Free to Read or Paywall Prisoner: Accessing Digital Transportation Journals

Transportation Research Board 99th Annual Meeting
Washington, D.C., January 14, 2020
Poster: P20-20660

Abstract

There is a common myth among internet searchers that they "can find anything with a search engine," and therefore don't need a librarian's help. However, these searchers may not understand the difference between "finding" an article citation online, and actually having "access" to the paper. Often times, access is blocked or limited by a journal paywall. Depending on the user's organizational affiliation, or bank account, scaling these paywalls can be expensive or impossible, thereby limiting "access" to research. For researchers at institutions which pay substantial subscription fees for journal access, this research paywall is often invisible, as the fees are paid by the organization's library. Library staff spend a great deal of time making content paywalls as invisible as possible for their users.

While there is a growing movement towards open access journals, a great deal of transportation research is still located behind a paywall. While transportation research indexes and search engines may allow searchers to locate the item, this does NOT mean searchers will have access.

This poster takes a survey of transportation and transportation-related journals, and compares the percentage of journals which are open access (freely available) to the percentage locked away behind a paywall. The poster also discusses the role librarians play in knocking down paywalls to make research accessible to researchers.

Approach

For this poster, the authors chose to examine transportation-related journals indexed in TRB's Transportation Research International Documentation (TRID) database <<https://trid.trb.org/>>, as TRID is " the world's largest and most comprehensive bibliographic resource on transportation research information,"[1] and is already known to TRB Annual Meeting attendees. The authors received a list of more than 300 journal titles and URLs from the TRB Transportation Research Information Services (TRIS) manager, and examined the list of more than 650 journals listed on the "TRID Serials" webpage.[2] deMontigny narrowed this list to a subset of 478 journals and publications, where at least some content is available by electronic access. This means about 200 journals were not listed due to language, electronic, or other access barriers. (We discuss the continued importance of print journals below.)

Taking this subset of 478 journals, deMontigny then visited each to determine its level of access and how much transportation information it included. It is important to note that deMontigny was working at a computer housed at the Montana Department of Transportation, without the benefit of database subscriptions common in academic and library settings. This "barrier" became useful when determining access levels because there was not a subscription in place to grant access behind the scenes. (We discuss access issues below.)

Upon visiting these journals, deMontigny categorized them by topical coverage, specifically looking at the amount of transportation-related research and information. Nearly three quarters of journals covered other disciplines, such as medicine, urban planning, or legal issues, for examples. Journals such as these were categorized as having "some transportation coverage," while the transportation-specific materials were rated as "transportation only." Subjective judgement was used in determining the percentage of "Transportation Coverage" in each journal, and each was ranked on a scale, as follows:

1: **Transportation Only**: The journal is devoted solely to the coverage of transportation topics;
2: **Mostly Transportation**: The majority of journal articles cover transportation topics, while other disciplines are also included;
3: **Some Transportation**: The majority of journal articles cover topics other than transportation, while transportation is also included;
4: **Occasional or Undetermined**: The journal covers transportation topics only on an occasional basis, or coverage frequency could not be determined with certainty, perhaps due to language or access difficulties.

Of the 478 journals in our dataset (see ***Figure 1***):

- 120 (or 25.1%) were classified as "Transportation Only;"
- 70 (or 14.6%) were classified as "Mostly Transportation;"
- 199 (or 41.6%) were classified as "Some Transportation;" and,
- 89 (or 18.6%) were classified as "Occasional or Undetermined."

While assessing journals for topical content, deMontigny also checked for openness of accessibility and the presence of paywalls. (A discussion of the precise meaning of "open access" can be found below.) Christiansen then analyzed the data, determining journal access levels and paywalls by topical coverage. Those results can be found in following sections.

The Meaning of "Open Access"

"Open Access" was defined in 2003 by the Bethesda Statement[3] as a publication that meets the following conditions:

> 1. The author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use.
>
> 2. A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving.

For our purposes we will refer to "Open Access" as topical information that is freely accessible to searchers. Many of these journals directly state that they are completely open access. Some of the journals we examined seemed to make all content open, without paywall, but did not make a "Open Access" declaration on their website. We refer to these as "Available, not declared Open Access." Still other journals have published statements supporting open access. However, each of these had to be explored to determine the extent of said "open access." In some cases, the most current year of journal papers were behind a paywall, while older materials were now open access. In cases like these, the journal was classified as "Partially Open Access." Finally, some journals were completely blocked with a paywall making them inaccessible without a subscription or one-time payment per article.

The Continued Importance of Print

This poster focuses on accessing digital journals. However, some transportation-related journals are either still published in print, or their entire publication life was as print-based journals and are no longer published at all. (We in fact excluded a couple dozen of these journals from our final dataset, as we are focusing on electronic access.) Other journals started as print journals, and made the transition to electronic publishing over the last two to three decades. This means that a great deal of foundational and important transportation research is available only in print, until it is digitized.

Most of this "born-print" material can be located through library catalog searches; transportation indexes (TRID, and others); and web search engines. However, some current researchers may not include these papers in their modern research lit searches, because of a perceived lack of access to print materials. It is important to note that journals that are not available electronically in any form can still be accessed by borrowing the physical resource, a scanned image of the article or a photocopy. This can be done through **interlibrary loan services** with the help of your librarian.

