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SOCIOLOGY | RESEARCH ARTICLE

The growth and decline of cryonics

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Abstract: Cryogenic storage has become known as an alternative to burial. While a substantial fraction of the public finds cryonics acceptable, enrollment remains miniscule. One of the greatest unknowns is whether cryonics companies will be able to operate continuously until reanimation of those in storage becomes possible. Two failure modes are considered; organizational decline and political attack. The cryonics industry has adopted a strategy that implicitly targets atheist millionaires and alienates women. This is a result of neglecting science in its marketing efforts. American cryonics organizations have also incurred an avoidable political risk by refusing to use the funeral industry as a sales channel. Two alternative strategies are suggested that could minimize failure risk by reversing the stagnation of the industry. A “repackaging” of cryonics could accelerate growth and improve services, as well as the political position of the industry. This repackaging includes a restructuring of the channels for funding cryonics. Integration with the mainstream assumes using the funeral industry as a sales channel. While both political experiences and research results have made the need for these developments apparent, pioneers of the industry have resisted them.

Subjects: Cultural Theory; Death; Death and Dying; Medical & Healthcare Law; Political Psychology; Psychological Science; Religion; Technology; The Body; The Body & Identity

Keywords: organizational decline; political risk; social marketing; organization theory; life extension; biopreservation; death; immortality; interment; religion



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ABOUT THE AUTHOR

David Sanders Stodolsky is a social and political psychologist. His research includes collective intelligence enhancement and workplace democratization. The focus is the application of Internet technologies to group problem solving. He has also published on the evolution of death understanding. The research reported here relates to the potential of cryonics to serve as a unifying technological basis for the evolving transhumanist movement. According to modern existentialism, a cultural system must shield the person from the fear of death. Cryonics can provide the foundation for a culture promoting the immortalization of mankind by technological means. However, it can only do this if it can provide organizational stability adequate for an experiment that must last hundreds of years. While vast sums have been expended upon the perfection of reversible cryonic suspension, organizational issues have not yet been addressed in a scientific manner. This paper is a first step in this direction.

PUBLIC INTEREST STATEMENT

The search for a “fountain of youth” has occupied mankind since the beginning of human history. Cryonics (freezing at death) offers one of the latest solutions. Revival with a regenerated body is seen as possible, assuming technology has become sufficiently advanced. However, cryogenic storage must be maintained, probably for hundreds of years. This paper was written to alert cryonicists of the need for greater organizational robustness, if there was to be any hope that this experiment would succeed. Literature on organizational failure and on barriers to enrollment were reviewed. Two strategies for restarting growth were presented. Unfortunately, industry leadership refused to accept that there were problems and even censored earlier versions of this paper. While cryonicists consider themselves to be taking a scientific approach to life extension, this response to criticism suggests religious fanaticism. An analysis of leadership attitudes and behavior indicates that cryonics has become a religion for many.

1. Introduction

Cryonics service providers offer their customers perpetual care. This care is meant to continue until medical technology has advanced to the point that their reanimation can be performed safely. While the most optimistic estimates are that reanimation may be possible in as little as fifty years, the time frame is normally considered to be hundreds of years. The poor quality of suspensions received by most persons, however, suggests that many will be reanimated only in the distant future, if at all. One of the greatest unknowns is whether these companies will be able to operate continuously over this period. An organizational failure of even a few months would terminate the experiment in medical time travel by causing irreparable damage to those in storage.

The cryonics industry's offer of perpetual care is organizationally similar to the offer of perpetual care provided by the Catholic Church in England in the Middle Ages in the form of chantries. Chantries were a type of trust fund established for the purpose of employing priests to sing a certain number of Masses during a stipulated period of time for the spiritual benefit of the deceased. The first perpetual Mass was established by royalty in the 1180s. Most institutions providing this service were suppressed in 1547 as part of the Reformation (Chantry, 2015). Therefore, the "perpetual" care lasted for less than 400 years. This is also a reasonable estimate for the amount of time that a majority of those in cryonic suspension will require before any reanimation becomes possible. However, the chantries were established as part of the Roman Catholic Church or as institutions under its direction and control. During this period, the Roman Catholic Church was as powerful as a state and was considered by many to be the governing body of Europe. In contrast, cryonics organizations are very small businesses with extremely limited resources, and are subject to regulation by both State and Federal governments. The key question addressed here is whether and how such organizationally inferior institutions can achieve the longevity that the most powerful organization in Europe only barely achieved in earlier times.

