Models in the RE Series : an RE@21 paper

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*An entirely pragmatic and non-theoretical approach
via a textual analysis identifying and counting :*

*instances of 'model' and words with 'model ...'
as stem in main texts of published papers*

620 papers

18,066 instances

505 'general terms'

215 'special names'

120 names for 'characteristics'
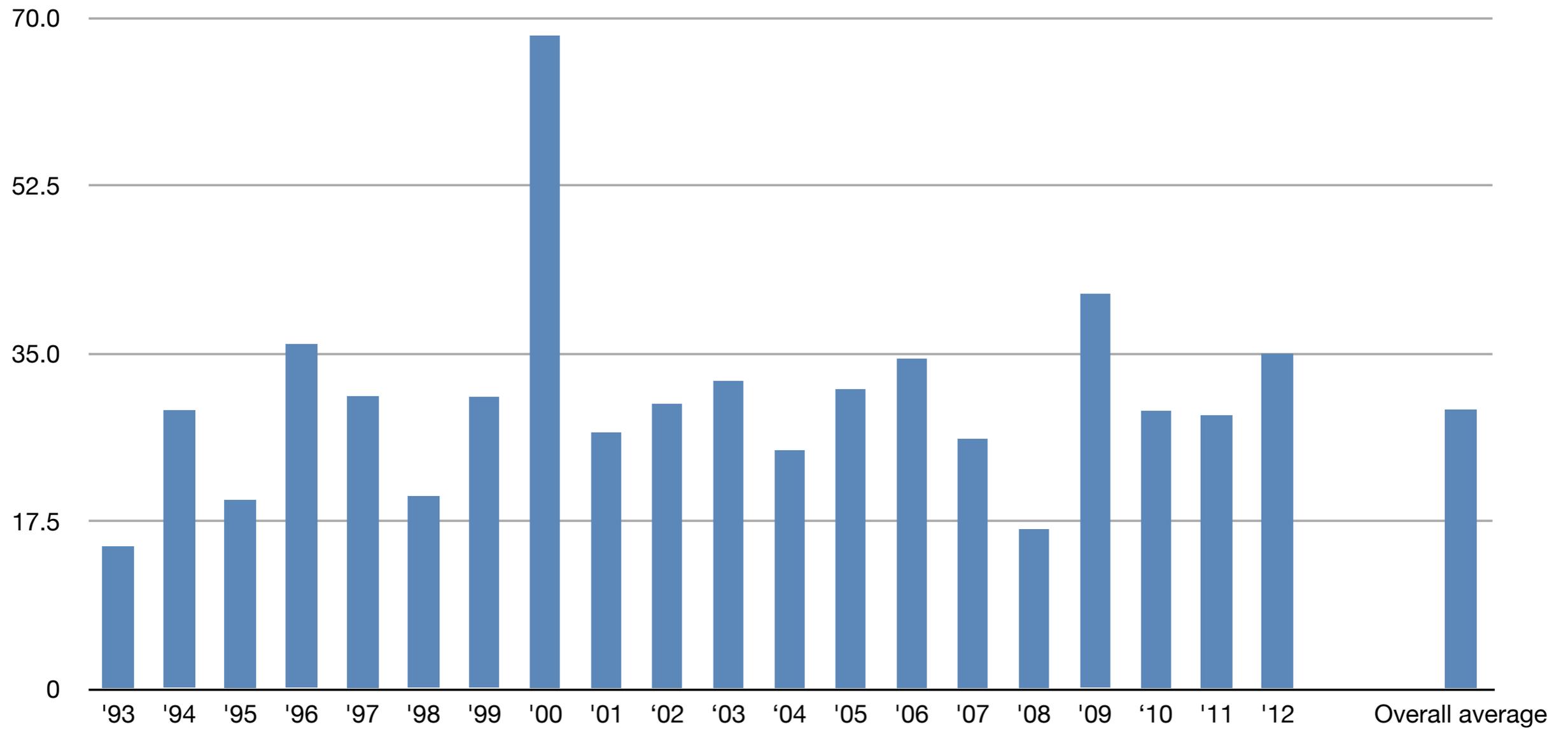
Average instances of 'model ...' within main texts of papers by year