The authors strongly encourage researchers to seek help from their nearest librarian when needed.

Figure 1:
Journal Topical Coverage

Percentage (and count) of n=478

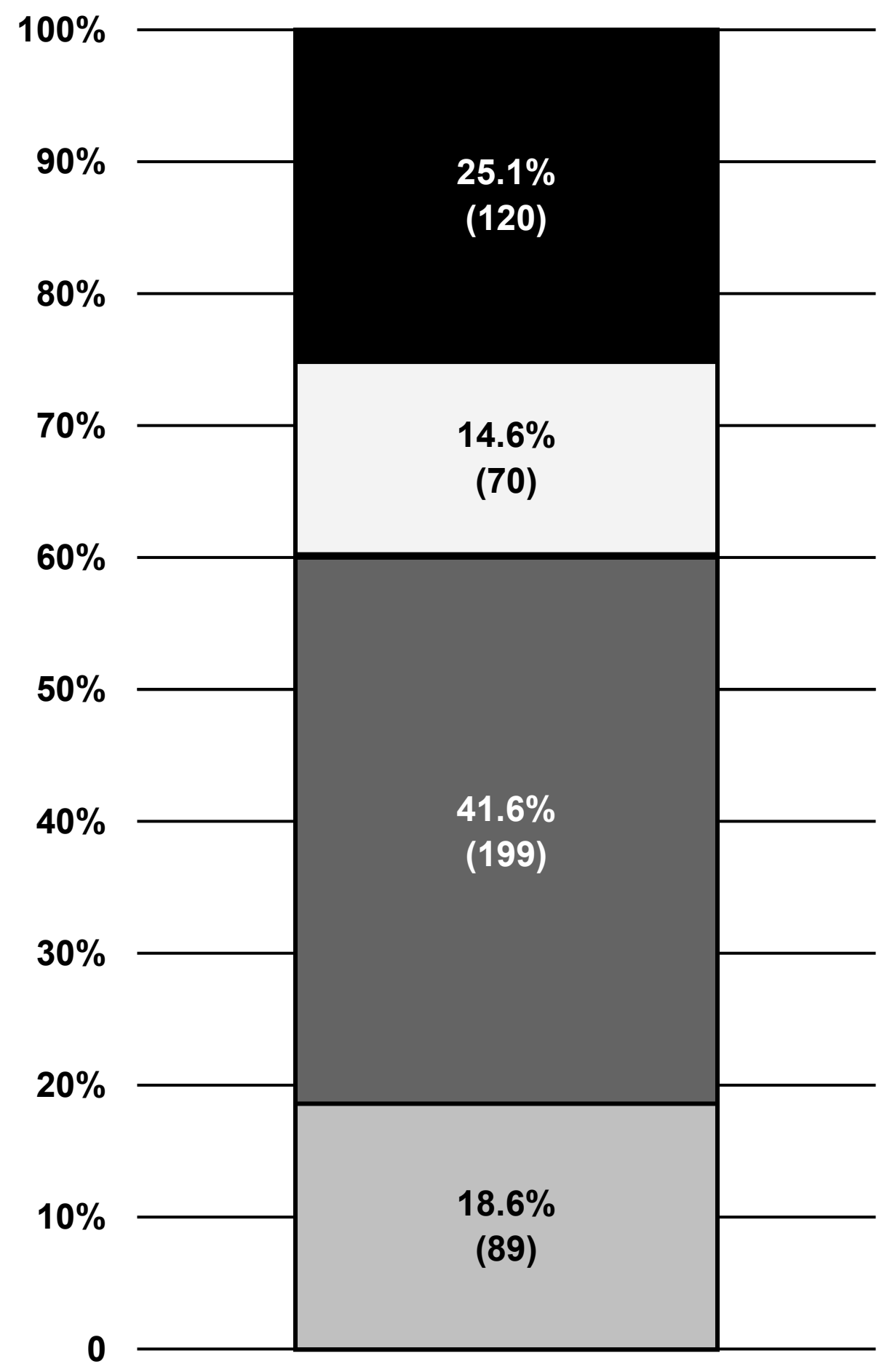

Figure 1 Legend

■ **Transportation Only:** The journal is devoted solely to the coverage of transportation topics.

□ **Mostly Transportation:** The majority of journal articles cover transportation topics, while other disciplines are also included.

▩ **Some Transportation:** The majority of journal articles cover topics other than transportation, while transportation is also included.

▨ **Occasional or Undetermined:** The journal covers transportation topics only on an occasional basis, or coverage frequency could not be determined with certainty, perhaps due to language or access difficulties.

