Electronic Management and Tracking

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As the number of universities and colleges involved in intellectual property (IP) management, technology transfer, and commercialization increases, so does the need for additional resources to perform these activities.

A recent *AUTM Licensing Survey*™ survey[1] noted that, over the past fifteen years, the total research expenditures for U.S. universities, hospitals, and research institutes increased threefold. As a result, the number and variety of documents (invention disclosures, patent applications, legal correspondence, patent files, licenses, and various types of agreements) handled by technology transfer offices has exploded. Furthermore, the number of stakeholders has grown and the need for timely decision making and/or the harmful consequences of not doing so has amplified. All of this has helped fuel the demand for bigger and better electronic management and tracking systems (EMTSs). In response, suppliers have developed systems ranging from simple, off-the-shelf, stand-alone products for database management to sophisticated, customized, state-of-the-art network solutions to serve almost every need. Several vendors are taking advantage of the Internet and offer subscription-based services on the Web. An increasing number of small- to medium-sized offices are replacing their spreadsheets and flat-file databases that they have used in the past for data keeping and management with systems based on a relational database, using complex algorithms and expert rules. Today's systems offer almost any service for a technology transfer office: automated document generation, document tracking, assistance with decision making, automatic reminders, computerized filing, and much more.

Considerations for an EMTS

There are more than one hundred EMTSs and IP software systems available to the technology transfer community today (a fairly comprehensive list of IP software available on the market today can be found at http://www.ipmenu.com/ipsoftware.htm). Most of these

systems have been developed and are sold by boutique shops that offer specific solutions servicing niche markets. Several companies are trying to build modular systems to mimic one-stop shopping, however, as of today, there is no system that can do everything for everybody in the field of IP management and technology transfer. The IP menu Web site classifies IP software resources according to their scope such as IP analysis, IP drafting, IP filing, IP management, and IP miscellaneous (covering topics from invention assessment to patenting cost estimation to updates on worldwide IP legislation).

The question is how to pick the most appropriate EMTS for a technology transfer office. While cost and budget factors often are the most important and over-riding concerns (and often the determinants) in such a decision, there are other important factors that need to be considered by technology transfer managers prior to deciding on the EMTS. Consideration of these factors can help make an informed decision and assist in navigating through the myriad choices in the marketplace today—including the make-or-buy decision (discussed later).

It is critical to do your homework because, once a system is installed and put in use, replacing or modifying it could be even more expensive than the original purchase. Expenses for modifying or replacing could include not only direct costs, but also indirect expenses of user training, data corruption, differing hardware requirements, programming requirements, etc. Furthermore, a thorough and an educated approach can help lower the cost of purchase, alleviate future dissatisfaction, improve acceptance by the users, shorten the project time frame, and provide for future scalability.

The considerations listed below are for guidance to the IP manager and/or technology transfer professional when evaluating EMTSs.

Scope of Activities

One of the first steps is to clearly define the objectives to be achieved and the purpose of incorporating the EMTS. The manager (or the decision-making team) must understand and define the activities relevant to the specific organization within the overall realm of IP management and technology transfer field. For example, a research institution or a university might need a system for invention disclosure management, while an attorney's

office might need an IP docketing and electronic patent-filing system. It is critical to layout the scope or the breadth of the organizational needs, maybe itemize them in order of importance, and then seek the appropriate solutions to meet those needs. Some of the common variables are listed below.

Invention Disclosure Records Management

How important is invention disclosure records (IDR) management? What can the EMTS do or should do? Would it be simple storage and retrieval of information, whereby information from paper copies will be re-entered into the database, or electronic generation of IDRs that can directly populate a database? Since research organizations (universities or otherwise) vary widely in the quality and quantity of data captured on their IDRs, for any automation, it would almost always necessitate some form of customization. Does the IDR management system need to include the ability to communicate with researchers and their technical managers or legal staff (especially if they are off site)? How will drawings and publications related to IDRs be stored and in what form?

Intellectual Property Management

What critical services are required for IP management? For example, docketing, IP maintenance, prior-art searching, drafting, filing? How critical are international IP management features of the system? For example, if the university's IP portfolio contains mostly U.S. patents, then a system designed to manage European patents might not be required. What is the most common form of IP in the portfolio—patents, trademarks, copyrights, service marks, or mask works? For example, if most of the IP is patents only, then trademark management may not be relevant.

Deal Management

If an organization has many agreements (joint research contracts, licenses, material transfer agreements [MTAs]), then a module that can assist in follow-up and auditing may be useful. What are the most common forms of agreements? Licenses, sponsored research, MTAs? If the university has just a few agreements, then the deal-management feature may not be very relevant.

Contacts Management

How important is managing contacts (internal staff, researchers, and/or external stakeholders) through the EMTS? Although most systems include some basic functions, more sophisticated tools, such as e-mail reminders and automatic correspondence generation, may not be included. If these functions are important, it is critical to keep them in mind, as well as how easily the system can be updated. Finally, if there is a system in place, data-transfer issues might need to be reviewed.