Morris RE@21 3
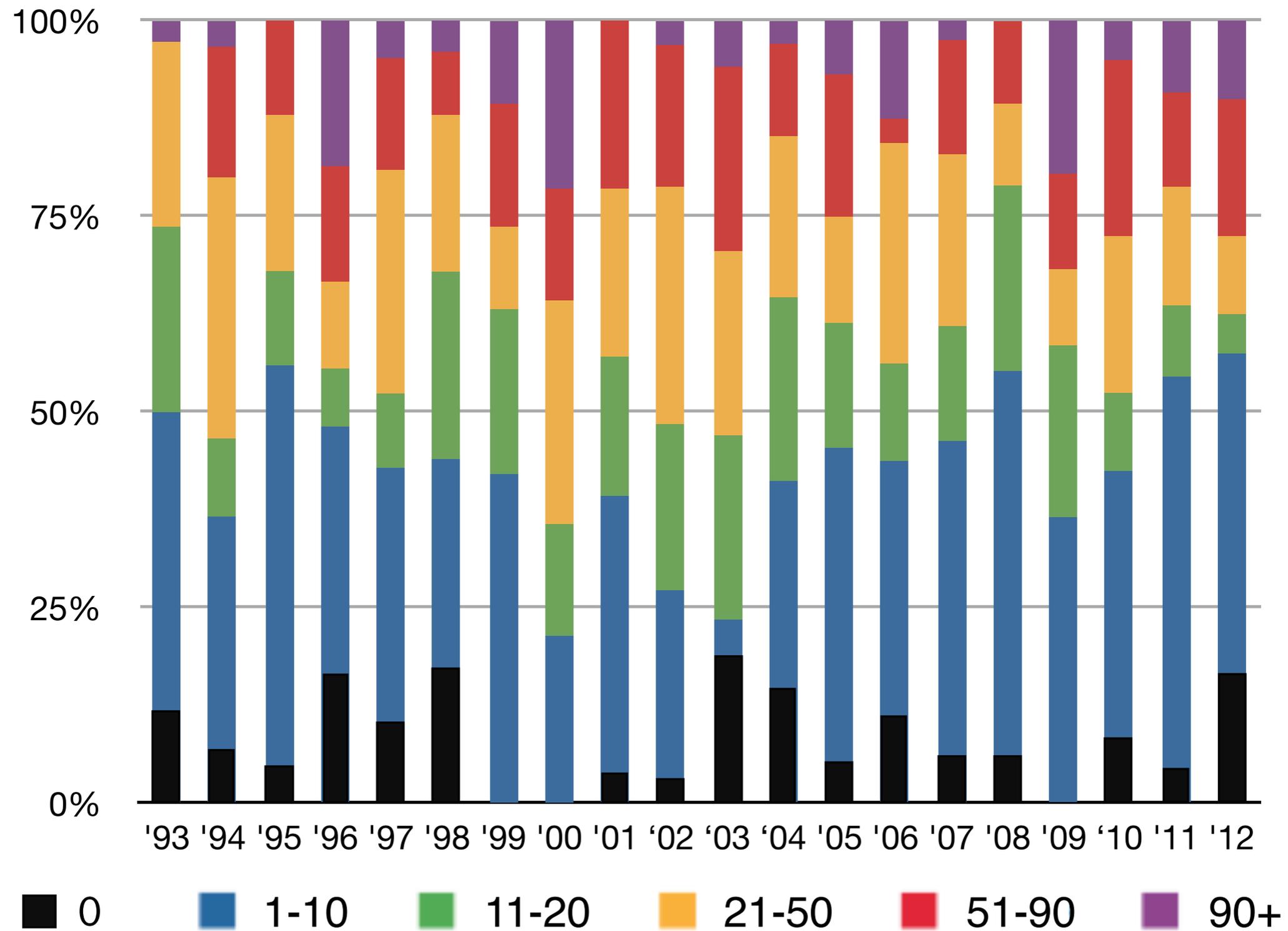
Percentage of papers containing numbers of
instances of 'model ...' within six ranges by year

