A Forrester Total Economic Impact™ Study Prepared For Microgen

The Total Economic Impact Of The DDEX Standards

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FORRESTER®

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Executive Summary

In December 2012, Microgen commissioned Forrester Consulting to examine the total economic impact that organizations may realize by using the DDEX standards for data exchange in the digital music supply chain. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact that DDEX may have on their organization.

DDEX Reduces Data Feed Deployment and Maintenance Expense

Our in-depth interviews with four organizations in the digital music supply chain and subsequent financial analysis found that by using DDEX standards instead of proprietary standards for data exchange, an organization can reduce its operational expenses associated with data feed creation, data feed maintenance, IT developer training and takedown processing (see Table 1).

Table 1
Risk-Adjusted Operations Expense Reduction Over Five Years[1]

Benefit category	Percentage reduction in task cost using DDEX vs. proprietary standards	Five-year benefit value (PV)	Comment
Reduction in data feed creation and integration expense	66%	$3,856,672	DDEX standards are used for new data feeds
Reduction in data feed maintenance expense	25%	$3,973,305	Savings after proprietary feeds are replaced with DDEX feeds.
Training costs avoided	-	$124,338	Savings associated for new proprietary feed that is not implemented.
Labor productivity improvement: processing takedown requests	85%	$41,888	Average annual savings

Source: Forrester Research, Inc.

- **Benefits.** The organizations we interviewed experienced the following benefits:
    - **Reduction in data feed creation and integration expense of 66%.** This represents savings over 5 years and results from using DDEX instead of proprietary formats to create new data feeds. These are one-time savings associated with new data feed creation. The value of the benefit scales with the number of new feeds that are created using DDEX.

- **Reduction in data feed maintenance expense of 25%.** This savings is realized when proprietary feeds are replaced with DDEX feeds. This is a recurring savings that scales with number of proprietary feeds that are replaced with DDEX.
- **Training costs avoided of $8,200 for each new proprietary feed avoided.** Each time an organization implements a new proprietary data feed with which it has no previous experience, it incurs a training cost to learn the characteristics of the feed. This cost is avoided if a DDEX feed is used instead.
- **Labor productivity improvement for processing takedown requests.** This results from automating parts of the takedown process with DDEX.

- **Future and other potential benefits.** Forrester anticipates that as more organizations implement DDEX in the future, new entrants and the overall DDEX ecosystem may experience the following benefits:
  - **Improved time to market.** Where one or both partners have already implemented DDEX, then the time to automate message exchange with new partners will be significantly shortened. This in turn will lower barriers to forming new partnerships and will allow faster exploitation of market opportunities.
  - **Reduced startup costs for new entrants.** Leveraging the shared investment and knowledge of the DDEX community will reduce the amount of research and capital expenditure around the formation and execution of new business models.
  - **Accelerated benefits because of increased ecosystem adoption of DDEX.** The benefits described in this study are based upon relatively early adoption of DDEX standards. Forrester anticipates that as the DDEX ecosystem expands and is established, the highlighted benefits will be accelerated by bringing forward implementations with partners into the first year. For larger players this should reduce costs even further and for smaller players it should lower barriers to enter into this market.
  - **Positioning for digital media market convergence.** As different types of digital media combine with music, the DDEX standards body may consider expanding its standards focus areas to include media types like video, film, print and games. This would provide similar benefits for those business models that span multiple media types.
- **Costs.** The organization we interviewed experienced the following costs:
  - **Initial DDEX implementation cost of $83,346 per standard.** This is the one-time cost associated with implementing the base 'logic' for a single standard (e.g. the ERN standard).
  - **Ongoing integration expense for DDEX data feed creation.** This is the incremental expense associated with implementing DDEX data feeds. DDEX data feeds are implemented either to replace existing proprietary data feeds or to implement new data feeds. This expense varies with the number of data feeds created, and ranges from $2,329,170 for 200 feeds to $5,323,333 for 360 feeds.
  - **Ongoing DDEX maintenance and expense $145,659.** This is the cumulative 5-year expense, and represents the labor effort needed necessary to maintain the overall DDEX deployment.

Factors Affecting Benefits And Costs

Table 1 illustrates the risk-adjusted financial results that may be achieved by an organization. The risk-adjusted values take into account any potential uncertainty or variance that exists in estimating the costs and benefits, which produces more conservative estimates. The following factors may affect the financial results that an organization may experience:

- The number of reciprocal (i.e. two-way as opposed to one-way) data exchange relationships it has. The number of reciprocal relationships is driven by the organization's position in the digital music supply chain.
- The number of DDEX standards implemented. Using more DDEX standards (e.g. implementing both ERN and DSR) will generate greater benefits, because the efficiencies generated by DDEX will accrue across a potentially larger number of partners and data feeds.
- The type of DDEX profile used. These include the "main", "simple" and "business" profiles, which are designed for decreasing implementation costs.
- The number of new data feeds that are deployed using DDEX. This will affect the benefits associated with data feed creation.
- The number proprietary data feeds that are replaced with DDEX data feeds. This will affect the benefits associated with data feed maintenance.

