Internal Logical Consistency is Essential for Every Valid Formal or Natural Scientific Discipline

Every scientific or formal discipline must be grounded in a coherent framework of clear, precise, and unambiguous concepts that exhibit internal logical consistency. In contrast, the prevailing paradigm of Component-Based Software Engineering (CBSE) is constructed upon imprecise and ambiguous concepts centred around fictitious constructs misleadingly referred to as "components"—entities that often lack definitional rigor, empirical grounding, and internal coherence. This conceptual ambiguity severely undermines CBSE's credibility as a scientific discipline and continues to obstruct both theoretical advancement and empirical validation.

Componentology, by contrast, constitutes a **hard science** founded on a rigorously structured and cohesive framework of well-defined, logically consistent principles and precise, testable, and falsifiable concepts. It is explicitly based on the recognition and understanding of the **objective reality of physical software components**, **physical Component-Based Products (CBPs)**, and **Component-Based Engineering (CBE)**. By satisfying the foundational criteria required of any legitimate discipline in both the sciences and formal sciences, Componentology stands as a **paradigm-shifting alternative** to the flawed, inconsistent, and conceptually incoherent foundations underpinning the existing CBSE model.

Abstract or Paper Introduction for Journals

A defining characteristic of any scientific or formal scientific discipline is the presence of a coherent and logically consistent framework comprising clear, precise, and unambiguous concepts. This structural clarity underpins theoretical robustness, empirical testability, and disciplinary legitimacy. In the case of Component-Based Software Engineering (CBSE), however, the prevailing paradigm remains entangled in conceptual ambiguity. It relies on imprecise and poorly defined constructs misleadingly referred to as "components," which often lack theoretical coherence and empirical clarity.

In contrast, this paper introduces **Componentology**, a hard science that redefines the foundations of component-based software engineering by anchoring them in testable, falsifiable, and precisely defined principles. Rooted in the objective reality of **physical components**, **Component-Based Products (CBPs)**, and **Component-Based Engineering (CBE)**, Componentology fulfills the epistemological and methodological criteria expected of a valid discipline in both the natural and formal sciences. It represents a paradigm shift capable of resolving long-standing conceptual inconsistencies that have hindered scientific progress in the field.