Digital trust corridors for matching workers and businesses
Short title: Irix

IRIX

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1 Excellence

2 Impact

3 Implementation

1 Excellence

1.1 Challenge and solution

1.1.a Problem to overcome

Recruitment is big business. All businesses are familiar with trying to find the right person for a job. Companies spend a lot of time and money searching for candidates, interviewing, auditioning and checking references and ratings. This is not surprising, as hiring workers with the right skills is crucial to a firm's success. Matching businesses with suitable workers is big business. The global staffing industry is valued at €378 billion a year—and it is growing fast, thanks to an increase in career changes and more workers opting to work remotely and short-term.

But inefficient. In traditional staffing methods, businesses advertise a job and workers signal their interest, or workers advertise their skills and business signal their interest. In both cases, the businesses and workers that approach each other do not have a longstanding relationship. Instead, they make quick assessments based on first impressions and the performance ratings of others. The problem is that, in the absence of trust, it is difficult to be sure of making the right match. Trust is a firm belief in the ability and reliability of someone. Without it, businesses and workers frequently mismatch. Businesses that hire the wrong person waste money on unsuitable skills and waste time on training people who don't stick around. Workers that take the wrong job are unhappy at work and have low job security.

And slow to change. Despite the economic and societal importance of matching businesses with the right workers, the staffing industry has been slow to change. Digital technology has transformed other sectors, like travel, real estate and shopping. Staffing is ripe for a similar disruption.

1.1.b Our solution

Our solution is Irix, a platform for matching businesses with workers by recursively harnessing other peoples' trusted contacts. Irix will revolutionize staffing by making better matches faster for less money.

Power of trust. Humans have a fundamental predisposition towards trust. Trust enables them to make better decisions more quickly. Key to Irix is combining the human inclination towards trust with a technology platform to build and track trust corridors. A trust corridor is trust between two people that do not know each other based on a pathway of trusted connections between them. In other words, if Alice trusts Bob, and Bob trusts Carol, Alice tends to trust Carol too. The advantage of trust corridors is that they can dramatically extend the community of people that a person trusts beyond the contacts that they know directly.

Headhunters of headhunters. The way Irix works is simple. When searching for a worker, every one of our suitable contacts becomes a headhunter. But they are not just hunting for the right candidate; they are also on the lookout for further headhunters. In fact, in Irix we don't differentiate between candidates and headhunters, since potential candidates tend to make the most informed headhunters.

An example. For example, suppose a business wants hire a mobile app developer. Using Irix, the business sends the job spec to a select number of its contacts that are most knowledgeable about app development. Each of these contacts can either apply for the job, or they can pass the job spec on to a small number of their most relevant contacts. As this process gets repeated, the number of people who learn about the job grows exponentially, some of whom will apply for the job. Only when the business chooses one of the applicants to hire does the process stop.

Rewarding connectors. To encourage people to forward job specs to contacts of their own, Irix makes use of a cash bounty system. The size of the bounty is set by the business. Everyone along the path of contacts from the business to the hired worker gets paid, but not everyone gets the same amount. The connector closest to the hired worker gets ½ of the bounty. Next in line gets ¼ of the bounty, and so on, with Irix taking what is left over as a fee. An example of this is shown in Figure 1.4. The further the reach of your search, the more of your money is working for you to give you the best results possible.

Figure 1.1. Left. The traditional way that businesses go about finding trusted workers. By going to their directly known contacts, their reach is limited. Right. Our new technology, called Irix, harnesses trust corridors to significantly extend the trusted reach.

What we have done so far

Conaissance (participant 1) conceived, designed and built Irix (irixit.com), a platform for matching businesses with workers using trust corridors. The platform is available as a website and has had 240 users. In 2017 Conaissance partnered with GetKalido (participant 2) to launch their platform in social working platform Kalido (kalido.me). During the last two years, our Consortium has:

- Built, tested and refined three internal versions of the Irix platform for the web.
- Integrated financial transactions for rewarding connectors.
- Partnered with social working platform Kalido, which has 60,000 users.
- Raised €30,000 for Irix and $5 million for Kalido to further develop and promote our products.
- Demonstrated our product in operational environments to find web developers and academic postdocs.

What we will do in Phase 2

We now need to upgrade our platform and accelerate market penetration. In Phase 2 we will:

- Make our platform more widely available by launching a mobile app for iOS and Android.
- Secure paying users on the social working platform Kalido.
- Extend the range of ways to add known contacts to include SMS and social media.
- Integrate seamless financial transactions whereby users can pay a bounty directly from their phone.
- Enhance the search process for speed and profit by optimizing the trust tree depth and size.
- Achieve market penetration by targeting film, academia, tradesmen, tutors and developers.
- Harness our built-in viral growth engine whereby users generate new users by inviting their contacts.
- Develop a distributed architecture to manage the large scale search volumes.

Figure 1.2. Screenshots from our Irix web platform.

Recipients is the number of people who are in the trust tree and have seen the job spec.

Candidates is the number of recipients who have applied for the job.

Your connections lists the people that the user has passed the job spec on to. For each invited person, the number of invitations (Shares) downstream from them is also shown.

1.1.c User needs and advantages

Here we outline the different user needs and how we address them. We discuss the state-of-the-art in §1.1.e and compare Irix to the state-of-the-art across these user needs in §1.1.f.

User need	Problem to overcome	Our solution
Trusted	Most workers are selected on the basis of first impressions because the business and the worker do not have a long-standing relationship. This means that workers are selected who are wrong for the job, and other workers are passed over who are right for the job.	Trust allows businesses and workers to make decisions that more accurately reflect the quality of long term success of their match. Our technology builds trust corridors by linking together contacts that are known to each other.
High reach	Reach is the size of the pool of workers that is considered when trying to fill the needs of a business. A limited reach has a lower chance of filling the position or tends to fill the position with a poor match.	The pool of candidates grows multiplicatively with the number of levels, the reach for a search tends to be vast. With this growth through trusted connections it allows for higher quality and less noise compared to traditional recruitment solutions.
Cost effective	Many job matching business charge a significant amount for their services, typically hundreds to thousands of euros. This is charged as a fee in most cases and is around 10-20% of the final hire value. E.g €50,000 Salary - 20% recruiter fee is €10,000	Irix lets users choose their own bounty based on their resources and the degree of incentivization they want. Because we make it easy and fast to pass on job specs, bounties can be nominal and still be effective. And because Irix does not rely on recruitment staff or complex search engines, its running costs are low.
Fast	The gap between needing a worker and finding that worker makes businesses inefficient. The current state-of-the-art for finding workers tends to take between a few week and a few months, causing businesses to suffer.	Because our technology makes use of parallel processing by many individuals acting simultaneously, it can produce extremely fast results. Successful searches produce results in days.
Biased information	Many matching platforms rely on a ratings systems to secure trust and encourage interaction between parties. But ratings have limitations: they attract extreme views and positive reviews are often solicited.	Our technology does not rely on ratings. We allow users to make connections based on who they trust and feel can achieve the role our service advertised. This leads to a higher quality connection and information can not be forged.
Accurate	One of the problems of sifting through a large pool of candidates is that there is a lot of room for choosing a false positive, meaning saying yes to a poor candidate.	As Irix is based on recursive iterations within its 'broadcast' stages this pre filters out candidates that are not suitable to share the request and unsuitable candidates.

1.1.d Importance of trust

Trust is becoming a key component to businesses and the digital economy. "Trust has become essential in the digital age. It must underpin how you organise and run your business so that you can be successful," reports Grant Waterfall, a Partner at PwC. Graham Neill, a Director at KPMG, concurs: "Digital trust has already become critical to how you develop and maintain positive, long term relationships with your customers and other stakeholders."

To understand how potential Irix users perceive trust and value of our platform, we interviewed a range of customers. They are chosen from across the six targeted user groups described in §2.1.a.

Kalido

"At Kalido we have a clear need to provide our users with functionality that enables then to trust other users outside their personal networks … finding a way of seeing beyond the 'trust horizon' would benefit our business model"

—Ash, Chief Technology Officer, GetKalido

Academic postdocs

"Overall there are a lot of postdocs out there but in any given subfield it's a small world. I advertise on [the job board] jobs.ac.uk but most of the time it's someone who worked with someone who worked with me that I end up hiring. Usually by emailing colleagues who pass on the message. It means you trust…the calibre of what you're getting."

—Anthony, Research Scientist, CNRS

Tutors and trainers

"When looking for a language tutor I generally ask friends and colleagues if they know someone to recommend. I think searching online can be confusing and I don't always trust what's written on the sites of [language school]. Reviews are hard to trust in my experience, I prefer…word-of-mouth referrals from people I trust."

—Roman, Expat Designer

Film industry

"[Word of mouth is] very important, definitely in the 8-10 range… It's how I've gotten most of my jobs in film, by word of mouth or networking, rather than by job posts. It means someone vouches for your work ethic and quality output, which is really important on a high pressure, low budget, tightly scheduled film shoot."

—Venla, Producer and Director

"I think [a trust corridor platform] could be useful in the film industry, as currently the easiest way of recruiting crew is largely via Facebook groups and a few industry websites that you either have to be a member of or have to know about in advance."

—Rebekah, Producer and Project Manager

Tradesmen

"Using an app like Irix would make hiring builders so much easier and reduce stress levels. It's hard to know if a builder is honest…or value for money. Hiring someone that has a proven track record with a trusted personal connection would…instil confidence and save time. [It] reduces the fear of strangers in your home. Irix could spell the end of cowboy tradesmen and benefit [them] with further referrals. Win-win."

—Felicity, Homeowner

Software developers

"I have had fairly good results from using LinkedIn in the past but my main successes have come from recommendations through other developers I come in contact with or work with. It seems to be a pretty tight community and once you know someone great you tend to stick with them. Sometimes they are not available but they recommend a friend in their place."