Legend: ■ 0   ■ 1-10   ■ 11-20   ■ 21-50   ■ 51-90   ■ 90+
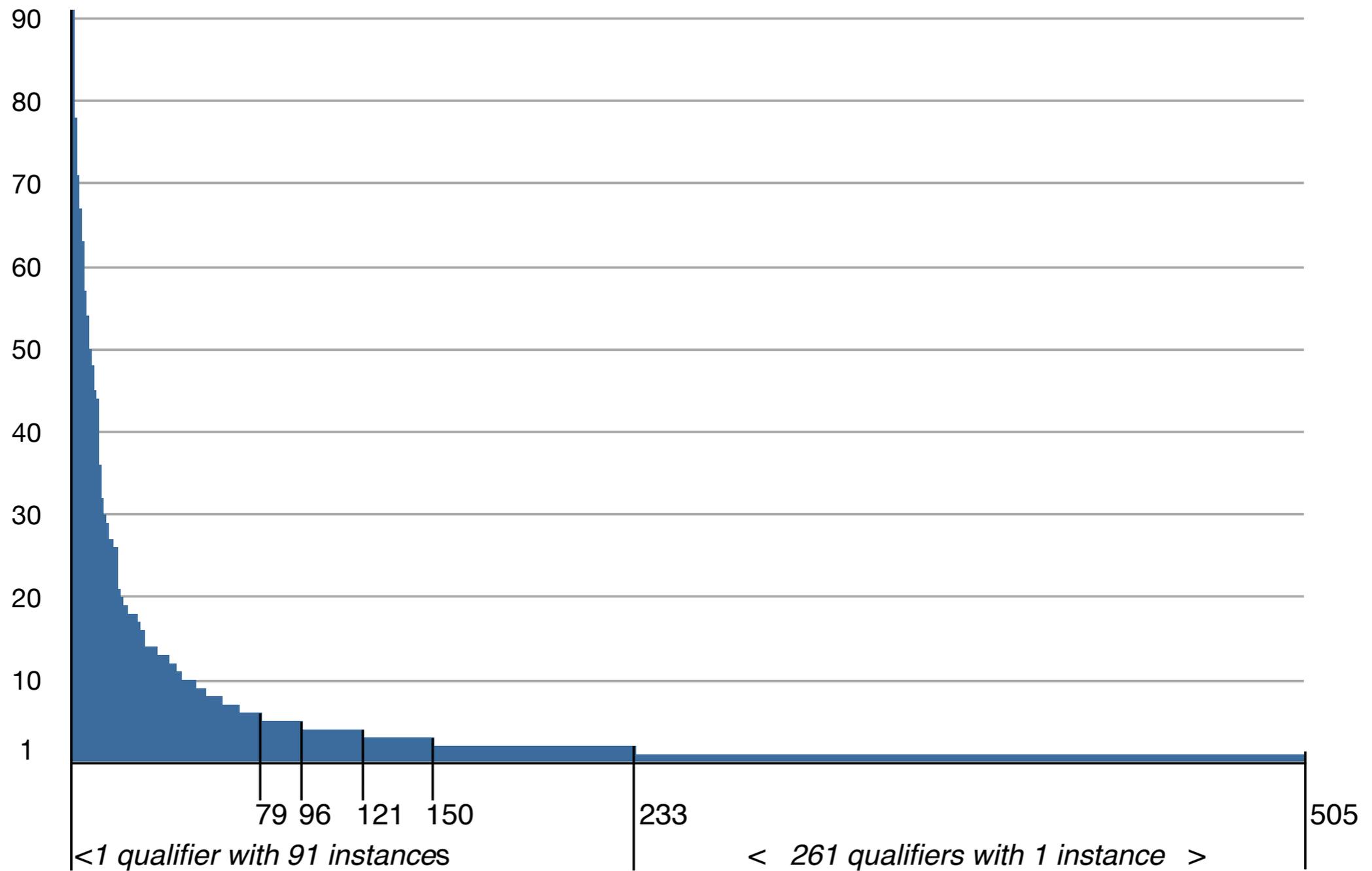
Number of papers in which general terms were used by descending order of frequency (1 with 91 ... 261 with 1)