2. Organizational decline

The study of organizations shows that they go through a period of growth, followed by a period of decline, until they finally disappear. The probability of long-term survival of business organizations is extremely low. "Around two-thirds of businesses are still operating after five years and almost one-half are still operating after ten years" (Bickerdyke, Lattimore, & Madge, 2000). Business failure statistics show that about 4% of small businesses (1–99 employees) that enter the marketplace disappear within one year, 15% disappear within three years, and 30% disappear within five years (Industry Canada, 2009). While this may not sound like so high a failure rate, when repeated over a hundred years, it means that very few organizations survive. In fact, the hundred-year survival is calculated from both sources as less than one chance in a thousand. Boulding notes that organizations follow the path of

inexorable and irreversible movement toward the equilibrium of death. Individuals, family, firm, nation, and civilization all follow the same grim law, and the history of any organism is strikingly reminiscent of the rise and fall of populations on the road to extinction (Boulding, 1950).

This failure dynamic is why it is so crucial to do everything possible to increase the chances of organizational survival.

The main reason for failure is inexperienced management. Managers of bankrupt firms do not have the experience, knowledge, or vision to run their businesses. Even as the firms age and management experience increases, knowledge and vision remain critical deficiencies that contribute to failure (Baldwin et al., 1997).

According to the monthly data on the Cryonics Institute (CI) website, CI membership will not continue to increase indefinitely with the current strategy. Those figures show that paid-up memberships will never pass 2,200. At that point, members going into suspension will equal new signups. (Some of the new cases are postmortems, i.e. they are signed up by family members or others, after

being declared dead, but since that data isn't given, it is impossible to make an adjustment. If half of all new suspensions are in this category, then the membership will peak at 4,400. [The Alcor Life Extension Foundation (Alcor) membership appears to be following a similar pattern, i.e. a fixed number of new members per month, which is a declining growth rate.] This is in sharp contrast to the earlier growth rates seen at CI, which indicated a doubling in membership every three to five years.} If this trend continues, then CI will reach its peak size in about 50 years. We can expect a long decline to follow, since long-term stability is an unknown phenomenon for organizations. CI would then be expected to disappear in less than a hundred years after this peak, about 150 years from now. Since about half of prearranged suspensions can be considered poor, due to delays in cooling, it is unlikely those cryonicists will be reanimated within this time frame. In fact, there is significant doubt that anyone cryopreserved with today's technology could be reanimated within the next 150 years. A hundred and fifty years would be an unusually long lifetime for a business organization, so this estimate is likely overoptimistic.

A more accurate assessment of decline can be made by looking at the specific risks likely to be encountered by cryonics organizations, as opposed to looking at overall trends. Both major providers operate in a problematic manner, if we consider the type of business model needed to sustain an organization over the long term. CI operates with volunteer labor in many functions. Alcor has benefited from very large occasional donations. It isn't clear what the long-term effect of these inputs vanishing would be.

The hostile takeover risk to cryonics organizations is underestimated. In political terms, the unorganized individual is in the weakest position in a society. Due to the individualism that dominates the organizations in the United States of America (USA), these cryonics providers are easy takeover targets for any organized group. The Temple of the Vampire (ToV) is a secretive church that rewards members achieving cryonics coverage with advancement up the ToV hierarchy. This encourages enrollment in cryonics organizations. Since CI offers the most economical option, CI probably has a majority of enrolled ToV members. Because many positions at CI are filled by volunteers, there is an enhanced risk that even a small secretive group could place their members in key positions and then exclude opponents. This is not just a theoretical risk. The CI President tried to place a ToV member on the Board of Directors in 2011. Another CI member, in an open dispute related to the 2011 election, was a ToV supporter, at minimum. If current trends continue, ToV will likely takeover both CI and Alcor. The dictatorial policies at CI, make it an easy takeover target. Alcor's self-selecting Board of Directors is a weakness permitting a small group to take control. A failed takeover attempt might cause even more damage to an organization in the short run, than a successful stealth takeover. It might result in ideological warfare that could cause the organization to breakup.