—Richard, Lead developer

1.1.e State-of-the-art

There are six processes for bringing together businesses and workers. Our product does not compete directly with these technologies, but rather creates new demand in an uncontested market space.

Recruitment agencies   Threat: Med

Recruitment agencies such as Manpower, Randstad and Beringer Tame are middlemen between businesses and workers. They try to match the needs of businesses with CVs that they have on file or with candidates that they headhunt. Because agencies focus on a particular sector, they profess to be more skilled at matchmaking than the businesses they represent. Some agencies meet their businesses and workers in person. However, their placements tend to be based on first impressions more than trust. In this sense, recruitment agencies can be seen as speeding up, or catalysing, the job board process. Recruitment agencies are expensive, typically charging a finding fee of 15-25% of the worker's annual salary. Digital technology is removing middlemen from other sectors, like travel agents and estate agents.

Job boards   Threat: Med

Job boards have their origins in print classified ads for jobs, which were first brought online in the 1990s. Today they are the most standardised way of finding a job. From indeed.com to totaljobs.com, this is where most job adverts can be found. Several of them have mobile apps, these apps were designed to follow the trend of mobile first technology. However this has added to the issue as these apps make applying for jobs a 1 click process. This has led to more CV submissions, lack of customisation, no custom cover letters or tailored CV's. This has had a huge impact on the Job board industry.

Social media   Threat: Low

Social media is used in two ways. In the first, jobseekers or employers advertise their needs to their immediate contacts. This approach has the advantage of relying on trust, but has limited reach because it does not recursively harness trust corridors (friends of friends, etc.). In the second way, jobseekers or employers join larger, purpose-built groups focused on a particular industry. These groups are in effect miniature job boards, since most of their members do not know each other and do not have trust relationships.

Freelance platforms   Threat: Low

Freelance platforms, like Upwork, help independent professionals (freelancers) and businesses collaborate remotely. Because the freelancers and the businesses do not normally meet in person, freelance platforms rely on ratings systems, similar to the ones used by Amazon, TripAdvisor and Airbnb. However, ratings systems have limitations. First, they are not personalized: a freelancer who has been good for other businesses may not be good for your business. Second, ratings require effort, so they tend to come from those most motivated to leave them: highly dissatisfied clients and highly satisfied clients. Most users in the middle neglect to rate. Many ratings are solicited from clients who are predisposed to rate well, like satisfied clients and friends. Freelance platforms provide businesses and freelancers with, at best, a rough indication of their suitability.

Word-of-mouth   Threat: Low

By word-of-mouth we mean any recommendations between individuals that are known to each other. Multi-layered, or recursive, word-of-mouth communication can happen in principle, but it is rarely encouraged and not systematized. These tend to be a first order request (can you do this job for me) or a second order request (do you know anyone who can do this job for me?). But because word of has yet to be captured and tracked by a technology platform, it is not scalable. That is where our product, Irix, comes in.

Search engines   Threat: Low

Search engines are in general the least effective technology for businesses to find workers, but it is worth considering why this is the case. Search engines use filters and metadata with taxonomic structures to locate information. Not all data lends itself to standard structures or universal search methods due to its complexity or relative position to the enquirer. First, people tend to present themselves in the best possible light, and therefore their qualifications or suitability tends to be subjective or exaggerated. Second, privacy concerns mean that many candidates are not willing to make their full details publicly searchable.

1.1.f Beyond the state-of-art

The Irix technology enables user to exploit not only their own network of trusted contact but to operate across multiple levels of of trusted networks beyond their own trust horizon. The technology does this by using a range of matching algorithms and artificial intelligence to ensure that all parties are well incentivised supported and protected tin helping their contacts achieve goals.

Current approaches can fail at making accurate matches, as employers and employees struggle to break through the noise that is created online. Irix will fill this gap in the market by providing a safe, cost effective, fast, trustworthy and accurate way for both sides to find exactly what they need. The tradeoff that competing technologies face is that they offer a large reach with low trust values, or a small reach with high trust values. Irix breaks the deadlock offering large reach and high trust values.

Irix's unique approach can be seen to be superior to many other methods of recruitment outlined:

Competing technology	Trusted	Cost effective	Fast	Accurate	Safe	Targeted	High Reach
Word-of-mouth	✓	✓		✓	✓	✓	
Search engines		✓		✓			✓
Recruitment agencies	✓		✓			✓	
Job boards		✓		✓			✓
Social media	✓	✓	✓				✓
Freelance platforms		✓	✓				✓
Irix	✓	✓	✓	✓	✓	✓	✓

1.1.g Innovation

Digital search meets human intuition

We have built a platform that acts as a new kind of search engine, combining human intuition with a digital system for building, tracking and rewarding trust corridors. Our platform uses a recursive (rule repetition) process that enables users to access trusted information outside of their local networks.

Less noise, more signal

Irix limits the need for mass broadcasts of information that give rise to the influx of many pieces of information but few relevant ones. Micro-blog platforms like Twitter broadcast to everyone on a person's contact list. Our approach is the opposite: we "thincast" to only the handful of people from our own contacts that we deem especially appropriate. This means that users receive more tailored requests and fewer distractions, making them more likely to engage with our product.

Rewarding connectors

Connectors provide a valuable service to society, and another benefit of our technology is that it gives them their due by rewarding them for the useful connections that make.

Global insight from local vision

A person's knowledge of his contacts and ability to make rapid associations about them is a valuable asset. Each one is a latent connector of our own local patch of the fabric of society. Until now, there was no technology which could harness these local maps to gain insights at a global level. Irix provides a technology to fasten together local connections into trust corridors to link up supply and demand.

Concept history

In 2009 the US Defense Advanced Research Projects Agency (DARPA) launched the Network Challenge. In this competition, teams had to locate ten red weather balloons placed around the US and report their findings to DARPA. Teams needed to find ways to validate and confirm reported sightings, and the winning team at MIT made use of recursive local networks (available in the public domain) that we have adopted as the basis of Irix. To DARPA's surprise, the contest was concluded in nine hours. It had many implications for incentivized network searching and illustrated the power of trust networks as a means of achieving complex tasks.

1.2. Approach

1.2.a. USP

Our Consortium has developed the automated trust corridor system that uses trusted contacts in our local networks, to recommend their trusted contacts in their own networks, to eventually locate roles and services with confidence. The framework is based on the knowledge of individuals in a chain and the trust they have with the people who recommended them and the people that they recommend.

The concept is best understood visually, as follows.

<div align="center">

A recruitment request   Successful trust corridor

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Bob wants to hire a developer. Using Irix, he invites some of his contacts to help.

One of Bob's contact is Kate. Kate doesn't need a job, so she invites people she knows to help.

One of Kate's contact is Mike. He isn't a developer either, so he passes on the offer to others.

One of Mike's contact is Emma, and she passes it on too.

But one of Emma's contact, Joe, is a developer. Joe discusses the job with Bob, and Bob hires him.

Total payout to connectors
€87.50

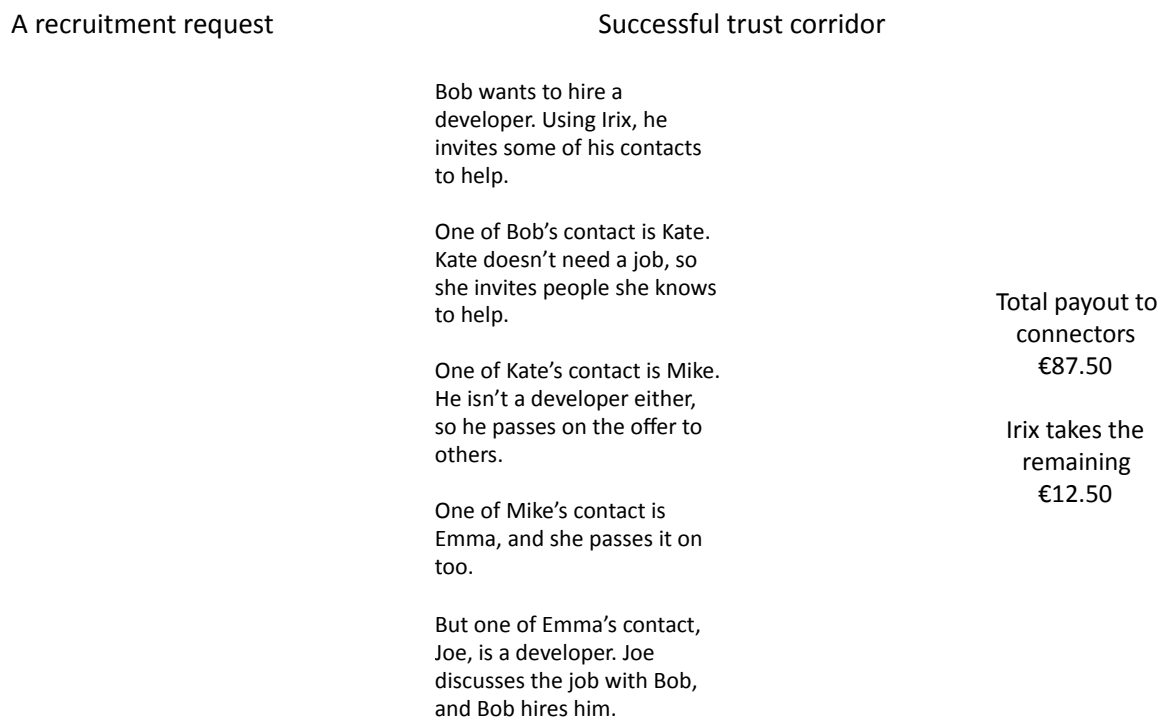Irix takes the remaining
€12.50

Figure 1.3. How Irix works: Bob initiates a search for a worker, and Joe ends up taking the job. The path from Bob to Katie to Mike to Emma to Joe forms the winning chain, and the three connectors all get a share of the bounty. The portion of the bounty left over goes to Irix as its fee. As we show in §2.2, the fee that Irix gets depends on the depth of the trust tree (shallower trees bring Irix more money), with the average fee estimated at 10%.