Disclosures

The reader should be aware of the following:

- The study is commissioned by Microgen and delivered by the Forrester Consulting group.
- Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Forrester strongly advises that readers should use their own estimates within the framework provided in the report to determine the appropriateness of an investment in DDEX.
- Microgen reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.
- The organization names for the interviews were provided by Microgen.

Current DDEX Charter Members and Board Representative

The DDEX charter members and board representatives as of December 2012 are shown below.

Charter Member	Board Representative
Apple Inc	Debra Ameerally
ASCAP	Michael Battiston
Google	FX Nuttall (Secretary)
Kobalt Music	Richard Thompson
Microgen Aptitude Limited	Martin Redington
Nokia	Peter Armstrong
Omnifone	Alex West
The Orchard	Josh Builder
PRS for Music	Paul Dilorito
Société Civile des Producteurs Phonographiques	Marc Guez
Société des Auteurs, Compositeurs et Editeurs de Musique (SACEM)	Michel Allain (Treasurer)
Sociedad General de Autores y Editores (SGAE)	José Macarro
SonyDADC	Christopher Read
Sony Music Entertainment	Kirit Joshi (Chair)
Universal Music Group	Kim Beauchamp
Warner Music Inc.	Spencer Chrislu

See http://ddex.net

TEI Framework And Methodology

Introduction

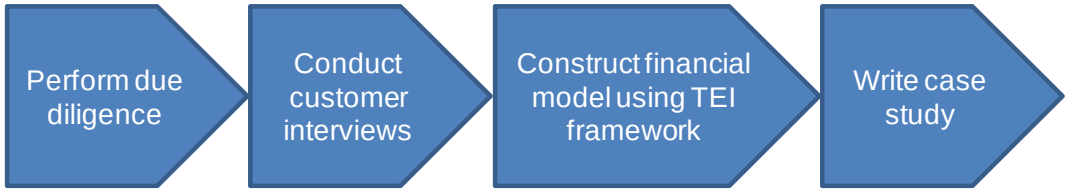
From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ framework for those organizations considering implementing the DDEX standards. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

Approach And Methodology

Forrester took a multistep approach to evaluate the impact that DDEX can have on an organization (see Figure 2). Specifically, we:

- Interviewed representatives from DDEX standards body and Forrester analysts to gather data relative to DDEX and the marketplace for DDEX.
- Interviewed four organizations currently using DDEX, to obtain data with respect to costs, benefits, and risks.
- Constructed a financial model representative of the interviews using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interviews.

Figure 2
TEI Approach



Source: Forrester Research, Inc.

Forrester employed four fundamental elements of TEI in modeling the DDEX standards:

1. Costs.
2. Benefits to the entire organization.
3. Flexibility.
4. Risk.

Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves the purpose of providing a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

Analysis

Interview Highlights

A total of four interviews were conducted for this study, involving representatives from the following organizations:

1. A major European rights and collections society. This organization has relationships with over 2,000 record labels and collects revenues from over 300,000 licensees. The organization uses DDEX to receive sales information using the DSR standard, and is used to generate sales reports and invoicing.

2. A major independent global digital music distributor. This organization has relationships with over 300 retailers, 13,000 record labels and various rights societies. The organization has large data exchange volumes, which are spread across its downstream retailers, upstream record labels and rights societies. It uses DDEX to receive and transmit both sales receipt and release notification data.

3. A global content and label owner. This company delivers digital music to downstream retailers, distributors and other digital service providers. The company uses DDEX for exchanging sales and release notification data.

4. A major United States music subscription service retailer. The people whom we interviewed use DDEX to exchange catalog data with label owners and matching data with the rights societies.

Reasons For Adopting DDEX

The organizations we interviewed adopted DDEX to:

- **Reduce cost and complexity of integrating and maintaining multiple proprietary data exchange standards**. All the organizations we interviewed were unanimous in their desire to lower the costs of managing data exchange in their part of the digital music supply chain. They also wanted to reduce business downtime caused be unanticipated changes that are occasionally made to proprietary standards.

- **Make their business operations more flexible and agile**. The interviewed organization felt that the time needed to perform integrations and maintain data feeds inhibited their ability to quickly establish new business relationships. They hoped that by using DDEX they could reduce the time and effort needed to integrate new business partners. It was felt that because DDEX is a living standard and can adapt as business innovation happens, it would allow them to more easily 'do business' with companies that have new business models.

