

Transferability Model TIDieR (TTT)

The Template for Intervention Description and Replication (TIDieR) was originally published by Hoffman et al (2014).

Brief name

Research Evidence Transferability Model: A Mathematical Approach to Using Research Recommendations Across Context Using a Classification and Regression Trees (CART) Model.

1. Why: Rationale, theory and/or goal of essential elements of the Transferability Model

Research products exist within databases in various forms, including primary study results in journals, synthesized data in repositories, and research evidence recommendations in guidelines. These research products are expensive to generate, synthesize, or translate in some contexts. We acknowledge the differences across contexts; however, there exist significant similarities that can enable transfer across contexts. The existing differences across contexts, however small they are, command more force in determining successful transfer across contexts.

Contextualization holds enormous benefits for global research use not just across geographical regions but also across sectors. We, however, argue that contextualization must be objective, scientific, and follow similar rigors and standards used in research (generation and synthesis), ensuring that quality is not lost in the contextualization process.

Contextualizing research recommendations using objective methods will help in reducing the cost of research, increasing uptake of research results, improving evidence-informed decision-making in LMICs, promoting equity and access in research, and reducing research waste. Although there exists several prediction algorithm approaches, we used the CART model for its ease.

We theorize that research is built on 4 key characteristics of existing evidence that will predict its transferability across contexts and 1 stakeholder in put to support 4 characteristics:

1. The Population: How similar is the population across contexts, especially in relation to the intervention in question? This includes comparative aspects like race, income, gender, religion, etc
2. The Intervention: What aspects can affect the use of the intervention in the new contexts? For example, costs, complexity, relevance, and appropriateness.
3. The Comparative (or alternative) option: What options exist for this intervention, and is there comparative evidence of its effectiveness?



4. Outcomes of Measure: What outcomes are prioritized in the research questions and in measured outcomes? This must consider what outcomes are a priority in the new context considering government policies, culture, costs, etc.
5. We also theorize that a short consultation process could help elucidate the four points above.

The Transferability Model uses the four points above in combination with the stakeholder consultations to predict the transferability of research recommendations across contexts. It uses the Classification and Regression Trees (CART) model to score the probability that an intervention is transferable.

The goal of the model is to predict the transfer of research recommendations across contexts and provide recommendations for adoption, contextualization, or generation of new evidence.

2. Who: Targeted Audience for the Transferability Model

The transferability model can be used in different stages of the evidence cycle. It can be applied during synthesis, especially at the stage of recommendations and plain language summaries. It can also be applied in recommendations, for example, in guidelines development.

- **Evidence Synthesizers:** During evidence synthesis, a modeling team can model the recommendations and predict transfers. This enables a smaller team to use less time to make evidence available or recommend generation for another context. The Transferability Model is aimed at all stakeholders within the evidence ecosystem, which includes policymakers, practitioners, people (citizens and households), and researchers. Each group plays a vital role in addressing the global SDG challenges, and the model serves as a valuable resource to enhance their efforts towards improving global SDG-related outcomes. By providing targeted insights and actionable strategies, the model aims to foster a collaborative approach to research evidence use, reduce research waste, and reduce the cost of research.
- **Evidence Translators:** During the practice guidelines development process, guidelines teams can use the model to apply research results across contexts.
- **Evidence Implementers:** Evidence implementers with research evidence needs could apply the model to make decisions on contextualization and get recommendations for adoption, contextualization, or de novo development of practice guidance.
- **Knowledge Brokers:** Knowledge brokers, or knowledge intermediaries (including to an extent science advisers), can use the model to predict the transferability of knowledge across contexts. This can provide a rapid and trustworthy approach to providing data to government or other knowledge-seeking partners at shorter times and costs.



- **Knowledge Translation Units:** Knowledge translation units within governments and communities of practice can use the model to rapidly contextualize synthesized knowledge to complement local data or decide on conducting primary studies. KTUs in LMICs are often faced with the challenge of a paucity of locally appropriate and meaningful data. However, most knowledge can be transferred across contexts, and where differences exist, there are possibilities of adaptations for populations, interventions, or outcomes. In some instances, the assumption of comparative interventions.
- **Government Agencies:** Policymakers at national and local levels are crucial users of the transferability model. They require evidence-based strategies to formulate policies that enhance the quality of programs and practice. The model provides them with insights into which interventions have been shown to be effective in different contexts, thus enabling informed decision-making. By utilizing the findings and predictions from the model, policymakers can adapt successful strategies from other regions to fit local needs, ultimately aiming to improve global SDG-related outcomes in their own context without requiring new evidence generation or synthesis.
- **Practitioners or Professionals:** Clinicians, teachers, farmers, and administrators are another key audience for the transferability model. They are directly involved in implementing SDG-related interventions and can utilize the

model to identify effective practices that can be adapted to their context.

