

# تکنولوژی تولید محصولات فرموله شده

دکتر علی نصیرپور

مهر 1391

# **Factors for successful products in the successive stages of the PD Process**

- **Stage 1: Product strategy development – integration of the product development program with the business strategy, clear description of the market and consumers, identification of market and consumer needs.**
- **Stage 2: Product design and process development – quantitative design specifications, multidiscipline integration, use of new techniques, feasibility analysis.**
- **Stage 3: Product commercialisation – multifunctional integration, planning and scheduling, market testing, business analysis.**
- **Stage 4: Product launch and evaluation – organisation and control, fast problem solving, evaluation of launch, production, distribution and marketing, evaluation of outcomes.**

# Company-controllable factors in product success and failure

## Consumers and markets

### *Consumers*

Closeness to the customer/consumer in product development

The product designed for the consumer's needs, wants and value

### *Marketing*

A strong market orientation

## Product

The product superior to competitors

The product has different, unique benefits

## **Project development process**

Multistage, multifunctional disciplined process with clear decision points

Integration of product, marketing, production, testing and evaluation

### *Stage 1. Product strategy development*

Product strategy related to business and market strategies

Clear and early product definition

More predevelopment work before product design

Product evaluation and screening to give sharper project selection decisions

### *Stage 2. Product design and process development*

Clear product design specifications

Creativity in design

Integration of product design and process development

Consumer/customer involvement in design

### *Stage 3. Product commercialisation*

Pre-commercialisation business analysis

The new product marketed by the design team to the production and marketing personnel

Integration of production, distribution and marketing planning

Costs definition and reduction

Product quality sustained

### *Stage 4. Product launching and evaluation*

A well-conceived, properly executed launch with a solid marketing plan

Evaluation measures set before launch

Timing of launch optimised

Good control methods

Post-launch evaluation and follow-on.

## **Product development management**

Good technical/manufacturing/marketing interfaces

The right organisational structure and environment

Project evaluation and decision-making procedures

Completeness, consistency and quality of execution of project

Good project leaders and a core group

Time and cost control; continuous evaluation of project and process

## **Company**

### *Company management*

Top management support

Product development in business strategy

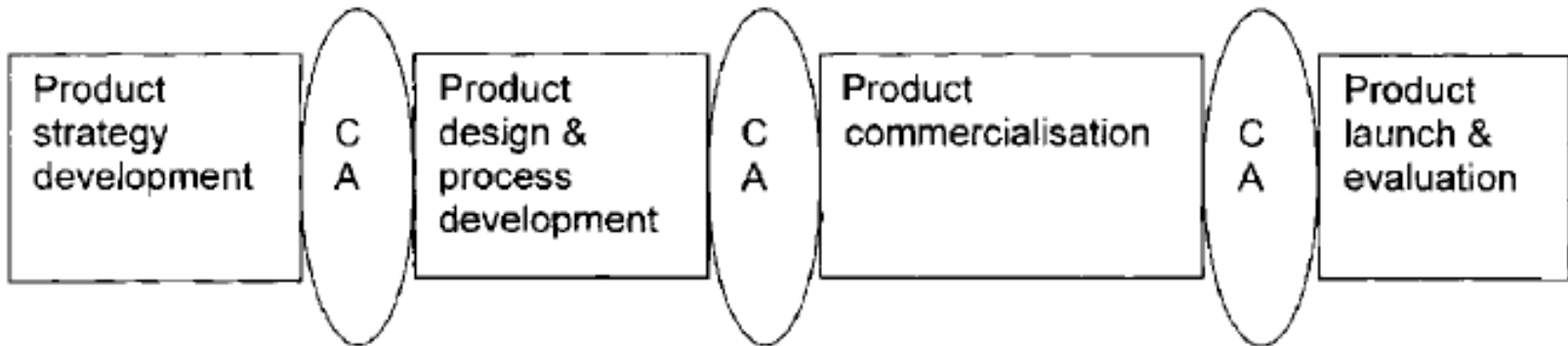
Resources in place – time, money, people