Revenue/Expense Management

Accounts receivable, accounts payable, royalty tracking—are these functions handled by the technology transfer office or the accounting office? If it is the latter, then does the EMTS need to send reminders when payments (for example, patent-maintenance fees) are due? For international agreements, can the EMTS convert foreign currency into U.S. dollars (useful for reporting)?

Functionality

Once the needs and scope are defined, the manager must decide the functional requirements of the EMTS. This will depend a lot on the nature and structure of the technology transfer office. For example, a small office with less-experienced staff might need a system that has more built-in intelligence and automation, while an office with more-experienced people handling a large amount of data might look for a system that offers improved reporting capabilities. Some of the items to consider are listed below.

Information Warehouse/Organization

How easy it is to enter and retrieve information or correct, change, and update it? How will the stored information be organized? How will the information be archived? Although this functionality will depend a lot on the scope of the system (which dictates the amount and the type of data to be handled), it is an important consideration for new technology transfer offices.

Reporting

Most systems offer a set of predefined reports. Are these sufficient, or, if not, then how easy it is to create customizable reports? Does the system offer statistical and graphing capabilities?

Intelligence

Many systems have built-in expert rules that help prevent critical mistakes and offer advice on IP management. For example, the system might ask questions about prior publications when entering a new invention disclosure or check for correctness of a value entered for patent-maintenance fees. Does the system have the ability to cross-reference related agreements and/or documents? Several Web-based systems provide links for additional information. What areas of expertise does the system need to provide? How will the system intelligence be kept up to date?

Automation

Consider the tasks that need to be automated such as generating reports, creating form letters, performing routine calculations, sending e-mail reminders and/or warnings. Is the system pro-active or reactive (i.e., on command only)?

Technical (Information-Technology Related) Considerations

The key information technology (IT) components of an EMTS are: data storage, data-management tools (algorithms and rules for data manipulation and retrieval), security controls, graphical user interface (GUI), and communication protocols with other programs and computers. It is the variances in these that differentiate various systems in their scope, functionality, technical features, and, eventually, the cost.

The level of technical considerations of an EMTS will depend largely on its scope and functionality. For a small, off-the-shelf package, technical considerations may be minimal, however, for a large system or a customized system to be used by multiple users, IT-related technical considerations could be substantial. The involvement of internal IT staff may be necessary to resolve issues such as those listed below.

Deployability

What will it take to deploy the new system or install it in the current IT infrastructure? What about the time to populate the new system with current data, training for employees, data-migration issues (if applicable), connectivity issues with current hardware, etc.?

Maintenance

Who will maintain the system and how will it be done on a regular basis? Who should the users call with problems and questions, i.e., who will provide technical support? How will changes be communicated to all users? Who will be responsible for fixing bugs? Who is responsible for periodic backups, and where and in what form will the data be stored?

Upgradeability

Can the system handle upgrades? This is especially relevant if the organization is planning changes in its operating system or platforms. Will the EMTS work on the new platform? What changes might be required and who will be responsible for making them? Does the vendor offer a system that can operate on multiple platforms?

Modifiability

Does the EMTS come with a software development kit (SDK) that would allow some level of customization? Does the technology transfer office have access to staff with the skills necessary to use the SDK?

Compatibility

Is the EMTS compatible with other existing programs and within the current computer system? A review of the new system platform and architecture as well as data-transfer issues should be conducted.

Security

Consider the security of data, correspondence (internal and external), user permissions (read only, ability to change/modify critical data, and to add other information such as marketing related).

Connectivity

Who will connect with the EMTS (discrete independent users or distributed multiple users on a local area network) and will they be need Internet connectivity? Who are the people who need to communicate on technology transfer-related matters and what type information do they need to share?

Web-Based Application Service Provider

Web-based application service provider (ASP) solutions offer their own pros and cons. While they can help alleviate some of the considerations, they can also increase other concerns. For example, ASP solutions can help reduce, or even eliminate, maintenance and upgradeability issues (since it is done remotely by an independent provider). However, they can raise concerns over security and trust issues with respect to data compromise and/or data leakage. An advantage of ASP services is that they are generally subscription-based (pay as you go) and that helps reduce upfront acquisition costs.

Other Considerations

Besides the considerations mentioned above, there are other factors that are equally critical while choosing an EMTS. These considerations really require a thorough examination and often can make or break a decision.

- *Ease of use:* Quite often, in the zeal to add features and capabilities to the software, vendors overlook a simple concept—how easy it is to use their product. As you test drive EMTSs, think about how many clicks it takes to perform simple tasks, how descriptive the screens are, how intuitive navigational capabilities are, etc.
- *Vendor experience:* Find out how many systems the vendor has installed and are currently in use, get a list of current and past customers, ask around to find out about the vendor's reputation. If you can, contact some of the vendor's current customers and ask them about their experiences in dealing with the vendor and the product.
- *Vendor stability:* As the EMTS industry evolves, mergers and acquisitions will rise, and it is important to evaluate the ability of the vendor to stay in business and be available for product support.