The dynamics of organizational decline, especially for small organizations, makes the long-term outlook for successful completion of the cryonics experiment poor. Also, the organizations are not economically self-sufficient but operate with donations of time and money. This makes it likely that inexperienced management will compound the risk of failure. Finally, the likelihood of hostile takeover appears high. Therefore, only the best preserved, if any, are likely to be revived before organizational failure occurs.

3. Political risk

One assumption is that as long as cryonics is regarded as a cult phenomenon, it will risk being prohibited should such an action appear politically opportune to even a single individual in a position of power. There can be little doubt that the current status of cryonics is that of a cult in the eyes of the general public. We can conclude from survey results (Badger, 1998) that much of the public sees cryonics as a selfish and immoral practice, which "steals" resources and opportunities from the majority of mankind and from the children of the future. This perception is reinforced by the appearance of the topic "cryonics" on "cult" and hoax websites. Websites such as Quackwatch, statements from public skeptics and from the President of the National Council of Health Fraud, and a resolution rejecting cryonics adopted by the Society of Cryobiology lends credible support to this view.

Direct political attacks on the industry have ranged from para-military operations, resulting in staff being dragged off to jail, to attempts by a funeral directors' association to place a provider under inappropriate regulation, potentially making it impossible to continue operation. Another legal initiative has prohibited the marketing of cryonics. While this type of direct political interference offers the greatest immediate risk to the industry, the long-term effects of cult status is also damaging. Mainline research funding and collaboration with many respected researchers and institutions is not an option as long as cryonics is regarded as a cult phenomenon.

The continuing insistence on using language, such as "patient" for those in suspension, is typically seen as inappropriate and even humorous by the average person. This gives many the excuse needed to dismiss the idea of cryonics without a second thought. Any thought about the benefits vs. the costs of cryonics is inhibited by emotional responses triggered by death-related stimuli. This type of inappropriate language virtually ensures an immediate dismissal of the topic. Provider organizations typically explain why they use the term "patient," but the average person has already dismissed the entire idea before reaching this explanation. Also, the term "cryonic" is confused with "cryogenic," even by some knowledgeable individuals, thereby impeding the development of an effective industry brand. That is, a term that is memorable and favorable, which can be used as a marketing "hook" on which to hang a concept that is non-trivial to explain and understand.

There are two separate dimensions we should be aware of when considering terms. First, there is common vs. technical language, e.g. "Aspirin" vs. "acetylsalicylic acid." The second dimension is insider vs. outsider language. Any cult or specialist group will routinely use terms that are foreign, meaningless, or even connoting an opposite meaning to outsiders. For example, an electrical engineer may refer to a circuit element as a "pot," meaning a potentiometer—a variable resistor. To an outsider, this would mean something to cook food in. Within cryonics there has been an effort to be more accurate by using technical language. However, these terms may be counterproductive when it comes to marketing, since these are typically technical, insider terms that may trigger entirely inappropriate associations in non-technical members of the public. The above criticism refers only to non-technical non-insider language utilization. Thus, it would apply only to publicly available information produced by the industry. Technical accuracy has been promoted as the solution to marketing problems. However, I am not aware of any successful industry that takes this approach in marketing to the public.

Another type of political risk results from the minuscule size of the cryonics industry. Regulation in related areas may make the practice of cryonics impossible in certain jurisdictions, even though no consideration has been given to cryonics at all. Recently, the State of Florida passed new regulations concerning all non-transplant uses of human tissues under the Uniform Anatomical Gift Act—the legal vehicle for transferring bodies to cryonics storage providers. The Florida Law confines accreditation in that State only to those facilities that meet the American Association of Tissue Banks' (AATB's) requirements and who are certified by the AATB. These regulations are not designed to accommodate cryonics and would impose an unsupportable burden on cryonics organizations.

The second problem is that, historically, the AATB has been virulently opposed to cryonics. Thus, it may be difficult for a cryonics organization to gain regulatory approval from the AATB. Therefore, by use of a non-governmental non-profit standard-setting institution, the State may indirectly make the practice of cryonics unlawful.

In summary, the cult status of cryonics, which is maintained by use of insider language, makes it an easy target for direct political attack or indirect elimination as a result of regulatory changes.