Resources

1. "About TRID." Transportation Research Board. 2020. Accessed 2020-01-07, from http://www.trb.org/InformationServices/AboutTRID.aspx
2. "TRID Serials." Transportation Research Board. 2020. Accessed 2020-01-07, from http://www.trb.org/InformationServices/TRISSerials.aspx
3. "Bethesda Statement on Open Access Publishing." 2020. Accessed 2020-01-03, from http://legacy.earlham.edu/~peters/fos/bethesda.htm
4. Bergstrom, Theodore C.; Paul N. Courant; R. Preston McAfee; and Michael A. Williams. [2014]. "Evaluating Big Deal Journal Bundles." Proceedings of the National Academy of Science of the United States of America. Accessed 2020-01-09 from https://doi.org/10.1073/pnas.1403006111
5. "Table 317.40.Number of degree-granting postsecondary institutions and enrollment in these institutions, by enrollment size, control, and classification of institution: Fall 2017." [2018]. United States, Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Spring 2018, Fall Enrollment component. (This table was prepared November 2017.) Accessed on 2020-01-08 from https://nces.ed.gov/programs/digest/d18/tables/dt18_317.40.asp
6. Integrated Postsecondary Education Data System (IPEDS): Academic Libraries (AL) [2018]. [dataset "AL2018"]. United States, Department of Education, National Center for Education Statistics (NCES). 2018. <<https://nces.ed.gov/ipeds/use-the-data>>. Accessed 2020-01-06, from https://nces.ed.gov/ipeds/datacenter/data/AL2018.zip

Access Levels: Transportation Research is Very Open; But Your Access May Differ

While determining journal topical coverage, we recorded journal access levels. To enable data analysis, "Access Level" characteristics were assigned values the following scale:

1: Open Access: The journal conforms to Open Access principles, and content is freely available;
2: Available; not declared Open Access: Content is freely available, but the journal does not seem to have an Open Access statement;
3: Partial Open Access: Some content is freely available, other content is behind a paywall (for example current year requires payment, while previous years are free);
4: Undetermined: We could not determine openness with confidence.
5: Not Open Access: All content requires payment.

Of the 478 journals in our dataset (see ***Figure 2A***):

- 75 (or 15.7%) were classified as "Open Access;"
- 79 (or 16.5%) were classified as "Available, not declared;"
- 180 (or 37.7%) were classified as "Partial Open Access;"
- 11 (or 2.3%) were classified as "Undetermined;" and,
- 133 (or 27.8%) were classified as "Not Public Access."

Happily, about 70% of the journals we surveyed were completely or partially available to a searcher outside of an academic library setting.

Figure 2B and ***Figure 2C*** parse the journal access date by topical coverage. For example, of the 120 journals we found dedicated to transportation research:

- 26 (or 21.7%) were classified as "Open Access;"
- 37 (or 30.8%) were classified as "Available, not declared;"
- 46 (or 37.5%) were classified as "Partial Open Access;"
- 0 (or 0.0%) were classified as "Undetermined;" and,
- 12 (or 10.0%) were classified as "Not Public Access."

This is good news for transportation researchers seeking digital research content: 90% of the journals we surveyed and rated as "Transportation Only" are wholly or partially available to researchers free of charge.

However, 75 (or 37.6%) of the cross-disciplinary journals which we ranked as "Some Transportation" where only available after paying a subscription or single-use download fee. So there are still barriers to researchers seeking cross-cutting content.

While data shows a fairly open environment for transportation researchers, electronic access to transportation journals can vary widely, based on a number of factors, including:

- Journal access type (open or pay);
- Research organization subscriptions (does your organization or research library pay subscription for you?);
- Are you an Industry, discipline, or professional organization member or sponsor; and,
- Has "born-print" content been digitized, among others.

For example, a researcher at an academic transportation research center may retrieve content from dozens of journals for "free" through library subscriptions. However, the state DOT researcher with whom they are working may be asked to pay to access the same content, if the department has not purchased subscription content.