- *Urgency of need:* How urgent is the technology transfer office's need to incorporate a system? If the need is not urgent, it may be prudent to wait for an upgraded version or conduct additional due diligence.
- *Secondary services:* How are the after sales and technical support from the vendor? Is support available 24/7? Is it included in the total package or is there additional cost?

Mini-Survey Results

A mini, informal survey of twenty-five randomly selected universities (mostly small to medium sized) was conducted to assess the relative importance of the above-mentioned considerations in each category.

Not surprisingly, budget and cost were the top considerations. However, minus that, the other two most important considerations in each category as indicated by the respondents are shown in the chart.

Category	No. 1	No. 2
Scope of EMTS	IDR management	IP management
Functionality	Information organization	Reporting
Technical	Maintenance/upgradeability	Compatibility
Other	Ease of use	Vendor experience

The Make-or-Buy Decision

Depending on the organization and the scope of activities it is involved in, the decision to make or buy an EMTS is a major one that must be made early on. From earlier discussions, if the scope of the EMTS is pretty broad, if specific needs of the organization are not met by any available packages on the market, or if the need for customization is extensive, developing an in-house system may be an option.

However, this decision should not be made hastily. Although there are many benefits of building an in-house system, to truly evaluate the alternatives, a total-project-cost approach that makes business sense and provides return on investment information

should be taken. A careful and thorough analysis should be made to qualify and quantify as many variables as possible—a task easier said than done. The analysis can include:[2]

- Obtaining functional requirements of the technology transfer office
- Reviewing ready-made packages
- Determining the gaps and overlaps
- Estimating the effort to fill the gaps and quantifying it
- Conducting a cost-benefit analysis of the two alternatives

Since there are no silver bullets that can help a technology transfer professional reach a decision on whether to make a system or buy one, the following provides some generic guidance in evaluation of pros and cons of the two options.

Potential Advantages of Building an In-House System

Some of the advantages of building an in-house system are that it can:

- Address unique requirements and customization
- Include flexibility to make changes
- Provide better control of the project (time and cost)
- Require no or low initial capital outlay
- Produce low maintenance costs (which can be up to 10 percent to 20 percent of the purchase cost of an off-the-shelf system) since it can be done during off times
- Use in-house labor and expertise, if available
- Evolve (start small and grow as needs change)
- Be easier to get after-sales service and future product improvements
- Reduce integration issues with current systems
- Offer the rare-but-possible opportunity of creating a marketable product

Potential Disadvantages of Building an In-House System

However, building a system in-house also has some potential disadvantages such as

- Internal departmental politics
- Lack of domain expertise (in-house system developers may not have any knowledge of IP management or technology transfer issues that can define needs or solutions in the design phase)

- Best practices may not be represented
- Deadline creep (the tendency to change requirements thereby affecting project completion time and cost)
- Feature creep (the tendency to keep adding features)
- Poor (or lack of) documentation and instructions
- Potentially losing a critical individual that can create a major setback
- Accurately assessing the overall project cost
- Time (the time until the system is available for use is likely to be significantly longer)

Management and Maintenance of an EMTS

As with any electronic system, the basic requirements to keep an EMTS going and extracting maximum value from it depends on its usage and maintenance. Notwithstanding the technical/IT-related aspects in terms of computer upgrades, operating-system changes, and network modifications (which vary from system to system and installation to installation), other basic requirements are generic in nature.

- *Populating the system:* If the system has no data, it cannot produce results. Accuracy in populating the system is also critical, especially if the system is unsophisticated or unintelligent or if changes have been made in-house.
- *Keeping the system updated:* For example, currency-conversion factors or patent-maintenance fee changes are critical to deriving accurate results and feedback from the system. Furthermore, depending on the changes made by the vendor, it may be critical to update the system with the latest version.
- *Responding immediately to bugs:* If problems are discovered, the system must be immediately fixed. If the vendor publishes patches, they must be immediately installed since they usually contain fixes to known bugs.
- *Increasing user acceptance:* By providing good instruction materials and periodic training and being responsive to user issues/problems, you can ensure that users will gain confidence in the new system. It is not uncommon to see wonderful electronic systems fail in an organization simply because users do not want to “mess” with it. Implementing a new system can mean the culture of the organization must change and old habits modified.

- *Maintaining management support:* Management support, or lack of it, can go a long way in the eventual success or failure of any electronic system. Management can support an EMTS by demanding reports with updated information, reviewing system-usage statistics, talking about the system, and, of course, providing adequate funding for its maintenance.

Conclusion

The decision to incorporate an EMTS in an existing technology transfer office should not be taken lightly. Depending on the size of the office and the amount and type of data to be handled, besides cost, there are several factors that should be taken into consideration. While the danger of paralysis-through-analysis always exists, the importance of conducting basic due diligence not only of the various packages available on the market, but of internal needs and desires, cannot be underestimated.

Incorporation of an EMTS is a long-term investment (irrespective of the dollars involved) and should be treated as such.

Notes

1. Association of University Technology Managers, *AUTM Licensing Survey: FY2003* (Northbrook, IL: Association of University Technology Managers, 2004).
2. Rick Sherman, "Essential Guidelines for Evaluating Analytic Applications," *DM Review,* August 2003.