Apply: Unpacking Solution Readiness Level 2

The second level, *apply*, involves identifying user and market requirements through a development stage. During the early development cycle of an innovation, it is critical to understand the market requirements necessary for wide adoption. What are the existing companies or organizations that exist in the system, and what factors will convince a user and purchaser to make the change? Expect significant iteration within the *apply* level as teams develop their product. Modifications to the innovation will need to be made as the team gathers more user feedback and develops a deeper understanding of market requirements. It is important to consider how to engage people who are providing feedback in the process of adapting the prototype, so they feel safe and welcome.

The *apply* level consists of the following I-A-T scaling activities:
- Product-user fit hypothesis
- Champion(s) identified
- Stakeholder mapping
- Initial market and differentiation analysis
- Product-market fit hypothesis

Product-User Fit

Product-user fit is the idea that the innovation satisfies the needs of the primary user. The user is sufficiently satisfied with both the approach and results that they want to continue to use it. Creating user stories is a simple way to convey product-user fit, providing insight into how their day might look with this new innovation and the problems it addresses.

User feedback should be consistently collected throughout development. In the early stages, the team should talk to at least 20-30 end users, present the user stories, and gather feedback on what works and what doesn't work.

Questions to ask end users include:

- How are you solving the problem today (before the innovation)?
- What is missing from existing solutions?
- How would your day look different with the innovation?
- How would the innovation fit in your workflow?
- Can you see yourself using the innovation every day?
- What do you think are the barriers for this to be widely adopted?
- Would this fit well into already established systems?

Champions

One indication of strong product-user fit is the emergence of cheerleaders enthusiastically supporting the innovation and going out of their way to help the innovation succeed, called **champions**. Having a champion is a clear indication that the team has developed something that offers a promising way to address an acute pain point. A champion who understands the logic behind the innovation can also help the team to market the innovation to other schools and districts. This could look like providing testimonials, reviewing marketing materials, or learning about ways other stakeholders would like to see the innovation be adapted in the future so that it will better "fit" the local context. A champion who has the political and organizational power to move the innovation forward in a district can be invaluable.

A champion could be a teacher who enthusiastically pushes to continue to use an innovation after a study or demonstration and highly recommends it to peers. A champion could also be a superintendent who is a strong advocate and helps the innovation scale at a broad level.

Stakeholder Mapping

A stakeholder is defined as someone who has influence in the adoption of an innovation (and in most cases are not end users of the innovation). A detailed stakeholder map is necessary to understand the individual requirements of all decision makers and influencers across the system. Depending on the innovation, stakeholders could include roles such as directors of curriculum, school district superintendents, parents, teacher committees, or chief technology officers. It is necessary to map out the pain points, priorities, and needs of these decision makers to create a plan to fulfill the different requirements. It is highly recommended that the research and

development team go out into the field and conduct customer discovery interviews to receive firsthand feedback of the requirements that need to be met for each functional role.

To conduct a stakeholder mapping, researchers should consider the following questions:

- Who are the people whose needs must be satisfied for an innovation to be adopted, and what are their functions in the adoption process? How does this vary across large and small school districts? How does this vary across urban and rural school districts?

- What are the critical criteria that must be met for different types of stakeholders and what is the plan to meet those criteria?

Stakeholder mapping should be done early in the development process to identify critical requirements that could impact the adoption of their innovations. For example, if a research and development team is developing a math intervention with a technology-based component, they should know early on the technical requirements for computer-based apps of their target school districts. If the innovation is built upon a Mac IOS platform but the districts exclusively use Chromebooks, there is a mismatch from a convenience perspective. At best, it will cost time and money to reprogram and validate the innovation in the actual operating environment. At worst, the initial friction will stall any adoption, and the research output will not be adopted. An early understanding of the actual operating environment could mitigate this failure mode.

