SCIRT Rebuilding Infrastructure

LEARNING LEGACY

Lessons learned from one of New Zealand's most challenging civil engineering projects: rebuilding the earthquake damaged pipes, roads, bridges and retaining walls in the city of Christchurch 2011 - 2016.

Driving Innovative Thinking in the New Zealand Construction Industry - presentation

Story: Academic Studies – Driving Innovation in the Construction Industry

Theme: Programme Management

A presentation delivered at Building a Better New Zealand (BBNZ 2014) Conference which examines the relationship between innovation and productivity improvement in the construction industry.

This document has been provided as an example of a tool that might be useful for other organisations undertaking complex disaster recovery or infrastructure rebuild programmes.

For more information about this document, visit www.scirtlearninglegacy.org.nz

Programme funded by Christchurch City Council New Zealand Government

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New Zealand Government

Driving Innovative Thinking in NZ Construction Industry

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03 September 2014

BUILDING A BETTER NEW ZEALAND

BRANZ

SCIRT Rebuilding Infrastructure

THE UNIVERSITY OF AUCKLAND FACULTY OF ENGINEERING

Construction Industry and Innovation

Construction needs to be more productive

→

Those who innovate are more productive

But! →

Construction is the least innovative sector

September 2014

Innovation & Productivity

Innovation ? → Productivity

- Productivity: well defined, easy to measure
- Innovation: not so specific, hard to measure

Definition of Innovation

"Intentional introduction and application within a role, group or organisation of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, the organisation or the wider society"

(West & Farr, 1990)

Definition of Innovation

- There are 3 critical elements in all definitions of innovation: Type, Novelty and Benefit

Innovation ⟶ Productivity

Depends on

- Type
- Novelty
- Benefit

Construction Innovation Classification Model

Innovation Type	Innovation Novelty	Innovation benefit
Tool	Incremental	Cost
Product		Time
Function	Modular	Quality
Design		Safety
Method	Architectural	Community
Technology	System	Environment

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Innovation benefit
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Time
Quality
Safety
Community
Environment

Analysis of SCIRT innovation database

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Christchurch City Council

New Zealand Government

EXAMPLE TOOLS:

Hydraulic Aluminium Shoring

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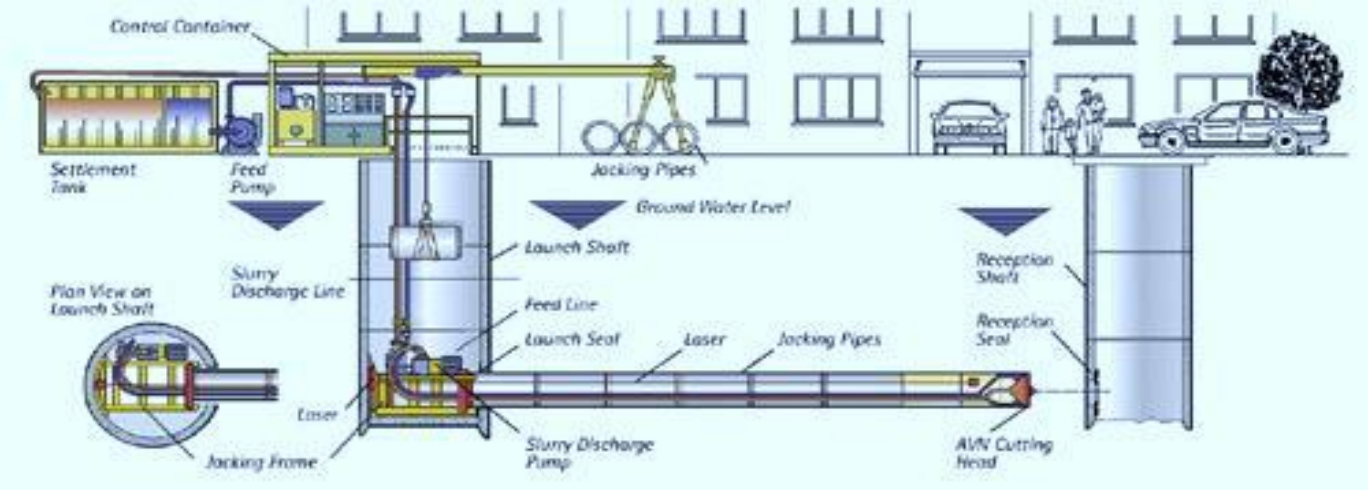
EXAMPLE METHODS:

Micro tunnelling to be an accepted practice



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Analysis of SCIRT innovation database