Morris RE@21 5
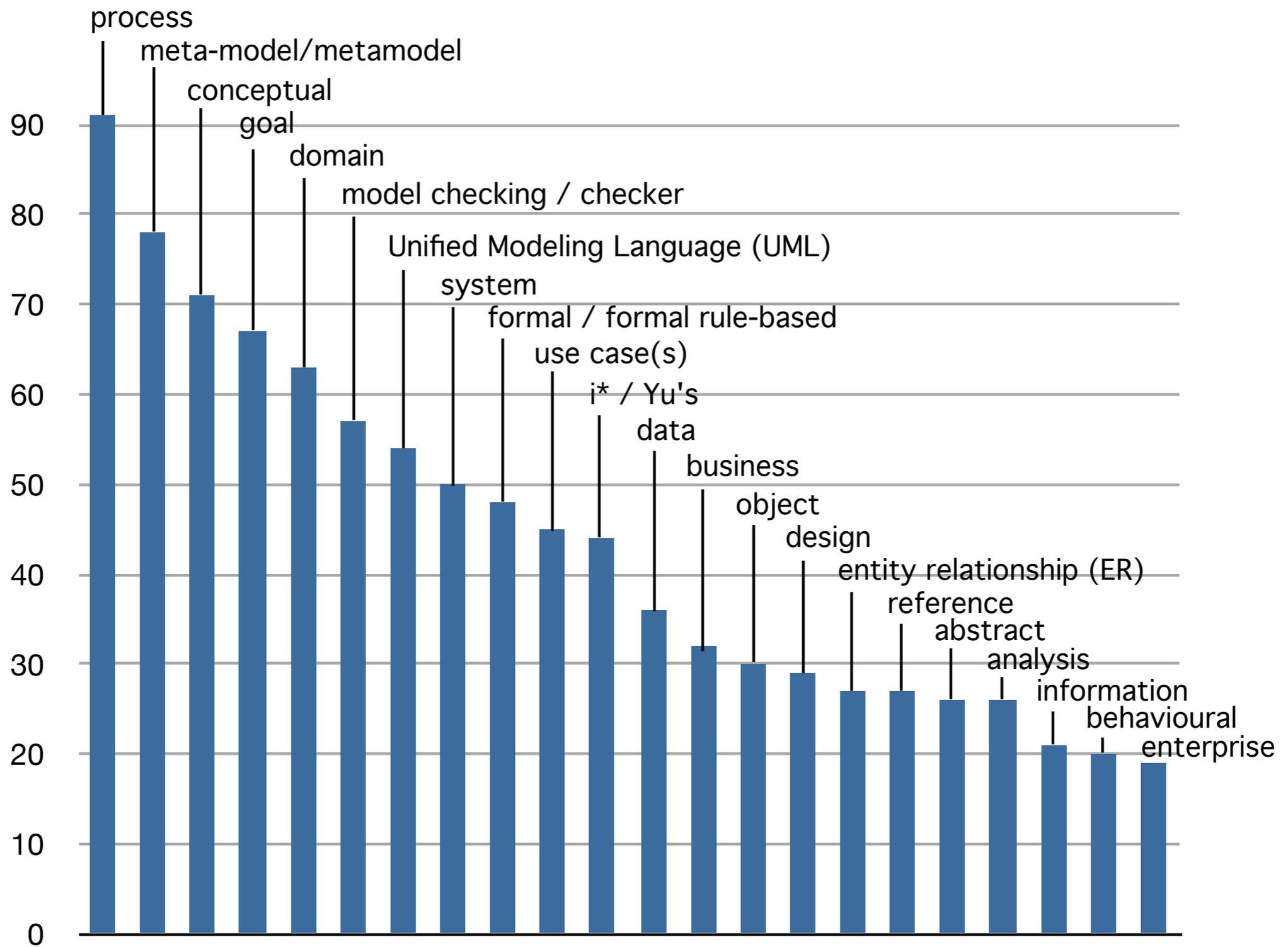
Most frequently used general terms by the number of papers in which they appear
