香港科技大学图书馆学术交流会 Academic Meeting of Hong Kong University of Science and Technology
June 02-04, 2019，香港科技大学李兆基图书馆 HKUST Lee Shau Kee Library

数据分析驱动的决策与服务
Data Analysis Driven Decision-Making and Services

上海交通大学 图书馆 陈进

2019年06月04日@香港科技大学李兆基图书馆

上海交通大学
SHANGHAI JIAO TONG UNIVERSITY

简介 Introduction

生长的有机体 Growing Organisms

- 在历史发展长河中 In the long course of historical development
- 图书馆与时俱进、服务职能不断演进 Library keeps pace with the times and its service functions are constantly evolving

智慧图书馆 Smart Library

传统图书馆 Traditional Library

通天之巴别塔 Babel Tower

数字图书馆 Digital Library

藏书楼 Book Storage

元者，善之长也。
亨者，嘉之会也。
利者，义之和也。
贞者，事之干也。
——《周易·乾·文言》

人才培养
Cultivating Talent

双一流建设
"Double First-Class" initiative

教学
Teaching

科研
Research

创新
Innovation

管理
Management

文化
Culture

支撑Support

教 学 研 管

优质资源
Quality Resources

主动服务
Active Service

图书馆服务 Library Service

浪之源

服务甄选之容器解说
Container Explanation of Service Selection

上海交通大学
SHANGHAI JIAO TONG UNIVERSITY

学科服务 Subject Service

(分层+分类)服务 (Layered+Sorted) Service

教学 Teaching & Learning	科研 Scientific Research	学科发展 Disciplinary Development
国际合作 Global Cooperation	文化激励 Motivating Culture	战略决策 Strategic Decision
教职员 Faculties	学生 Students	......

University Affairs   *University Activities*

支持 Support

泛学科化服务体系
Ubiquitous Subject Service System

所有服务学科化，学科服务泛在化 All Services be Disciplinary, Subject Service be Ubiquitous

⊛ 图书馆愿景 Library Vision

- 📖 学术交流中心 Academic Exchange Center
- 📖 知识加工中心 Knowledge Value-Added Center
- 📖 文化传承中心 Cultural Inheritance Center

⊛ 图书馆服务 Library Services

- 📖 基础服务 Basic Service in Lib
- 📖 扩展服务 Extend Service out Lib
  - 📖 步入实验室/办公室 Step in (Approach) Research Laboratory / Office
  - 📖 融入研究团队 Integrate into Research Team (Friends of Faculty)
  - 📖 嵌入研究过程 Embed in Research Process

Ubiquitous Subject Service System (USSS)

泛学科化服务体系 (六大脉络)
Contexts of Ubiquitous Subject Service System (Six Aspects)

1
走进院系 主动服务
Do Service Actively by Outreaching to Research & Teaching

2
绩效资源 分类保障
Build Higher-Quality Collections Efficiently & Accurately

3
嵌入课程 支持教学
Embed in Courses to Support Teaching & Learning

4
融入科研 辅助决策
Integrate into Research to Support R&D

5
触摸技术 培育创新
Inspire and Assist Students to Join in Innovation Practices

6
科艺相通 文化育人
Cultivate Talents by Promoting Campus Culture

Key Functions

组建12+4+X学科服务团队 Build 12+4+X Subject Service Teams

学校院系全面覆盖 Cover All schools & Institutes

建立院系基地 Set up Service Bases

团队协同，交叉融合 Team Working and Cross Supporting

1 组建学科馆员团队 Organize Subject Librarian Teams

2 服务无处不在 Service Not Only in Library But Also on Campus

遍访教授 Contact with All Professors

征集意见 Collect Information & Opinion
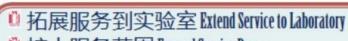
明确需求 Understand Needs

推送服务 Send Service to Office

累计拜访教授 1180 人 Has Visited 1180 professors till Now

3 培训信息专员 Train (Research Team Members as) Information Specialist

信息专员培训

图书馆信息专员聘书

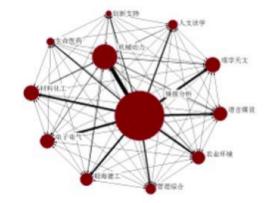**4** ……

拓展服务到实验室 Extend Service to Laboratory

扩大服务范围 Expand Service Range

在图书馆和研究团队之间架起桥梁 Build Bridges between Library & Research Teams

累计培养信息专员 1462 人，覆盖全校 200 余个科研团队 Has Trained 1462 Information Specialists from Over 200 Research Teams
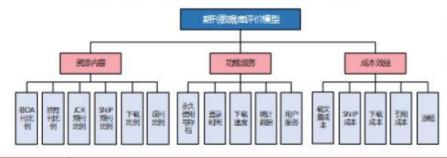
聚焦三方面 Focus on 3 Aspects

① 顶层设计 Top Design

- 三一原则：将资源建设的权力交给 Three-One Rule (or Trisection Unity Rule): To Give the Power of Resource Development to
  - 院系师生 Faculty and Students
  - 学科馆员 Subject Librarians
  - 采访馆员 Acquisition Librarians
- 院系师生说了算 The Key Right belongs to Faculty & Students

② 技术优化 Optimization via Technologies

- 搭建电子资源分析系统 Build the Electronic Resource Analysis System (ERAS)
- 开发自动映射分类专家系统 Develop the Automatic Mapping Classification Expert System
- 构建期刊数据库评价模型 Establish the Journal Database Evaluation Model, etc.
- ……

③ 先进理念与方法 Advanced Concepts & Methods

- 引进需求驱动采购 Introduce DDA
- 建立集团采购机制 Setup Group Acquisition Mechanism (eg. DRAA)
- 构建资源地图 Construct Resource Map
- 重组学科群资源 Re-Organize Resources According to Disciplinary Group
- ……

ERAS功能结构

资源地图

◎ 和教师开展广泛合作 Cooperate Extensively with Faculty

◎ 深度支持教学和人才培养 Assist Course Instruction & Talent Cultivation

Library
Teaching & Learning

学分课程
Credit Courses

> 每年5门课程
> Annually 5 Courses

> 滚动培训 Rolling Training
> 定制主题培训 Customized Training

用户需求导向的信息素养教育
User Driven Information Literacy Education

嵌入课程
Embedded in Instruction

> 嵌入21个学院的64门课程 Embed in 64 Courses of 21 schools
> 9200余名学生受益 Benefits More Than 9200 Students

支持教学
Support Teaching & Learning

辅助教学模式与方法创新
Assistance of Innovation in Teaching Model & Method

> 微课 Micro Courses

智慧泛在课堂
Ubiquitous Smart Class

> 翻转课堂 Flipped Classroom
> 互动分享 Interactive Sharing
> 电子教参 E-Reserved Book Services