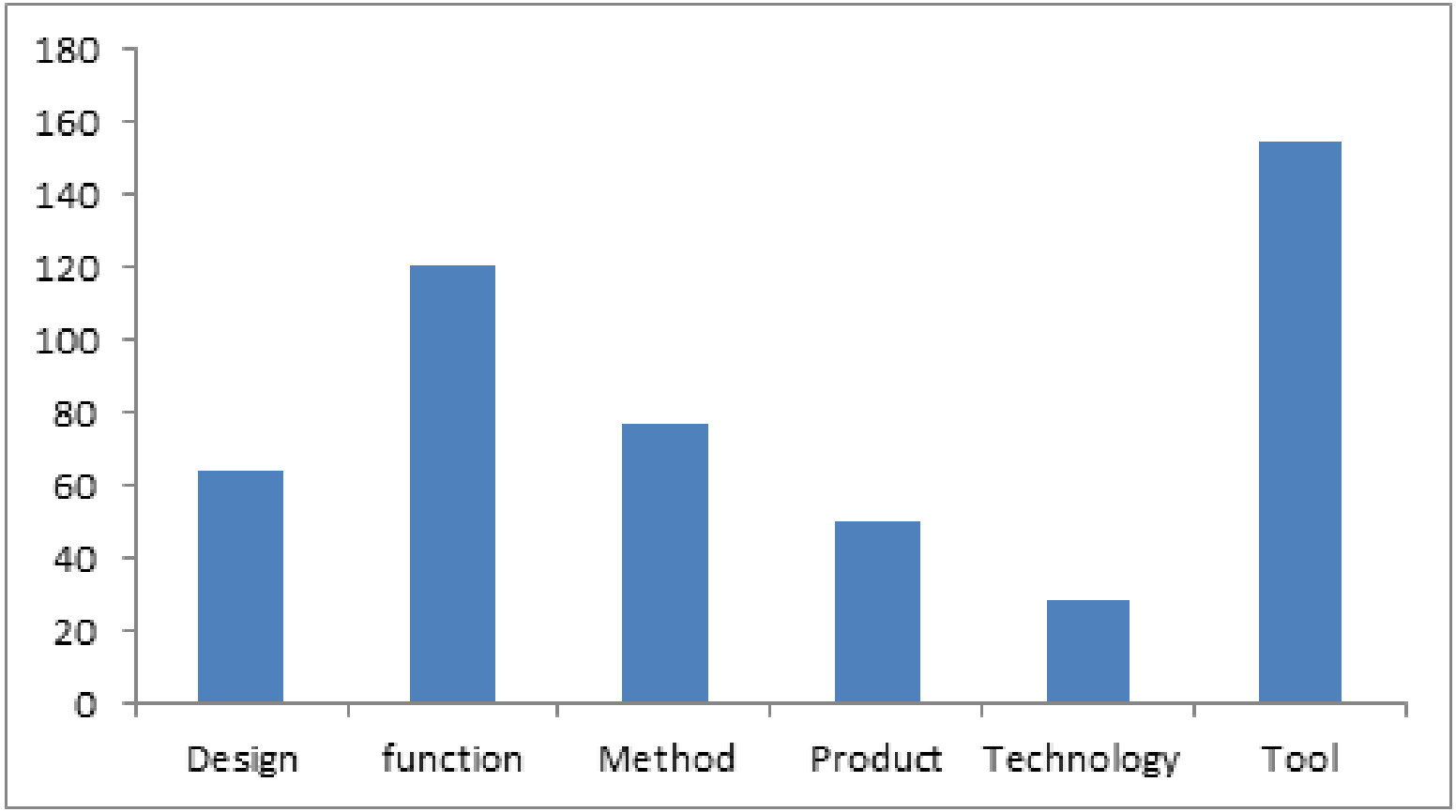

Figure 1. Innovation classification based on Type

Analysis of SCIRT innovation database

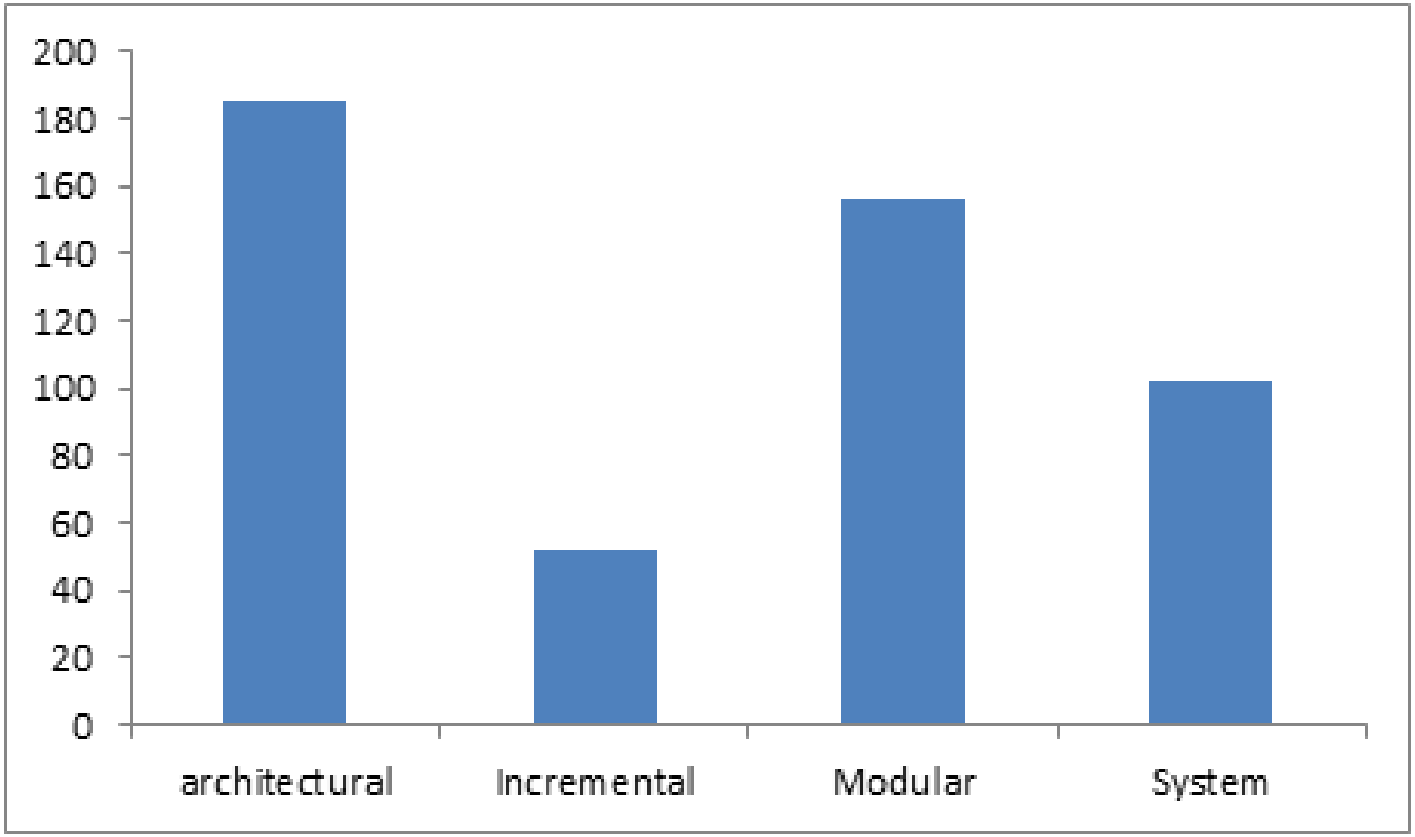

Figure 2. Innovation classification based on Novelty