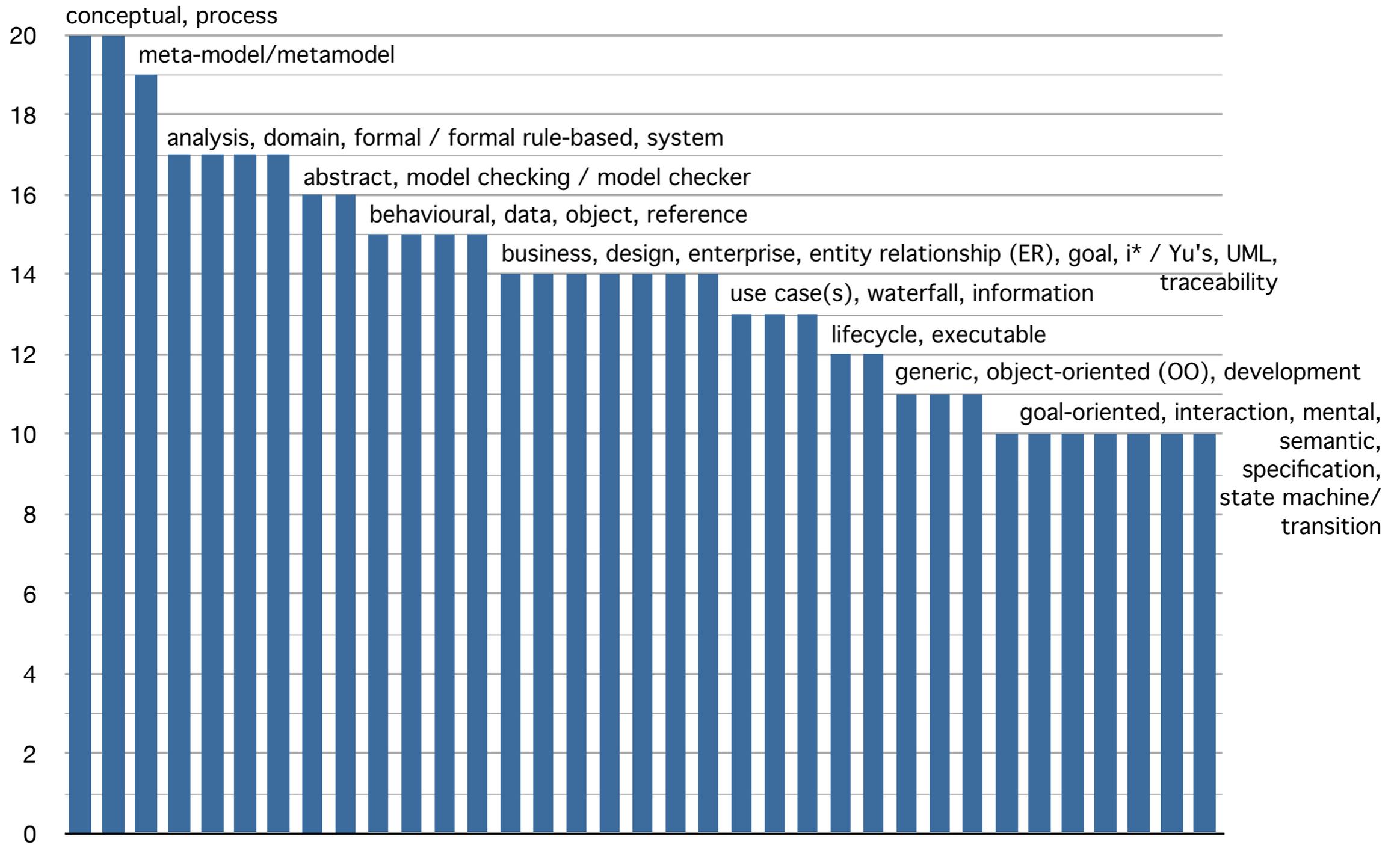
General terms qualifying 'model ...' by number of years (20 ... 10) used in papers