- **Improve the transparency and auditability of sales data.** It was felt that using common standard for reporting sales data would ultimately increase the trust between the creative communities and the organization that supply, distribute and sell digital music.

- **Lower the cost of entry for new players into the digital music industry**. By removing the barrier presented by implementing, integrating and maintaining multiple proprietary data formats, it is hoped that overall revenues in the industry would increase because more players can enter the market.

DDEX Standards Used By The Interviewed Organization

The DDEX standards used by each interviewed organization varied with the organization's position in the digital music supply chain, and their roadmap for implementing DDEX.

At the time of the interviews, the organizations were using or upgrading their implementations of the Electronic Release Notification (ERN) and/or the Digital Sales Report (DSR) standards. Because the standards had matured sufficiently, all the interviewed organizations were undertaking significant DDEX implementation and integration projects.

At the time of the interviews, the organizations' use of DDEX ranged from one to four years, and were exchanging data with fewer than five partners each. All were planning to significantly increase the number of partners they exchanged data with in 2012.

Framework Assumptions

We learned that the primary benefits associated with DDEX are:

- Reduced data feed implementation expense. DDEX data feeds require a lower labor effort to implement in comparison to proprietary feeds. Therefore any new data feeds that are created with DDEX are done at a lower cost.
- Reduced proprietary feed maintenance expense. DDEX data feeds are easier to maintain than proprietary feeds and require a lower labor effort. Therefore organizations that replace proprietary data feeds that with DDEX feeds will experience lower overall data feed maintenance expense. Similarly, any new data feeds that are created with DDEX will have comparatively lower maintenance expense.

To account for the potential impact of these two benefits, this analysis models two different kinds of organization:

- Larger, mature organizations (similar to the organizations that we interviewed) that already have many proprietary data feeds in place. For this kind of organization, we assume that DDEX is primarily used to replace proprietary feeds and hence lower its overall data feed maintenance expense.
- Smaller, growing organizations that are creating new data feeds commensurate with their growth. For this kind of organization, DDEX is assumed to be the primary standard used for creating new data feeds and therefore avoids the higher cost associated with creating proprietary data feeds.

Table 2 provides the model assumptions that Forrester used in this analysis.

When modeling the costs and benefits, we assumed a team of two developers and two quality assurance engineers (see Table 2). While team sizes varied from organization to organization, it does not affect the number of labor days needed to perform a specific task.

Table 2
Model Assumptions

Ref.	Metric	Calculation	Value
A1	Number of working days per year		250
A2	Number of developer		2
A3	Developer fully loaded annual salary		$125,000
A4	Number of quality assurance engineers		2
A5	Quality assurance engineer fully loaded annual salary		$80,000
A6	Number of data administrators		2
A7	Data administrator fully loaded annual salary		$65,000

Source: Forrester Research, Inc.

The discount rate used in the PV and NPV calculations is 10% and time horizon used for the financial modeling is 5 years. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult with their respective company's finance department to determine the most appropriate discount rate to use within their own organizations.

Costs

The costs for implementing and maintaining DDEX standards fall are:

- Initial DDEX implementation costs. These are the costs of implementing a 'base' standard (e.g. ERN or DSR), and integrations with two to three partners. Initial implementation costs are incurred each time an additional standard is adopted. Integration with a few partners is included in this cost because these initial integrations are needed for testing and gaining experience with integrations.
- Ongoing DDEX ongoing maintenance expense. This is expense needed to maintain the DDEX implementation.
- Increment costs for each new data feed deployed using DDEX. We model data feed deployment costs separately for mature organizations and growing organizations.

The interviewed organizations mostly used internal resources for development and maintenance. These resources consisted of software developers and quality assurance engineers. In one instance, hired consultants performed the

initial implementation and internal resources performed quality assurance. Over time, we assume that some organizations will outsource their DDEX deployments as low cost providers appear in the market.

Initial DDEX Implementation Costs

All organization that wish to use DDEX will need to perform an initial implementation of the "logic" that drives the standards. The interviewed organizations reported their initial implementation costs ranged from $25,000 to $200,000. The variance in cost is attributable to the number of standards implemented, the number of data feeds included in the initial implementation and complexity of integrating with the backend systems.

To estimate the initial implementation cost, we assumed a single DDEX standard (ERN was the most commonly cited), used for both receiving and transmitting data. Based on a development time of 45 days, the initial development cost is $73,800 (see Table 3).