Table 3. Example Questions for Mapping Stakeholder Innovation Requirements

Potential Stakeholder	Potential Needs and Priorities
District Superintendent	Will the innovation support one or more of the district's top priorities? Does the innovation adhere to state and federal policy? Will the innovation improve achievement for all students? How well will it support students with disabilities, English language learners, or other important student populations? If applicable, will the teacher union support expected teacher training, assessment, and implementation? Do their principals and teachers want this innovation? What will it cost to adopt and sustain it? Is it worth it?
Director of Curriculum or Assessment	Will the innovation improve achievement, student behavior, or course or school completion? What is the likely size of improvement? How difficult is it to achieve high fidelity of implementation? What qualifications do staff need to be able to implement it well? How well is the innovation operationalized? Will it support district coaches in their current work with teachers? Has the innovation worked well in similar districts/schools? Will changing the curriculum or practice be worth the amount of effort and resources to train and support adoption? Does the innovation fit well with the other parts of instruction (e.g., the learning standards, assessments, and curricula used)? What reporting functions are available to help administrators and teachers easily track implementation and progress?
Chief Technology Officer	Is the innovation compliant with data privacy regulations? Does the innovation integrate well with the current identity management system? Are software updates easy to make? What tech support is available to users?
Principal	Does the innovation support instructional leadership goals? What supports are provided to school administrators to support their staff with adoption and implementation? What will be eliminated to make room for this new innovation?
Teachers	Is the innovation easy to implement? Does the innovation fit well with the other parts of instruction (e.g., learning standards, assessments, and curricula used)? Will teachers be able to see meaningful results within 3 months of using the innovation? How will the innovation replace (not add to) what teachers are expected to do?
Parents	Does the innovation enable parent engagement in learning? Does the innovation match the values of school community? Are there privacy or equity concerns regarding who has access to information or services?

Initial Market and Differentiation Analysis

A market analysis is necessary to understand other solutions that address the same or similar problem, how the new innovation is differentiated from those currently available, and how many customers exist in the target market. Despite a new innovation holding promise, there is a sense of fatigue and saturation on the side of the purchasers due to the sheer volume of new innovations. It is critical to understand how the new innovation compares to existing solutions.

There are multiple components in the market analysis described below—including Differentiation Hypothesis, Feature vs. Solution, Market Sizing, Ecosystem Shifts—that need to be revisited multiple times throughout the lifecycle of development. Further, the field and market may change over time, such as the introduction of new competitors or their offerings, new legislation that impacts relevant policies or funding streams, or events (e.g., COVID-19) that fundamentally change how education is delivered.

1) Differentiation Hypothesis

Understanding how the problem is being addressed today will be the first step in creating what is known as a "competitive matrix," that is, a mapping of direct competitors and their product features, pricing, funding sources, and value propositions. What are the characteristics of competing products, including their convenience, increase in productivity, contextual fit, or cost? The competitive matrix will clarify how crowded the market is and what types of characteristics the innovation must include in order to compete with existing solutions. Here are the questions to consider:

- How is the innovation differentiated from the competition?
- Does it enable a capability that does not exist already?
- What are the compelling reasons why a user or customer would choose this over competing solutions?

2) Feature vs. Solution

Solutions are composed of multiple features. Understanding whether the innovation is a complete solution or a feature is a highly important milestone in the framework. All of the information collected in the competitive matrix in the step above, in addition to the requirements of the stakeholders, can help make an initial hypothesis. Customer interviews and user feedback will also help determine whether additional components are required for a customer to adopt the innovation as a full solution.

- *Does the innovation augment an existing solution?*
  - If there are early indications that the innovation does not have enough features to be a standalone solution, a transition target may be an existing company that can incorporate

the innovation into an existing solution. Start the conversations early with the existing providers to gauge their level of interest in transitioning technology from researchers.

- *Does the innovation displace an existing solution?*
  - If there are early indications that the innovation has the potential to be a complete solution, the innovation may be in a position to displace an existing solution. The competitive analysis started in the step below will help the team understand what features are necessary to displace an existing solution.