Figure 2A:
Journal Access Levels

Percentage (and count) of n=478

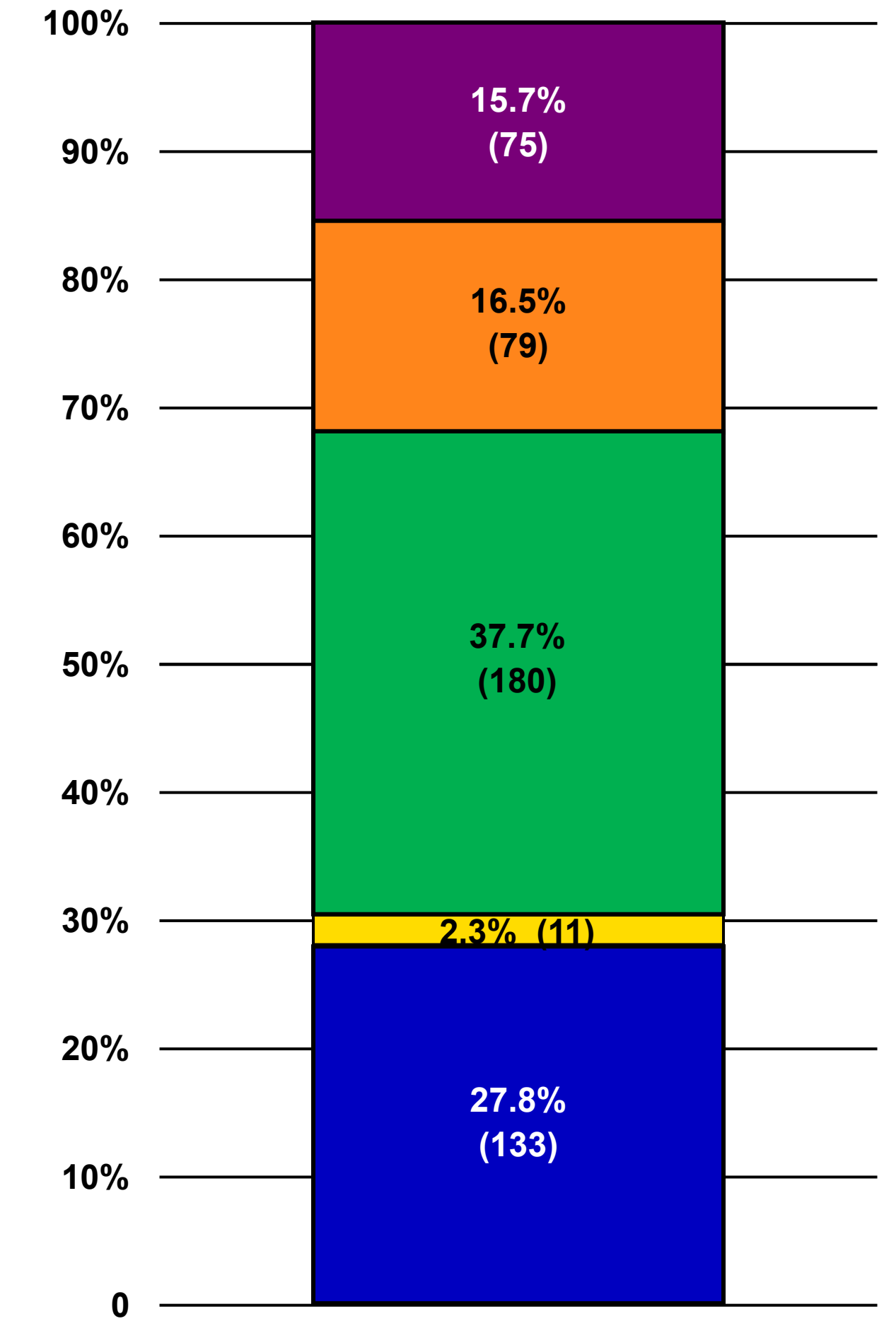

Figure 2B: Access Levels to Journals, by Topical Coverage (Counts)

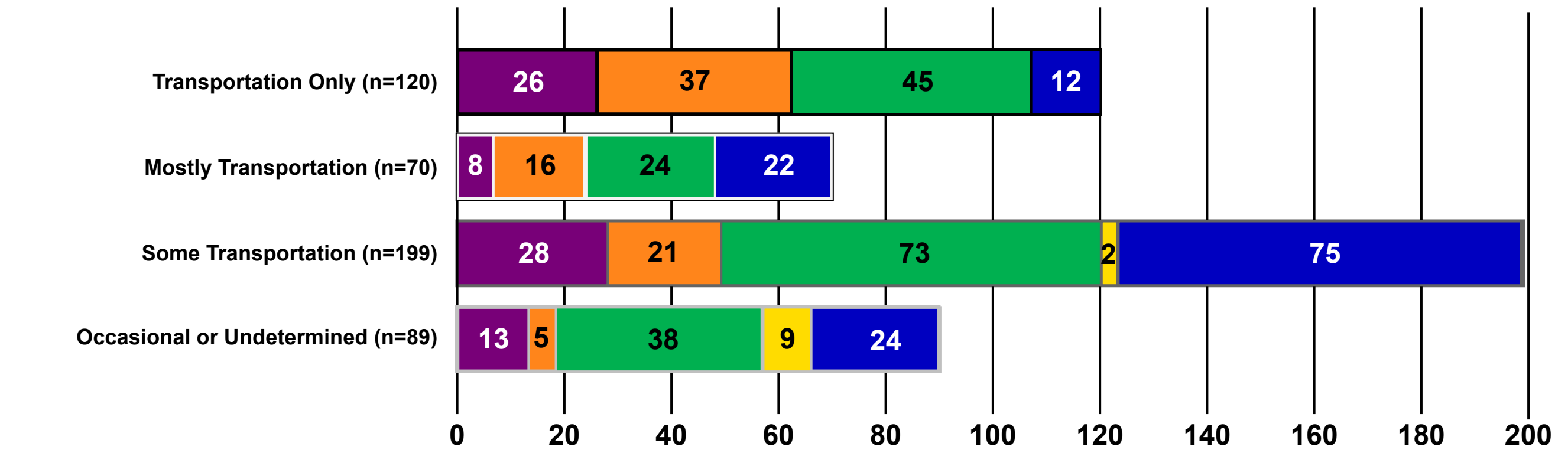

Figure 2C: Access Levels to Journals, by Topical Coverage (Percentages)