Reward. Providing a higher reward to the user closest to the 'target acquisition' is the most efficient way to incentivise the acquisition process. We have built a number of systems that allow us to monitor for fraudulent activity so as to secure the businesses' finances. Fraud prevention plays a vital part within the rewards system.

Why now. There has never been a better time for the recruitment sector to change the way it works. Wasted time, inefficiency and poor technological development are showing the cracks in the sector. The fast adoption of online tools and mobile applications shows that now is the perfect time to fill this gap in the market. 83% of young adults report searching for jobs online, making job sites the most used recruitment method. In conjunction with the fact that the staffing industry is growing at a high rate each year, this makes now the right time to enter the marketplace.

1.2.b Our product so far

Platform versions

To date we have built three versions of our platform. Each subsequent version was based on feedback generated from user and technical tests. The third version was launched with real users.

Irix 1.0
Nov 2016 – Jan 2017
The first version of Irix was a pilot version built in WordPress. The goal of this build was to replicate our formulation of the technology (e.g., the growth of Galton Watson trust tree) and to establish proof-of-principle of usability and demand. We also incorporated the bounty system for rewarding connectors.

Irix 2.0
Feb 2017 – Jul 2017
To better cope with the recursive nature of Irix trust corridors, we built our second platform around the Laravel PHP framework. This more natural foundation enabled us to better separate the business and presentation code and build in secure authentication so the winning chains could be safely rewarded.

Irix 3.0
Aug 2017 – Mar 2018
The third version of Irix was a complete rebuild of the web platform to have greater speed, reliability and usability. The tech stack for the new build includes HTML, CSS, Laravel, JavaScript, PHP, Bootstrap 3 and jQuery. It has secure login, a reliable email client and complete trust tree tracking.

Technology readiness level

Irix is at Technology Readiness Level (TRL) 6: technology demonstrated in a relevant environment.

TRL	Requirement	Date	How we satisfied the requirementmos
1	Basic principles observed	May 2016	• Founders studied solution to the DARPA Network Challenge
		Jul 2016	• Formulation of a general search tool based on trust corridors
2	Technology concept formulated	Aug 2016	• Modeling and simulations of growth model support development
		Oct 2016	• Staffing selected as best market for Irix trust concept
		Nov 2016	• Study of structure of Irix trust trees (Galton Watson trees)
3	Experimental proof of concept	Nov 2016	• Irix 1.0: First software platform developed in WordPress.
		Dec 2016	• Tested for technical correctness and ability to track tree layers
		Jan 2017	• Exponential bounty system implemented
4	Technology validated in lab	Feb 2017	• Irix 2.0: Second software platform in-house around Laravel.
		Apr 2017	• Unique authentication system developed in implemented
		May 2017	• Internal user testing for UX and edge cases
		Jun 2017	• Irix and Kalido meet to find a solution to Kalido's search problem
5	Technology validated in relevant environment	Aug 2017	• Irix 3.0: Third prototype developed by subcontractor BytePace
		Aug 2017	• Irix and Kalido agree to launch Irix within Kalido community
		Sep 2017	• Platform optimised for performance on smartphones
		Oct 2017	• Tree branching navigation checked for consistency, edge cases
6	Technology demonstrated in relevant environment	Nov 2017	• Platform used to recruit science postdocs placed on jobs.ac.uk
		Dec 2017	• Platform used to match freelancers in the filming industry
		Feb 2018	• Feedback from users lead to improvements in UX and UI
		Mar 2018	• Usability interviews conducted across target sectors (see §2.1a).

1.2.c Next steps for our product

TRL	Requirement	Start date	How we will satisfy the requirement
7	System prototype demonstration in operational environment	Month 01	• Enhance current website security and stability for larger volume
		Month 01	• Spec the mobile app vs of platform in XD or Sketch; check logic
		Month 03	• Build mobile app vs of platform using React Native
		Month 06	• Develop Irix plug-into Kalido to help users find nec. helpers
		Month 11	• Secure user on Kalido that are willing to pay a bounty
		Month 12	• Confirm value hypothesis by collecting feedback from users
8	System complete and qualified	Month 13	• Extend range of ways to add known contacts (SMS, social media)
		Month 13	• Integrate seamless in-app financial transactions for bounties
		Month 15	• Launch mobile app for iOS and Android
		Month 16	• Optimize incentive structure to optimise no. of user connections
		Month 12	• Battery of tests for performance on range of mobile hardware
		Month 12	• Subcon. London Inst.: model profit using Galton Watson trees
9	Actual system proven in operational environment	Month 11	• Seamlessly integrate contacts to include Facebook and LinkedIn
		Month 13	• Early adopter market penetration: film industry, academia.
		Month 13	• Mainstream user market pen.: tradesmen, tutors, developers
		Month 14	• With subcon. THRSXTY, create PR strategy and identify segments
		Month 04	• Enhance search for speed profit by optimizing the trust trees
		Month 20	• Harness our built-in viral growth engine for expansion, profit
		Month 14	• Targeted marketing campaigns for identified audience segments
		Month 16	• Develop a distributed architecture for large scale search volumes

2 Impact

2.1 Entering the market

2.1.a Targeted user groups

We focus on six industry sectors which have a strong need for our product. To accelerate market uptake, we differentiate between early adopters and mainstream users. Early adopters make up a smaller fraction of the market, but they are more accepting of limitations. They also provide validated learning by assessing our minimum viable product. As our platform is user-tested and refined, we will turn to attracting mainstream users.

Kalido users   Early adopters

Kalido matches people of disparate backgrounds and skill sets - unlike networks like upwork where users operate in silos (e.g. software developers). Kalido users can offer a range of hook-ups from work based tasks like providing bookkeeping to social tasks like looking for a tennis partner.

Irix will enable these users to find work and social partners beyond their trust horizons with minimal risk through the Kalido ecosystem, providing a win for the users and a win for Kalido (as a business as it achieves its task of linking its users together to improve their lives).

Film industry   Early adopters

The film and television production industry is an ideal early adopter because it relies heavily on word of mouth recommendation and trust when looking for hires on productions. Quick turnaround times are essential to keeping production costs down. From the freelancers' perspective, it would make securing clients simpler and more effective than the current methods: Facebook groups and job boards. The lack of organisation within London's freelancer pool means that she is definitely always looking for alternative routes of finding trusted workers.

Academic postdocs   Early adopters

Postdoctoral researchers are research apprentices to senior researchers. They have completed their formal training (PhD) but do not have enough expertise to lead research projects on their own. There are an estimated 300,000 postdocs globally, and nearly half of these are selected by word-of-mouth recommendations or provide a recommendation which is connected to the employer through a trust corridor. Recruitment agencies do not have the expertise to select for postdocs, but job boards are popular, such as jobs.ac.uk (UK) and stepstone.fr (France).

Tradesmen   Mainstream users

Builders, plumbers and other tradesmen are often selected because of a referral from a trusted contact. This is because it is hard to judge their work up front or even while they do it; only long after they have finished the job does low quality work become apparent. Websites such as Rated People, Task Rabbit and Houzz's Professionals section already have a built-in reviewing system, however word-of-mouth would still be more efficient in earning users' trust.

Tutors & trainers   Mainstream users

Tutors & trainers includes any specialist who is employed to help a person get better in a specific skill. Examples include music teachers, private tutors, sports coaches and personal trainers. In many instances, the skill level required is not high and an amateur coach if sufficient. Personality compatibility is then the main determinant for success, and this is hard to infer through job boards, recruitment agencies or freelance platforms.

Software developers   Mainstream users

As more and more products go digital, the number of software developers continues to rise. Skills can vary from developer to developer and often developers are specialists in specific languages or frameworks. Developers often get grouped together regardless of what language they write, but their skill sets can vary heavily. Peer recommendation serves as a filtration system to ensure the right skills are matched with the right talent

2.1.b Business model canvas

Key activities	Value proposition	Key partners	Customer relationships	Customer segments
Matching people by generating trust corridors over personal trust networks. Supporting the software infrastructure to help match our users. Marketing the service to key market sectors and partners.	Irix provides a fast effective form of recruitment that allows trusted connections to make recommendations for advertised positions. This saves businesses time and money. **Key resources** Human resources • Conaissance team of 4 • Kalido team of 2 Kalido • social working pform • 60,000 user base	Conaissance (partic. 1) • trust corridors • web, app dev'ment • statistical physics Kalido (partic. 2) • app development • social working • marketing THRSXTY PR (subcon.) • PR • social Media • content marketing London Inst. (subcon.) • network theory • stochastic processes	• Database manag'ment • B2C support • AI Chat bots • Social interaction • Kalido (participant 2) will push product to 60,000 users **Channels** Direct • Irix website • Irix mobile app Indirect • Social media platforms • Kalido database Viral • Users promote Irix simply by using it	• Kalido network • Film freelancers • Academic postdocs • Tradesmen • Tutors and trainers • Software developers

Cost structure	Revenue streams
For Irix the main costs will be personnel, including web and mobile app developers and graphic designers.	Our revenue will be from the search bounties that we generate. This is paid to Irix as a 10% fee as previously discussed in the application.