Table 3
DDEX Initial Implementation Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
B1	Number of days for base development and testing		45				
B2	Number of developers	A2	2				
B3	Developer daily rate	A3/A1	500				
B4	Number of quality assurance engineers	A4	2				
B5	Quality assurance engineer daily rate	A5/A1	320				
Bt	Initial DDEX implementation costs (one standard)	B1*((B2*B3)+(B4*B5))	$73,800	$0	$0	$0	
	Spread		100%	0%	0%	0%	
Bto	Total (Original)		($73,800)	$0	$0	$0	($73,800)

Source: Forrester Research, Inc.

Ongoing DDEX Maintenance Expense

Like proprietary protocols, DDEX implementations will require ongoing maintenance. Numerous factors contribute to this expense, including time needed to keep abreast of changes and developments to the DDEX standards, implementing any changes to existing data feeds and membership dues to the DDEX standards organization. We recognize that this expense may be highly variable, depending on each organization's use of DDEX and DDEX membership level.

To estimate that value of the ongoing DDEX maintenance expense, we assume that two developers will require the equivalent of 25 days annually to execute various ongoing maintenance functions. This yields an annual expense of $25,000 (see Table 4). We assume that as an organization's DDEX environment grows, it will become more complex and will therefore require a larger maintenance effort. To account for this we assume that the maintenance expense will increase by 10% in Years 2 and 3, and then by 5% in Years 4 and 5.

Table 4

Ongoing DDEX Maintenance Expense

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total
C1	Annual number of days for standards review and implementation		25						
C2	Number of developers and testers	A2	2						
C3	Average developer and tester daily rate	A3/A1	$500.0						
Ct	Ongoing DDEX maintenance and expense	C1*C2*C3	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	
	Spread		0%	100%	110%	120%	125%	130%	
Cto	Total (Original)		$0	($25,000)	($27,500)	($30,000)	($31,250)	($32,500)	($146,250)

Source: Forrester Research, Inc.

Ongoing DDEX Integration Expense For Larger Or Mature Organizations

All the organizations we interviewed anticipated expanding their use of DDEX rapidly over the next 12 - 24 months. The primary purpose of this expansion is to replace proprietary data feeds with DDEX data feeds. (The benefits associated with this are discussed in the Benefits section of this study). We assume that after performing the bulk of the

conversion, subsequent DDEX data feed implementations will be for a mix of replacing existing data feeds and creating new ones.

The interviewed organization reported that effort needed to create a new integration with DDEX ranged from 10 - 12 days, considerably lower than the 20-30 days for proprietary standards experienced by some of the interviewees. The primary driver of variance in integration time is integration complexity. We anticipate that the effort required to implement new DDEX integrations will fall over time as development teams gain more experience with the DDEX standards or that integrations can be outsourced to low cost providers.

For this analysis we assume that the development team will need 12 days in Year 1 to deploy a DDEX data feed, and that this will fall to 6 days by Year 5 (see Table 5). We also assume that the bulk of replacements will occur in Years 1 and 2 (150 and 100 feeds respectively). Over a five year period, the total integration cost is $5,838,400. We recognize that this cost will vary with the number and actual standards that are implemented.

Table 5
Ongoing DDEX Integration Costs For Larger Or Mature Organizations

Ref.	Metric	Calc.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
D1	Number of new DDEX feeds implemented annually		150	100	50	50	10	
D2	Number of days for implementation and testing		12	10	8	6	6	
D3	Number of developers	A2	2	2	2	2	2	
D4	Developer daily rate	A3/A1	$500	$500	$500	$500	$500	
D5	Number of quality assurance engineers	A4	2	2	2	2	2	
D6	Quality assurance engineer daily rate	A5/A1	$320	$320	$320	$320	$320	
Dt	DDEX integration costs for	D1*D2*((D3*D4)+(D5*	$2,952,000	$1,640,000	$656,000	$492,000	$98,400	

	established organization	D6))						
	Spread		100%	100%	100%	100%	100%	
Dto	Total (Original)		($2,952,000)	($1,640,000)	($656,000)	($492,000)	($98,400)	($5,838,400)

Source: Forrester Research, Inc.

Ongoing DDEX Integration Expense For Smaller Or Growing Organizations

We learned from the interviews that the digital music supply chain has many smaller and growing organizations. Smaller organizations will either be pushed to adopt DDEX by larger partners or will adopt it because the deployment and maintenance costs are lower compared to proprietary standards. (The benefits associated with lower integration costs are explored in the Benefits section). For this analysis we assume that smaller organizations will lag larger ones in their adoption of DDEX, and their use of DDEX will be driven initially by replacing proprietary data feeds and then by business expansion.