Flipped Classroom

学习空间
Learning Commons

> 群组学习 Group Study
> 研讨、汇报展示 Discussion & Presentation

Group Learning & Study

全面支持学科发展和管理决策的情报分析服务 Information Analysis to Support for Discipline Development and Management Decisions

宏观 Macro
面向学校职能部门
Facing to University & Administrative Department

- 学术成果管理与分析 Academic Output Management & Analysis
- 国际合作成效分析 Effect Analysis of International Cooperation
- 知识产权转移转化 Assist Intellectual Property Transformation

中观 Meso
面向院系
Facing to School & Institute

- 院系管理决策支持 Assist Decision Making for School & Development
- 学科发展态势分析 Discipline Status & Trend Analysis
- 辅助学科评估 Assist Disciplinary Evaluation

微观 Micro
面向课题组科研人员
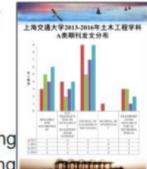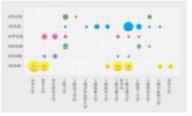Facing to Research Team & Member

- 创新团队和重点实验室的评估 Condition Evaluation of Innovation Team & Key Laboratory
- 辅助人才评估 Assist to Apply Talent Plan
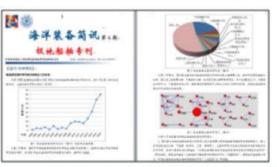- 定题服务、查新和查收查引 SDI Service, Novelty Search

- 机构知识库 Institutional Repository
- 专业认证和教育评估 Professional Certification and Educational Evaluation
- 智库服务 Think-Tank Service
- 专利培训 Patent Information Training
- 技术发展动态追踪 Dynamic Tracking of Technology Development

触摸技术 激发创新 Inspire & Assist Students to Join in Innovation Practices

- 图书馆具有支持创新的资源和优势 Libraries Have Resources and Advantages to Support Innovation
- 聚焦：创新思维和动手能力培育 Focus: Cultivating Innovative Thinking & Manipulative Ability

在校学生 Students in University

学习 Learning

课程 Courses,
实验 Experiments,
训练 Practice...

教务处、院系、实验室 Academic Affair Office. Schools or Colleges. Labs. ...

创新 Innovation

观摩、创意活动、实践、试错 Observation, Creativity, Originality, Activities, Practice, Trial Error...

图书馆 Library
院系、实验室 Schools or Colleges, Institutes, Labs, ...

创业 Entrepreneurship

基金、探索、试点 Funds, Exploration, Pilot Project ...

学联、创业学院、零号湾 Entrepreneurship Academy. Student Union. neoBay. ...

创客空间
Library Makerspace

感知 Perception

认知 Cognition

探知 Ascertainment

Won 1st Prize in 2017/2018 MCM/ICM

支持竞赛 Support Contests

支持教学创新 Support Innovation Lectures & Salons

感知新技术 Technologies Perception & Achievements show

营造校园文化，弘扬大学精神 Carrying Forward University Spirit, and Constructing Campus Culture

创立阅读品牌 **Create** **Reading Brand**	鲜悦 (Living Library) 交圕 (SJTU Library) Series 思源 (Thinking of Source) Series
建设文化基地 **Build** **Culture Base**	李政道图书馆 Tsung-Dao Lee Library 思源 (Thinking of Souce) Pavilion 交大-京东创客空间 SJTU-JD Maker Space
宣传推广活动 **Propaganda** **Promotion** **Activities**	科普讲座/展览 Popularize Science Lecture / Exhibition 领读者/书之道 Leading-Readership, Book Knows, ... 名师导读/大师讲坛 Famous Teacher / Master Lecture
科艺沙龙 **Science & Art** **Salon**	Tsung Dao Lee Science and Art Workshop Tsung Dao Lee Science and Art Salon Tsung Dao Lee Science and Art Lecture
主题展览 **All Sorts of** **Exhibition**	Science & Technology Paintings, Photos Student's Products

图书馆 Library

博物馆 Museum

档案馆 Archive

科技馆 Science & Technology Museum

艺术馆 Art Gallery

李政道图书馆 Tsung Dao (T.D.) LEE Library

上海交通大学
SHANGHAI JIAO TONG UNIVERSITY

资源建设 Collection Development

原则 Principle

学校战略引领 Guided by University Strategy

> 重点保障支柱学科 Prioritizing the pillar disciplines

> 全面兼顾基础学科 Comprehensive focusing on fundamental disciplines

> 特殊扶持特色和弱势学科 Supporting the featured and potential disciplines

> 灵活倾斜新兴交叉学科 Cultivating the new inter-disciplines

顶层设计 Top Design

"三一原则"：将资源建设的权力交给 'Three-One Rule'
(or Trisection-Unity Rule): To Give the Power of Resource Development to

* 院系师生 Faculty and Students
* 学科馆员 Subject Librarians
* 采访馆员 Acquisition Librarians

院系师生说了算 The Key Right belongs to Faculty & Students

三一原则 Three-One Rule

院系师生
Faculty &
Students

院系师生说了算
Based on User
Demand

资源建设领导小组最终决策
University Collection
Development Group Make Final
Strategic Decision

学科馆员
Subject
Librarians

采访馆员
Acquisition
Librarians

学科馆员定基调
Guided by Subject
Librarian

采访馆员重协调
Balance Control &
Operation

用有限经费购买优质资源
Build high-quality resources by limited budget

提升质量，支撑教学科研
Enhance Quality to Support Teaching & Research

- 对接学科发展，保障核心资源 Ensure core resources according to priority of discipline development policy
- 开展馆院共建，满足专业需求 Co-construct resources with departments to meet special needs

开发平台，提高工作效率
Lift Efficiency & Accuracy by building Analysis Platform

- 电子资源分析系统 ERAS
- 期刊数据库评价模型 Journal Database Evaluation Model
- 自动映射分类专家系统 Automatic Mapping Classification Expert System
- 资源地图 Resources Map

精准采购，提升经费效益
Improve Benefits via Introducing Advanced Concepts & Methods

- 需要驱动采购 DDA
- 循证采购 EBA
- 联合采购 Acquisition Consortium

馆藏策略 Development Strategy
新理念/方法 New Concept & Method
大数据分析 Big Data Analysis
评估模型 Evaluation Model
创新平台 Innovative Platform

质量 Quality

效率 Efficiency

效益 Benefit

目的：高效精准地建设高质量馆藏
Aims: Build Higher-Quality Collections Efficiently & Accurately

使命
Mission

以学校发展战略和师生需求为牵引，在智慧图书馆框架下，形成结构合理、重点突出、特色鲜明、类型丰富的满足学校发展的文献资源体系

Leading by university strategy and the needs of faculty & students, based on the frame of smart library, to build the collections with a reasonable structure, prominent emphasis, distinctive features and rich types

理论体系
Theory System

- 三一原则
  Three-One Rule
- 馆藏发展策略 Collection Development Strategy
- 绩效理论
  Performance Theory
- ......