Top management in major decision making

### *Company knowledge*

PD project synergy with company's resources/skills/knowledge

Technological synergy and market synergy with company resources/skills



CA is critical analysis and 'Go/Recycle/No Go' decisions by top management

## The fundamental PD Process.

# ***Stage 1: Product strategy development***

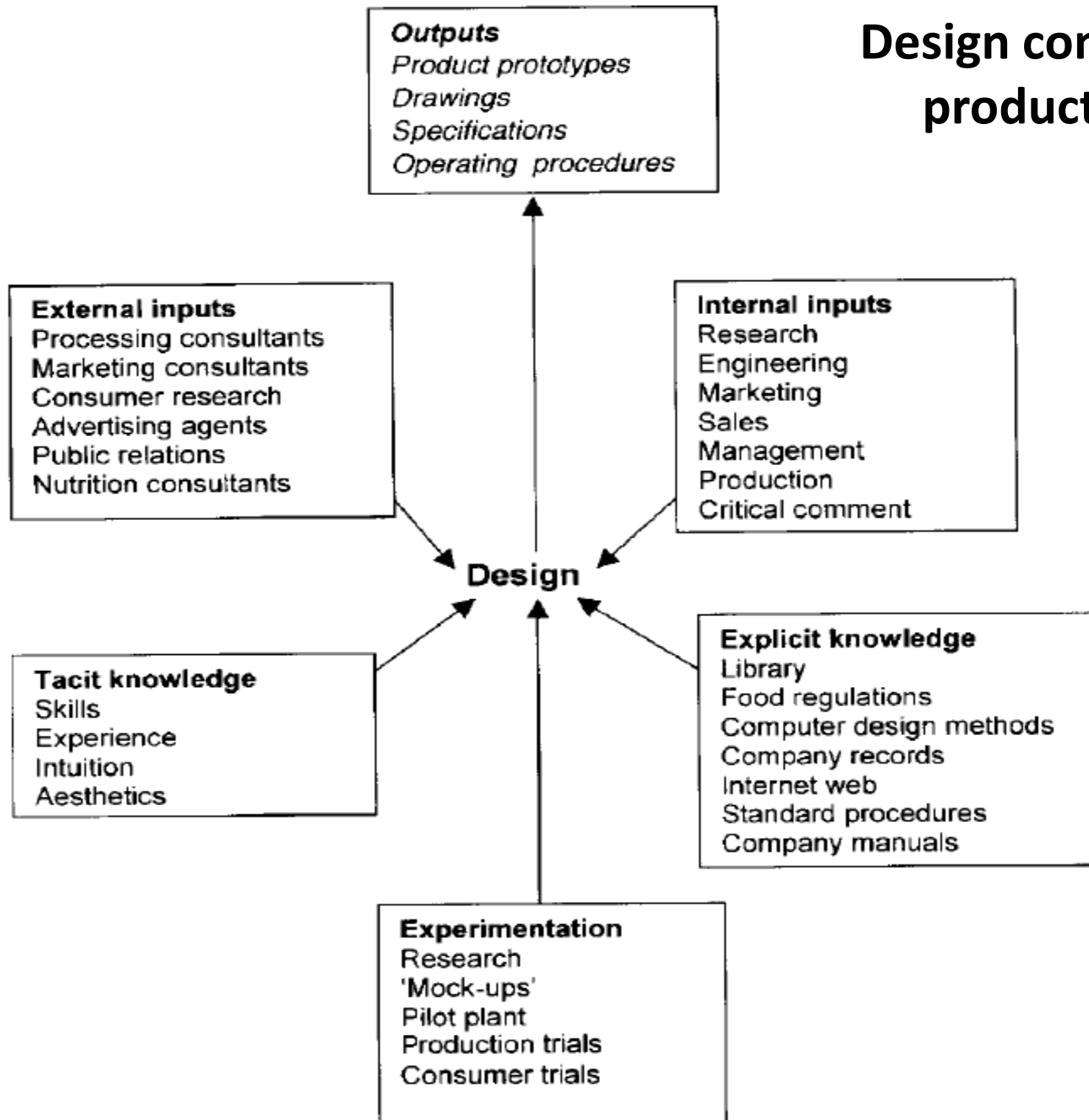
- A business definition and a product definition have to be developed in the early stages
- Product concept and if possible the product design specifications plus a report on the feasibility of the project are the outcomes of this stage
- Definition of what the new product should offer the consumer/customer, that is the benefits, desired product characteristics, uses, safety, value. With the consumers/customers, a product concept is developed describing the product as the consumer sees it and wants it. This product concept is developed into more quantitative descriptions by relating the product concept to both the product metrics, which can be measured by physical, chemical, microbiological or sensory tests, and also the processing, production and marketing methods