The bar chart labels, from tallest to shortest bars, read:

- **conceptual, process** (20)
- **meta-model/metamodel** (19)
- **analysis, domain, formal / formal rule-based, system** (17)
- **abstract, model checking / model checker** (16)
- **behavioural, data, object, reference** (15)
- **business, design, enterprise, entity relationship (ER), goal, i* / Yu's, UML, traceability** (14)
- **use case(s), waterfall, information** (13)
- **lifecycle, executable** (12)
- **generic, object-oriented (OO), development** (11)
- **goal-oriented, interaction, mental, semantic, specification, state machine/ transition** (10)

Generic terms, 505 in all, qualifying 'model(…)', each word followed by the number of papers in which it appeared.

A abstract 26, abstracted 2, abstractionist 2, abuse case 1, activity 4, activity level 1, agent 4, agent-based 3, agent-oriented 6, agile process 3, algebraic 2, allocation 1, analogic 1, analysis 26, analytic(al) 9, animated 1, animation 1, annotation 1, anti-goal 1, application 4, apprenticeship 1, archetype 1, architectural 5, architecture 8, argumentation 1, artifact 2, artifact-based 1, as-is 3, as-is info 1, aspect 2, aspect-oriented 5, assessment 2, asset 1, assumption 1, at-least 1, at-most 1, augmented 1, automata-based 1, automation 1, automoton 1

B base 7, baseline 2, basic 1, Bayesian 3, behavior 10, behavioural 20, big-step 1, billing 1, black box 1, Boolean 1, box and arrow 1, box-and-line 1, business 32, buy-n-integrate 1,

C capability 2, capacity 2, causal 3, causality 1, change 1, class 6, classification 3, classifier 1, co-operation 1, cognitive 6, cognitivist 1, collaborative 2, common 1, communication 4, communication paths 1, compiler 2, complex 2, compliance 2, component 6, component based 1, composition(al) 3, comprehensive 1, comprehensive success 1, computable 1, computer 1, computing 1, computational 11, concept-of-operations 1, conceptual 71, concern-space 1, concrete 1, concurrent 1, configuration 1, configuration management 1, conflict 2, consistency 1, constraint 1, contextual 9, contractual 1, control 2, controller's 1, correlation 1, cost 3, cost and value 1, cost-benefit 3, counting 1, course-grained 1, creativity 3, culture 1, current-state 1, customizable 2, customization 2, customized 1, cyclic 2,

D data 36, data flow 4, data flow diagram 1, data-sources 1, database 4, decision 10, decision making 2, decision support 1, decomposition 1, defect 1, dependency 8, dependent 1, descriptive 5, design 29, design rationale 1, design-time 1, detailed 3, development 10, developmental 1, dialogue 1, discourse 1, distributed 1, do-everything-in-house 1, document 2, documentation 1, domain 63, domain-specific 2, dyadic 1, dynamic 7,

E ....