2.1.c Sustainable development

In 2016, the United Nations introduced 17 Sustainable Development Goals. These new goals will "mobilize efforts to end all forms of poverty, fight inequalities and tackle climate change, while ensuring that no one is left behind". Our project connects to four of these goals:

By reducing the barriers to matching workers with jobs, our technology creates a more efficient and fair employment market. The ability to quickly find work appropriate to one's skills helps everyone share in progress.

Validation and access to information is key for building strong institutions, encouraging society provide the required support for them.

By reducing the friction associated with matching employees and employers, our project makes employment more agile, offering firms and individuals the chance to quickly find the skills and opportunities that they seek.

Our project lets more people work together. This enables small businesses to find suitable people quickly, while taking up less resources to do so and at the same time establishing stronger business relationships.

2.1.d Market

The global staffing industry for matching businesses with workers is vast. The 2016 global market was valued at €378 billion, with Europe alone valued at €132 billion. The Staffing Industry Analysis predicts that global staffing revenue will continue to grow by 3% in 2017 and 2018. The size of the market, combined with high prices for services which have not kept pace with technology, provides a great opportunity for Irix.

EU recruitment

In the European Union there were 226 million jobs that were recruited for in 2016. Of these, 188 million were for permanent jobs, 33 million were for freelance jobs and 5 million were for temporary jobs.

Staffing fees

The three most used forms of staffing are recruitment agencies, job boards and freelance sites. Recruitment agencies typically charge fees of 15–25% of the annual salary they are recruiting for. This is very expensive: on the order of €5,000 to €15,000 per hire. Job boards such as Indeed.com and Monster.com typically charge between €100–600 per listing per month. Freelance sites like UpWork charge 8.8%–12.5% of the value of the entire project, meaning that the fee for a €10,000 development project would be €880–€1,250.

Figure 2.1. In 2016 the average EU employment rate (fraction of adults working) was 71%, the highest average recorded for the EU. The breakdown across countries is shown here. Source: EU Labour Force Survey.

As the numbers above suggest, business are willing to pay significant amounts of money to find the right workers. And speed matters: 64% of recruiters report awarding monetary bonuses as incentive to find employees faster [3].

The advantages of trust

When a worker is suggested by someone known to the business, this is called in the staffing industry a referral. Referrals are more trusted, meaning that there is stronger belief in the ability and reliability. The statistics in support of this are striking. Referrals are five times more likely to get hired than any other form of hiring [1], and they are hired faster: 55% faster then going through careers sites [2]. Nearly half, 46%, of employees hired through referrals stay for over three years, compared to 14% of those hired through job boards [2].

Staffing method [4]	Sources of applicants [4]	Sources
27% Career sites	52% Job boards	[1] Jobvite 2017 Recruiting Funnel Benchmark Report
19% Job boards	34% Career sites	[2] Jobvite Index
16% Referrals	03% Referrals	[3] Jobvite Recruiter Nation Report 2016 [4]
15% Internal hire	02% Internal hire	Jobvite 2017 Recruiting Funnel Benchmark Report
04% Agency	02% Agency	

2.1.e Barriers to entry

What are barriers to finding talent?

There are a number of barriers to finding talent that influence our barriers to market:

63% Not enough suitable candidates	42% Candidates don't respond to contact
34% Difficulty finding passive talent	23% Too many unqualified junk CVs
11% Other	

The first for market barriers provide the opportunity for us to overcome our entry barriers:

Barrier	Strategy to overcome barrier
Psychology of using Irix	Getting users to think of using Irix over competitive business models is key to our success. This is likely the largest barrier to entry as people are used to using certain tools now. However, because people trust word-of-mouth over all other methods, and as Irix heavily relies on this we predict that it will be easier to acquire users than on most other platforms. We are going to launch a campaign that educates potential users about us with our PR agency. We will be targeting users of job sites and recruitment agencies initially. We can target them using digital audience segmentation tools. We are looking to target heads of HR and business owners using LinkedIn and other social platforms. Getting people onto trial the platform through referrals could work well here. If a friend uses Irix we will encourage and incentivise recommendation. These are just some of the ways in which we will educate them.
Critical mass	In order for Irix to work we need to have a critical mass of users that can support the business model. Due to the exponential tree structure of Irix searches we don't need a lot of people to start using the product for the Irix brand to be shared with potential users. However marketing to our very own social network - Kalido - means we have instant access to 60,000 users. We will be producing SMS alerts, emails and push notifications to all users, saying that we are now available inside the Kalido app.

2.1.f   Competing companies

Job seekers and employers are often overwhelmed by the current recruitment solutions available to them. A number of these solutions deliver unqualified applicants which makes the process very inefficient. This leads to overworked employers and unhappy employees.

Indeed (job board)   Threat level: Low

Indeed is an American worldwide employment-related search engine for job listings launched in November 2004. Indeed is currently available in over 60 countries and 28 languages. In October 2010, Indeed.com passed Monster.com to become the highest-traffic job website in the United States. In 2005, Indeed launched their beta version of what they refer to as "pay-per-click job advertising network".
Value: €812m

Monster (job board)   Threat level: Low

Monster.com is one of the largest job search engines in the world. In 2008, Monster had over a million job postings at any time and over 1 million resumes, in the database and over 63 million job seekers per month. The company has approximately 5,000 employees on its payroll in 36 countries. Monster is headquartered in Weston, MA in the United States.
Value: €347m

Adecco (recruitment agency)   Threat level: Low

Adecco is the largest recruitment company in the world. They have 5,100 branches in over 60 countries and territories, making their services widely available. Adecco's headquarters are located in Zurich, Switzerland.
Value: €724m

Randstad (recruitment agency)   Threat level: Low

Randstad is the world's second-largest HR service provider after Adecco with 29,750 employees worldwide. The Dutch company achieved a turnover of €19.2 billion in 2015.
Value: €420m

Upwork (freelancer site)   Threat level: Low

Upwork, formerly Elance-oDesk, is a global freelancing platform where businesses and independent professionals connect and collaborate remotely. Three million jobs are posted annually,

Fiverr (freelancer site)   Threat level: Low

Fiverr is the world's largest online marketplace for freelance services, beginning at a cost of $5 per job performed, from which it gets its name. Based in Israel and headquartered at Tel Aviv, the site is

worth a total of $1 billion USD, making it one of the largest freelancer marketplaces along with Fiverr.
Value: €700m (estimated)

primarily used by freelancers to offer services to customers worldwide. As of 2012, over three million services were listed on Fiverr.
Value: €519m

2.2. Business model

Our business model is simple. We provide a better search facility to find people for roles and service by exploiting personal networks and charge a percentage of a reward fee paid to the network for doing so. Integrating initially into the Kalido ecosystem with their user base and splitting the reward fee 50/50. Secondly we are launching a stand alone solution into the recruitment sector which we retain 10% of the reward fee.

2.2.a Revenue

How Irix makes money

The way that Irix makes money is simple. Every time a bounty is put up for a search, Irix gets a cut. Just how much depends on how many layers the winning chain in the search tree has. The "bottom connector" (the one that finds the provider) gets ½ of the bounty. The connector above him gets ¼ of the bounty, the connector above him gets ⅛ of the bounty, and so on.

	Instigator (business)→	Connector →	Connector →	Connector →	Connector →	Provider (worker)	Irix revenue
0 connectors							€100
1 connector						€50	€50
2 connectors					€25	€50	€25
3 connectors			€12.50	€25	€50		€12.50
4 connectors	€6.25	€12.50	€25	€50			€6.25

Payout structures for a €100 bounty for different numbers of connectors in the winning chain.

Based on simulations and date from our users so far, we estimate the number of connectors in a winning chain to be binomially distributed, with a mean of 4 (see the table to the right). With this distribution for the number of connectors, and the payout model shown above, we worked out that the average Irix revenue is $(¾)^{2μ}$ of the bounty, where μ is the mean number of connectors. For a mean of μ = 4, the typical Irix revenue is $(¾)^8$ = 10.0% of the bounty.

For example, for a €100 bounty, Irix would pay out rewards totalling €90 and keep €10. We use this value of 10% in our estimates of revenue throughout.

No. of connectors	Probability
0	0.4%
1	3.1%
2	10.9%
3	21.9%
4	27.3%
5	21.9%
6	10.9%
7	3.1%
8	0.4%

Projected income

First revenue model 1: Kalido ecosystem

Within the ecosystem we are splitting our fee 50/50 between Kalido and Irix. Expect revenue of 10% of the reward fee per user request. Kalido split of the 10% fee is half (so 5% of the gross).

Second revenue model: Stand alone Irix solution

In this model we are taking the full 10% fee from the reward/ bounty when using our own platform.

Searches after 24 months

	Kalido	Film	Postdocs	Tradesmen	Tutorsx	Developers
Av. bounty	€40	€150	€300	€100	€50	€1000
Av. Irix revenue	€4	€15	€30	€10	€5	€100
Annual searches	10000	8000	3000	4000	3000	5000
Total Irix revenue	€40,000	€120,000	€90,000	€40,000	€15,000	€500,000

Total: €805000

2.2.b Scalability

This business model that has margins and revenue built in from the start is very scalable because everytime the solution is used and delivers a successful result we get paid our 10% fee. This fee is then driven back into the business for development and promotional activities. In our model we are also driving knowledge of our platform everytime it is used.

For every business/ employer that makes a request using the solution they will on average reach out to 4 people and those 4 people will reach out to their networks as seen below. This has a built in promotional tool as anytime it is used it is also promoted as they see our brand. This model was used by Hotmail and was one of the fundamental ways they achieved rapid growth.

2.3. Financing

GetKalido is owned by its employees and a small proportion of external investors. Connaissance is also owned by its employees and a smaller degree of external investment. The ongoing work and commercial activity is a joint venture between the two parties with 50% of the revenue on the Kalido platform after costs going to Connaissance and 50% going to GetKalido. 100% of the revenue on the Stand alone system will go to Connaissance.