Analysis of SCIRT innovation database

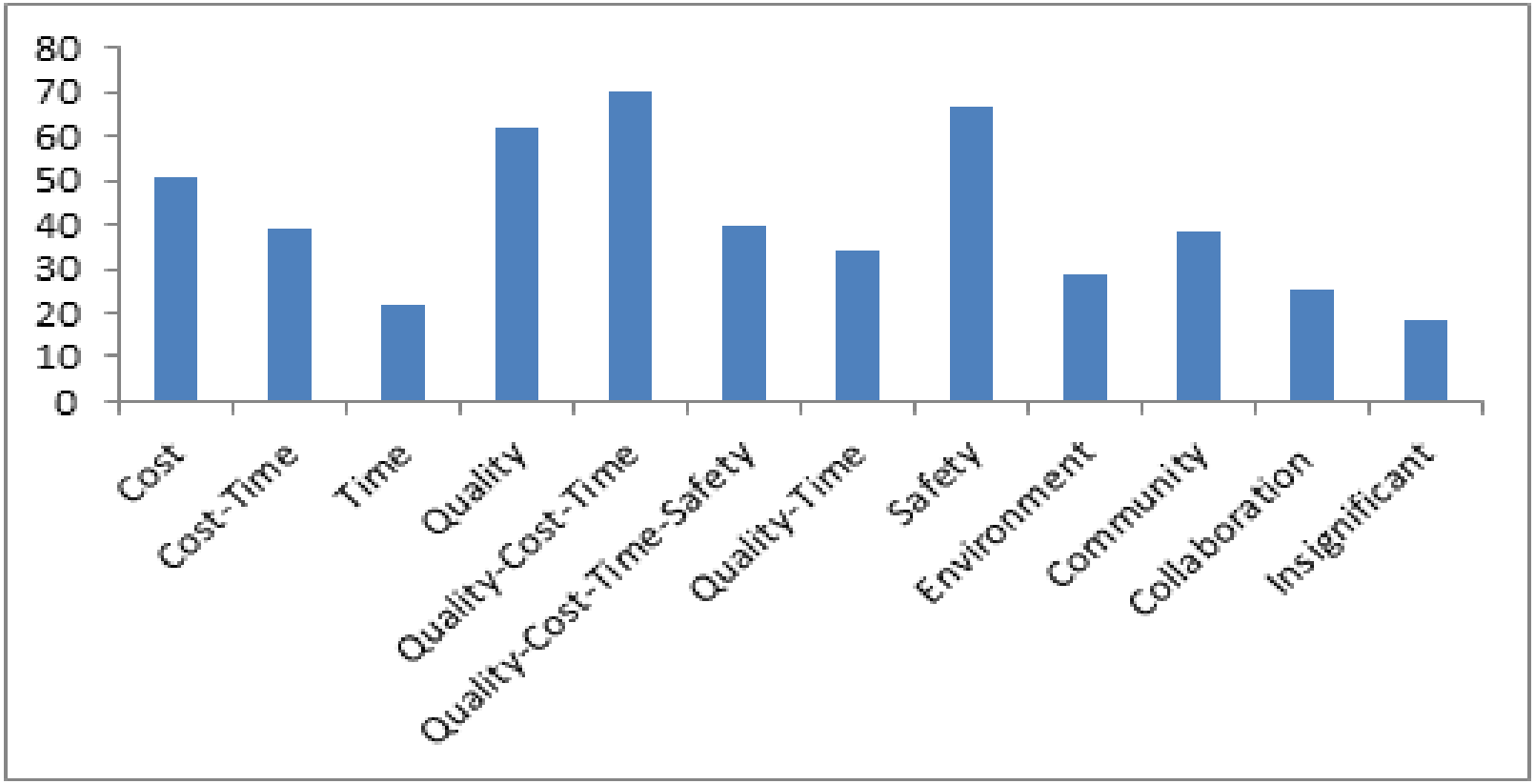

Figure 3. Innovation classification based on Benefits

Analysis of SCIRT innovation database

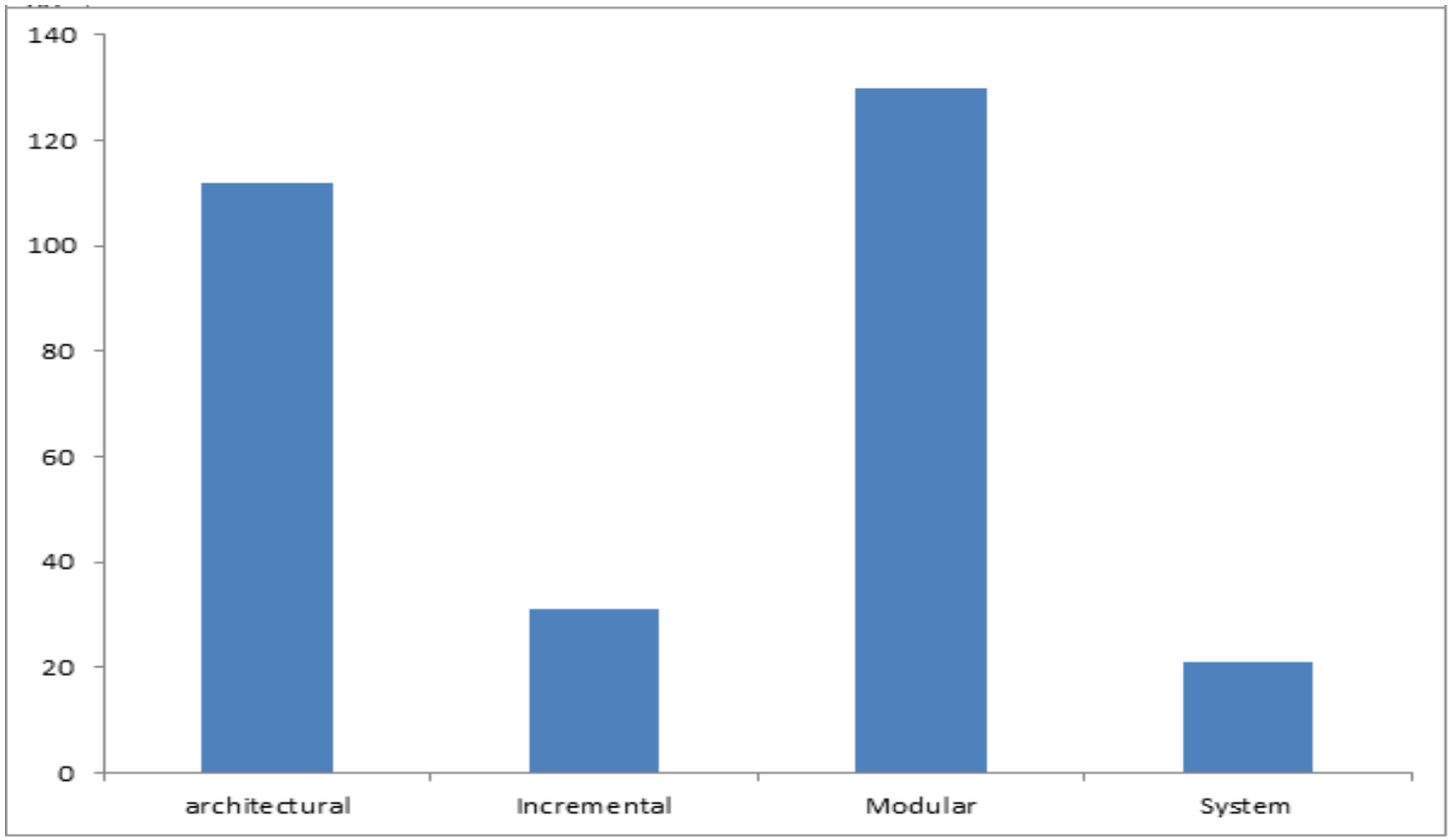