方法体系
Method System

- 采购模式
  Acquisition Model
- 资源发现
  Resource Discovery
- 资源整合
  Resource Integration
- ......

评价体系
Evaluation System

- 生命周期管理
  Life Cycle Assessment
- 主客观评估 Subjective & Objective Assessment
- 定性定量评估 Qualitative & Quantitative Assessment
- ......

支撑体系
Support System

- 电子资源分析系统
  ERAS
- 期刊数据库评价模型
  JDEM
- 自动映射分类专家系统
  AMCES
- ......

案例概览 Cases Overview

学科服务 Subject Service

01
能源与矿业工程领域发展前沿分析 Frontier analysis of the development of energy and mining engineering

02
学科趋势/态势分析 Discipline Trend Analysis

03
国际合作分析 International Cooperation Analysis

04
学院发展定位分析
School's Orientation and Development Analysis

05
ESI潜力分析与监测 ESI Disciplines' Potential Analysis and Monitoring

06
高被引学者成长规律分析
Analysis of Growth Rules of Highly Cited Scholars

07
人才评估/评价 Assist Talent Evaluation
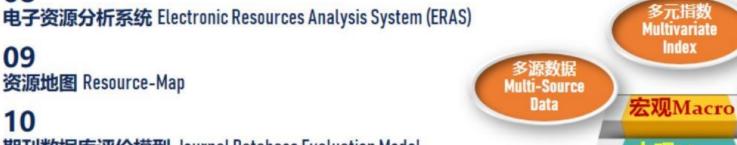
资源建设 Collection Development

08
电子资源分析系统 Electronic Resources Analysis System (ERAS)

09
资源地图 Resource-Map

10
期刊数据库评价模型 Journal Database Evaluation Model

11
自动映射分类专家系统 Automatic Mapping Classification Expert System

多元指数
Multivariate Index

多源数据
Multi-Source Data

多维分析
Multidimensional Analysis

宏观Macro

中观Meso

微观Micro

宏观
Macro

中国工程院
Chinese Academy of Engineering

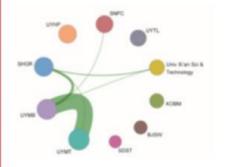⊛ 扫描全球工程科技的研发热点 **By Scanning the R&D Hotspots of Global Energy and Mining Engineering**

需求
Requirement

⊛ 挖掘并发现重点前沿技术 **To discover and explore the cutting-edge key technologies**
⊛ 把握全球工程科技发展大势 **To understand the global development trend**
⊛ 研判世界工程科技发展新方向 **To estimate (measure) the new development directions**
⊛ 以智库功能为决策提供参考 **To provide reference for decision-making as a think-tank**

分析领域
Analysis
Sub-Area

⊛ 能源与电气科学技术与工程 **Energy and Electrical** Science, Technology and Engineering
⊛ 核科学技术与工程 **Nuclear** Science, Technology and Engineering
⊛ 地质资源科学技术与工程 **Geology Resources** Science, Technology and Engineering
⊛ 矿业科学技术与工程 **Mining** Science, Technology and Engineering

方法 Method

🔹 定量（论文、专利）分析+定性（专家）分析
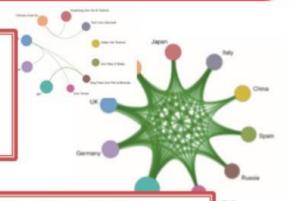Quantitative (Papers, Patents) analysis +
Qualitative(Experts) evaluation

Top-13 Research Fronts

No.	Engineering research front	Core papers	Citations	Citations per paper	Mean year	Percentage of consistently-cited papers	Patent-cited papers
1	Advanced nuclear energy technology: fusion-fission hybrid reactor technology	802	35 451	44.20	2013.43	-	-
2	Renewable energy power generation and energy storage: energy-saving and environment-friendly technologies	687	37 042	53.92	2013.76	-	-
3	Key engineering technologies, equipment, and materials for the intelligentization of coal, oil, and gas exploitation	75	146	1.95	2014.75	-	-

指标 Index

🔹 被引频次 Citations
🔹 高被引论文 Highly Cited Papers
🔹 核心论文 Core Papers
🔹 施引论文 Citing Papers

🔹 平均出版年 Mean Publication Year
🔹 引文速度 Citation Velocity
🔹 常被引论文 Consistently cited publications

结果 Results

🔹 基于期刊和会议论文，发现Top13研究前沿 Discovered Top 13 research frontiers ← the Journal & Proceeding papers
🔹 基于专利文献，发现Top14技术开发前沿 Discovered Top 14 technology frontiers ← the Global patents
🔹 揭示出相关工程前沿的发展趋势、技术特征、重点布局国家、主要竞争机构和主要研究人员 Revealed the frontiers' development trends, technical characteristics, key layout countries, major competition institutions, and major researchers

全球工程前沿
**Global Engineering Frontiers
Annual Report by CAE**

**成效
Effects**

◎ 中国工程院连续两年面向全球发布"全球工程前沿"年度报告 The annual report "**Global Engineering Frontiers**" has been released globally by CAE for two years

◎ 报告引用了我们的研究分析结果 Our research and analysis results about energy & mining engineering are adopted

Case 2:学科趋势/态势分析 Discipline Trend Analysis

科技研究前沿分析
Analyses of
Science & Technology
Research Frontier

海洋工程装备 Ocean & Marine Engineering

智能机器人 Intelligent Robotics

材料基因组 Materials Genome

量子信息 Quantum Information

脑科学 Brain Science

智慧城市 Smart Cities

高温超导 High Temperature Superconductor

上海交通大学先进产业技术研究院 Advanced Industrial Technology Research institute of SJTU

背景 Background

- 20世纪80年代后期高温超导的发现，在全球掀起了一股"超导热"。1980s: HTS became a hot research topic all over the world.
- 21世纪，中国的高温超导技术在超导材料技术、超导强电技术和超导弱电技术三个方面取得了重大进展和突破 21th: HTS research got great progress in China. especially in technologies of superconductive material. superconductor electrical. and superconductor electronic
- 高温超导技术广泛地应用到智能电网、交通运输、电子通信、医疗器械以及其它领域 Strategic Value in many Applied Areas: Smart Grid (Electric Power). Transportation. Communication. Medical Device. etc.
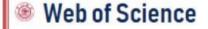
Case 2: 学科趋势/态势分析 Discipline Trend Analysis

目的 Aims

⊛ 通过分析高温超导相关学科领域的发展状况和趋势、态势等 By analyzing the development status, trends and situation of HTS related disciplines
  ➤ 加强我校在高温超导领域的技术创新 To strengthen SJTU's abilities of technical innovation
  ➤ 提高专利转移转化的效率和质量 To improve the efficiency and quality of patent transfer of our university
  ➤ 为学校对高温超导重点学科领域的布局提供参考和建议 To provide references and suggestions for the layout of key disciplines of HTS in our university
  ➤ 为学校对高温超导领域的研究和产业布局提供战略建议 To give strategic suggestions for the research and Industrial Distribution of HTS in our university

方法 Methods

⊛ 文献计量分析 Bibliometric analysis
⊛ 内容分析 Content analysis
⊛ 可视化分析 Visualization analysis

工具 Tools

⊛ Web of Science
⊛ Derwent Innovations Index
⊛ Derwent Data Analyzer
⊛ Citespace
⊛ Excel
⊛ ......