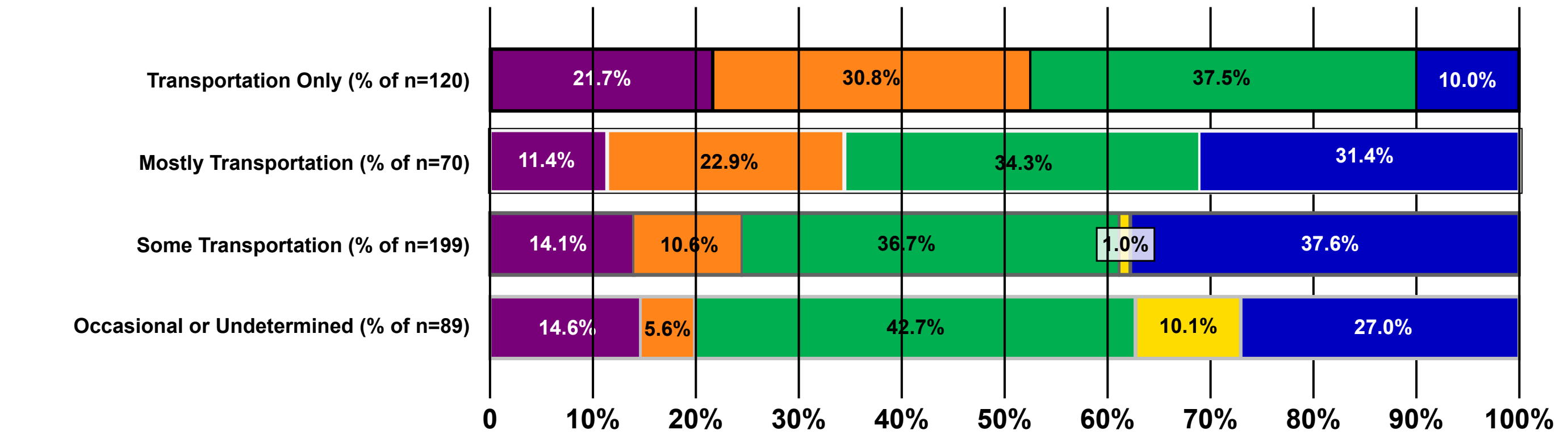

Figure 2 Legends

🟪 **Open Access:** The journal conforms to Open Access principles.

🟧 **Available; not declared Open Access:** Content is available, but the journal does not seem to have an Open Access statement.

🟩 **Partial Open Access:** Some content is freely available, other content is behind a paywall.

🟨 **Undetermined:** We could not determine openness with confidence.

🟦 **Not Open Access:** All content requires payment.

Paywalls: Transportation Journals are Easy on the Pocketbook, But Inter-Disciplinary Content May Eat at Your Budget

"Paywalls" are used by information providers to derive revenue from information seekers. Some journals, for example the *Transportation Journal* <<https://www.jstor.org/journal/transportationj>>, published by Penn State University, and housed in the JSTOR database, keeps transportation research papers behind a paywall. Searchers can usually find the Title, Abstract, and Citation for a *TJ* paper using any search engine. When the searcher clicks through to the paper landing page, they may even see a preview of the paper and the reference section. But they are often confronted with a choice if they want to read or download the full text of the paper: either gain access by logging in through an institutional subscription, or pay a one-time use fee.

For this poster, we looked for the presence or absence of paywalls at each of the 478 journals reviewed. To enable data analysis, "Paywall Presence" characteristics were assigned values the following scale:

1: No Digital Paywalls;
2: Partial Paywall: Certain content, such as the current year, may be behind a paywall;
3: Undetermined: We could not determine existence of paywall; and,
4: Pay for all Access: All content requires payment.

Of the 478 journals in our dataset (see ***Figure 3A***):

- 154 (or 32.2%) were classified as "No Digital Paywall;"
- 180 (or 37.7%) were classified as "Partial Paywall;"
- 11 (or 2.3%) were classified as "Undetermined;" and,
- 133 (or 27.8%) were classified as "Pay for All Access."

In other words, nearly 70% of transportation journals reviewed had no, or only partial, paywalls, while nearly 28% required payment for any full-text access.

Again, ***Figures 3A*** and ***3B*** parse the journal data by topical coverage, giving values for counts and percentages for each topical ranking.

For example, of the 70 journals which we rated as "Mostly Transportation" content, there was a fairly even distribution (24, 24, and 22) of the absence of all paywalls, partial pay-for-access, and all content locked behind a paywall. These cross-disciplinary journals, which we have classified as "Mostly Transportation" or "Some Transportation" are of great importance to anyone who is studying planning, urban renewal, safety, construction, materials, maintenance, and the environment. Even though these topics are at the forefront of transportation research, they are not exclusive to transportation. Because of the presence of paywalls, these journals could represent the bulk of access expenses for transportation researchers.

You will notice the close similarity of the graphs in ***Figures 2*** and ***3***. In this case, looking at levels openness and electronic access, versus the presence of paywalls could be seen as looking at the same data from two different lenses.

From either point of view, the good news is that digital transportation research content has a high percentage of availability. This good news, however, does not mitigate the expense of journal paywalls for cross-disciplinary content, nor the frustration felt by individual researchers who may get stymied by pay-per-use requests, in the absence of subscription access.

We look a bit more at journal database subscriptions in the next section.