Figure 4. Innovation novelty categories that focused on delivering a single benefit

Analysis of SCIRT innovation database

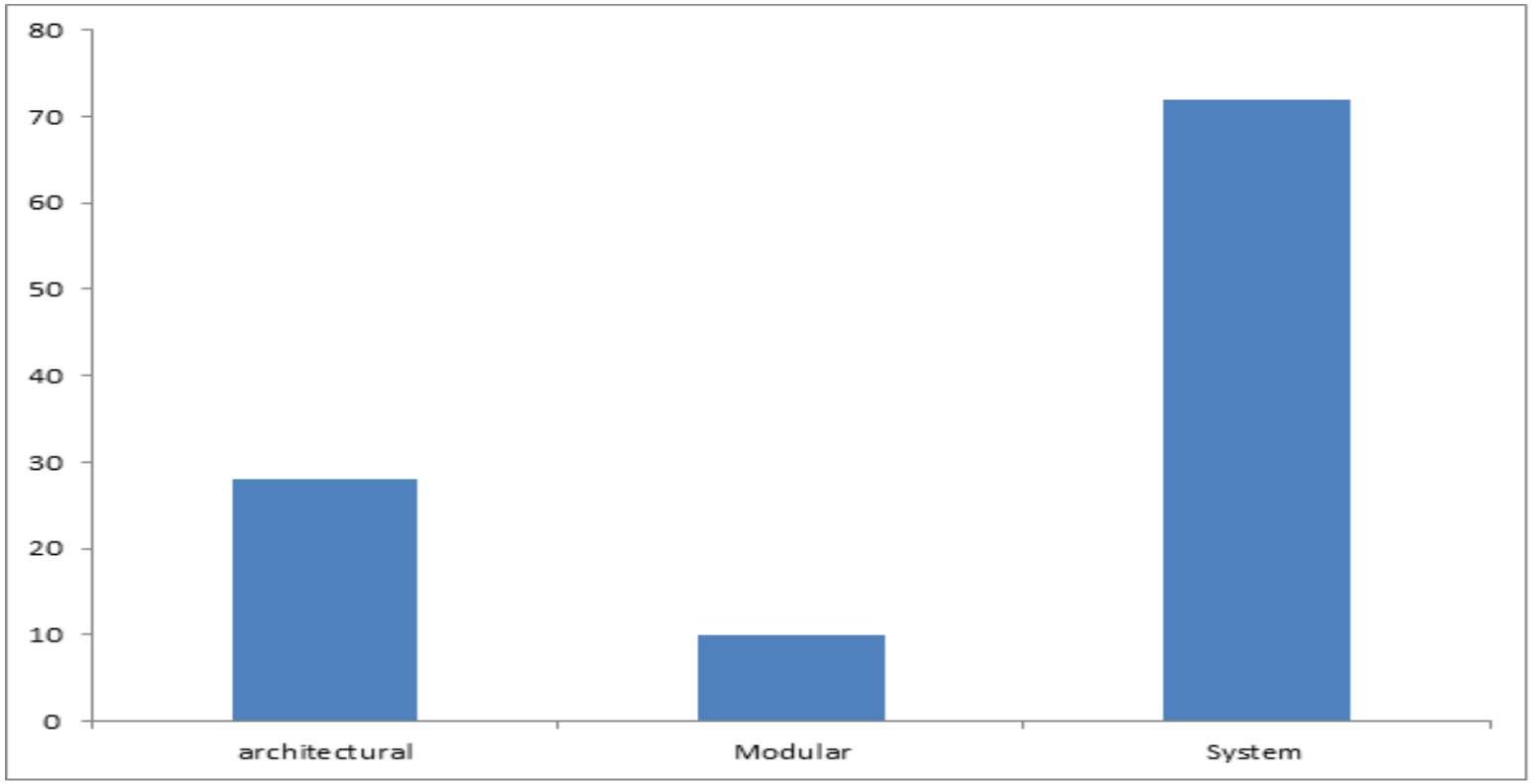

Figure 5. Innovation novelty categories that delivered combination of quality-time-cost benefit