思路 Processing Way

- 通过对世界各国在高温超导方面发展政策的研究 By analyzing on the development policy of HTS in world's developed countries
- 通过对全球期刊论文、会议论文和专利信息的检索、分析与可视化呈现 Through the retrieval, analysis and visualization of journal papers, conference papers and patent information
- 揭示全球高温超导发展的政策重点、核心研究主题及其演变轨迹、相关的专利技术、核心研究机构、核心研究者等，向学校高温超导的研究和技术的产业化布局提出策略建议 To reveal the policy focus, core research topics and their evolution trajectories, related patented technologies, core research institutions, core researchers and so on for the development of HTS in the world

企业竞争力分析 Analysis of Corporate Competitiveness

气泡大小：专利数量
Bubble size: Number of Patents

经济实力 Economic Strength
技术实力 Technical Strength

- 该图展示了企业的资金和技术情况 The plot shows us that, the capital and technology situation of a enterprise
- 为交大在推进产学研合作上提供参考 So then, it can provide reference for SJTU in promoting the cooperation with industry
- 进而助力交大提高专利转化效率 And Help SJTU to improve the patent transfer efficiency

Case 2: 学科趋势/态势分析 Discipline Trend Analysis

成效延伸
Effect Extension

⊛ 报告显示，主要国家的优势技术领域分布和专利权人分布与区域技术发展的关联性很强 The report reveals that, the distribution of dominant technology & the distribution of patentees in major countries are strong relevant with the regional technology development

⊛ 上海市科委对我们的报告内容非常感兴趣 This aroused the interest of Shanghai Municipal Government
➢ 提出进一步分析上海市在该领域的发展态势、优势团队 The government entrusts us to make analysis of the Development Trend, Advantage Team in HTS area in Shanghai
➢ 进而为产业布局提供支持 So as to provide support for HTS industrial layout of Shanghai

⊛ 重点对上海市自主拥有的知识产权的技术分布和专利权人分布等内容与国际、国内进行了比较分析 Focus on the comparative analysis of technology and patentee distribution of Shanghai's own intellectual property rights, at home and abroad
⊛ 提交关于上海市高温超导技术研发布局调整的策略报告 Submitted a report, in which, the Strategic suggestions for the layout adjustment of HTS R&D in Shanghai are put forward

国际合作现状：100+ 合作伙伴 International Cooperation Status：100+ Partners

双硕士和博士课程 Dual Master's and Ph.D. Programs

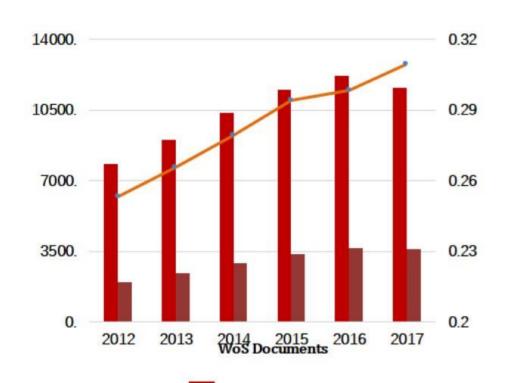访问研究员/学者计划 Visiting Fellows / Scholars Program

联合研究实验室 Joint Research Labs

合作出版物 Joint Publications

访问学生科研实习计划 Visiting Students Research Interns Program

国际研究合作现状 Status Quo of International Research Cooperation
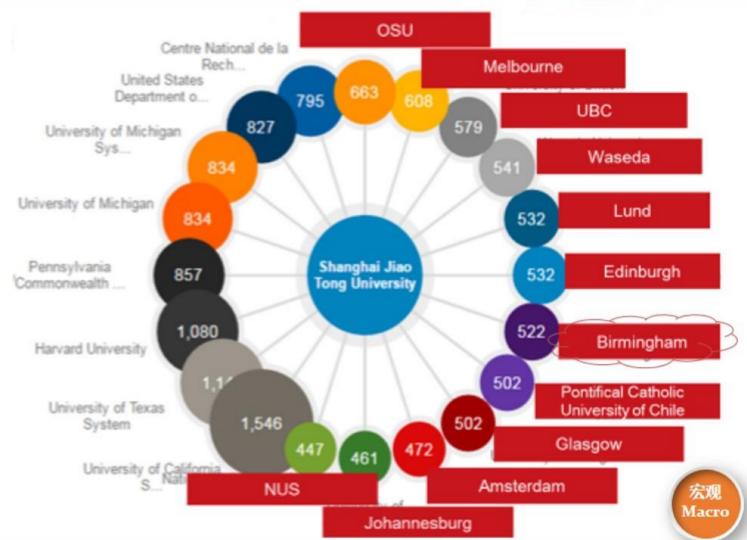
合作发文
Publications with Co-Author

篇均被引|(2012-2017)
Average Number of Citations Per Paper (2012-2017)

与U21机构的合作发文 Co-Author with U21:	28.35
所有合作发文 General Co-Author:	8.71
交大 SJTU (Only):	6.98
全球基准值 Global Baseline:	4.78

- ◎ 建议 Suggestion to University
  - 优化国际合作方针 Optimize the international cooperation plan
  - 建立一个聚焦于重点合作伙伴的联合种子基金 Set up a Joint Seed Funding which Focus on Key Partners

- ◎ 建立新的战略合作伙伴计划 SJTU Establishes a New Strategic Partner Program
  - 采纳了图书馆的反馈 Adopted Library's Feedbacks
  - 3000万元/3年 A Funding of 30 Million RMB / 3 years
  - 20个战略合作伙伴 20 Strategic Key Partners

优势互补 **Complementary Strengths**

交大？ **SJTU's Visibility**

Joint Ph.D. Programs

Research Internship Programs

Joint Seed Funding

Establish Joint Research Centers or Joint Labs

......

