

Improved New Concept Screening as a Means to Accelerate Construction Technology Diffusion, for the NSF-PATH Program

Ed Hudson¹

Abstract

One method to accelerate innovation in residential construction is by improving the new product development (NPD) process among manufacturers and developers of homebuilding technologies. A notably weak link in the NPD process is *new concept screening*, which evaluates the marketability of a new product concept before significant R&D resources are expended on it. The complexity of the new technology decision process and structure in homebuilding renders traditional concept screening techniques less effective. An improved concept screening model, developed specifically for building technologies, will help developers concentrate spending on marketable concepts, decreasing time-to-market and reducing the market failure rates of new homebuilding technologies. Additionally, public organizations that promote building technology diffusion could increase their effectiveness by selecting technologies with greater probability of widespread adoption by applying a more effective screening methodology.

Keywords: residential construction, homebuilding technology

Introduction

UNCERTAINTY IN NEW CONCEPT SCREENING

Throughout the NPD process, decisions are made to screen for the technical and economic feasibility and market acceptance of a new concept or technology. Screening for market acceptance is an especially difficult task. Market acceptance needs to be expressed numerically when applied to a business plan, such as projected market share capture, quantity of units sold, or dollar volume of sales, and converting future purchasing behavior to a numeric expression is not an exacting science. New technologies are introduced into a competitive environment, and reactions from both stakeholders and competitors are highly uncertain. The Association for the Advancement of Cost Engineering, for example, places estimates and projections developed in the concept screening stage of NPD in the category where reliability is poorest—ranging from –50 percent to +100 percent variance (18R-97).

Methods for new concept screening of consumer products and services have undergone substantial refinement in recent years. In an attempt to make the NPD process more efficient and reduce time-to-market, many U.S. firms have endeavored to push the

¹ NAHB Research Center, Email: ehudson@nahbrc.org

product definition stage earlier in the NPD process. The earlier a new concept can undergo market screening, the sooner unlikely concepts are screened-out before it consumes significant R&D resources. Early, accurate screening allows the firm to devote its resources on technologies with the greatest probability of market acceptance.

NEW CONCEPT SCREENING FOR CONSUMER GOODS

Screening of new consumer concepts relies primarily on feedback from potential buyers, who are generally the intended end-users of the new concept. A typical concept screening process attempts, in some fashion, to replicate the actual circumstances of the purchase decision. Participants in this research are informed of the new concept and its attributes and are asked to rate its overall favorability, likelihood of purchase, and other pertinent issues. Over time, companies conducting new concept screening assemble a database of market acceptance scores with subsequent market share capture for the concepts they evaluate and eventually commercialize. The market acceptance scores and actual market share capture rates are used together to predict the acceptance of newly rated concepts.

CHALLENGES TO NEW CONCEPT SCREENING FOR BUILDING TECHNOLOGIES

This process is often applied to NPD for construction technologies. However, the structure and process of decision making in new home construction is much more complex than for typical consumer products, so the reliability of traditional concept screening suffers. Unlike consumer products, the decision to specify a new technology or product for new homes is typically not made by a single individual, but by staff from building companies representing a variety of homebuilding functions: purchasing, project management, design & engineering, sales and others. Further, a homebuilding firm may be strongly influenced by stakeholders outside the firm—architects, homebuyers, building officials, suppliers, or trade contractors who will often exert influence in this decision. A more effective screening process for new building technologies would quantify the impact of the relationships between and interactions among participants. At the present, no publicly available model of concept screening attempts to quantify this complex interchange.

A need exists to improve the new concept screening research among homebuilding technology developers. Improved concept screening will reduce the cost to innovate and time-to-market for beneficial technologies. Further, agencies such as NSF and HUD encourage the adoption of homebuilding technologies that may have societal benefits, and this type of screening tool could bring to light market acceptance issues that would doom an otherwise good idea.

Future Research Direction

Improving concept screening of new building technologies will require developing a methodology that accounts for the unique decision environment in the homebuilding

industry. Prior to developing this methodology, some fundamental research needs to be conducted to improve our understanding of the decision environment:

1. The structure of the decision—who plays what role—and how decision factors vary between stakeholders and influencers
2. How best to categorize decision factors—product attributes, cost, purchasing logistics, switching costs, stakeholder acceptance—and how important they are in new technology decisions
3. Type of influence exerted by stakeholders and collaborators in the decision to specify a new building technology
4. How decision factors and structure vary by builder demographic and type or application of technology