Analysis of SCIRT innovation database

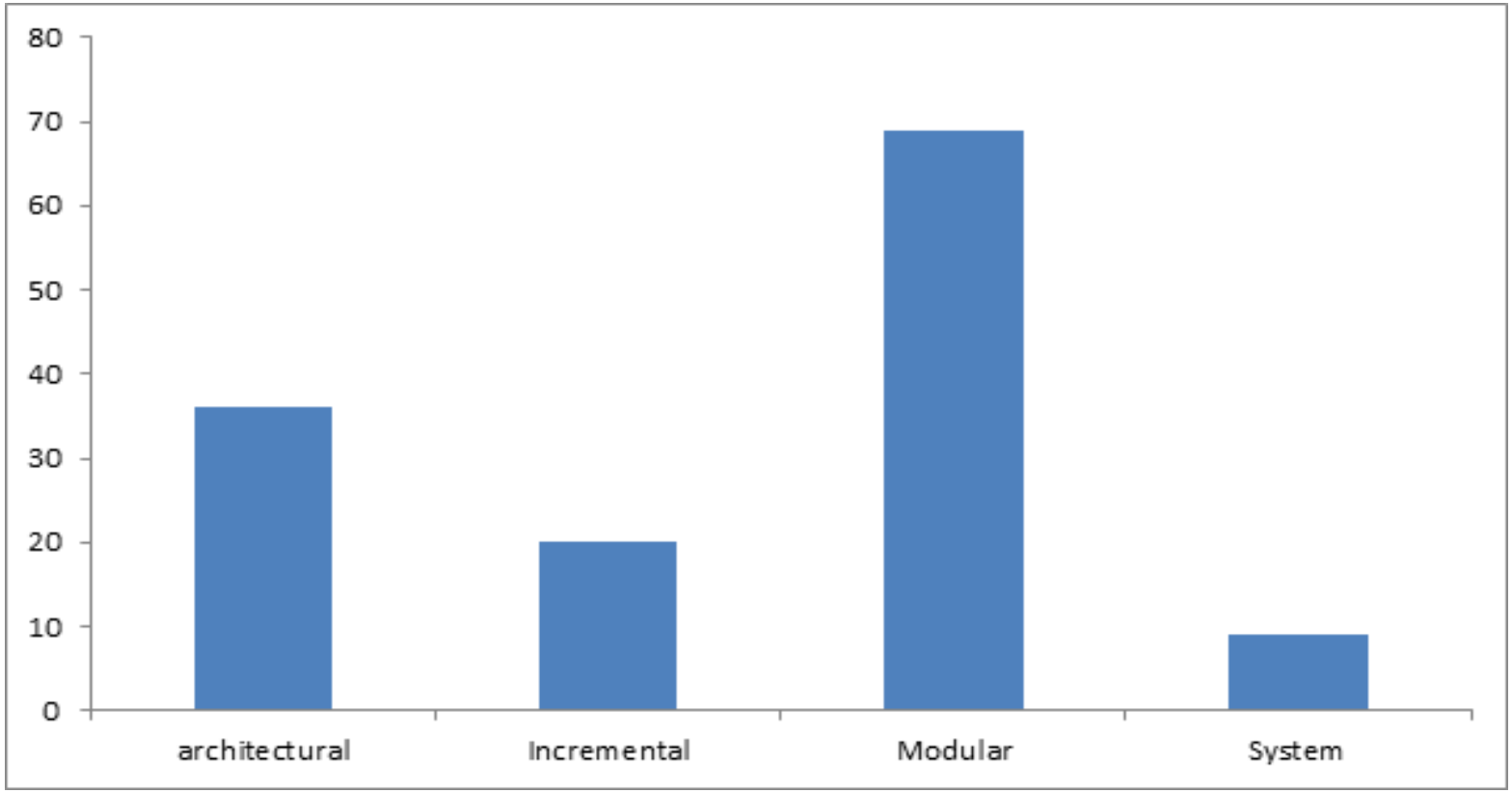

Figure 6. Innovation novelty categories that delivered either sustainability, safety or community