Figure 3A:
Journal Paywall Presence

Percentage (and count) of n=478

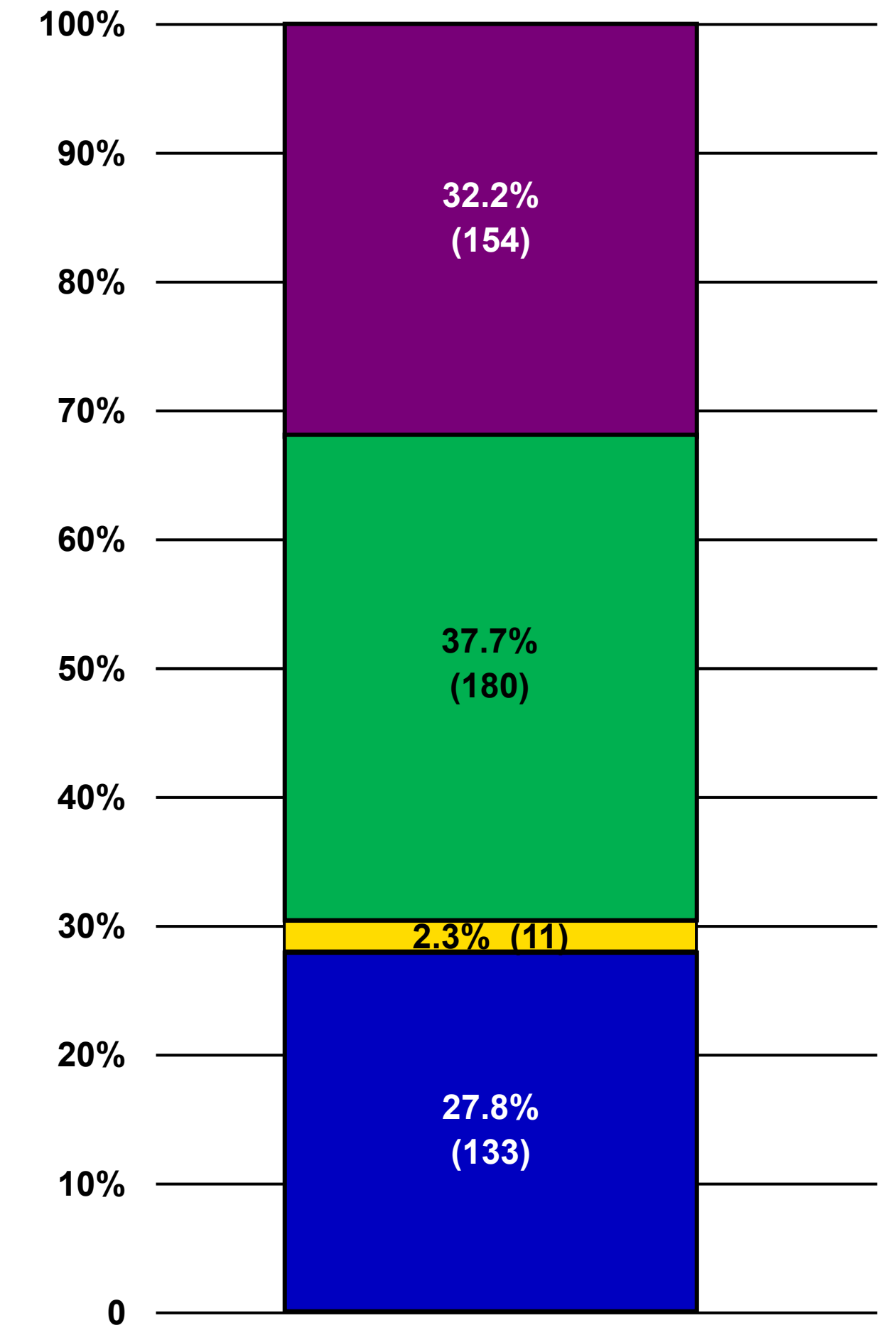

Figure 3B: Journal Paywall Presence, by Topical Coverage (Counts)

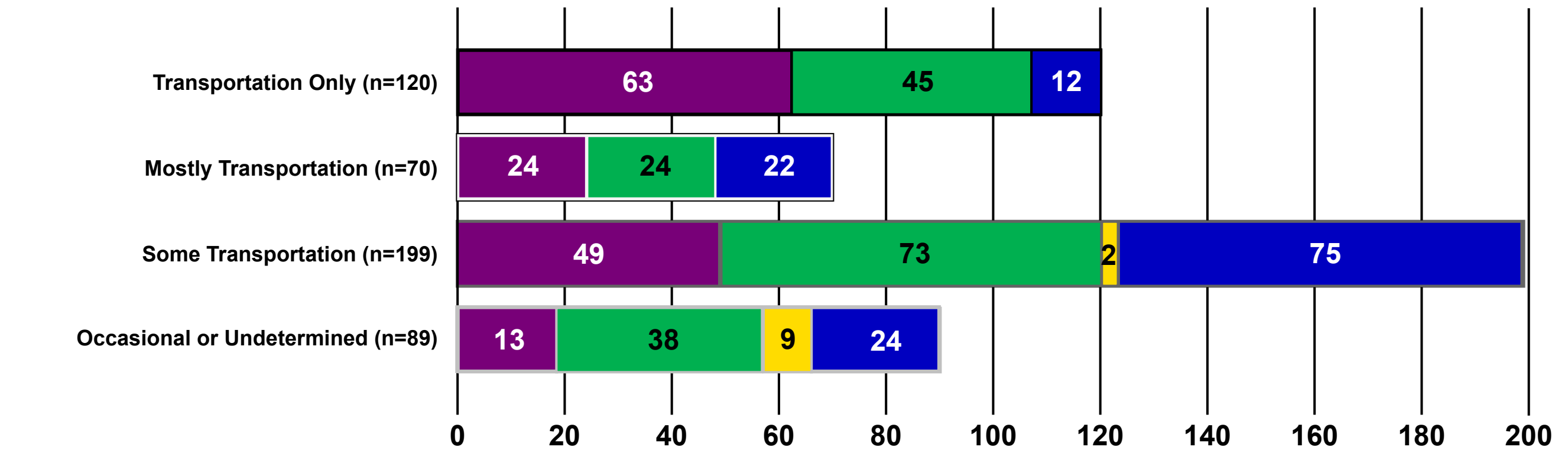

Figure 3C: Journal Paywall Presence, by Topical Coverage (Percentages)

