectives must align with organization to…
    - Support/enhance quality healthcare delivery
    - Enable/amplify financial health and strategy
    - Foundation for integration of service delivery

VMOSA

Vision	The dream
Mission	The what and why
Objectives	How much of what will be accomplished and when
Strategies	The how
Action Plan	Action items, their assignees & deadlines

Vision and Mission

Vision

- Defines entity's purpose in context of its values
- Should inspire others → convey sense of higher purpose
- Success of communicating vision with positive response → competency of leader
  - Section 5B: Leadership
- Example from a pediatric health system:
  - **Best Care…Healthier Kids**

Mission

- Defines entity's purpose and primary objectives (business goals)
- Action-oriented
- Describes
  - Main function
  - Reason for existence
  - Customers (beneficiaries)
- Example from a pediatric health system:
  - **To make kids better today and healthier tomorrow**

Objectives (Goals)

- Tangible desired accomplishments
- Describes how the vision and mission will be fulfilled and operationalized
- Goals/deliverables should be **SMART**
  - [MindTools 2018, MindTools #2 2018]

Specific	**S**imple, **S**ensible, **S**ignificant
Measurable	**M**eaningful, **M**otivating
Achievable	**A**greed, **A**ttainable
Relevant	**R**esults-based, **R**easonable, **R**ealistic and **R**esourced
Time-bound	**T**ime-based, **T**ime-limited, **T**ime/cost-limited, **T**ime-sensitive

K112. Environmental scanning and assessment methods and techniques

Environmental Scan

- Collection of data about external and internal influences that could affect desired future state
- Internal
  - human resources, financial resources, facilities, organizational culture, other resources
- External
  - collaborators and affiliates, regulators, vendors, contractors, competitors, professional organizations, current industry standards, etc.

Environmental Scan - Internal

- **This information helps to define technical requirements later:**

Organizational	Size, # of beds, departments, clinics, outpatient/inpatient, etc.
Services	# outpatient visits, # inpatients, average length of stay, bed occupancy rate, # radiology & imaging exams, # of procedures, etc.
Business Management	Expenditures (total organizational, material, capital expenditures, IT capital), number of employees, personnel costs, etc.
Research & Education	# of students & trainees, third party funds (grants, etc.), total research expenditure, total education costs

[Brigl et al. 2005]

Environmental Scan - External

- Survey external influences that will impact your organization's ability to:
  - fulfill its vision
  - deliver on its mission
- **Benchmarking**: process of surveying other entities similar to yours in size and mission

Environmental Scan - Methods

- **PESTLE Analysis** [PESTLE 2016]

P	**Political**	existing and potential effect of political influences
E	**Economical**	effect and influence of local, national and global economy
S	**Social**	projection of social changes inside the organization, cultural influences are also part of it (local, national, regional, global)
T	**Technological**	effects of existing, new and advanced technologies
L	**Legal**	effects of national, European and international legislation
E	**Ecological**	local, national and global environmental issues and questions of its solution

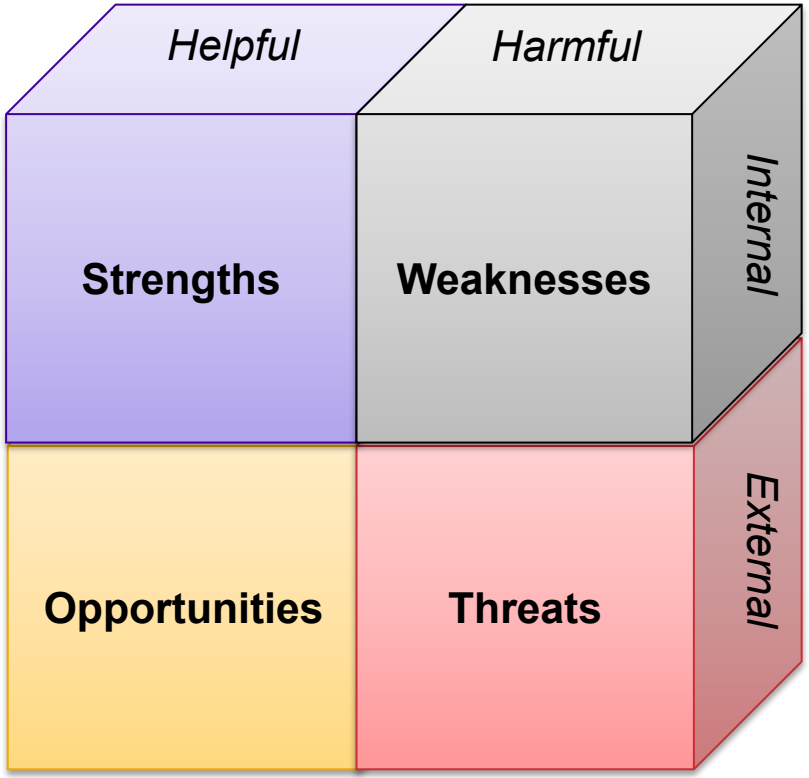
Environmental Scan - Methods

- Other versions
  - PEST
    - P - Political – existing/potential effect of political influences
    - E - Economical - effect and influence of economy
    - S - Social - projection of social changes
    - T - Technological - effects of existing & new technologies
  - STEEPLED
    - Same as PESTLE except adds Ethical and Demographic factors
  - PESTELI, STEER, SLEPT and STEP also

SWOT Analysis

- Strengths
- Weaknesses
- Opportunities
- Threats

- Another method of environmental scanning



Question

All of the following represent environmental scan methods EXCEPT:

A. PEST
B. SNOP
C. PESTLE
D. SWOT
E. Benchmarking

Question

All of the following represent environmental scan methods EXCEPT:

A. PEST

B. SNOP

C. PESTLE

D. SWOT

E. Benchmarking

SNOP stands for Systematized Nomenclature of Pathology, which is a predecessor to SNOMED-CT. PEST, PESTLE, SWOT and Benchmarking are all methods that can be used to perform an environmental scan during the strategic planning process.

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Environmental Scan (free resources)

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That’s a wrap!