2.3.a Impact of Phase 2

The Phase 2 project would have a substantial impact on the joint venture between Get Kalido and Conaissance. In its current position the project is progressing well but slowly, held back by the lack of substantial investment. The joint venture would be able to employ 15 new full time employees at the end of the Phase 2 project, rising to 20 employees at the end of another three years.

The table below outlines the income and costs for the three years after the end of phase 2. The company is still expanding over this period under its own resource. We would expect to raise additional capital in this period but we feel its is clearer to illustrate the company without this additional investment. Thus as the sales expand in this period the costs / internal investment pretty much keep track leaving a small profit. There is plenty of room for adjustment by reducing some of our costs however we feel the higher costs of internal investment will build stronger foundations in the business.

Assuming the average Kalido search bounty is €40 and the average stand alone bounty is €330 the business will generate the following cash flow.

SME Inst. Post Phase 2 period: 36 months

		2020 H2	2021 H1	2021H2	2022 H1	2022 H2	2023 H1
	Employees	15	15	18	18	20	20
	Kalido Base Searches	10,000	10,000	12,500	12,500	15,000	15,000
	Stand Alone Searches	20,000	20,000	25,000	25,000	35,000	35,000
Income	Kalido @ €4 ps	€40K	€40K	€50K	€50K	€60K	€60K
	Stand alone @ €33 ps	€660K	€660K	€825K	€825K	€1,150K	€1,150K
	Total income	**€700K**	**€700K**	**€875K**	**€875K**	**€1,215K**	**€1,215K**
Cost	OPEX	€450K	€450K	€540K	€540K	€600K	€600K
	CAPEX	€50K	€50K	€50K	€50K	€50K	€50K
	Commercial Development	€75K	€75K	€100K	€100K	€120K	€120K
	Total cost	**€575K**	**€575K**	**€690K**	**€690K**	**€770K**	**€770K**
	Net	**€125K**	**€125K**	**€185K**	**€185K**	**€445K**	**€445K**

2.3.b Funding and subsequent financing

The total funding required for Phase 2 is €2,123,899. We are requesting 70% of this, or €1,486,729, as the EU contribution, and will raise the remainder of €637,170 ourselves.

	Source	Amount
EU contribution (70%)	H2020 SME Instrument	€1,486,729
Conaissance contribution (15%)	External and founder investment	€318,585
GetKalido (7.5%)	Founder investment	€159,292
Commercialization (7.5%)	Commercialization during the first 24 months	€159,292
Total		€2,123,899

As we commercialise our product across and beyond Europe, we will continue to seek furture financing. We are already in contact with a number of business angels and venture capital organisations to ensure we can finance our project now and in the future. We will pitch to investors, such as UK-based Balderton Capital; we would like to use the SME mentoring programme to hone our skills in this area. We would expect to raise an additional €2M to accelerate expansion and the global commercialisation of Irix beyond Phase 2.

2.4 Knowledge protection

In devising our plan to protect IP, we considered the reports IP Management in Horizon 2020, and Commission recommendation on the management of IP.

Freedom to operate

We found no patents which impinge on our freedom to operate in the EU and globally, based on a patent search of the "Patbase" database. We have also explored our competitor technologies and assessed the market to identify any issues with our freedom to operate. Within the staffing sector we have identified no technology that causes us concern.

Our own patents

Conaissance will file appropriate patents of its own by Dec 2018 on its proprietary methods for 'optimising trust corridors over multi-linked trust networks, including novel network incentivisation structures'.

Irix ownership

This Irix web platform and mobile app is and will be solely owned by Conaissance.

IP

Conaissance and GetKalido own all of the exploitable IP involved in this project.

IP and potential IP	Status of protection
Irix 1.0, 2.0 and 3.0 web platforms	Conaissance owns copyright
Kalido iOS and Android apps	GetKalido owns copyright
Trust trees and relational data	Copyright is protected for 15 years by Database Directive (96/9/EC of European Parliament)
"Irix" name	Conaissance is seeking trademark protection in the UK. We will extend trademark as and when we enter new territories (activity in a territory is a prerequisite for trademark protection).
"Kalido" brand name	Owned by the GetKalido team and investors.
Kalido network	Owned by the GetKalido team and investors.

Technology compliance

We have developed our software to comply with all data protection regulations. Any personal data generated by the system is owned and controlled by the owner of the individual profile and thus it complies with the standard data protection regulations and the european GDPR.

We also notice that human resources wants to focus on talent acquisition across all the new platforms; to forge new paths for talent management; to help create amazing employer brands that practically vacuum eager talent their way. The majority of the workforce has made it clear that values , transparency and accountability are key. Compliance is part of that: a functional reflection of positive integrity and deeper ethics.

2.5 Dissemination and communication

Effective dissemination of our project results and communication of our project activities are core activities involving our whole team. Our activities will take a variety of forms and focus on four audiences: (i) the recruitment community; (ii) the wider technology community; (iii) society beyond the technology world; and (iv) industry and other stakeholders.

This project will foster wide technological awareness and industrial uptake, stimulating innovation in allied fields that go far beyond our current work plan. In this sense, this project will contribute to the Horizon 2020 portfolio of new, innovative companies at the forefront of technology across Europe.

Recruitment community

Social Media Advertising
We are already using social sites to build our audience ready for growth. We are focusing our efforts with the leading sites, such as Twitter and Facebook as this is where we see potential. We have target audience segments we feel will be our early adopters on mass launch.

Interns & student recruitment
We will host three-month internships for media graduates in social network technology. This will attract bright minds to work for our company without having to spend a lot of money. Interns will be mentored by a member of the core team.

Paid Advertising
We will be advertising our system through a number of advertising channels. Namely search engines such as Google Adwords and Bing as well as job related sites - these can be in the form of editorials, adverts and product reviews.

Wider technology community

Project website
The project will have a stand-alone, dedicated website which will evolve with the project. It will include: a summary of our technology and vision; access to beta-version software; press clippings and popular summaries of our work; and links to events at which team members will be present.

Popular technology press
We will engage with the popular science and technology media by preparing and presenting press releases on our most important innovations. Specifically, we will target Wired, Technology Review and the New Scientist.

Seminar streaming
Consortium members are invited to present at international trade shows. When possible we will make ad hoc recordings of these to be streamed from the project website described above.

Society beyond the technology world

Social networks
Social networks offer real-time exchange of information with unprecedented flexibility and reach. We will create an Irix Facebook group and promote discussion on it (e.g., trust) and disseminate results and events on a dedicated Twitter account. We will work with pre-existing Facebook groups that we have reached out to.

Popular press
We will utilise our subcontractor's PR connections at various media outlets to engage with editors for reviews, interviews and advertorial content in print based media like The Metro, Financial Times and Time Out.

Public engagement
Some members of our team have a record of public engagement with commitments to schools and public speaking events. These offer good channels to inform and excite interest in our new technology across a wide audience.

Industry and other stakeholders

Search
We will work closely with search experts to link the untapped legacy data held outside the digital systems with standard search results allowing organisations to access both types of results using single systems.

Partners
We are partnered with Kalido to approach their 60,000 users. We can also partner with a number of freelance Facebook groups - these groups help people to find people for tasks.

3 Implementation

3.1 Team

Our Consortium has two partners: Conaissance and GetKalido. The Conaissance core team is Neil Gebbie, Zak Johnson, Antonia Tingey and Paolo Barucca. The GetKalido core team is Ash Sologar and Sanjay Varma.

3.1.a Experience

Our consortium has the technical, commercial and management skills to commercialize our product and generate profit, as shown below. The combined Consortium team of six people has strong experience in technology, software development and launching new services.

We have two third-party subcontractors: London Institute (LI), who hold the the additional mathematical expertise we require. THRSXTY (T) who are experts in PR and marketing for technology brands.

Technical experience	NG	ZJ	AT	AS	SV	PB	LI	TS
Social networks		✓		✓	✓			✓
Commercial platforms	✓			✓	✓			
General security							✓	
Chain base security				✓			✓	
Com. trust models				✓			✓	
Fraud management	✓				✓			
Network structures	✓						✓	
Marketing & PR		✓					✓	✓
Software testing	✓			✓				
Software development	✓	✓		✓				

Commercial expertise	NG	ZJ	AT	AS	SV	PB	LI	TS
Project management		✓	✓		✓			
Grant management			✓				✓	
Innovation management				✓				
Finance and accounts					✓			
International contracts			✓	✓	✓			
Product development			✓					
Marketing		✓			✓			✓
Customer service		✓			✓			
EU Audits			✓					
IP and patents					✓			

3.1.b Management structure

Operations officer
We will appoint a project operations officer who will be responsible for: hiring and assisting staff; synchronising the WPs and tasks therein; marketing campaign logistics; ensuring budgets are correctly allocated; assisting with the H2020 annual reports.

Work package leaders
The core team members will take on the following roles based on their expertise and experience:
WP1 Platform upgrade and expansion   Neil
WP2 Launching in the Kalido ecosystem   Ash
WP3 Stand alone system & market replication   Zak
WP4 Commercialisation & growth   Zak & Paulo
WP5 Management and communication   Antonia

Decision-making mechanisms
The project Board will be made up of 3 team members from Conaissance and 2 from GetKalido to oversee project implemented. The Board will align the tasks within the work packages. Final decision making will rest with the chair of the Board, Zak.

Appropriateness of mechanisms
We have distributed responsibility and have prepared detailed deliverables (§3.2.b) within the work packages and set milestones (§3.2.c) which will help us chart our progress and pace ourselves. We outline the challenges and risks that we are most likely to encounter and how we will overcome or mitigate them in §3.2.d.