- **Development Agencies:** Development agencies can use the transferability model to inform their program. For example, an education program or a health program that was successful in Cameroon can be modeled for France using aspects that compare the population, interventions, comparators, and outcomes and then modeling this into the recipient context. This saves time for conducting new reviews, guidance, or primary studies.
- **Funders, Donors, and philanthropies** can apply the model to evidence: Organizations working in the education sector, both local and international, form another key community. They can use the model to design and implement educational programs that are evidence-based and contextually relevant. NGOs can collaborate with educational practitioners and policymakers to ensure that their interventions are effective and sustainable.

3. What: Procedures, activities, and/or processes used in the Transferability Model

Part I: Baseline Initiatives/work

- Identify topic for transferability prediction and modeling



- Identify research evidence recommendation from primary study or systematic reviews
- Conduct a rapid review in cases where there is no existing evidence synthesis

Part II: Evaluation criteria of the toolkit

- Extract data from research evidence by Population, Intervention, Comparators (if identified), and outcomes. These are then mapped out and used within CART decision trees.
- For Population: map out the following characteristics of participants for contextual scoring for predicting transferability noting the differences and similarities across context – age, race, income, gender, religion,
- For Intervention: map out the following characteristics of the intervention for contextual scoring for predicting transferability noting the intervention implementation dynamics across context for – complexity, relevance, cost, existing alternative interventions and their effect sizes.
- For comparators: map out the following characteristics of the comparative intervention in relation to the index intervention for contextual scoring for predicting transferability noting the intervention implementation dynamics across context for – complexity, relevance, cost, existing alternative interventions and their effect sizes.

- For Outcomes: map out the outcomes to consider contextual priorities – essentially outcomes are sequenced and prioritized. Some outcomes considered secondary may be more relevant in different contexts. Outcomes are also scored by relevance or importance to context. A key question asked in this section is: what outcomes are required in this context (sequencing), which are most important (prioritized), and which have been reported in the synthesis or study report (indication for transferability's effect size).
- A stakeholder session is organized to complement the above approach with a focus on:

Relevance: stakeholders vote on relevance in a binary scores of 1=yes, an intervention is relevant and 0=no, an intervention wasn't.

Complexity: stakeholders vote 1= if an intervention's complexity was *low*, 2= if it was *moderate*, and 3= if it was *high*

Cost of an intervention: stakeholders vote 1= if an intervention's cost was *low*, 2= if it was *moderate*, and 3= if it was *high*

Importance – impact: stakeholders vote 1= if an intervention's outcome impact with 1=low importance, 2=moderate importance, and 3=high importance.

Transferability: Stakeholders vote 1=perceived transferability or 0=perceived non-transferable.



Part III: Drawing conclusion on Transferability

By using a statistical algorithm (CART Modelling approach) and using a software (Python and/or Jupyter notebook), several codes are run to verify intervention transferability strength. For example, a meta-analysis is said to be transferable if across contexts:

- The populations are similar or the intervention has no difference on populations across contexts; the intervention is relevant, not complex, and its cost is medium or low; the outcomes of measure are relevant, important, and have a good effect size.
- The intervention new and not familiar to new context (thus relevance may be hard to estimate), but its complexity is low, cost is affordable, and its impact is medium or high.
- There are no existing comparators with better score.

The model predicts transferability by estimating the probability that applying research evidence in a context will be implementable and effective through the above characteristics within the model. A score above 75% is considered transferable. A score between 50 and 75% is considered transferable but with contextualization. A score below 50% requires that new research is conducted for the context.

Please note that the model can make prediction across the PICO and as such can make recommendations for contextualization even for meta-analysis scoring above 75% and will require consideration before implementation.

Finally, the model can infer recommendations for transferability, for example suggests complimentary approaches that could reduce cost or complexity of an intervention; suggests populations within a contexts that would benefit from interventions; propose alternative interventions; propose modifications in outcomes of measure.

4. Proposed Uses of the Model

This model can be used in:

- a. databases where interventions have been evaluated with existing meta-analysis eg the Cochrane Collaboration database, the JBI Database, the Cambell Collaboration databases
- b. databases where research recommendations have been made especially using evidence into decision making frameworks eg the Education Endowment Toolkit, the MAGIC Recommendations, Duodecim Guidelines; HAS guidelines, WHO guidelines, NICE guidelines
- c. Primary studies results without meta-analysis

The above could be within regions or countries, could be from Global South to Global North, could be across sectors.

Examples

- Digital Learning
- Social and Emotional Learning
- Semaglutide for Type 2 Diabetes Mellitus



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