目的 Why

1. 支撑学院国际评估 Support School in International Evaluation
2. 协助学院制定发展战略 Assist School in Making Development Strategy

概况 What

对标分析 Benchmarking analysis

上海交通大学 Shanghai Jiao Tong University	密西根大学 University of Michigan	斯坦福大学 Stanford University
• 电子信息与电气工程学院 School of Electronic, Information and Electrical Engineering	• 工程学院电气工程与计算机科学系 Electrical Engineering and Computer Science Department, College of Engineering	• 工程学院电气工程系和计算机科学系 Electrical Engineering Department and Computer Science Department, School of Engineering

VS

中观 Meso

参数：师资，科学技术研发产出 Parameters: Faculties, Science & Technology R&D Output

分析 How
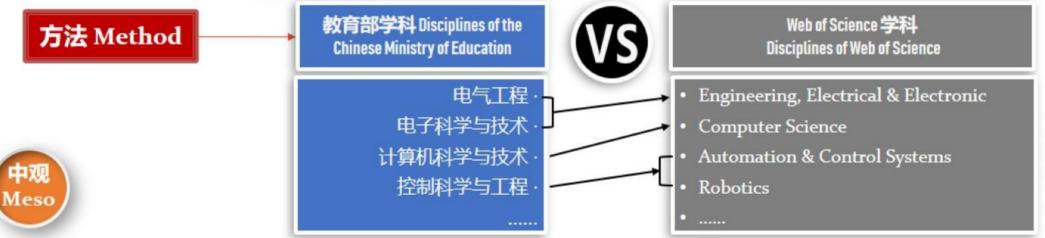
1. 师资情况分析 Faculty Situation Analysis
2. 学术期刊发文分析 Academic Journal Articles Analysis
3. 学术会议发文分析 Academic Conference Papers Analysis
4. 高被引论文分析 Highly Cited Papers Analysis
5. 专利分析 Patent Analysis

2017
上海交通大学电子信息与电气工程学院师资和科研产出情况对标分析报告
——上海交通大学、密西根大学、斯坦福大学相关院系比较

International Evaluation Report

方法 Method

中观 Meso

教育部学科 Disciplines of the Chinese Ministry of Education

VS

Web of Science 学科 Disciplines of Web of Science

电气工程 ·
电子科学与技术 ·
计算机科学与技术 ·
控制科学与工程 ·
……

- Engineering, Electrical & Electronic
- Computer Science
- Automation & Control Systems
- Robotics
- ……

Case 4:学院发展定位分析 School's Orientation and Development Analysis

结论 Conclusion

1. 师资 Faculty
   给出师资数量和质量对标结果 Comparison result - quantity and quality
2. SCI, CPCI, ESI
   给出对标分析结果-发文活跃度、论文影响力、研究领域、研究合作情况等
   Analysis result - paper quantity, citation influence, research areas, research cooperation
3. 专利 Patent
   给出对标分析结果-技术领域和合作现状，专利授权和转让的数据分析结果
   Benchmarking result - technical fields and cooperation, patent authorization and transfer

成效 Effects

1. 成功用于学院国际评估 Success in school's international evaluation
   发现优势，找出差距，量化对比结果，获得良好评估效果 Find advantages and gap, Quantify comparison results, Achieve good evaluation effect
2. 影响学校的发展决策 Effect school's development decisions
   报告被学校管理层接受，并被用于调整和制定发展决策 Report is accepted by school administrators, and is adopted in adjusting and making development decision

中观
Meso

背景 Why

1. ESI是评价学科或大学发展水平的重要指标之一 ESI is one of important index in evaluating the development level of a discipline or university
2. 这项工作能够促进学校的世界一流学科建设 This work can promote the construction of world-class disciplines

概况 What

1. 分析临界状态学科 Analyze disciplines to understand if it is in critical state
2. 提出策略建议 Propose strategic suggestions

方法 How

对标分析 Benchmarking analysis
具体指标有：标杆机构、作者分布、期刊发文、ESI高被引论文等
Include: Institution, Author Distribution, Journal Papers, Highly Cited Papers, etc.

建议 Suggestions

1. 推动跨学科交叉和研究 Promote interdisciplinary research
2. 关注相应学科人才队伍建设 Build discipline talent team
3. 拓展国内外交流与合作 Expand cooperation at home and abroad
4. 鼓励学者积极加入网络学术社区 Encourage scholars to join online academic community

Macro

支持 Support

跟踪ESI指标，有效提升外文核心资源整体保障率
Track ESI indicators to guarantee discipline core resources

ESI journal guarantee disciplines

ESI Top 1% disciplines' journal guarantee and usage

成效 Effect

- 微生物 Microbiology
- 经济与商业 Economics and Business
- 精神病学/心理学Psychiatry/psychology
成功进入ESI前**1%**
  successfully entered ESI global top **1%**

药理学和毒理学
成功进入ESI前**1‰**
pharmacology and toxicology
successfully entered ESI global top **1‰**

学院根据建议逐步完善学科战略规划与布局
Institutes have gradually improved their strategic planning

图书馆发布ESI学科竞争力分析报告 Analysis Report

2016年起陆续进入ESI前1%的学科
ESI Global Top 1%
Microbiology, 2016
Economics and Business, 2018
Psychiatry/psychology, 2018

2018新增进入ESI前1‰的学科
2018 ESI Global Top 1‰
药理学和毒理学
pharmacology and toxicology

截至2019年共计监测19个学科进入ESI 1% Till 2019, SJTU holds 19 ESI Global Top 1% Disciplines

- 论文被高频度引用反映了作者的学术水平 **Highly Cited Papers can reflect in large extent Academic Level of a scholar**
- 与未来的领军人物存在一定的关联性 **And, there exists Relevance with that the scholar becomes academic leader**

- 成为大学的重点关注点之一 **It becomes one of the focus point for many universities that**
  - 发现高被引科学家的发展模式和发展规律 **Discovering the growth rule (or Pattern) of Highly Cited Scholars**
  - 进而培养高被引科学家或学者 **Furthermore, finding the way of training Highly Cited Scientists**

- 学校立项委托图书馆帮助分析工程领域高被引学者的发展规律，以期为我校培养高被引人才找到方向。**Our university entrusts library to do analysis of development rule of highly cited scientists on engineering area (Phase one)**

微观 Micro

数据来源 Data Source

⚉ 2017年和2018年工程领域入选高被引的242名学者 242 Highly Cited Scholars in Engineering area in 2017 and 2018

参数选择 Parameter Selection

⚉ 博士毕业年份 Education background: Bachelor, Master, Ph.D.