3.1.c Partner strengths and weaknesses

The partnership between Conaissance and GetKalido came about in a natural way. Kalido had launched its social working platform in some countries and was expanding into Europe. But in all of their territories, they had a problem as outlined below.

	Conaissance, UK	GetKalido, UK
What's the symbiosis?	Conaissance's weakness is GetKalido's strength. GetKalido's has a ready-made user base of 60,000 ready to use our technology. Kalido has partnered with us to make roll out to this closed group possible.	Kalido's weakness is Conaissance strength. Kalido needed to find a software solution that was intelligent enough to find trusted people for roles within its network. Conaissance provided this missing link in the form of Irix.
What does the team bring to the table?	Trust based search Running big software development projects Complex mathematical problems Running grant based projects	Managing a social working platform Fundraising Market replication in new countries Bringing new concepts to market
What does the company bring to the table?	Technical innovation Software management skills	Commercial skills Financing Social working platform

3.1.d Subcontracting

We intend to subcontract two third parties: THRSXTY (global PR) and the London Institute for Mathematical Sciences (network theory). Subcontracting costs are 16.7% of the total budget.

	PR Firm, UK	London Institute, UK
What are they?	THRSXTY is one of the leading UK PR firms and has a global presence.	The London Institute is a private physics and mathematics research centre with expertise in network theory and stochastic processes.
What will they do?	With their extensive reach, THRSXTY will help us strengthen our presence in the EU and replicate our market in other countries.	The London Institute will develop complex networks, including mapping, understanding and optimizing social, financial and infrastructure networks.
Why did we choose them?	They specialise in public relations, digital and influencer marketing, as well as event production. Their amazing campaigns for Evian, Patron and Clash magazine all appeal to a similar key demographic.	We've worked with the London Institute for over two years. They have extensive expertise on modelling network structures that closely match our needs.
Is it best value for money?	We have approached other PR firms with international experience, and none provided comparative value for money, nor matched THRSXTY's enthusiasm for our concept and its global potential. Their UK head office has a bright digital team that have worked on some fantastic global campaigns that we feel fits perfectly.	According to the company statistics site Glassdoors.co.uk, the annual salary for postdocs at Imperial College and Oxford are £36,061 and £35,100, compared to London Institute £36,000—no significant difference. But in terms of expertise and know-how, the London Institute has an advantage. They offer best value for money.
Relevant tasks	WP3.1: Strategy for EU WP4.1: Kalido Marketing WP4.2: Plug-in Marketing	WP1.1: Architecture WP1.2: AI WP4.5: Subcontracting

3.2 Work packages, deliverables and milestones

3.2.a Work packages

WP	Work package title	Partic. number	Lead participant	Person months	Start month	End month
1	Platform upgrade and expansion	1	Conaissance	55	1	15
2	Launching in the Kalido ecosystem	2	GetKalido	40	7	12
3	Stand alone system and market replication	1	Conaissance	50	13	24
4	Commercialisation and growth	1	Conaissance	62	13	24
5	Management and communication	1	Conaissance	43	1	24

3.2.b Deliverables

WP	No.	Deliverable	Dissem. type	Deliv. month	Deliv. month
1	D1	Plug-in software ready and tested for launch	Other	Public	12
	D2	Mobile app (iOS and Android) ready and tested for launch	Other	Public	15
2	D3	Irix integrated into Kalido platform	Other	Public	11
	D4	Irix available on Kalido platform	Other	Public	12
3	D5	Market report of awareness & penetration into target segments	R	Public	15
	D6	First 3000 platform users	R	Public	18
4	D7	Total bounty value over €100,000	R	Public	21
	D8	First international users	R	Public	15
5	D9	Project sign off	Other	Public	24
	D10	Recruitment of successful team	R	Public	9

R = document, report   Other = software, etc.

3.2.c Milestones

WP	Milestone		Means of verification	Month
1	M1.1	Software developed	Software available to 3rd parties	15
	M1.2	Distributed architecture	Test software running over multiple servers	13
2	M2.1	Live on Kalido	Available to Kalido users	12
3	M3.1	3000 platform users	System report showing 3000 platform users	18
4	M4.1	International users	IP address of 'business root' is outside UK	15
	M4.2	Gross bounty over €100K	Total bounty committed surpasses €100K	21

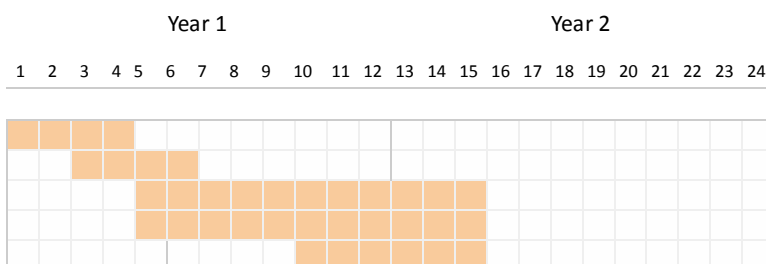## 3.2.d Timeline (Gantt chart)

☐ = Lead person   ☐ = Task month

AT = Antonia Tingey   NG = Neil Gebbie   ZJ = Zak Johnson   AS = Ash Sologar   SV = Sanjay Varma   PB = Paolo Barucca   LI = London Institute
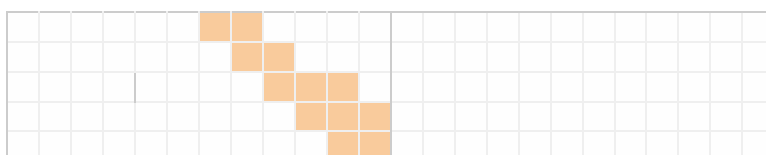
Tasks (T) & milestones (M)

WP1 Platform upgrade and expansion

T1.1 Architecture
T1.2 AI
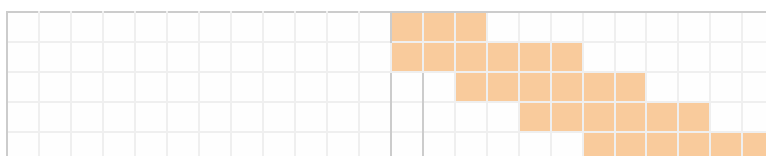T1.3 Continuous Testing
T1.4 Development & Imp
T1.5 SIT

WP2 Launching in the Kalido ecosystem

T2.1 Technical Audit
T2.2 Test Plan & Case Dev
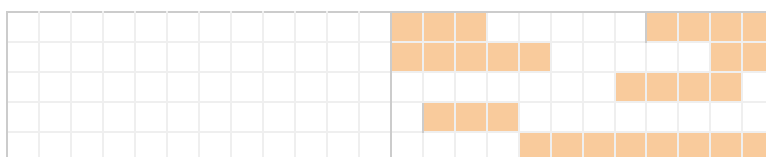T2.3 Integration Dev
T2.4 Pilot testing
T2.5 Reporting

WP3 Stand alone system and market replication

T3.1 Strategy for EU
T3.2 Film campaign
T3.3 Postdocs Campaign
T3.4 Tutors & Developers
T3.5 Tradesmen Camp

WP4 Commercialisation and growth

T4.1 Kalido Marketing
T4.2 Plug-in Marketing
T4.3 EU conf & Activation
T4.4 Pricing & licensing
T4.5 Incentive structures

WP5 Management and communication

T5.1 Coordination
T5.2 Kalido plug-in
T5.3 App dev
T5.4 Recruitment
T5.5 Interns
T5.6 Subcontractors
T5.7 Comms & Diss
T5.8 IPR
T5.9 Mentoring
T5.10 Reporting
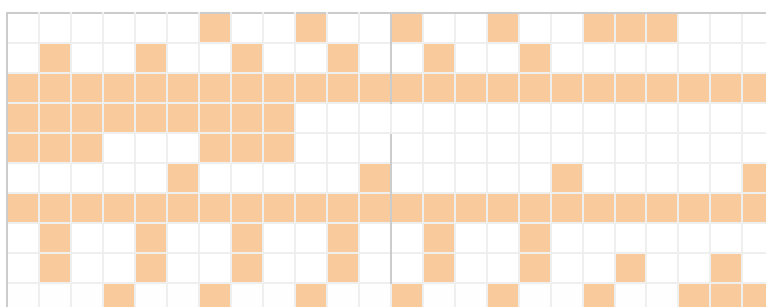
3.2.e Detailed work plan

WP1 Platform upgrade and expansion   Months 1-15

Participant number: 1 Conaissance   Neil Gebbie

Obj. 1   Extend stand alone software (website & App) for commercial launch
Obj. 2   Extent plug in software/ API for commercial launch

Task	Name	Description
1.1	Architecture	Modify software architecture to run trust corridor searches and enhance the speed profit by optimising the trust trees.. Spec the mobile app vs of platform in XD or Sketch; check logic. The software architecture and app will need to be

		upgraded using react native to include the additional software to seamlessly update a user's trust profile as well as interact with other profiles on or off the network.
1.2	AI	Artificial intelligence module will be developed to teach the system to predict, suggest and map alternate corridors to prompt uses to try alternate start points for trust corridors.
1.3	Continuous Testing	Set up automated testing for our development process. Using continuous integration tests and tools we validate our logic and code quality to ensure that our iteration times are shorter.
1.4	Development and Implementation	The actual task of implementing the business logic into a technical application. Breaking down the tasks then coding from our development team such as payment integration, bounty etc... Once the software is developed, the stage of implementation comes in where the product goes through a pilot study to see if it's functioning properly. At this stage we will also enhance current website security and stability for larger traffic volumes
1.5	SIT	System integration testing - to ensure the upgraded software works seamlessly with the rest of the software modules.