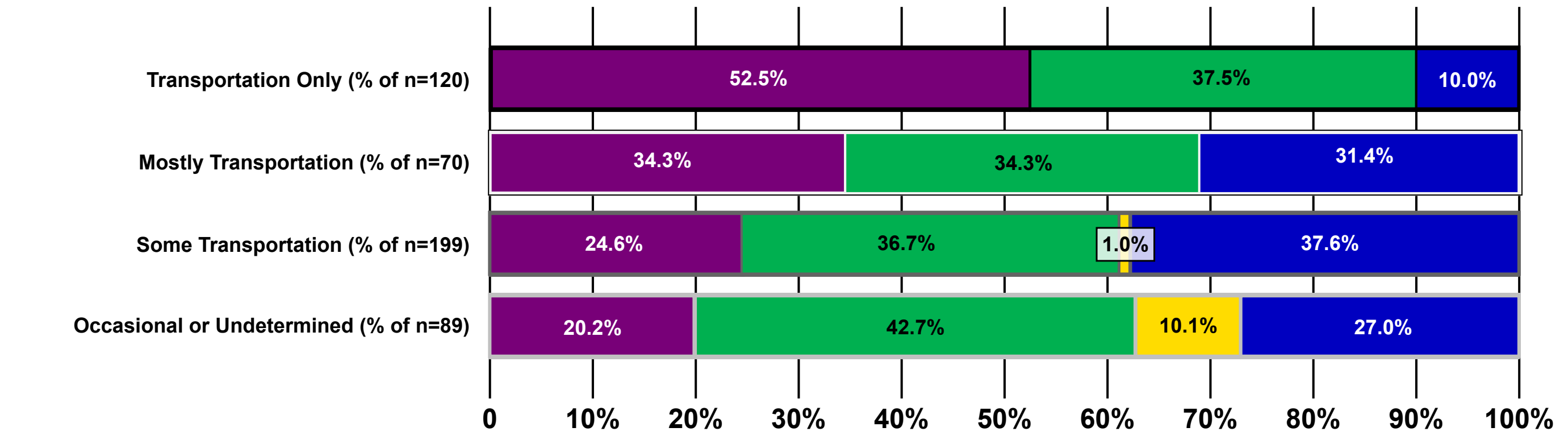

Figure 3 Legends

🟪 **No Digital Paywalls**

🟩 **Partial Paywalls:** Certain content, such as the current year, may be behind a paywall.

🟨 **Undetermined:** We could not determine existence of paywall.

🟦 **Pay for All Access:** All content requires payment.

US$2,423,967,155.00

Total amount spent for all 2902 libraries on "ongoing commitments to subscriptions," including electronic databases, for 2016-2017[6]

US$1,975,244,307.00

Total amount spent by the 457 libraries, paying US$1 million or more on "ongoing commitments to subscriptions," including electronic databases, for 2016-2017[6]

US$637,312,664.00

Total amount spent by the 47 libraries, paying US$10 million or more on "ongoing commitments to subscriptions," including electronic databases, for 2016-2017[6]

US$20,562,571.00

Maximum reported amount spent by any library on "ongoing commitments to subscriptions," including electronic databases, 2016-2017[6]

US$835,274.69

Mean amount spent per library on "ongoing commitments to subscriptions," including electronic databases, 2016-2017[6]

US$0.00

Minimum reported amount spent by any library on "ongoing commitments to subscriptions," including electronic databases, 2016-2017[6]

2902

Number degree-granting institutional libraries reporting "ongoing commitments to subscriptions," including electronic databases, 2017[6]

4298

Total number of U.S. degree-granting postsecondary institutions; Fall 2017[5]

Figure 4: Scaling the Paywalls: What do Subscriptions Cost Academic Libraries?

Scaling the Paywalls: Academic Library Subscriptions Expenditures

For transportation researchers with access to large, research oriented libraries, journal paywalls may be largely invisible. This is because academic libraries negotiate and purchase electronic journal subscriptions to, in some cases, thousands of journals. This electronic subscription access is then often integrated directly into the library online catalog, for one stop searching. This broad discovery tool can give the appearance of a library "holding" or "owning" millions of research articles, while, in fact, they are paying for "access," not necessarily ownership.

For research libraries, depending on the breadth of research their institution engages in, these journal subscriptions can run into the millions of dollars per year. Journals are often bundled together, and bundle prices can vary from library to library, based on size or negotiating skills.[4] Finding out exactly what a university or college library pays for journal subscription bundles can take a lot of work, up to making Freedom of Information Act (FOIA) requests. (For more details see Bergstrom, et. al., 2014.)