To model DDEX adoption in smaller organization, we assume that the majority of DDEX data feed deployments will take place in Years 2 and 3 (80 and 60 integrations respectively - see Table 6). Similar to large organizations we assume that the effort (and cost) will over time as organization gain experience with DDEX and the availability of low cost outsource providers. Over a five-year period, the total integration cost is $2,732,800. We recognize that this cost will vary with the number and actual standards that are implemented.

Table 6

Ongoing DDEX Integration Costs For Smaller Or Growing Organizations

Ref.	Metric	Calc.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
E1	Number of new DDEX feeds implemented annually		20	80	60	30	10	
E2	Number of days for implementation and testing		12	10	8	6	6	
E3	Number of developers	A2	2	2	2	2	2	
E4	Developer daily rate	A3/A1	$500	$500	$500	$500	$500	

E5	Number of quality assurance engineers	A4	0	2	2	2	2	
E6	Quality assurance engineer daily rate	A5/A1	$320	$320.00	$320	$320	$320	
Et	DDEX integration costs for smaller or growing organizations	E1*E2*((E3*E4)+(E5*E6))	$240,000	$1,312,000	$787,200	$295,200	$98,400	
	Spread		100%	100%	100%	100%	100%	
Eto	Total (Original)		($240,000)	($1,312,000)	($787,200)	($295,200)	($98,400)	($2,732,800)

Source: Forrester Research, Inc.

DDEX Implementation And Maintenance Cost Summary

The costs for implementing and maintaining are shown in Table 7. Note that the ongoing integration expense will vary with number of new integrations performed each year.

Table 7
DDEX Implementation And Maintenance Cost Summary

Ref.	Cost Category	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Bto	Initial DDEX implementation costs (one protocol)	($73,800)	$0	$0	$0	$0	$0	($73,800)
Cto	Ongoing DDEX maintenance and expense	$0	($25,000)	($27,500)	($30,000)	($31,250)	($32,500)	($146,250)
Dto	DDEX integration costs for established businesses	$0	($2,952,000)	($1,640,000)	($656,000)	($492,000)	($98,400)	($5,838,400)
Eto	DDEX integration costs for smaller or growing businesses	$0	($240,000)	($1,312,000)	($787,200)	($295,200)	($98,400)	($2,732,800)

Source: Forrester Research, Inc.

Benefits

From the interviews we learned that the financially quantifiable benefits realized from using DDEX are:

- Cost avoided for data feed creation and integration.
- Reduction in data feed maintenance expense.
- Training costs avoided.
- Labor productivity improvement associated with processing takedown requests.

It's important to note that the reduction in data feed creation and maintenance benefits increases with number of feeds that that are created using DDEX standards. This means that the scale of the benefits experienced by an organization is proportional to the number of feeds that are implemented using DDEX.

Cost Avoided For Data Feed Creation

From the interviews we learned that the labor effort needed to create a single proprietary feed ranges from 20 to 30 days. Complexity was the main reason that drove this variance. In contrast to proprietary feeds, the interviewed organizations were experiencing data feed deployment efforts of 10 to 15 days when using DDEX.

The benefit associated with this labor savings is realized only when a new feed is created with DDEX, and not when an existing proprietary feed is replaced. For this reason, we assume that growing organizations will benefit most from deploying new data feeds with DDEX. While larger organizations may also experience this benefit, we assume that their primary motivation for initially deploying DDEX is to replace existing proprietary feeds.

For this analysis, we assume that it takes the development team 25 days to create a proprietary feed. We also assume that DDEX data feeds take 12 days to create initially, and drops to 6 days over time. This yields a labor savings of $5,313,600 over 5 years (see Table 8).

Table 8
Cost Avoided For Data Feed Creation Expense

Ref.	Metric	Calc.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
F1	Number of new feeds created annually		20	80	60	30	10	
F2	Number of days needed to create a new integration for a proprietary feed		25	25	25	25	25	

F3	Number of days needed to create a new integration with DDEX		12	10	8	6	6	
F4	Number of developers	A2	2	2	2	2	2	
F5	Developer daily rate	A3/A1	$500.00	$500.00	$500.00	$500.00	$500.00	
F6	Number of quality assurance engineers	A4	2	2	2	2	2	
F7	Quality assurance engineer daily rate	A5/A1	$320.00	$320.00	$320.00	$320.00	$320.00	
Ft	Cost avoided for data feed creation and integration	F1*(F2-F3)*((F4*F5)+(F6*F7))	$426,400	$1,968,000	$1,672,800	$934,800	$311,600	
	Spread		100%	100%	100%	100%	100%	
Fto	Total (Original)		$426,400	$1,968,000	$1,672,800	$934,800	$311,600	$5,313,600

Source: Forrester Research, Inc.