WP2 Launching in the Kalido ecosystem   Months 7-12

Participant number: 2   GetKalido   Ash Sologar

Obj. 3   Integrate Irix plug-in
Obj. 4   Make Irix available on the Kalido platform

Task	Name	Description
2.1	Technical Audit	Our development team reviews the current technical infrastructure that Kalido is currently using. We determine the current business logic, flow and requirements. Our team will be working alongside senior members and stakeholders at Kalido to ensure our initial integration has minimal friction in the Kalido ecosystem.
2.2	Test Planning & Case Development	Once the requirements have been reviewed, we plan the testing of our project at a high level. Test plan documentation is created during this phase. This phase ensures the testing team is adhering to the same logic and requirements of our plan. The goal of this phase is to determine in detail how to test our product. Test cases should be written to guide the tester through each test. The test cases should be updated if new features are introduced. During this phase we will be using placeholder data. Prepare any placeholder data required to run tests during this phase so our testing team can implement normalized data. Implement a bug tracking system for future use.
2.3	Integration development	We extend the Irix codebase to act as an intermediary between our current ecosystem and the Kalido user base. We incrementally roll out current Irix features. We simultaneously perform code quality testing whilst continually integrating into the Kalido app.
2.4	Pilot testing	Using a predetermined sample size we perform user testing of Irix within the Kalido application. At this stage we determine how our implementation can be improved, simplified or extended to better suit the user base. Depending on the outcome of these tests we may have to make modifications to our current implementation in 2.3. Here we will also optimise the app incentive structure.

2.5	Reporting	Once the pilot testing is completed, confirm value hypothesis by collecting user feedback. This task also involves an analysis of defects found and other metrics such as how many passed/failed/skipped test cases. This final phase of this work package might also include a retrospective of our process. This allows the team to learn and improve for future projects.

WP3 Uptake on stand alone system and market replication   Months 13-24

Participant number: 1   Conaissance   Zak Johnson

Obj. 5   Generate awareness of Irix
Obj. 6   Generate users

Task	Name	Description
3.1	Strategy for market replication	Working with THRSXTY PR to create EU marketing strategy. This will help us identify the key advertising partners and avenues needed to scale up our marketing efforts for penetration into other EU markets. We will target current job searching methods in this industry such as word-of-mouth via social media by contacting Facebook group owners and partnering with them. This way we can use their pre-existing user pool to our advantage, and with their seal of approval people within that database will trust our service more. Look at ways to integrate contacts using SMS, email & social media.
3.2	Film industry campaign	We will be targeting specific skills within this industry such as producers and camera operators. We will be marketing in various industry publications and digital outlets. We are also utilising ZJ's contact to run a pilot in WeCrew an industry freelance platform.
3.3	Postdocs campaign	We have a plan to approach our contacts within academic institutions at Oxford (UK), Karlsruhe Institute of Technology (Germany) and Paris-Sud (France). We will be launching a campaign to market within the institutions via email, advertising and digital media.
3.4	Software developers & tutors campaign	We have grouped these two sectors together since they tend to work on a per project basis. We will target small business owners who are looking to find tutors/developers to improve their business via adverts on business related sites and blogs.
3.5	Tradesmen campaign	We will approach homeowners to use Irix to find builders, and interior design related sites to find people looking for workers to assist their home projects.

WP4 Commercialisation and growth   Months 13–24

Participant no: 1 Conaissance   Zak Johnson and Paolo Barucca

Obj. 7   Get Kalido users to use the Irix
Obj. 8   Commercial launch of plug-in to other parties

Task	Name	Description
4.1	Kalido marketing	Marketing to the 60,000 Kalido users to highlight the key benefits of using the Irix plug-in. This campaign will roll out using SMS, email and push notifications within the Kalido App.
4.2	Plug-in marketing	Developing a marketing plan for roll out of our plug-in to other social platforms and partners.

4.3	EU conferences and activation	Attending conferences to highlight the key benefits of the Irix plug-in. Case studies will be discussed in a wider audience showing the key successes to our partner businesses.
4.4	Pricing & Licensing	Commercial license model development - developing purchase options based on organisation type, network size, transaction models, open interactions. Marketing of plugin functionality to other new and mature ecosystems
4.5	Incentive structure	We have so far used an exponentially decreasing (by a factor of ½) reward structure. We will consider other exponential factors and flat and quadratic incentive functions. The goal is to match the reward to the required user motivation at each level. Optimize incentive structure to optimise no. of user connections

WP5 Management and communication   Months 1–24

Participant number: 1   Conaissance   Antonia Tingey

Obj. 9   Overall coordination of the 2 SME partners and 2 subcontractors, and Irix plugin and platform.
Obj10   Find and hire key technical and commercial interns and employees.

Task	Name	Description
5.1	Overall coordination	Conaissance will oversee overall coordination between the two partners, Conaissance and GetKalido, and the two subcontractors, London Institute and THRSXTY. Conaissance will also oversee that the EU funding is secured in a timely way.
5.2	Coordinate Kalido plugin	GetKalido will coordinate the plugin of Irix within the Kalido app, including wireframes and data standards.
5.3	Coordinate app development	Irix will coordinate extending the web platform into a mobile app, including management of UI and UX designer. It will oversee consistency between the app and web platform.
5.4	Recruitment	Conaissance and GetKalido will oversee the recruitment of new team members, through a mixture of known recruitment agencies, job boards, and using Irix itself to secure new trusted employees.
5.5	Interns	Conaissance will be in charge of advertising for and interviewing technical interns, to assist with aspects of web and mobile app modifications.
5.6	Subcontractor meetings	We will meet every two weeks with our subcontractor London Institute for the first 6 months of the project, and monthly thereafter. We will meet monthly with our subcontractor THRSXTY during the last 16 months of our project.
5.7	Communication & dissemination	Communication and dissemination will be done by both core teams, Conaissance will ensure subcontractor THRSXTY dovetails into these efforts.
5.8	IPR	Conaissance will oversee general IPR management, including any trademark and patent applications and copyright protection. Conaissance will also liaise with outside bodies such as WIPO and patent agents.
5.9	Mentoring	Use the SME Instrument mentoring service to support WP4 Commercialization to ensure we understand local territories and perception of trust corridors.
5.10	Reporting	Conaissance will collect periodic progress reports from Conaissance and GetKalido teams, to be submitted for each reporting period.

3.2.f Risks

Technical risks relate to potential difficulties in implementing our technology.

WP	Level	Name	Risk	Mitigation
1	Med	Multiple mobile platforms	Developing the mobile app for multiple operating systems and hardware (handset) variations is too expensive and time consuming.	We will adopt React and React Native, a new language environment developed by Facebook to eliminate the need to build separate app implementations by automatically exporting them from a single source.
2	Low	Slow speed	Search times are too long because individual users may take a day or more to pass on the listing to further contacts.	We only need some users to be fast, not all, since the fast ones will make connections to the next level, and so on. If needed, we will prompt users to act within hours by tracking their response times (e.g., like Airbnb does).
1	Low	Unscrupulous users	Users adopt a shotgun approach by passing job specs to many unsuitable contacts in the hope of getting lucky and being part of a winning chain.	For users that frequently adopt a shotgun approach, we will track a trustworthiness score: the fraction of times that a user has been part of a successful trust corridor (winning chain). This score will be seen by others, and on this basis they may refrain from passing on to unscrupulous users.
2	Low	Fraud	Users try to defraud the system by impersonating a user that is part to the winning chain and entitled to a reward.	Each user node will have a 512 bit random string which acts as its "DNA", passed from one generation to the next. A daughter node inherits half of its DNA from its parent, with the other half a random string unique to itself. This gives a secure record of the lineage of winning chains.
2	Med	Confusion	Users find the recursive nature underlying Irix confusing	We will add pictorial instructions when users sign in, and overlay prompts throughout.

Commercial risks relate to potential difficulties in how users derive value and we generate growth.

WP	Level	Name	Risk	Mitigation
5	Med	Recruitment	We cannot recruit the qualified new team members fast enough.	Our core team members have ongoing relationships with recruitment agencies for developers and designers. They can provide quick turnaround times for finding staff.
4	Low	Growth but little revenue	The number of users is growing, but we are not making enough money per user.	Irix revenue is directly linked to the depth (number of layers) of trust trees. To increase revenue, we will reduce tree depth by encouraging more targeted connections.
3	Med	Revenue but little growth	We are making enough money per user, but users are not generating new users enough to create a viral growth engine.	Irix growth is directly linked to the size (number of nodes) of trust trees, since each node is a new advertisement. We will notify everyone on the tree if a search is successful, encouraging them to instigate a new, different search of their own.
3	Low	Insufficient incentive	Recipients are not sufficiently incentivised to pass on and make further connections.	We will model a range of incentive structures in addition to the exponential decrease up the winning chain that we currently use.
4	Low	Users go "off-system"	A user tries to circumvent the winning chain and link the business and the worker more directly.	Individuals in the tree trying to get further down the winning chain. If this happens we will ensure that loops in the tree is forbidden.

3.3. Resources

3.3.a Summary of personnel

Personnel by job

This project will have a total of 250 person-months (pms) over the two years of Phase 2. Conaissance will have 180 pms, GetKalido will have 45 pms, and the two subcontractors combined will have 25 pms (10% of the total pms).

Partner	Personnel	Person-months
Conaissance	Core team: Neil, Zak, Antonia, Paolo	60
Conaissance	Web developer	18
Conaissance	App developers	36
Conaissance	Marketing and sales	27
Conaissance	Data modelling	12
Conaissance	Security & financial transactions	15
Conaissance	Interns (4 x 3 months)	12
Kalido	Core team: Ash, Sanjay	12
Kalido	Web and app developers	18
Kalido	Marketing	15

Subcontractors

London Institute	Network structure, Galton-Watson trees	16
THRSXTY	National, international PR campaign	9
Total		250

Personnel by work package

The 250 person-months are distributed over the work packages as follows:

Participant	WP1	WP2	WP3	WP4	WP5	Total
Conaissance	42	14	40	50	34	180
GetKalido	5	22	-	9	9	45
London Institute	8	3	-	5	-	16
THRSXTY	-	1	5	3	-	9
Total	55	40	50	62	43	250

3.3.b Other direct costs

Please complete a table if the sum of the costs for' travel', 'equipment', and 'goods and services' exceeds 15% of the personnel costs for that participant.