Analysis of SCIRT innovation database

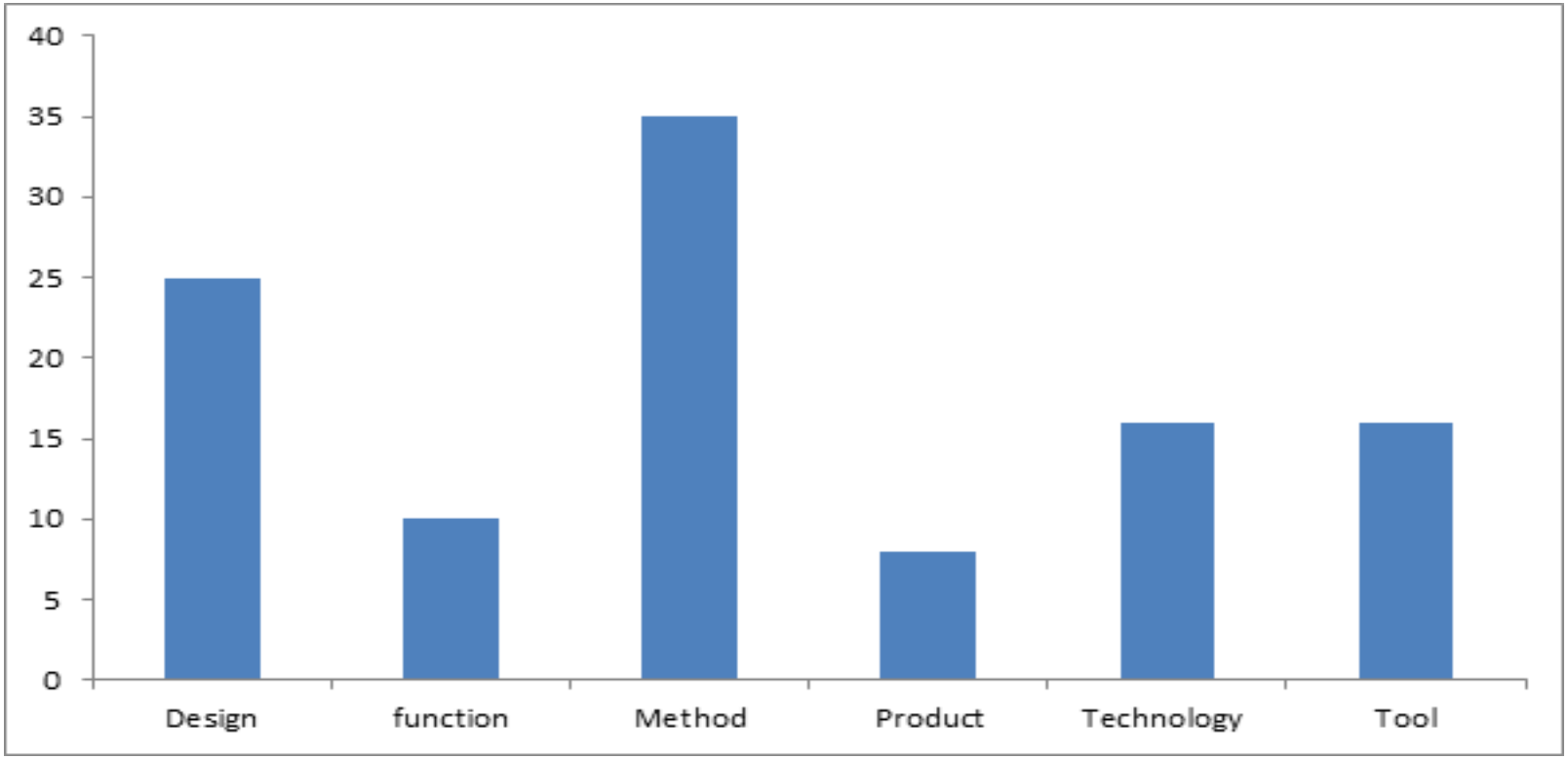

Figure 7. Innovation types that delivered a combination of quality-time-cost benefits

