

Scientist-Stakeholder Relationships Drive Carbon Data maturity within CMS

Brown et al 2022 ERL CMS Special Collection ([10.1088/1748-9326/ac87bf](https://doi.org/10.1088/1748-9326/ac87bf))



Science Question

What are the characteristics of organizations, PIs and projects that result in the **development and rapid uptake of products** across CMS from 2010-2020, as measured by changes in the Applications Readiness Level (ARL)?

Data

Using data from carbon.nasa.gov and from the product-level PI survey, we calculated the change in ARLs in a contingent effectiveness model of technology transfer to understand the impact of different aspects of the CMS program on success in maturing products during the period of performance.

Methods

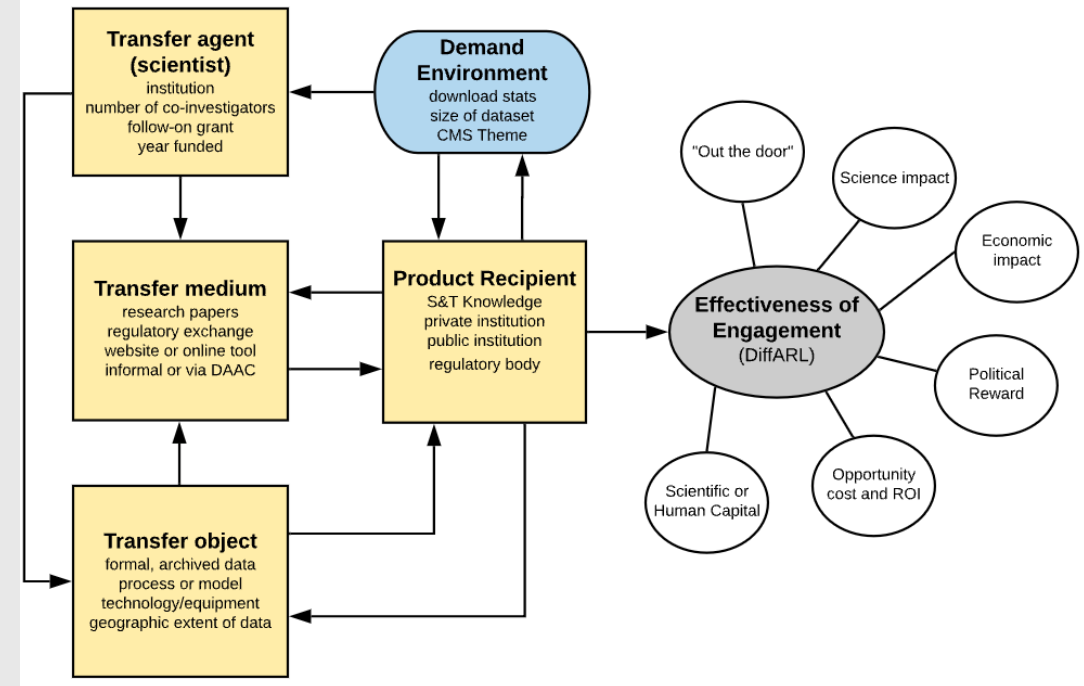
We used a correspondence analysis (CA) technique. CA is based on singular value decomposition and is used to detect and represent underlying structures in categorical data. The primary goal of CA is to **illustrate important relationships** among qualitative variables using a graphical representation.

Significance

Access, awareness and availability are key to the use and uptake of products by stakeholders. Length of time a CMS PI has been engaged in the program is a key driver, as was the fundamental need of the stakeholder for the data product. The ability of a scientist to understand the stakeholder context. More frequent and decision-targeted engagement is critical for uptake. Our quantitative approach revealed the importance of the production of scientific articles and datasets as the foundation upon which subsequent use of the data product by stakeholders.

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We used the change in ARL for each product-stakeholder pair (the DiffARL) as our 'Effectiveness of Engagement' metric.

Results

Most important drivers of ARL increase were found to be:

- Citations of dataset DOI (demand for data)
- Datasets archived (transfer of data)
- Number of files in dataset (transfer of files)
- Number of stakeholders engaged – sweet spot between 1 and 4 stakeholders. 9 or more stakeholders resulted in only one ARL change.
- Year initially funded (characteristics of the scientist)