The total Other Direct Costs do not exceed 15% of the personnel costs for either of the two participants.

4 Members of the consortium

4.1 Participant 1: Conaissance Ltd

4.1.a Description of the legal entity

Conaissance Ltd is a UK SME dedicated to human-facilitated search. The premiere product of Conaissance is the Irix, a web platform which enables individuals to easily and quickly identify trust corridors through the complex ecosystem networks which connect them to others. Conaissance has offices in London and combines expertise in software design with computational methods for navigating complex networks to establish optimal trust corridors to quickly bring people solutions which they can be confident about.

4.1.b Key persons

Neil Gebbie

Background
Neil has worked for over 8+ years as a full stack web developer applying his knowledge, skill set and problem-solving abilities in a digital environment. Neil has a background in web development and now, with the use of future thinking frameworks he is applying his skills to native app development. Neil was Born in Australia with Scottish heritage, and joined the Conaissance Ltd to develop their application and extend their web presence.

Experience
Application architecture, source control, web development, database management, technical documentation, algorithm implementation

Zak Johnson

Background
Zak has worked as a marketing professional for many years in a number of competitive markets including start-up, e-commerce, tech & FMCG. Zak started his career working in cell search, triangulation and monitoring of mobile devices and then went on to work as a technology and marketing consultant for start-ups.

Experience
Software marketing, e-commerce, digital marketing, ATL advertising, social media and marketing strategy

Antonia Tingey

Background
After studying at King's College London, Antonia went straight into the restaurant industry, where she managed restaurants and turned them around. She then moved to working with startups. Antonia has managed defence contracts with the UK Ministry of Defence and the US Department of Defense. She handles Irix's software procurement, accounts, contract negotiations and subcontractor relationships.

Experience
Grant management
Finance and accounts
Marketing
Customer service

Paolo Barucca

Background
Barucca is a theoretical physicist specializing in the statistical physics of disordered and complex systems. He is currently researching systemic risk in financial networks trying to provide general, informative and reliable indicators for quantifying the risk of default cascades in networks, prevent systemic crises, and design more sustainable financial policies.

Experience
Statistical physics, network theory, systemic risk, information chains

4.1.c Relevant products or services

Name	Led by	Description
Machine to machine provisioning	Neil Gebbie	We developed a provisioning platform for the Cable and Wireless (now part of Vodafone) broadband and mobile provisioning platform. The goal was to enable Cable and Wireless partners to automatically provision a range of services without the need of manual intervention, allowing them to surpass British Telecom's much smaller service offering.
UK DTi taxonomical information management	Neil Gebbie	We designed and implemented the original software for the UK Department of Trade and Industry to manage all of its internal documentation using taxonomical structures (document metadata) to streamline searching on core document attributes and content.
UK House of Lords management system	Neil Gebbie	We designed and developed the system that runs day-to-day debate management in the British House of Lords, allowing members to book and manage their planned speeches, modernising ancient systems and protocols.

4.1.d Relevant projects or activities

Name	Description
Identifying network hierarchies	Identified a method of identifying hierarchies and rankings of nodes in directed graphs is, fundamental to ecosystem network analysis: E. Letizia, P. Barucca, F. Lillo, "Resolution of ranking hierarchies in directed networks", submitted to PLOS ONE.
Adaptive networks	Administrative lead on a $1m project funded by the Defense Threat Reduction Agency for designing networks capable of self-healing and adapting, which involved managing the development team and the finances.
Ecosystem network communities	We developed new ways of breaking up complex graphs into natural communities, a challenge in both the Kalido ecosystem and others: P. Barucca, "Spectral partitioning in equitable graphs", Physical Review E **95**, 062310 (2017)
Enron gas well monitoring system	Designed software to provide Enron with real time reporting on gas "well head" production gathering data directly from flow monitors and converting this into real time reports for energy traders.

4.2 Participant 2: GetKalido Ltd

4.2.a Description of the legal entity

GetKalido redefines how individuals connect to exchange services. We want to make the world better. We disrupt person-to-person commerce at the exact time that an entire generation is replacing the traditional corporate dream with an independent freelance one. We believe that today's work culture is fundamentally flawed. Too many people wake up wishing they didn't' have to trudge to jobs they don't like, work for people they don't respect and take home money that never feels like enough. When you are the one working, you do all the work, while others often take all the profits. When you are the one paying, bureaucracy often destroys the soul of the engagements. We built Kalido to fix all this.

4.2.b Key persons

Sanjay Varma

Background

Varma is the founder and Chairman of JMATEK International, a Hong Kong headquartered multinational group offering market leading, high quality comfort appliances to consumers around the world. Previously, Sanjay was the #3 member in Alibaba's leadership team in its early days. He started his career with McKinsey & Company in India. In 2013, Sanjay was awarded the "Outstanding Entrepreneurship Award" by Enterprise Asia. Sanjay is on the advisory board of Columbia Business School's Eugene Lang Entrepreneurship Center. He also serves on the board of Running to Stop the Traffik, a Hong Kong-based initiative that aims to stop human trafficking and slavery through endurance sports events that raise money for charity. He has an undergraduate degree from The University of Michigan and an MBA from Columbia University in New York.

Experience

Product development, commercialisation, strategy, marketing

Ashvin Sologar

Background

Sologar has a broad range of technology experience including development, product management, and consulting in both enterprise and startup contexts. He previously led McKinsey & Company's Africa-based technology work in heavy industry. During his time at McKinsey, he served clients in banking, healthcare, water, IT infrastructure, rail, ports, power, and charity foundations. His work has taken him across Europe, Australia, Africa and the Middle East. Prior to that, he worked for a software development company called SUBNET Solutions, holding marketing, strategy and product management roles during his tenure there. Ashvin holds an MBA from INSEAD in France and Singapore, and a BSc in Computer Engineering from the University of Alberta, Canada

Experience

Software development, project management, product, development social networks

4.2.c Relevant products or services

Name	Led by	Description
Kalido	Sanjay Varma	Devised and build from scratch a 50,000 user commercial social network operating across South Africa, India and the UK.
Alibaba	Sanjay Varma	Number 3 at Alibaba, helped commercialize and roll out the the globally successful online marketplace.

4.2.d Relevant projects or activities

Name	Description
Sanjay Varma	Advisory board member of Columbia Business School's Eugene Lang Entrepreneurship Center.
Sanjay Varma	2013, Sanjay was awarded the "Outstanding Entrepreneurship Award" by Enterprise Asia
Ashvin Sologar	Led McKinsey & Company's Africa-based technology work in heavy industry
Ashvin Sologar Sanjay Varma	MBA from INSEAD in France MBA from Columbia University

4.3 Third parties involved in the project

Does the participant plan to subcontract certain tasks?	Yes
Does the participant envisage that part of its work is performed by linked third parties?	No
Does the participant envisage the use of contributions in kind provided by third parties?	No

No.	WP	Task to be subcontracted	Justification of 'best value for money'	Sub-contractor	Amount
1	WP1	T1.1 Architecture (substantial) T1.2 AI (substantial)	LIMS will consult on mathematical algorithms structures in the code in these takes. Leading expertise in this area and working relationship.	LIMS	€113,295
1	WP2	T2.4 Pilot testing (substantial)	LIMS will review information generated by the pilot systems and modify the mathematical algorithms based on the results to optimize the system. As they would have designed this part of the functionality they are the most appropriate to do this.	LIMS	€42,485
		T2.	THRSXTY will be assisting with PR and marketing activities launching on the Kalido ecosystem. This will include making first contact with users via SMS, Email, Push notifications and banner advertising.	THRSXTY	€14,161
1	WP3	T3.3 Awareness (substantial) T3.4 Action (partial)	THRSXTY will be helping to implement our 12 month PR and marketing strategy for awareness and action. They specialise in public relations, digital and influencer marketing, as well as event production.	THRSXTY	€70,809
1	WP4	T4.1 Kalido marketing (substantial) T4.2 Plug-in marketing (partial) T4.5 Incentive structure (substantial)	THRSXTY will be assisting us in our marketing plans for Kalido and our plug-in. This will be in the form of social media activation and press releases for PR to media outlets.	THRSXTY	€42,485
			The LIMS team have exceptional talent and experience in modelling financial incentive structures having worked on projects for the world bank and other international finance organisations.	LIMS	€70,809
1	WP5	5.2 Subcontracting (partial)	LIMS & THRSXTY need to participate in this task as they are the only subcontractors.	THRSXTY LIMS	€0

5.   Ethics and security

5.1. Ethics

Personal Data

Does your research involve personal data collection and or processing?

Yes - limited data is collected in the form of email addresses and related to the search task. This data can be accessed by parties involved, and will be removed after a successful match or if there is no math after a time limit of 30 days.

Third Countries

Do you plan to import any material including personal data from non EU countries into the EU?

There is a possibility that users of our system will be outside the EU, and in some cases some of their information may be processed within the EU.

Do you plan to export any material including personal data from the EU to non EU countries?

Depending on where our system is used e.g. Russia there may be local laws which may force us to process some data in those territories. If a user in the EU interacts with a user in Russia then some of this data may be processed in Russia.

5.2. Security

Indicate if your project will involve activities or results raising security issues.	No
Indicate if your project will involve 'EU-classified information' as background or results.	No