**product design specifications for designer**

# Stages in the PD Process

## Design components in food product development





### ***Stage 3: Product commercialisation***

The key issues are:

- maintain the product qualities at the same standard as in the design through the process and the distribution;
- produce and distribute at the quantities needed;
- develop a total product concept for marketing that agrees with the consumer needs and wants and creates unique value for the chosen target market;
- organise a distribution channel which ensures quality, quantity and costs;
- reduce uncertainty and risk in the launching;
- reach the predicted sales and profits.

# Key questions in product development management

**Business strategy:** does it focus on product strategy and innovation strategy?

**Product strategy:** is it a predicted, continuous development of the product mix? Does it show the product improvements and the major product innovations, which will be the basis for the product development program?

**Product development program:** is it based on the business strategy and on predicted social and technological changes? Does it specify outcomes needed, time and costs? Are there clear objectives?

**Product development organisation:** is there a multifunctional, integrated organisation uniting teams and functional groups? Are there identified organisations for incremental product improvements and for major innovations?

**Top management control:** has top management agreed to the program and the individual projects? Has top management set the decisions it will make throughout the project and indicated the information it needs for these decisions? Has top management identified the resources needed for the program?

**Knowledge:** is there the level of product, processing and marketing technologies for the planned product development? Is there product design knowledge and creative abilities to create unique products?

**Consumer/product relationship:** does the company recognise this relationship as a major factor in product development success? Are the consumers integrated into the product development process?

**Systematic product development process:** has the company recognised the important stages in its planned product development and designed a suitable basic PD Process, and identified variations for different products?

**Product design and process development:** are there clear definitions of the product concept and the product design specifications? Is there integration of the product design and process development?

# **The product development process**

- ❖ **Product strategy**
- ❖ **Product design and process development**
- ❖ **Product commercialisation**
- ❖ **Product launch and evaluation**

## **The substages in Stage 1**

- defining the project;
- developing the product concept;
- identification of processes, distribution and marketing;
- development of product design specifications;

## Decisions



## Outcomes

### Stage 1. Product strategy

Project acceptance  
Resources for  
initial investigation



**Project aim, outcomes and constraints**

Product idea  
acceptance



Product concept  
Product design specifications

Resources for design  
Programme timing  
Harmony with business



**Product report**  
Technical feasibility: marketing suitability  
Consumer acceptance  
Project plan  
Project costs, risks

### Stage 2. Product design and process development

Acceptance as new  
company product



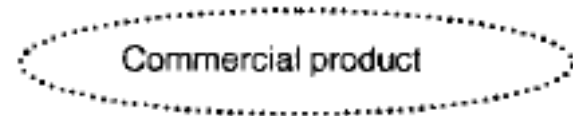
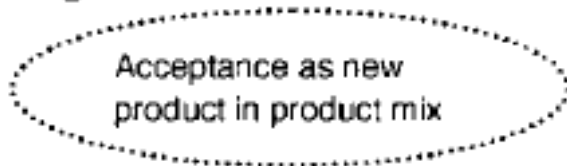
Final prototype product

Resources for  
commercialisation  
Total company  
involvement  
Harmony with  
business



**Feasibility report**  
Target consumers: product qualities  
Processing method: predicted costs  
Marketing strategy: predicted sales  
Project costs, risks

### Stage 3. Product commercialisation



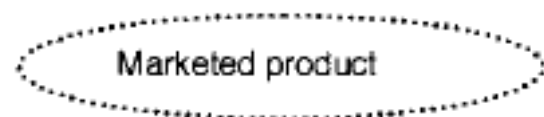
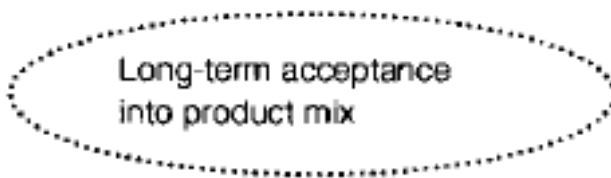
Launch agreement  
Capital investment agreement  
Acceptance into company organisation