⚉ 学术研究经历 Academic and research experience

⚉ 合作依赖性 Reliance on collaboration

⚉ 发文时间轨迹 The time history & Institute distribution for the publications

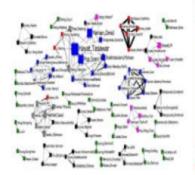⚉ 研究主导性：引领、跟随、参与 Research dominance: lead, follow, participate

目的 Objective

⚉ 通过数据发现 To understand (based on analysis)

➢ 学者的学术生涯 Academic liveness of the scholars

➢ 解析人才的活跃度、人才流动、合作聚类现象 Talent Flow and Collaborative Clustering situation

➢ 不同类型学者的行为特征 Characteristics of researchers of different type

⚉ 给大学提出学者发展模式的建议 Then, Give University suggestion of scholar development mode
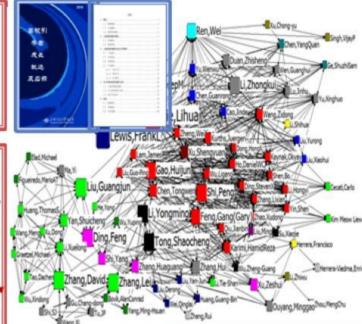
咨询报告
Consulting Report

⊛ 提交咨询报告（给学校）**Complete a consulting report (to university)**
  ➢ 总结近两年工程学科高被引学者的发展特征 **Concluded the development rule of highly cited scholars in Engineering Area in recent two years**
  ➢ 提出跟踪人才发展和培养模式的建议 **Proposed the suggestions of tracking & training highly cited young talents**

➢ 分析了我校上榜学者的实力和危机 **Analyzed the strength and crisis of the ranked scholars in SJTU**
➢ 揭示了我校潜力学者 **Revealed potential highly cited scholars of SJTU**

成效
Effects

⊛ 根据我们的分析结论，学校引进了几位有潜力进入高被引榜单的学者，并制定了培训计划 **According to our conclusion, university introduced potential scholars and made training program for highly cited scholars**
⊛ 高被引学者数量增长显著 **The highly cited scholars of SJTU grow obviously, this year**

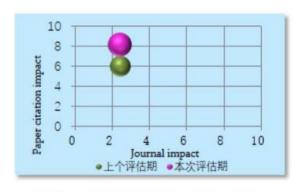**Collaboration Reliance**

Case 7:人才评估/评价 Assist Talent Evaluation

目标 Aim 支撑学校对对高层次人才的多重评价
Assist to Achieve Multiple Evaluation for Top Talents

重点 Point 研究活跃度和影响力
Research Activity and Impact

学术影响力图 Academic impact location map

方法 Method 建立评价体系 Setup A Parameter Model

➢ **14个指标**：论文数量、H指数、论文被引影响力、国际合作贡献度等
Including **14 indicators**: Num. of Papers, H Index, Impact of Papers, Contribution on International Cooperation, ...

➢ 制定**归一化指标**：归一化期刊影响因子、被引影响因子（去除不同学科之间引用数量级别的差异）**Normalization Processing** to Journal Impact Factor, Cited Impact Factor (to eliminate the effect of disciplines)
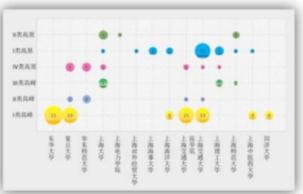
微观 Micro

结果 Result
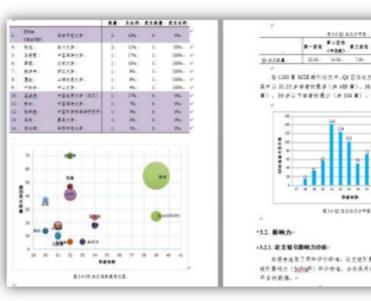
🏛 **报告被采纳 Analysis Reports have been adopted by HR Dept. in**
  ➤ 高层次人才聘期评价 Evaluations of Introduction of Top Talents
  ➤ 引进前的人才评估 Engagement Examination of Introduced Talents

🏛 **评估服务延伸至上海高峰高原学科建设计划**
Evaluation Service be Extended to Shanghai Peak and Plateaus Discipline Construction Plan

成效 Effect

  ➤ 制定高层次人才选拔标准 Making Selection Criteria of Top Talents
  ➤ 学科发展的学科分析及建议 Analyzing Situation of Discipline and Giving Suggestion for Discipline Development

评估超过700人（自2013年起）
Evaluated More Than 700 Persons (Since 2013 ~)

微观
Micro

Case 8: 电子资源分析系统 Electronic Resources Analysis System

目的 Aims

- 核心资源保障分析 Core Resource Supportability Analysis
- 学科资源质量分析 Discipline Resource Quality Analysis
- 资源使用期刊分析 Resource Usage Analysis
- 资源成本效益分析 Resource Cost-Benefit Analysis
- 馆藏资源建设指导 Guide to Collection Development

电子资源分析系统通过自动收割、文献匹配和计量分析等方法，帮助图书馆掌握订购资源的质量和绩效，优化馆藏建设策略。**ERAS** intends to review the quality and performance of purchased resources by automatic harvesting, document matching and bibliometric analysis, and further assist to optimize the library collection development.

思路 Processes

> 馆藏资源列表 Collection Resource List
> 核心资源列表 Core Resource List (JCR、ESI、BKCI)

匹配 Matching →

核心保障分析报告 Core Resource Supportability Analysis Report

> 馆藏资源列表 Collection Resource List
> 学科分类体系 Subject Category Systems (JCR、ESI、MOE)

映射 Mapping
匹配 Matching →

学科资源质量报告 Discipline Resource Quality Analysis Report

> 馆藏资源列表 Collection Resource List
> 下载 Downloads
> 引用 Citations

收割 Harvest
匹配 Matching →
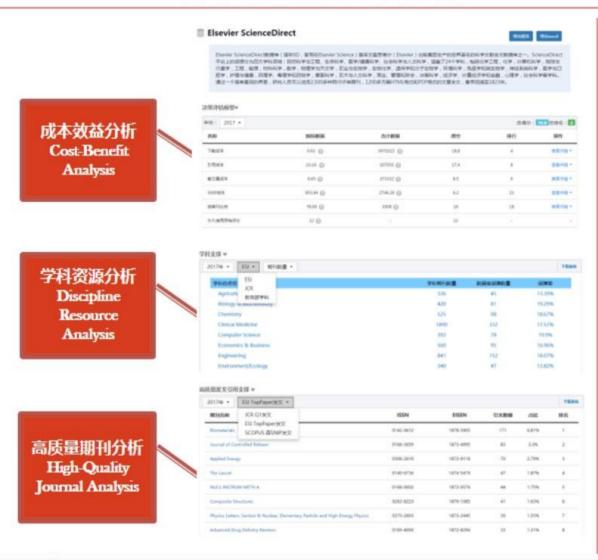
使用情况分析报告 Resource Usage Analysis Report

> 下载 Downloads
> 引用 Citations
> 发文 Publications
> 价格 Costs

收割 Harvest
匹配 Matching →

成本效益分析报告 Resource Cost-Benefit Analysis Report

成本效益分析
Cost-Benefit Analysis

学科资源分析
Discipline Resource Analysis

高质量期刊分析
High-Quality Journal Analysis

应用效果 Application Effects

- 综合分析馆藏建设质量和效益，优化采购策略 Assist to optimize the acquisition strategy based on the analysis of collection quality and benefit