Reduction In Data Feed Maintenance Expense

The organizations we interviewed were large, mature organizations, which typically have hundreds of data feeds with a variety of partners in the digital music supply chain. These organizations were planning to replace as many proprietary data feeds as possible with DDEX feeds over the next 12 - 24 months. The primary benefit that these organizations anticipated from replacing proprietary data feeds with DDEX is to lower their long term data feed maintenance costs. They were unanimous in their desire to reduce the effort needed to maintain proprietary feeds. Smaller organizations should also experience this benefit, but at a reduced scale.

We learned from the interviews that proprietary data feeds are maintenance intensive. Because each proprietary feed has its own unique characteristics, any knowledge gained in learning how to maintain them is not readily transferable from feed to feed. This adds to overall inefficiency. At its worst, performing maintenance on proprietary feed can result business downtime. We learned that the interviewed organization anticipated that the effort needed to maintain DDEX feeds would be 20% to 30% lower than proprietary feeds.

For this analysis, we assume that:

- The majority of proprietary feeds are replaced in Years 1and 2 (150 and 100 respectively), and fewer feeds in subsequent years (see Table 9).

- It takes an average of 10 days, spread over the course of a year, to maintain a proprietary feed.
- The average reduction in feed maintenance effort is 25%. We recognize that this value can vary widely, depending on the complexity of the proprietary feed and frequency at which a feed requires maintenance.
- The maintenance savings are cumulative from year to year.

Based on these assumptions, an organization can save $4,100/feed annually. The cumulative 5-year savings are $5,781,000.

Table 9
Reduction In Data Feed Maintenance Expense

Ref.	Metric	Calc.	Year 1	Year 2	Year 3	Year 4	Year 5	Total
G1	Number of fewer data feeds to be maintained		150	100	50	50	10	
G2	Time needed to perform maintenance on a proprietary feed (days)		10	10	10	10	10	
G3	Percentage reduction in effort needed to maintain DDEX feeds		25%	25%	25%	25%	25%	
G4	Number of IT developers	A2	2	2	2	2	2	
G5	Developer daily rate	A3/A1	$500	$500	$500.00	$500	$500	
G6	Number of quality assurance engineers	A4	2	2	2	2	2	
G7	Quality assurance engineer daily rate	A5/A1	$320	$320	$320	$320	$320	

Gt	Reduction in data feed maintenance expense	G1*G2*G3*((G4*G5)+(G6*G7))	$615,000	$1,025,000	$1,230,000	$1,435,000	$1,476,000	
	Spread		100%	100%	100%	100%	100%	
Gto	Total (Original)		$615,000	$1,025,000	$1,230,000	$1,435,000	$1,476,000	$5,781,000

Source: Forrester Research, Inc.

Training Costs Avoided

Each time an organization needs to implement a new proprietary standard, the development team needs to learn the characteristics and format of that feed. The interviewed companies expect that this training burden would disappear for every new proprietary feed that is avoided. We learned that it takes approximately 5 days for a development team to learn a new format.

On a per feed basis, the savings associated with training are $8,200. Assuming four new proprietary feeds are avoided annually, the savings are $32,800 (see Table 10).

Table 10
Training Costs Avoided

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Year 4	Year 5	Total
H1	Number of new proprietary data feeds created annually		4					
H2	Time needed for learning the new proprietary feed (days)		5					
H3	Number of IT developers	A2	2					
H4	Developer hourly rate	A3/A1	$500.00					
H5	Number of quality assurance engineers	A4	2					
H6	Quality assurance engineer hourly rate	A5/A1	$320.00					

Ht	Training costs avoided	H1*H2*((H3*H4)+(H5*H6))	$32,800	$32,800	$32,800	$32,800	$32,800	
	Spread		100%	100%	100%	100%	100%	
Hto	Total (Original)		$32,800	$32,800	$32,800	$32,800	$32,800	$164,000

Source: Forrester Research, Inc.

Labor Productivity Improvement Associated With Processing Takedown Requests

Certain organizations in the digital music supply chain, particularly retailers, are regularly sent takedown requests. Large retailers may have to deal with thousands of takedown requests annually. Responding to takedown request is often a manual and tedious process. The labor effort needed to respond to these requests is proportional to the number of requests received. The retailer that we interviewed estimated that dealing with takedown requests consumed 10% of 3-person team's time annually. However, when DDEX was used to automate the takedown process, it required 1% to 2% of the team's time to process takedown requests.

For this analysis we assumed a team of two people each paid a fully loaded salary of $65,000. Based on the experience of the retailer we interviewed, the labor productivity improvement for the team is valued at $11,050 annually (see Table 11).