- *Is the innovation a completely new solution?*
  - If there are early indications that the innovation has the potential to be a complete solution that creates a new market and does not displace existing solutions, it may be able to create a new market. For instance, Google Classroom did not exist 10 years ago. It has created a new ecosystem of digital tools adopted by schools that would not have been possible. New markets can be created by fundamental ecosystem changes (technological advancements or public policy).

3) Market Segmentation and Market Sizing

Who is the target market, how many customers exist within this market, and what are their requirements? Defining the market segment and the size of that market segment will help teams formulate short-term and long-term customer acquisition strategies.

Market segmentation. First, the team will need to define the customer and the market segments into which they may fall. What is the target market and what are the solutions that are typically adopted? Market segmentation questions include:

- *Is the innovation targeting a specific student population?*
  - For instance, a research and development team has developed an interactive science curriculum for students with disabilities in K-5. However, the analysis of how districts adopt similar products for this student population (market segment) finds that school districts tend to adopt curriculum programs that encompass all students with features that support access and learning for students with disabilities. Thus, to serve this market segment, the researchers may need to include their curriculum within a broader curriculum package, or partner with others to meet the market requirements.

- *Is the innovation targeting urban or rural districts?*
  - For example, if the innovation requires prolonged internet access (cannot be used offline), some rural districts with limited internet bandwidth may face challenges. Therefore, the research and development team may not want to target this market segment at the initial launch.

- *Are there certain requirements that are typical of a state depending on the student population?*
  - For example, to support access to grade-level learning of multilingual learners, states may desire innovations focused on science or math that use students' home languages or use learning strategies that provide learning in formats less reliant on language. Assessing the size of such a market can inform whether development of language-specific versions will be of sufficient interest.

Market sizing. Next, the team will need to quantify the number of potential customers that exist within the target market segment (or segments). Using a disciplined approach to quantify the market in incremental steps will help determine the type of resources required to scale up as well as the type of customer acquisition (sales and marketing) strategy required to access these markets. Three tiers of market sizing are presented below:

- *What is the Total Addressable Market (TAM), the total potential market demand for the innovation?*
  - For instance, if the research and development team is selling a kindergarten literacy curriculum, every single school district in the country that serves kindergarteners would be the TAM.

- *What is the Serviceable Addressable Market (SAM), the total segment of the market that is within reach today?*
  - For example, for a kindergarten literacy curriculum that is tied to certain standards used by only a portion of the states, the number of school districts within these states is the SAM.

- *What is the Serviceable Obtainable Market (SOM), the total segment of the market that can be captured with the research and development team's immediate resources?*
  - For example, if a team can only support up to 10 districts in the next 12 months, that number of districts is the SOM.

4) Ecosystem Shifts

External factors may significantly change the way innovations may be adopted. These changes could be fueled by forces such as legislation, budgetary changes, and increased acceptance of digital solutions. Tracking changes that are relevant to the innovation and aligning the development with the ecosystem changes is also one component of the market analysis activities. It is typically impossible to predict the type of shifts that may occur, but here are examples of questions that may be relevant:

- Has there been recent legislation or upcoming legislation that may help propel wider adoption?

- With the proliferation of such digital tools such as Google Classroom, are there opportunities to integrate into emerging ecosystems?

Product-Market Fit Hypothesis

Has the team identified whether the innovation meets the needs of all the stakeholders and, therefore, meets the needs of the whole market? To conduct this analysis, the following set of questions should be considered:

- Does the solution address the requirements of all stakeholders? If it does not, there needs to be a plan formulated to address requirements at a later stage of development.
- Are champions advocating for the innovation and creating natural momentum behind the innovation?
- Have the efforts of champions led to potential customers enthusiastically requesting access to the innovation?
- Is this a scalable solution? For example, can the team support a large number of districts with their adoption and operations at the same time?
- Do significant ecosystem forces exist that can help drive adoption?

If the team is able to answer yes to the first four questions above, there are early indications that they have achieved product-market fit.

Learn more about the I-A-T scaling activities and access resources here.