- 发掘资源利用与科研产出的关系，强化资源对科研的支撑 Enhance the supportability of resources to research by exploring and illustrating the connections between resource usage and research outputs

- 实现商业化应用，已有100多家用户 As a commercial product with more than 100 users

北京大學圖書館 PEKING UNIVERSITY LIBRARY

清華大學圖書館 Tsinghua University Library

中国人民大学圖書館 RENMIN UNIVERSITY OF CHINA LIBRARIES

中国科学技术大学 University of Science and Technology of China Library

Case 9: 资源地图 Resource-Map

资源地图是电子资源分析系统的衍生产品，是基于学科聚类和数据驱动的多维度资源导航系统，根据教育部二级学科体系重组资源，快递定位各细分学科的核心资源。

Resource-Map (RM) is a derivative product of the Electronic Resource Analysis System (ERAS), and it is a subject clustering and data driven multi-dimensional resource navigation system. All kinds of resources can be reorganized according to the subject categories of the Ministry of Education, therefore, the RM system can browse and position subject core resources easily.

特点 Features

学科资源聚类 Subject resource clustering
- 对所有资源分类 Classify all kinds of resources
- 按教育部学科聚类 Cluster according to subject categories of MOE

多维资源筛选 Refine resources with multi-angle
- 可按出版社、出版年、核心书刊列表等筛选 Filter resources by publisher, year, core resource list, etc.

精准资源揭示 Reveal resources accurately
- 精准揭示资源可访问年份 Provide accessible periods of resources, both current issues and back issues
- 提供数据库全文链接 Offer links of accessible database directly

优化排序算法 Optimized resource ranking
- 引入文献计量的排序算法 Bibliometric guided ranking algorithm
- 基于影响因子、下载、引用 Based on impact factor, downloads, citations
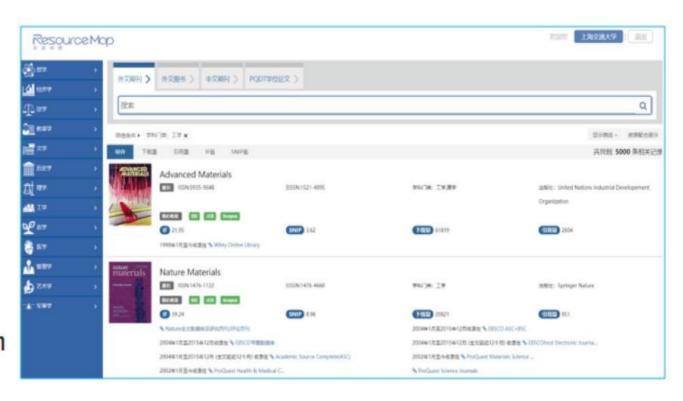
面向用户 Functions for Users

- 聚类学科资源 Cluster subject resources
- 定位核心资源 Locate core resources
- 促进校内学术成果交流 Assist academic communication in university
- 支持科研全流程 Support for whole research cycle

面向学科馆员 Functions for Subject Librarians

- 掌握学科资源现状 Help understand collection status of subject resources
- 提供学科服务平台 Offer a subject service platform

目的 Aims

- 借助参数模型，综合评价期刊数据库 Comprehensively evaluate the journal databases via parametric model
- 为新订决策提供依据 Assist to make decision before purchasing
- 为续订决策提供依据 Assist to make decision in renewing

思路 Processes

指标遴选 Indicators Selection
- 开展文献调研 Literature survey to get parameters
- 确定遴选原则 Selection criteria

权重设置 Weights Setting
- 层次分析法 Analytic hierarchy process
- 德尔菲法 Delphi
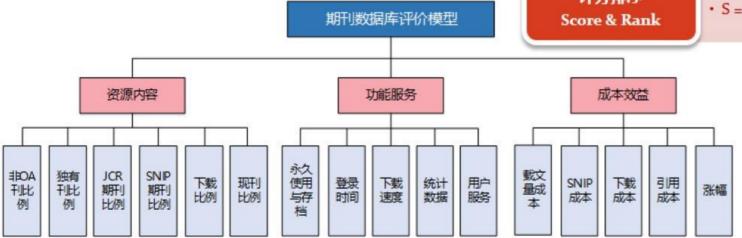
数据处理 Data Processing
- 比例型定量指标 Proportional quantitative indicators
- 非比例型定量指标 Non-proportional quantitative indicators
- 定性指标 Qualitative indicators

评分排序 Score & Rank
- $S = w_1X_1 + w_2X_2 + ... + w_{21}X_{21}$

期刊数据库评价模型

资源内容
- 非OA刊比例
- 独有刊比例
- JCR期刊比例
- SNIP期刊比例
- 下载比例
- 现刊比例

功能服务
- 永久使用与存档
- 登录时间
- 下载速度
- 统计数据
- 用户服务

成本效益
- 载文量成本
- SNIP成本
- 下载成本
- 引用成本
- 涨幅

借助参数模型，客观、量化评估数据库价值，为是否订购数据库提供决策参考。

According to the parametric model, the values of a database could be objectively and quantitatively evaluated.

[Include database introducing & renewing]

评价排名结果 Evaluated Ranking Results

排名	数据库	资源内容	功能服务	成本效益	总分
1	PNAS	86	75	75	79
2	Oxford Journals	80	61	79	76
3	Wiley Online Library	81	83	66	76
4	ACM Digital Library	78	67	69	72
5	SpringerLink	78	69	67	72
6	Nature	87	92	46	72
7	OSA E-journals	77	75	64	71
8	Annual Reviews	85	83	52	71
9	Royal Society of Chemistry	75	73	66	71
10	American Society for Microbiology	85	55	65	71
11	Science Online	86	49	66	71
12	Elsevier ScienceDirect	72	76	66	70
42	European Mathematical Society	74	64	27	53
43	Project MUSE E-journal	56	64	45	53
44	EBSCO Special Collections	38	57	64	52
45	AMS	71	51	31	51
46	ASTM SEDL	67	54	27	48
47	EBSCO ASC+BSC	35	55	56	47
48	ProQuest ABI/INFORM Complete	30	45	64	47
49	EBSCO CMMC	50	57	38	46
50	HeinOnline	41	33	57	46
51	Gale Literature Resource Center	37	46	38	39
52	EBSCO AAC	39	59	19	35