Analysis of SCIRT innovation database

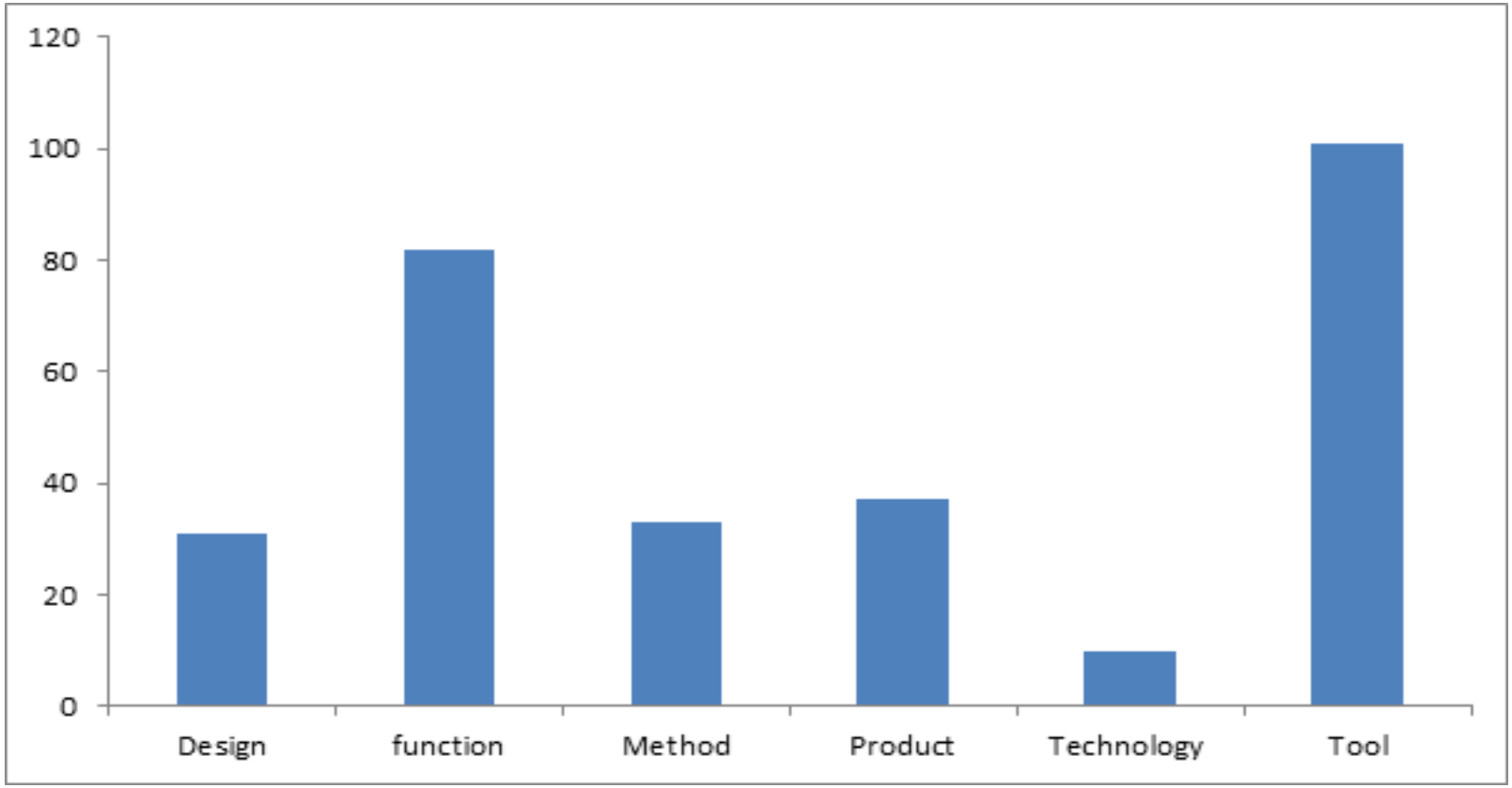

Figure 8. Innovation types that delivered a single benefit

Analysis of SCIRT innovation database

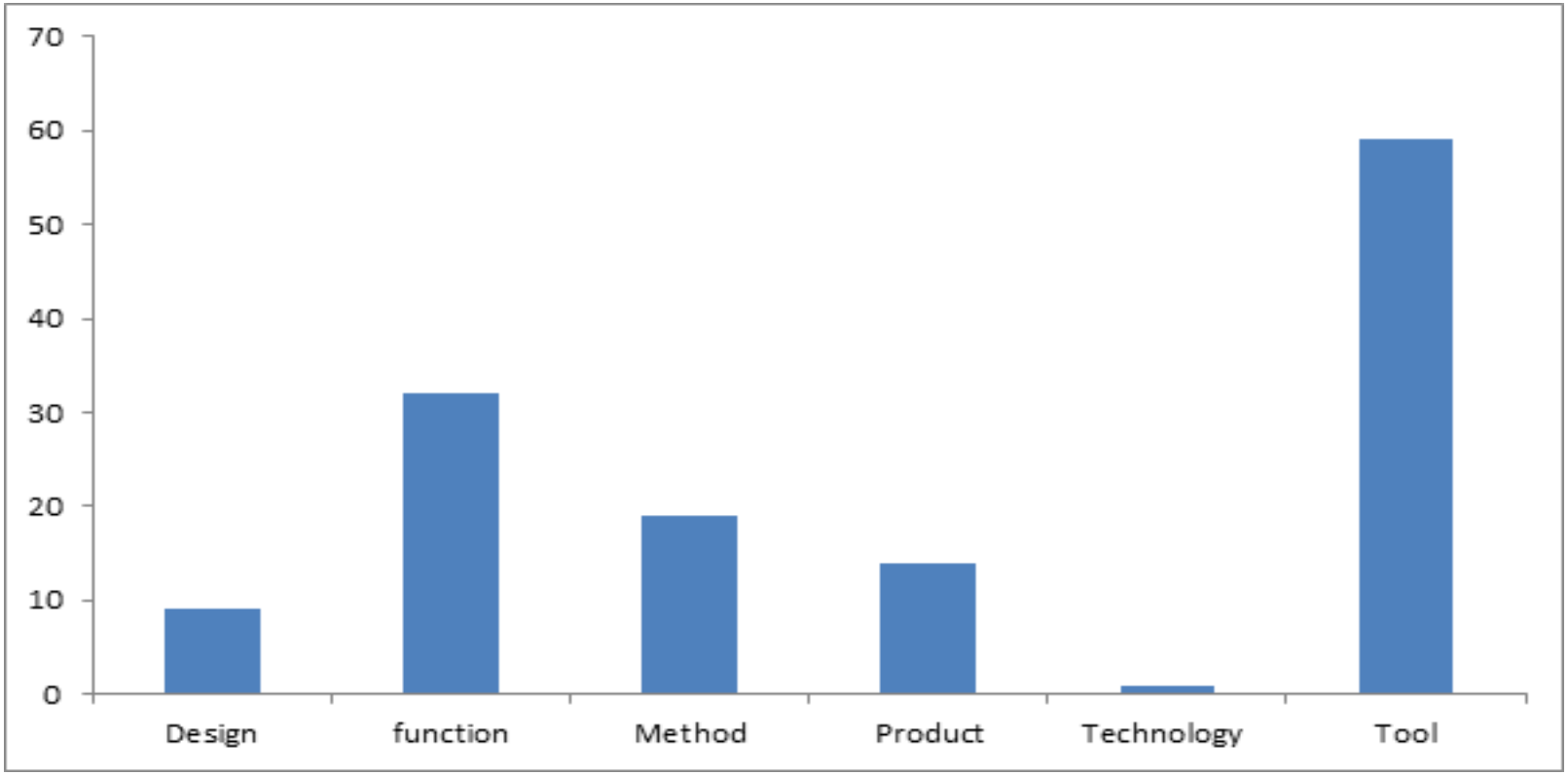

Figure 9. Innovation types that delivered either sustainability, safety or community