#### Commercial report

Production plan: distribution plan  
Marketing plan: sales forecast  
Human resources  
Financial plan: capital investment  
Investment analysis: risk analysis  
Effect on company: effect on society

### Stage 4. Product launch and evaluation



Feedback to future business strategy  
Future product development  
Resources for future product development



#### Final evaluation report

Product quality and position  
Costs against targets: sales against targets  
Indicative return on investment  
Effect on company  
Market acceptance: society acceptance

**Identifying the outcomes necessary for the decisions**

## Project constraints: a checklist for product development projects

Product	Processing	Marketing	Financial	Company	Environment
Eating quality	Equipment	Channels	Fixed capital	Strategy	Local government
Composition	Capacity	Distribution	Working capital	Structure	National government
Nutrition	Raw materials	Prices	Investment	Expertise	Industry agreements
Packaging	Wastes	Promotion	Project finance	Location	Farmers' agreements
Shelf life	Energy	Competitors	Cash flows	Management	Economic status
Use	Water	Size	Profits	Innovation	Business cycle
Safety	Personnel	Product mix	Returns	Size	Social restrictions

# **The consumer in product development**

**Understanding consumer behaviour**

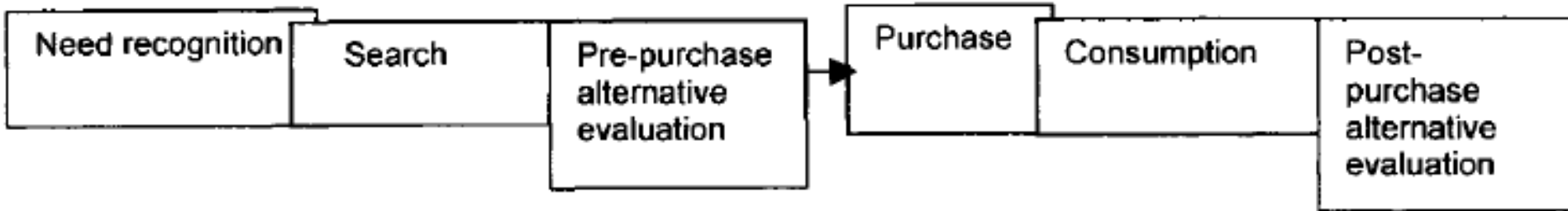
**Stimuli to buy and eat**

**Product judging criteria**

**Consumer/food relationship**



## Understanding consumer behaviour



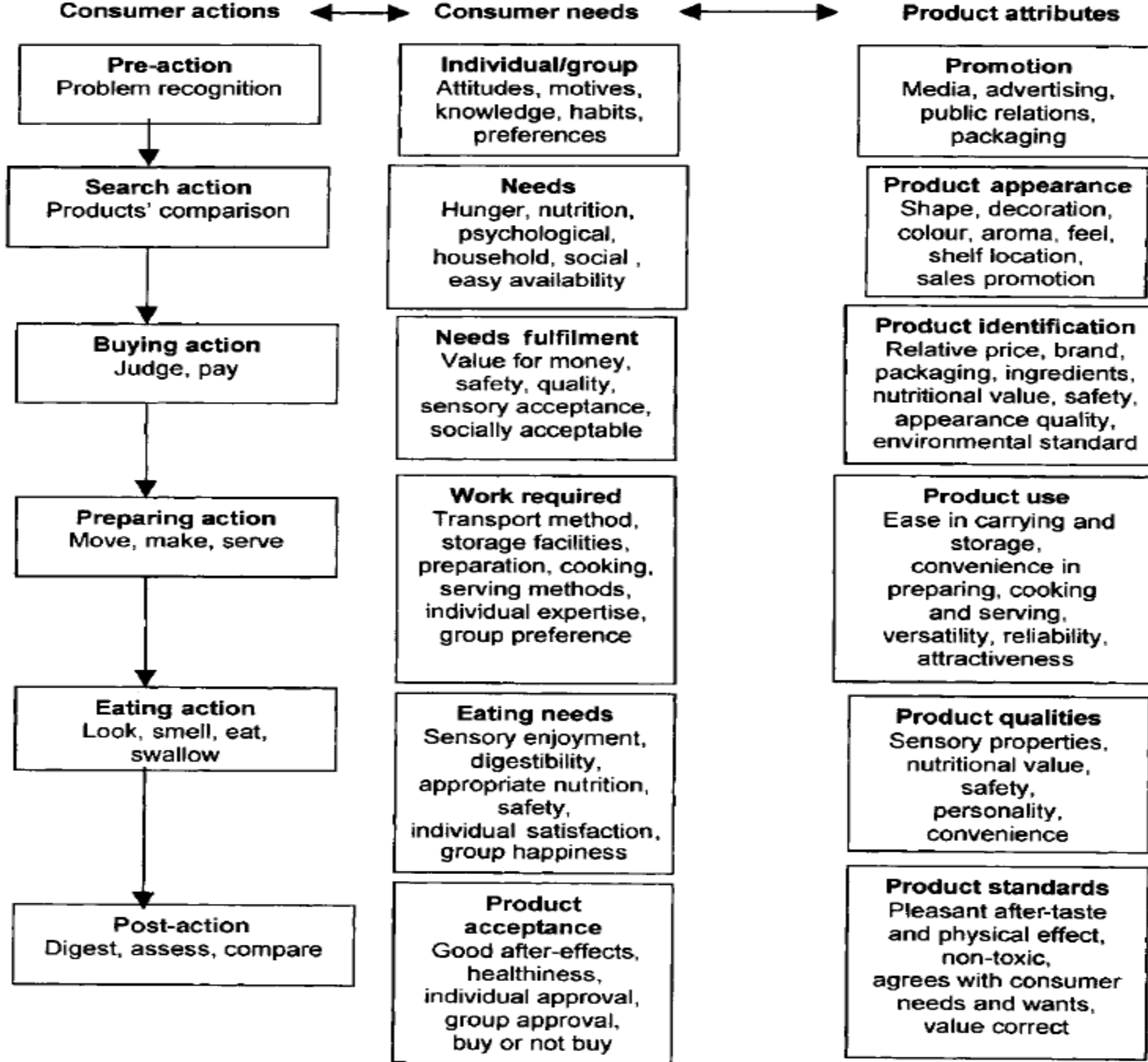
## General consumer behaviour in buying and consumption

**Table 5.2** Consumer actions after buying the food product

---

Action	Sub-actions	Decisions for and against
Preparation	Transport, store, prepare, cook, serve	<i>Easy/difficult</i> <i>Quick/time-consuming</i>
Eating	See, feel, smell, bite, savour, swallow	<i>Enjoy/neutral/dislike</i> <i>Easy/difficult</i> <i>Clean/messy</i> <i>Quick/takes time</i>
Post-eating	Digest, general feeling, feeling in stomach	<i>Comfortable/indigestion</i> <i>Well/sick</i> <i>Pleasant/unpleasant after-taste</i>
	Dispose of waste	<i>None/large, clean/messy</i>
	Compare with other foods	<i>Like/dislike</i> <i>Repurchase/never buy again</i>