效果 Effects

- 基于参数模型综合评价所有50+期刊数据库 Evaluate all journal databases (50+ in our Library) based on parameter model
- 动态有效监控数据库绩效 Monitor the performance of databases dynamically and effectively
  - ❋ 纵向追踪历年使用 Tracking the historical usage
  - ❋ 横向比较数据库效益 Comparing the value difference among databases
  - ❋ 评价数据库对教学科研的支撑作用 Measuring the role of a database in supporting teaching, learning and research
- 优化期刊数据库配置（末位淘汰）Optimize the compositions of journal databases (bottom out or last one eliminated)

采购决策 = 定量排名 + 定性评判

Final Decision =

Quantitative Ranking + Qualitative Judgement

目的 Aims

- 实现外文资源分类自动化 To classify foreign literatures automatically
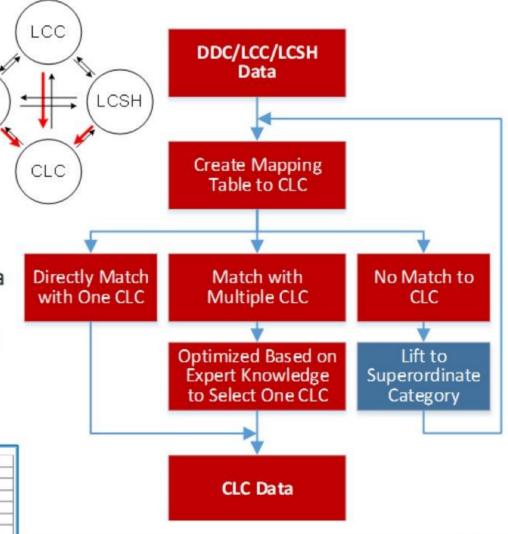- 提高编目工作效率 To make cataloguing efficiently

思路 Processes

- 利用同现映射法建立映射关系表 Establish mapping tables by co-occurrence mapping method
- 一对一，直接获得分类 Get results if there exist 1 → 1 mapping
- 一对多，基于专家知识和统计概率选择最优分类 Select optimal CLC from 1 → n mappings based on expert knowledge or statistic data
- 无法映射，则提升上位类匹配，直至实现映射分类 Lift back to a superordinate category and re-make mapping classification by the same way

LCC

DDC   LCSH

CLC

DDC/LCC/LCSH Data

Create Mapping Table to CLC

Directly Match with One CLC

Match with Multiple CLC

No Match to CLC

Optimized Based on Expert Knowledge to Select One CLC

Lift to Superordinate Category

CLC Data

Input: DDC, LCC, LCSH

Output: CLC

LCC	DDC	Subject1	Subject2	Subject3	CLC1	CLC2	CLC3
HG4527	332.6	Investment			F830.59	F830.59-62	
B3279	193 s				B516.54	B920	B516.52
TH845	624.1/71	Structural stability.	Tall buildings.	Reliability (Engineering	TU31	TU3	
QC176	530.4/1	Solid-state physics.			O48	O482.4	
SB750	632/.3	Plants	Plant diseases		S432	S43	S432.2
HB172.5	339	Macroeconomics.			F015	F035	F016

效果 Effects

- 映射分类结果一致 Produce consistent classification results
- 自动分类速度达200条记录/分钟 Receive efficient Mapping Classification result of 200 items/minute
- 特别适用于电子资源分类 Suitable especially for classification of e-resource

应用 Applications

- 系统实现商业化 A commercial system is developed
- 被上图、南图、复旦、同济、华师大等应用 Adopted by many libraries, such as Shanghai Library, Nanjing Library, Fudan University Library, Tongji University Library, ...

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结束语 Summary

- 图书馆服务的本质是要提供有价值、不可缺、受欢迎的服务 Valuable, indispensable and popular services are essential in a library service system
- 泛学科化服务已成为上海交通大学图书馆服务体系的基本模式 SJTU library has built innovatively an Ubiquitous Subject Service System which is the backbone of SJTU library service system
- 数据驱动是上海交通大学图书馆服务体系中最重要的部分，极大提升了服务的质量和效率 Data Analysis Driven Services (Including Decision-Making & Collection Development) Belong to the most important part of the SJTU Library Service System, It has boosted in improving the service quality and efficiency

Ubiquitous Subject Service System (USSS)

Contexts of Ubiquitous Subject Service System
(Six Aspects)

1. Do Service Actively by Outreaching to Research & Teaching
2. Build Higher-Quality Collections Efficiently & Accurately
3. Embed in Courses to Support Teaching & Learning
4. Integrate into Research to Support R&D
5. Inspire and Assist Students to Join in Innovation Practices
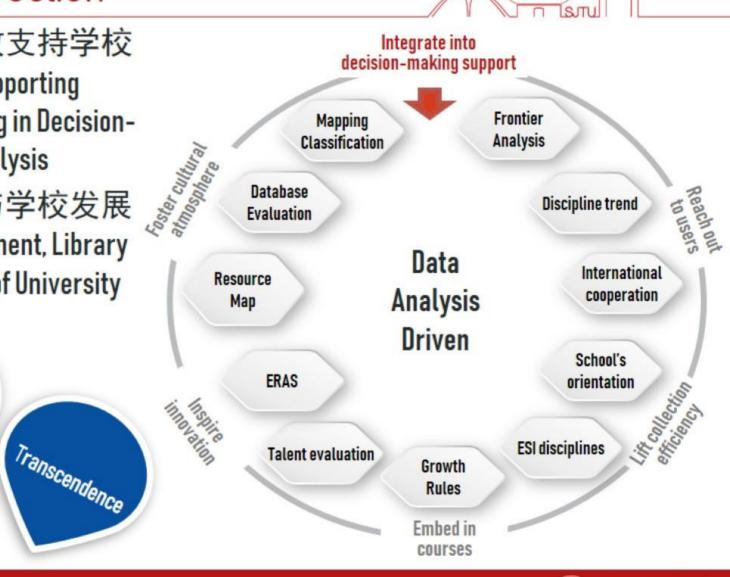6. Cultivate Talents by Promoting University Culture

战略发展方向 Strategic Direction

◉ 通过数据分析参与决策，有效支持学校发展 We Have Received Success in Supporting University Development by Participating in Decision-Making and Services based on Data Analysis

◉ 未来，图书馆将持续积极参与学校发展的核心事务 For the Future Development, Library Should Actively Engage in Core Affairs of University Development

◉ 关键词 Keywords

🗌 转型 Transformation

🗌 超越 Transcendence

Transformation

Transcendence

Integrate into decision-making support

Foster cultural atmosphere

Reach out to users

Inspire innovation

Lift collection efficiency

Embed in courses

Data Analysis Driven

Mapping Classification

Frontier Analysis

Database Evaluation

Discipline trend

Resource Map

International cooperation

School's orientation

ERAS

Talent evaluation

Growth Rules

ESI disciplines

物竞天择，适者生存

It is not the strongest of the species that survives, nor the most intelligent.

It is the one that is the most adaptable to change.

— Charles Robert Darwin

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Thank you
Q&A