Analysis of SCIRT innovation database

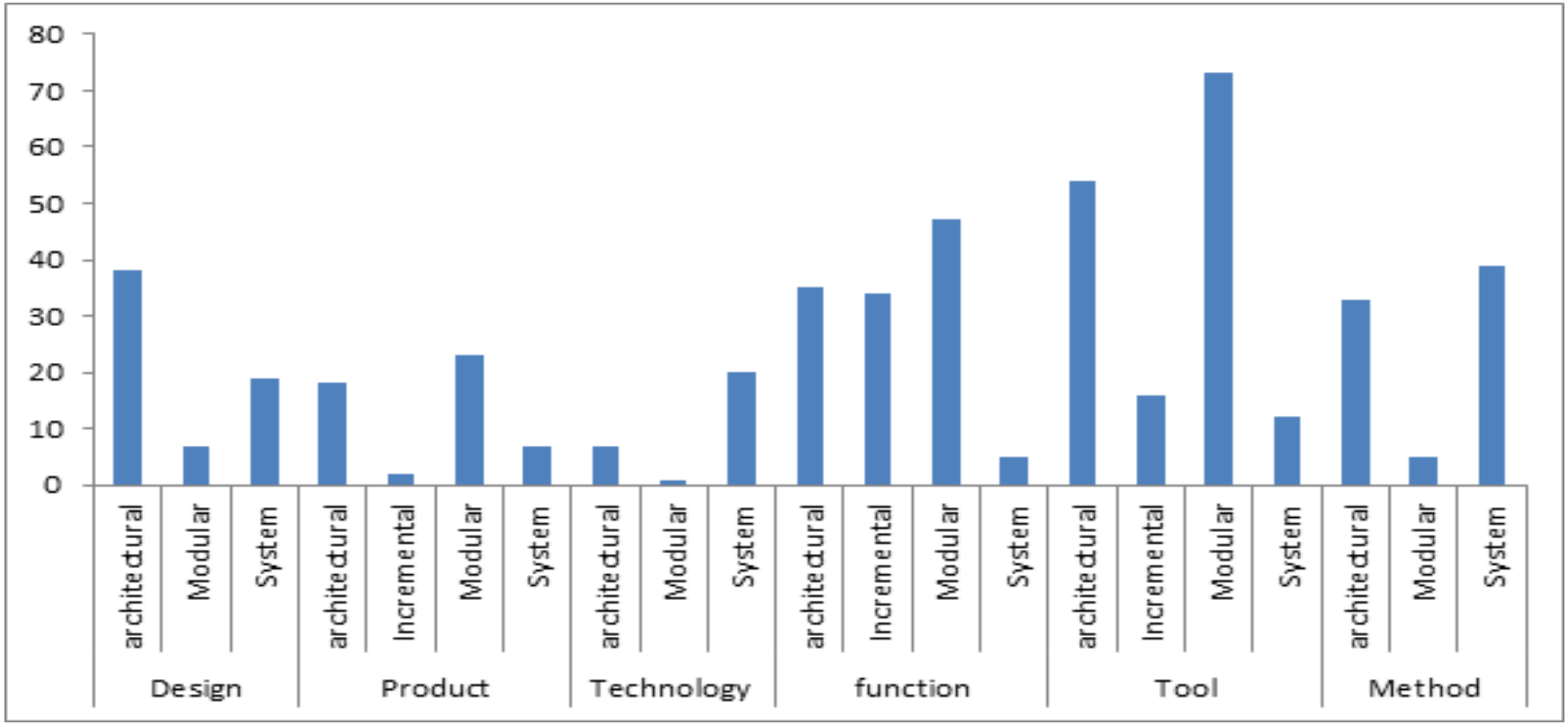

Figure 10. Degree of novelty of various types of innovation

Analysis of SCIRT innovation database

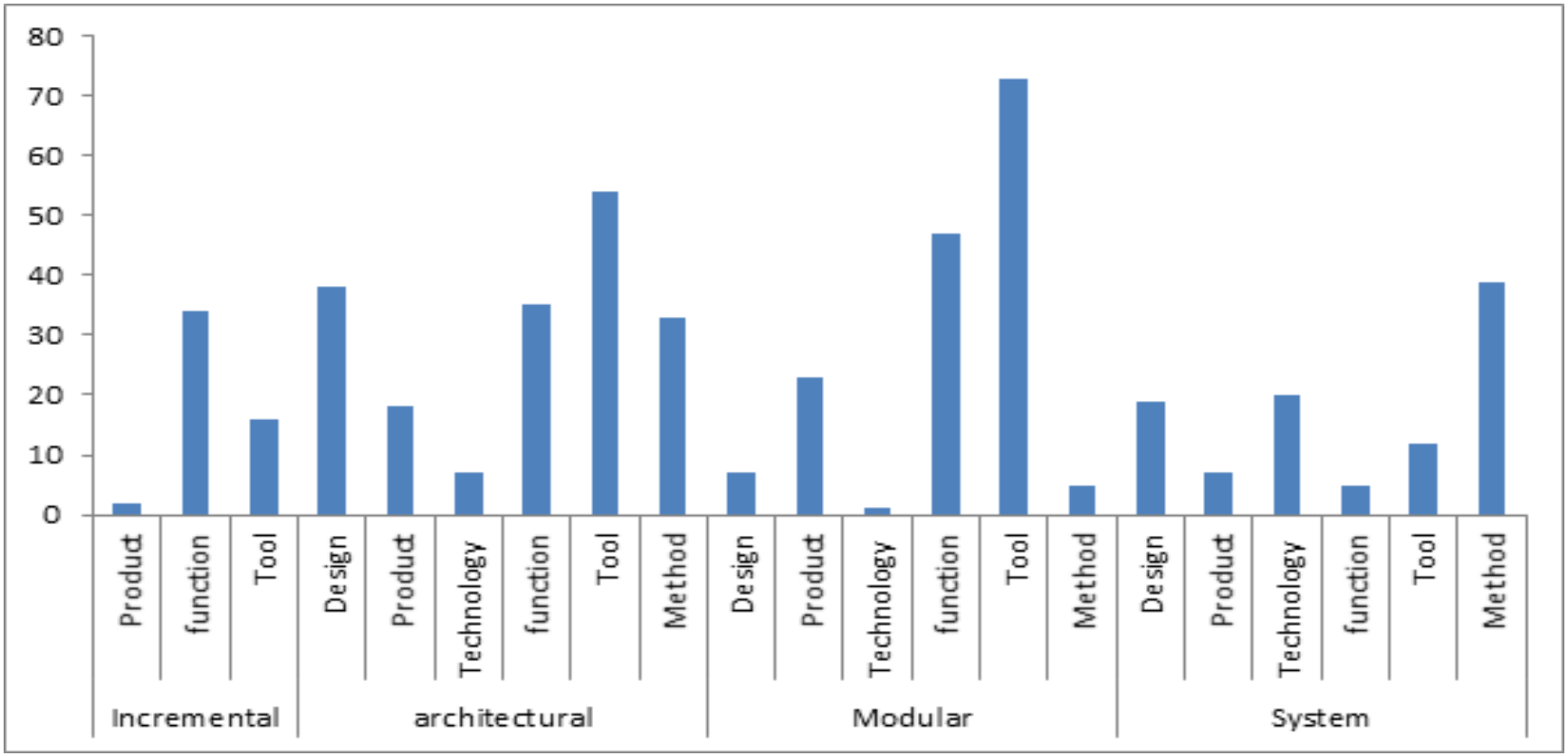

Figure 11. Spread of innovation types for each level of novelty

Analysis of SCIRT innovation database

- Diversity of types, degree of novelty and performance benefits.
- Most of the reported innovations were tools or functions in response to immediate problems faced by the operational teams.
- Most innovations were modular or architectural, developed through localised problem solving or at the interface of operational sub-systems.

Conclusions

- There are large differences among different categories of innovation, and their impact on productivity are of different levels of significance.
- This classification system can be used to develop more detailed innovation KPI system tailored to the specific requirements of the construction project.
- The classification system can be used to study the relationship between organisational factors and various categories of innovation

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