Table 11

Labor Productivity Improvements Associated With Takedown Requests

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Year 4	Year 5	Total
I1	Percentage of data team's effort needed to process takedowns prior to DDEX		10%					
I2	Percentage of data team's effort needed to process takedowns with DDEX		1.5%					
I3	Number of team members	A6	2					
I4	Data analyst fully loaded annual salary	A7	$65,000					

It	Labor productivity improvement: processing takedown requests	(I1-I2)*I3*I4	$11,050	$11,050	$11,050	$11,050	$11,050	
	Spread		100%	100%	100%	100%	100%	
Ito	Total (Original)		$11,050	$11,050	$11,050	$11,050	$11,050	$55,250

Source: Forrester Research, Inc.

Summary Of Benefits

The value of the benefits associated with deploying DDEX data feeds is summarized in Table 12. We note that the overall value of the benefits will vary with scale of each organization's DDEX deployment.

Table 12
Summary Of Benefits

Ref.	Benefit Category	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Fto	Cost avoided for data feed creation and integration	$426,400	$1,968,000	$1,672,800	$934,800	$311,600	$5,313,600
Gto	Reduction in data feed maintenance expense	$615,000	$1,025,000	$1,230,000	$1,435,000	$1,476,000	$5,781,000
Hto	Training costs avoided	$32,800	$32,800	$32,800	$32,800	$32,800	$164,000
Ito	Labor productivity improvement: processing takedown requests	$11,050	$11,050	$11,050	$11,050	$11,050	$55,250

Source: Forrester Research, Inc.

Flexibility

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for some future additional investment. This provides an organization with the "right" or the ability to engage in future initiatives but not the obligation to do so. There are multiple scenarios in which a customer might choose to implement DDEX and later realize additional uses and business opportunities. Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

The interviewed organizations all planned to rapidly expand their DDEX deployments, which would increase their operational savings. At the same time, they realized that proprietary data feeds would be used for the foreseeable future.

They also anticipated that as more organizations adopted DDEX, the speed at which new business relationships could be formed would increase.

Risk

Forrester defines two types of risk associated with this analysis: implementation risk and impact risk. "Implementation risk" is the risk that a proposed investment in DDEX may deviate from the original or expected requirements, resulting in higher costs than anticipated. "Impact risk" refers to the risk that the business or technology needs of the organization may not be met by the investment in DDEX, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates.

Quantitatively capturing investment and impact risk by directly adjusting the financial estimates results in more meaningful and accurate estimates and a more accurate projection of the ROI. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates. The risk-adjusted numbers should be taken as "realistic" expectations since they represent the expected values considering risk.

The following implementation risks that affect costs are identified as part of this analysis:

- The cost of deploying DDEX is depended on the number of DDEX standards that are implemented, the DDEX profile used (i.e. "main", "simple" or "business") and the number of data feeds that are implemented.
- Ongoing DDEX maintenance expense will vary with the number of feeds and standards that need to be maintained, as well as any membership fees paid to the DDEX standards body.

The following impact risks that affect benefits are identified as part of the analysis:

- Reduction in data feed creation and integration expense will vary with the number of DDEX data feeds that are implemented, and the difference in effort needed to create proprietary and DDEX feeds.
- Reduction in data feed maintenance expense will depend on the number of proprietary feeds that are replaced with DDEX and the relative effort needed to maintain DDEX feeds.
- Training costs avoided are driven by the number of proprietary data feed implementations avoided and the time needed to learn a new data feed.
- Labor productivity improvement: processing takedown requests will vary with the number of takedown request processed and the labor effort needed to process them.

Table 13 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates. The TEI model uses a triangular distribution method to calculate risk-adjusted values. To construct the distribution, it is necessary to first estimate the low, most likely, and high values that could occur within the current environment. The risk-adjusted value is the mean of the distribution of those points. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

Table 13
Cost And Benefit Risk Adjustments

Costs	Low	Most likely	High	Mean
Initial DDEX implementation costs (one standard)	100%	100%	150%	117%
Ongoing DDEX maintenance and expense	100%	100%	200%	133%
DDEX integration costs for established organizations	100%	100%	125%	108%
DDEX integration costs for smaller and growing organizations	100%	100%	125%	108%
Benefits	**Low**	**Most likely**	**High**	**Mean**
Reduction in data feed creation and integration expense	80%	100%	103%	94%
Reduction in data feed maintenance expense	80%	100%	103%	94%

Source: Forrester Research, Inc.

Financial Summary

Tables 14 and 15 show the risk-adjusted impact on costs and benefits. These values are determined by applying the risk-adjustment values from Table 13 in the Risk section to the cost and benefits numbers in Tables 7 and 12.