---



Comparing consumer needs and product attributes in the food behaviour process

## Individual

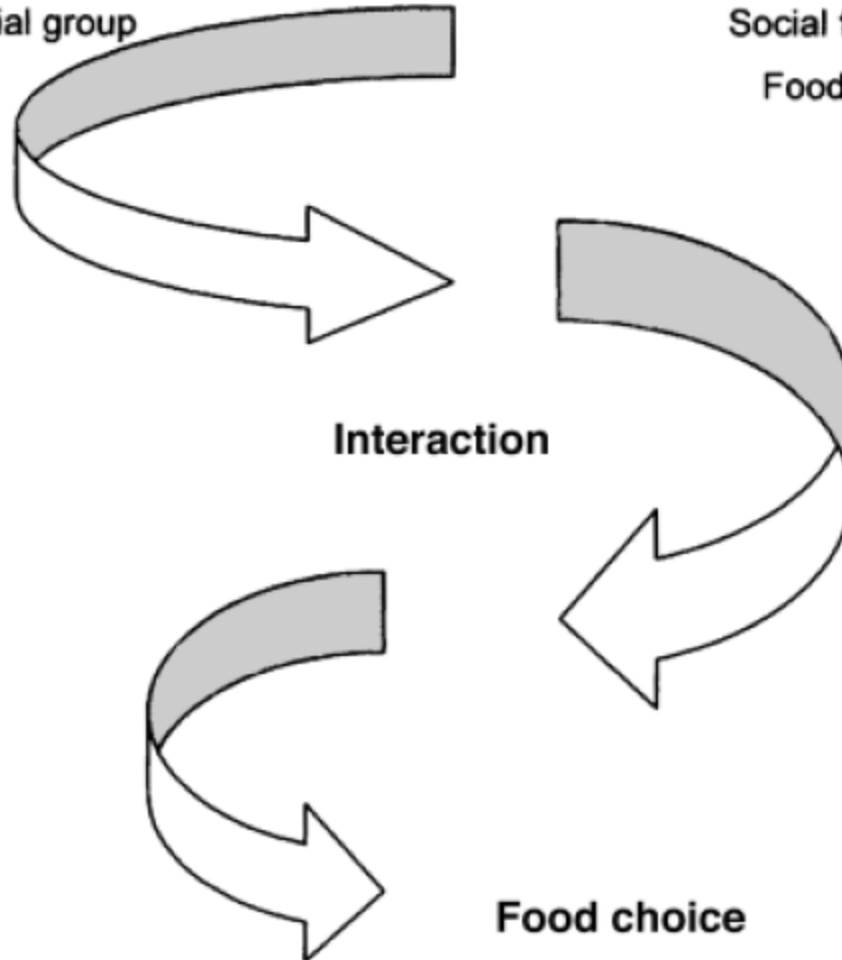
Perception of ethnicity  
Perception of social group  
Perception of variety  
Level of involvement  
Habitual behaviour  
Prior experience  
Food neophobia  
Expectations  
Stereotypes  
Likes/dislikes

## Environment

Effort to obtain food  
Social facilitation  
Food appearance and aroma  
Packaging  
Visual stimuli  
Tasting  
Menus  
Décor, store layout  
Music  
Signs, posters