Words qualifying 'model(…)' and used to create the titles of particular types of 'model(…)', 215 in all

A Active Knowledge Modeling (AKM), ADORA, Alloy, AMUSE, Architectural Assessment Method (ATAM), Aspect-oriented RE (AORE), AWARE

B Bayesian Belief Net (BBN), BPEL, Business Process Modeling Notation (BPMN)

C Capability Maturity (CM), Capability Maturity Improvement (CMI), Capability Maturity Model (CMM), COCOMO, Coloured Petri Net (CPN), Component-Bus-System-Property (CBSP), Computation Independent (CIM), Conceptual Documentation Model (CDM), Conceptual Systems Model (CSM), Continuum of Relevance Index (CRI), CORE, Core Scenario, Corporate Documentation Model (CDM), Creative Problem Solving (CPS), CREWS UC, Csikszentorihalyi's, CSP

D DebrisAnalysis, Defect Detection and Prevention (DDP), Discrete Time Markov Chain (DTMC), dXSM

E e3-control, e3-value, EARA, Eclipse, Enterprise Resource Planning (ERP), Event Process Chain (EPC), Event-driven Process Chain (EPC), Evolutionary Prototyping with Risk Analysis and Mitigation (EPRAM)

F Fluid, FODA, Formal OO Method (FOOM), Formal Topos (FT), Four Variable, Functional Size Measurement (FSM), Functionality Usability Reliability Supportability plus Constraints (FURPS +)

G Gate, gBIS, Geo , Goal-Oriented RE (GORE), Goal-oriented Requirement Language (GRL), Goals-Skills-Preferences

H Hierarchical transition System (HTS), HMI, Hydra Intermediate Language (HIL)

I i* / distributed intentionality / Yu's, IBIS, IBM Rational, IKIWISI, IMPACT, Interaction Overview Diagram (IOD), IS3DP, ISO 2000 IT Service Management, ISO/IEE 15504 Operational Risk Management

K Kano, KAOS, KAOS meta, Kirkpatrick four-level

L Labelled Transition System, LOTOS

M ...

Words that 'model...' preceded and modified, 120 in all (as opposed to those words that themselves did the preceding and qualifying)

Structural characteristics, attributes or components of models or modelling
artifacts, attributes, boundary, completeness, complexity, concepts, constraints, constructs, content, coupling, description, details, diagrams, elements, entity, files, flaws, fragment, granularity, hierarchy, idiom, level, mappings, metrics, objects, option, package, parameter, plug-in, primitives, representation(s), scenarios, signifiers, size, space, specification, structure, symbols, symmetries, target, template, variations, viewpoint.

Principles or practices related to such characteristics
approach, assumptions, categories, collaboration, context, decisions, formalism, framework, habits, interoperability, language, method, methodology, notation(s), paradigm, perspective, philosophy, practice, process, quality, rules, semantics, standard, strategy, syntax, task, technique(s), theory, uncertainties, understandability.

Words that 'model...' preceded and modified (contd...)

Possible transformations or changes of models
adaptation, aggregation, building, change, co-adaptation, construction, creation, elaboration, evolution, extension, extraction, generation, integration, interchange, merging, modification, permutations, propagation, reconfiguration, refinement, reinterpretation, revision, tools, trade-offs, transformation, transition, update(r).

Activities or qualities not involving change or transformation
activity, analysis, checker, checking, comparison, comprehension, effort, execution, exploration, interaction, management, ranking, sharing, validation, verification, visualizer

Persons or agents involved in any aspect of modelling
agents, developers, team, users.

CONCLUSIONS

A discipline such as requirements engineering becomes mature when its dominant artifacts, for example models, cease to be individualistic productions and acquire communally agreed characteristics.

A 'declaration' or 'statement of intent' for each newly defined model addressing a number of questions about its potential form and use