Table 14
Risk-Adjusted Costs

Ref.	Cost Category	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
Btr	Initial DDEX implementation costs (one protocol)	($86,346)	$0	$0	$0	$0	$0	($86,346)	($86,346)
Ctr	Ongoing DDEX maintenance and expense	$0	($33,250)	($36,575)	($39,900)	($41,563)	($43,225)	($194,513)	($145,659)
Dtr	DDEX integration costs for established	$0	($3,188,160)	($1,771,200)	($708,480)	($531,360)	($106,272)	($6,305,472)	($5,323,333)

	businesses								
Etr	DDEX integration costs for startup/growing businesses	$0	($259,200)	($1,416,960)	($850,176)	($318,816)	($106,272)	($2,951,424)	($2,329,170)

Source: Forrester Research, Inc.

Table 15
Risk-Adjusted Benefits

Ref.	Benefit Category	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
Ftr	Cost avoided for data feed creation and integration	$400,816	$1,849,920	$1,572,432	$878,712	$292,904	$4,994,784	$3,856,672
Gtr	Reduction in data feed maintenance expense	$578,100	$963,500	$1,156,200	$1,348,900	$1,387,440	$5,434,140	$3,973,305
Htr	Training costs avoided	$32,800	$32,800	$32,800	$32,800	$32,800	$164,000	$124,338
Itr	Labor productivity improvement: processing takedown requests	$11,050	$11,050	$11,050	$11,050	$11,050	$55,250	$41,888

Source: Forrester Research, Inc.

DDEX: Overview

DDEX is a consortium of leading media companies, music licensing organizations, digital service providers and technical intermediaries, focused on the creation of digital supply chain standards.

To support the automated exchange of information along the digital supply chain, DDEX has standardized the format in which information is represented in XML messages and the method by which the messages are exchanged between business partners. These standards are developed and made available for industry-wide implementation.

DDEX standards help rights holders, retailers and technical intermediaries to more effectively communicate information along the digital supply chain. This leads to efficient business transactions, reduced costs and increased revenues for all sectors involved.

Formed in 2006, DDEX initially focused on standardizing message formats for the digital music supply chain but the foundation of the standards is sufficiently generic that they can easily be adapted to other digital media supply chains.

Appendix A: Total Economic Impact™ Overview

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, risks, and flexibility.

Benefits

Benefits represent the value delivered to the user organization — IT and/or business units — by the proposed product or project. Often product or project justification exercises focus just on IT cost and cost reduction, leaving little room to analyze the effect of the technology on the entire organization. The TEI methodology and the resulting financial model place equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization. Calculation of benefit estimates involves a clear dialogue with the user organization to understand the specific value that is created. In addition, Forrester also requires that there be a clear line of accountability established between the measurement and justification of benefit estimates after the project has been completed. This ensures that benefit estimates tie back directly to the bottom line.

Costs

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs in the form of fully burdened labor, subcontractors, or materials. Costs consider all the investments and expenses necessary to deliver the proposed value. In addition, the cost category within TEI captures any incremental costs over the existing environment for ongoing costs associated with the solution. All costs must be tied to the benefits that are created.

Risk

Risk measures the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections, and 2) the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as "triangular distribution" to the values entered. At minimum, three values are calculated to estimate the underlying range around each cost and benefit.

Flexibility

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. For instance, an investment in an enterprise wide upgrade of an office productivity suite can potentially increase standardization (to increase efficiency) and reduce licensing costs. However, an embedded collaboration feature may translate to greater worker productivity if activated. The collaboration can only be used with additional investment in training at some future point in time. However, having the ability to capture that benefit has a present value that can be estimated. The flexibility component of TEI captures that value.

Appendix B: Glossary

Discount rate: The interest rate used in cash flow analysis to take into account the time value of money. Although the Federal Reserve Bank sets a discount rate, companies often set a discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their respective organization to determine the most appropriate discount rate to use in their own environment.

Net present value (NPV): The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

Present value (PV): The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total net present value of cash flows.

Payback period: The breakeven point for an investment. The point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Return on investment (ROI): A measure of a project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits minus costs) by costs.

A Note On Cash Flow Tables

The following is a note on the cash flow tables used in this study (see the example table below). The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1. Those costs are not discounted. All other cash

flows in Years 1 through 3 are discounted using the discount rate (shown in Framework Assumptions section) at the end of the year. Present value (PV) calculations are calculated for each total cost and benefit estimate. Net present value (NPV) calculations are not calculated until the summary tables and are the sum of the initial investment and the discounted cash flows in each year.

Table [Example]
Example Table

Ref.	Category	Calculation	Initial cost	Year 1	Year 2	Year 3	Total

Source: Forrester Research, Inc.

Appendix C: Endnotes

[1] Forrester risk-adjusts the summary financial metrics to take into account the potential uncertainty of the cost and benefit estimates. For more information on Risk, please see page 21.