However, the U.S. Department of Education's National Center of Education Statistics (NCES) performs an annual survey of colleges and universities, collating the data into the Integrated Postsecondary Education Data System (IPEDS) <<https://nces.ed.gov/ipeds/>>. The survey goes out to all 4,298 degree-granting postsecondary institutions.[5] One section of the survey is dedicated to the staffing, holdings, circulation, and subscriptions of academic libraries (section AL).[6]

The variable we were most interested in for this poster is "Ongoing commitments to subscriptions" (variable number: 160175; variable name: LEXMSCS). The data dictionary defines this variable as: "The expenditures for ongoing subscriptions to serials in all formats, including duplicates, for all outlets. These are publications issued in successive parts, usually at regular intervals, and, as a rule, intended to be continued indefinitely. Serial subscriptions include periodicals, newspapers, annuals (reports, yearbooks, etc.), memoirs, proceedings, and transactions of societies. Includes the costs of electronic serials bought in aggregations and serial packages."[6]

Please note that this variable is not exclusively focused on electronic journal subscriptions, and that the balance of expenditures for electronic research journal subscriptions compared to newspapers and yearbooks will vary from library to library. We are reporting this statistics here as it covers ALL types of subscription expenses, without claiming what percentage is dedicated to electronic journal access.

The numbers do tell an important story: academic libraries and librarians dedicate a great deal of resources to "scale" paywalls for their faculty and student researchers.

***Figure 4** stacks up the* numbers *from IPEDS AL:*

- **4298:** Total number of U.S. degree-granting postsecondary institutions; Fall 2017[5];
- **2902:** Number degree-granting institutional libraries reporting "ongoing commitments to subscriptions," including electronic databases, 2017[6];
- **US$0.00:** Minimum reported amount spent by any library on "ongoing commitments to subscriptions," including electronic databases, 2016-2017[6];
- **US$835,274.69:** Mean amount spent per library on "ongoing commitments to subscriptions," including electronic databases, 2016-2017[6];
- **US$20,562,571.00:** Maximum reported amount spent by any library on "ongoing commitments to subscriptions," including electronic databases, 2016-2017[6];
- **US$637,312,664.00:** Total amount spent by the 47 libraries, paying US$10 million or more on "ongoing commitments to subscriptions," including electronic databases, for 2016-2017[6];
- **US$1,975,244,307.00:** Total amount spent by the 457 libraries, paying US$1 million or more on "ongoing commitments to subscriptions," including electronic databases, for 2016-2017[6]; and,
- **US$2,423,967,155.00:** Total amount spent for all 2902 libraries on "ongoing commitments to subscriptions," including electronic databases, for 2016-2017[6]

Of the more than $2.4 **billion** dollars spent on subscriptions by the surveyed libraries:

- **47 libraries** (1.6% of 2902 libraries), paying more than $10 million each, spent more than $637 million, or 26.3% of the total, on subscriptions; and,
- the **457 libraries** (15.7 % of 2902 libraries) paying more than $1 million each annually, spent more than $1.9 *billion*, or **81.5%** of the total.

Clearly some academic libraries have more resources than others. Researchers would be well served to consider, and ask about, the library resources available to them as they choose a research institution at which to work.

Further, as most academic libraries provide subscription journal access to researchers "for free," academic libraries are underwriting research efforts, including transportation research, by hundreds of millions to billions of dollars each year.

Conclusions

As we noted earlier, the survey of transportation journals and publications represented by this poster is incomplete. Our survey subset of 478 journals excluded another 200 titles. We experienced significant access barriers to some journals, especially when produced in languages which we do not read, or for which the browser translation was less than adequate. We invite the assistance of our international colleagues to help us fill in those gaps.

In this poster, we can see:

- **Nearly 70%** of transportation research literature is fully or partially open to researchers, meaning electronically available without cost.
- Meanwhile, **more than a third** of cross-disciplinary journals require subscription or payment for any level of access, other than search and discovery. However, cross-disciplinary research is important as it adds depth to transportation research, and researchers should contact their library about Interlibrary Loan services, which may allow for free or reduced-price access.
- This means while move to open access continues, there are still significant costs for accessing published research journals.
- In the United States for example, academic libraries spend more than **US$2 billion** annually for subscriptions, including electronic journal subscriptions.
- Researcher access to research journals can vary widely, based on the type, and bank account, of the organization at which they perform their research.
- Libraries and librarians not only enable and improve search and discovery of research journals and outputs, they play an often invisible role in providing entity-wide access to content kept behind a paywall, underwriting research expenses.

Acknowledgements

The authors wish to thank Bill McLeod, TRB's Transportation Research Information Services (TRIS) manager, for providing the list of journals indexed by TRID and used for analysis in this poster.

Authors

Bobbi deMontigny
https://orcid.org/0000-0001-7140-0982
Librarian and Technology Transfer Specialist, Montana DOT
bodemontigny@mt.gov

Leighton L Christiansen
https://orcid.org/0000-0002-0543-4268
National Transportation Library, USDOT
leighton.christiansen@dot.gov

Recommended Citation

deMontigny, Bobbi https://orcid.org/0000-0001-7140-0982; and, Leighton L Christiansen http://orcid.org/0000-0002-0543-4268. 2020. *Free to Read or Paywall Prisoner: Accessing Digital Transportation Journals*. United States. Department of Transportation. Bureau of Transportation Statistics. National Transportation Library. https://doi.org/10.21949/1506101