Thursday, 11 July 2013

1. Who is to make the model and to decide everything about it?

2. What will be the overall purpose of the model ?

3. What is to be represented, denoted or exemplified by the model, and in what way is this domain to be restricted ?

4. Will some general or specific analogy be used for denotation, or will a defined formalism be used ?

5. How will the model be constructed in terms of its semantics and syntax ?

6. How will the model be presented so that it may be examined and used ?

7. What activities associated with the model will be possible ?

8. What changes or transformations will be possible ?
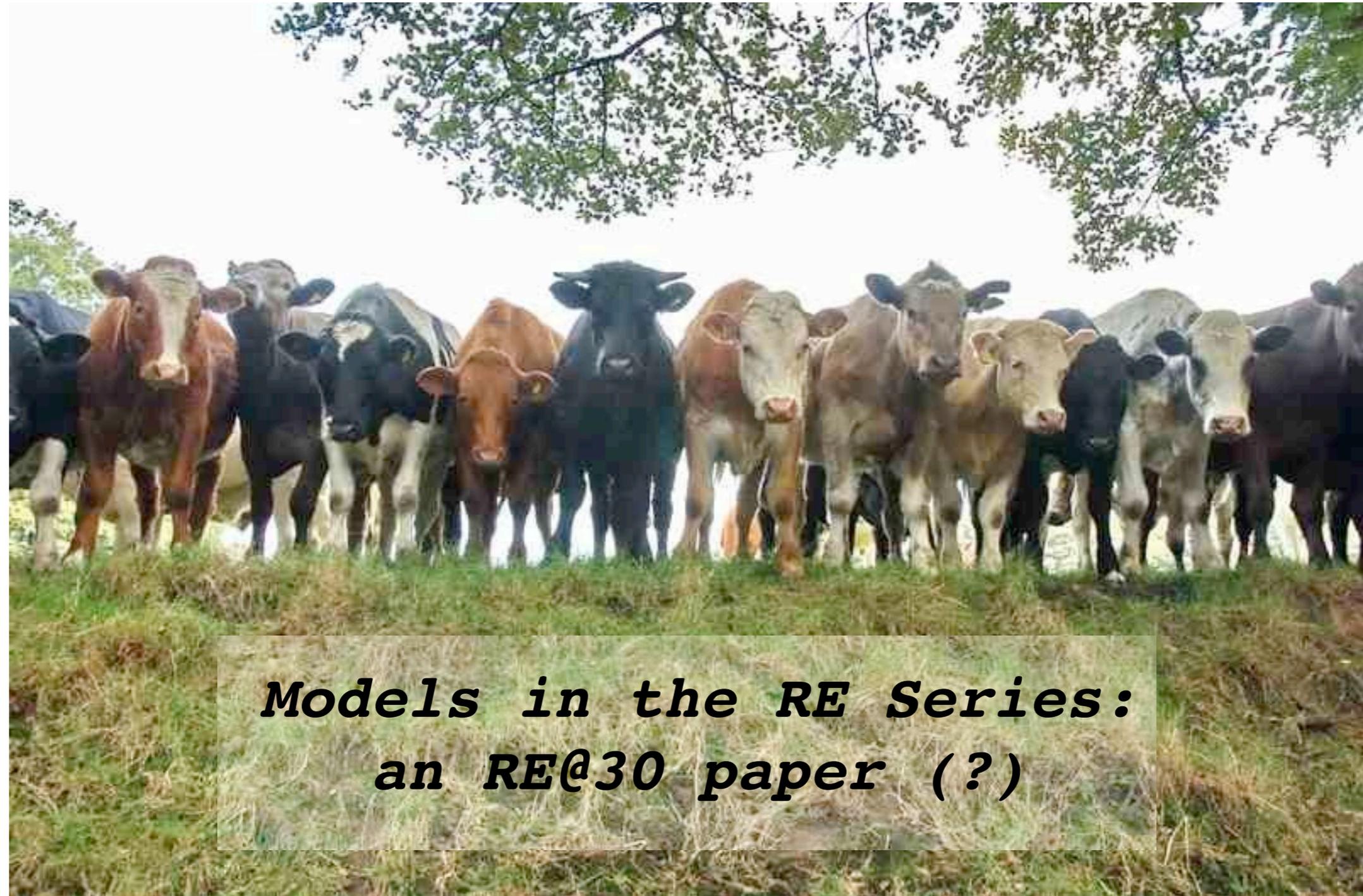
Models in the RE Series:
an RE@30 paper (?)