Prioritizing Radical Health Innovations within Medical Facilities
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Introduction

New medical devices and health IT products are reaching the market at an increasingly rapid pace. Prioritizing innovation options among a wide array of relevant and attractive products is a challenge faced by medical facilities in all echelons of care1. Leaders are faced with three key risks when implementing new products: 1) the lack of objective clinical information; 2) the lack of sufficient financial data2, such as maintenance and training costs; and 3) unfavorable clinician interactions with the technology can lead to suboptimal performance and inability to obtain full value from the investment (Figure 1).

Innovation Risk Triad

Theoretical Framework

Innovation adoption is influenced by individual and organizational variables3,4. In a health care setting, systematic study of clinician opinions regarding medical technology can connect organizational and individual behaviors to create a more innovation-friendly environment (Figure 2).

Methods

Radical Innovation = major departures from standard practice that may change workflow or professional roles.

Setting
Advocate Christ Medical Center Emergency Department
• Level I Trauma Center
• 683 Bed Hospital

Data Collection
This study used Q methodology (Figure 3), a mixed-methods technique, to analyze the opinions of physicians and nurses in an emergency department.

A) Qualitative

B) Market Analysis

C) Instrument Development (43 items Total)

CIC cardiac marker panel that provides 4 markers with results in 20 minutes (Tropinin I, CKMB, Myoglobin, NT-proBNP)

D) Instrument Deployment (Q-sorts)

Figure 3: A Qualitative methods generated data on potential areas for radical innovation. Interviews identified favorable technology characteristics and focus groups identified specific clinical challenges. B) Market analysis identified products that meet ergonomic and clinical needs identified qualitatively. C) Generic descriptions of current products were developed. D) Participants were asked to rank the 43 products in terms of what they felt were “most likely” and “most unlikely” to improve care in their department. These Q-sorts were then subjected to factor analysis and interpreted.

Benefits:
• Statistical analysis of subjective data
• Designed to measure preferences
• Simultaneous analysis of individual & group trends
• Subcultures can inform engagement strategy

Limitations:
• Potential interpretation bias, volunteer bias, and non-responder bias.
• Reliability metrics are not applicable in Q-met hodology, since perceptions fluctuate based on personal experience.

Results

40 participants completed Q-sorts (12 physicians, 25 nurses, and 3 of undisclosed licensure). Factor analysis revealed 4 statistically significant (p<.01) clusters of shared opinions held among 33 participants that explained 53% of the study variance. Members of each factor represented diverse roles, seniority, and self-described innovation style (Figure 4).

Prioritization

Care “Subcultures”
Analysis of the individual factors revealed trends in technology preferences that could provide useful insights during change management (Figure 5).

References

9. Figure 1: Clinical performance and cost estimates of emerging products are challenging to assess.
10. Figure 2: Difficult trials and meta-analyses that support the efficacy of a given innovation take time to complete and will likely be available after the period when adoption would lead to the greatest competitive advantage. Likewise, data on Wasted resources and will likely be available after the period when adoption would lead to the greatest competitive advantage.

Figure 4: Demographic breakdown of study participants. IN = Innovator; EA = Early Adopter; EM = Early Majority.

Table 1: Table A. PRIORITY RADICAL INNOVATIONS

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Seniority</th>
<th>Innovation Style</th>
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<tbody>
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<td>Health Communication</td>
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<td>AirStrip CARDIO2000</td>
<td>AirStrip Technologies</td>
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<td>Sangam Health</td>
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<td>8</td>
<td>MediCom</td>
<td>Griffin Solutions, Inc.</td>
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<td>Abaxis</td>
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Figure 5: “Subcultures” of technology preferences that could provide useful insights during change management.