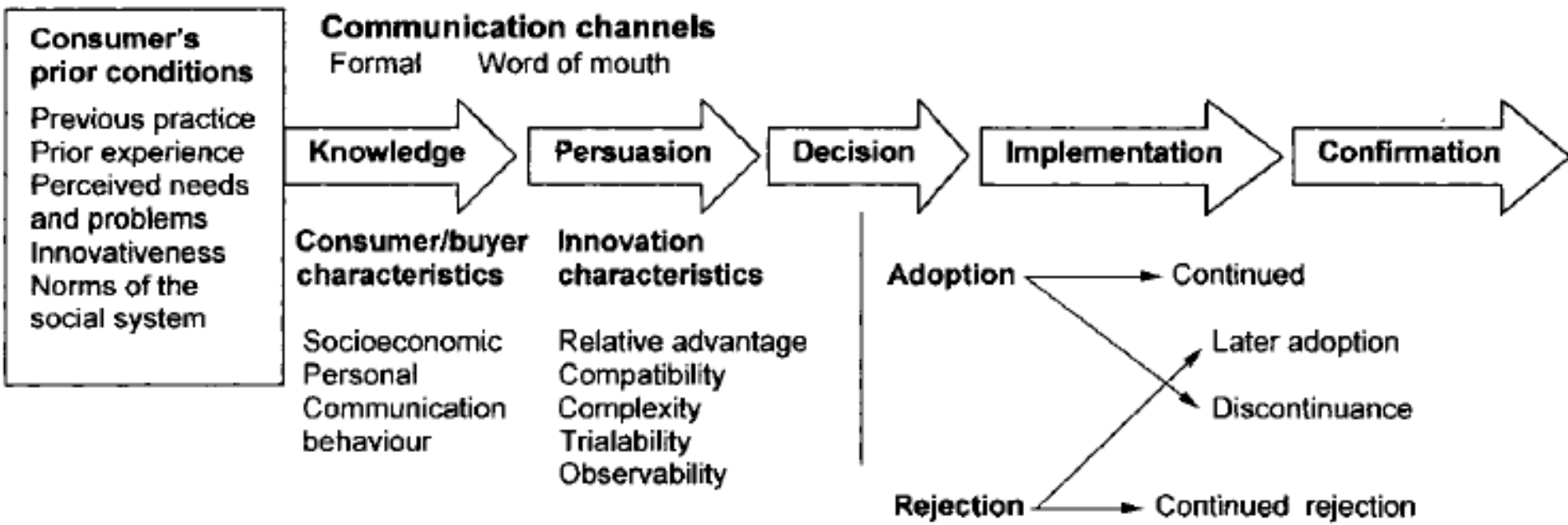
Interaction

Food choice



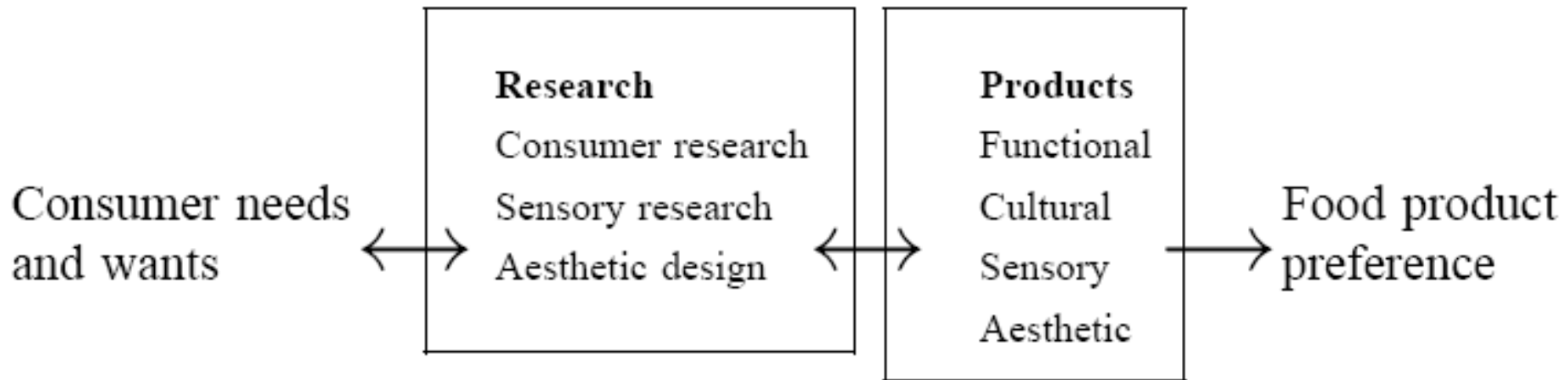
**Interaction of the individual and the environment in food choice**

# **Consumers' avoidance and acceptance of new products**



**Rogers' model of the innovation-decision process**

# Integrating consumer needs and wants in product development



# Consumer testing in product design and process development

Steps	Activities	Techniques
‘Getting the feel’ Consumer panels	Ideal profiles	Profile tests Descriptive sensory analysis Multivariate analysis
	<b>Product ‘Mock-ups’</b>	
‘Screening prototypes’ Consumer panels	Product comparison	Difference testing Ranking
	<b>Elementary product prototypes</b>	
‘Ball park studies’ Consumer panels	Acceptability of attributes Acceptability of products	Attribute scoring to ideal Preference panel Hedonic testing
	<b>Acceptable product prototypes</b>	
‘Optimisation’ Central location test Consumer panels	Product improvement Competitive comparison Food behaviour study Packaging testing	Acceptance testing Hedonic comparison In-home use tests Ergonomic testing
	<b>Optimum product prototype</b>	
‘Scale-up’ Random consumer test Small buying experiments Consumer panels	Buying predictions	Acceptance testing
	Commercial product concept	In-depth interviews
	<b>Semi-commercial product</b>	



## Key questions in measuring the design process

1. Is there a difference between two food samples? Used when trying to duplicate a product or to see if there is a difference between product prototypes. Difference tests such as triangle tests, paired comparisons can be used.
2. Is the product acceptable? How acceptable? Used for the optimum prototype products when testing by large consumer groups or smaller, representative panels.
3. What are the characteristics of the products? How strong are they? Used when building up the product concept and also in designing the product prototypes. This can be called descriptive analysis or product profiling. The profile method is designed to give a profile of the overall sensory properties by describing and determining the relative magnitudes of the attributes.