4. Industry neglect of science in marketing

The almost total neglect of science in marketing is one reason for a dysfunctional strategy. When the objective of a marketing strategy is to promote social change, as opposed to a simple product

(Practices surrounding death are imbedded in the culture of a society. Therefore, changes in these practices require a fundamental restructuring of social behavior.):

Andreasen (1995, pp. 66–67) offers a simple way of distinguishing civically oriented informational efforts that fail from those that succeed in their efforts ... [Five effective strategies are]

- The organization’s mission is seen as bringing about behavior change by meeting the target market’s needs and wants.
- The customer is seen as someone with unique perceptions, needs, and wants to which the marketer must adapt.
- Marketing research is vital.
- Customers are grouped in segments.
- Competition is seen to be everywhere and never ending.

Emails to the original CryoNet Mailing List, for example, show that the dominant view is that “The [cryonics] organization’s mission is seen as inherently good,” “Customers are the problem,” because they are ignorant or unmotivated, “marketing research has a limited role”—actually none, “Customers are treated as a mass,” and “competition is ignored,” except for self-destructive infighting (It is not clear that the industry has even identified what market it is competing in). So, we can conclude that amateurism in marketing has succeeded in choosing five out of five ineffective strategies, virtually guaranteeing failure.

While the choice of the term “cryonic” can be excused, since it was selected before resources were available for marketing research, the continuing neglect of marketing science can be ascribed to a combination of ignorance and incompetence. Typically, social science is dismissed as obvious and unnecessary. However, even this doesn’t explain the resistance to new understandings of the marketing problem. For example, while religion was shown to be an important factor in the choice of cryonics by Badger’s (1998) survey, his results and advice were ignored. It took a reanalysis of that data to show that religion was, in fact, a crucial factor. Even this result was rejected by leaders in the industry. A direct test of this result—that current marketing was targeting atheist millionaires, however, yielded almost the exact number of members signed up with the cryonics providers in the USA (Stodolsky, 2008). This result, combined with the results from two independent studies of attitudes toward life-extension technologies, (Kogan, Tucker, & Porter, 2011; Partridge, Underwood, Lucke, Bartlett, & Hall, 2009) which showed that religious orientation was the most important predictor of attitudes, finally achieved acceptance of what in retrospect was an obvious result. There is no evidence, however, that even this has led to a change in marketing strategy.

The second major finding from the reanalysis (Stodolsky, 2008) of the Badger (1998) data was that marketing was targeting millionaires. While many claim that anyone can afford to sign up for suspension using life insurance, assuming that they start when they are young, it is clear that financial requirements are a major barrier. For example, we know, from numerous instances of people having to drop their suspension coverage due to financial difficulties, that cost is a barrier. We also know that a majority of the world’s population, including people with incomes under a few dollars a day, will never be able to sign up for financial reasons. There were already indications of this in Badger’s article (Badger, 1998). He stated, “Group differences based on Income approached statistical significance (Badger, 1998).” That is, the wealthy are more likely to say, “I believe that cryonics is an exciting idea and intend on looking into it further (Badger, 1998).” This was the only action item in the survey. He reported that, “Individuals making more than \$100 K were generally more favorably disposed toward cryonics (Badger, 1998).”

Eight percent of Kaiser’s sample indicated that they wished to live forever and an additional 37% stated they would like to live indefinitely (Kaiser, Gross, Lohmeier, Rosentreter, & Raschke, 2014).

Zhavoronkov found that over 10% desired to live to, at least, 180–200 years (Zhavoronkov, 2015). Other findings of a less formal nature also suggests a failed marketing approach. The *New Scientist* magazine contest, which offered a choice between a free suspension or a trip to Hawaii, resulted in 28% of those responding choosing suspension. Over half of the respondents in a more recent poll indicated that they would like to have their body frozen after death (Would you want to be brought back to life after death, 2015). Therefore, if suspension was available without cost, we could expect between about a third and a half of the population of the United Kingdom (UK) to accept it. Kaiser found that 22% of a German sample could imagine having their body placed in suspension. However, even the much more conservative figure based upon the less than a half of a percent of atheists in the USA still yields a potential population of 1.2 million, a figure that is vast compared to the couple of thousand members of American cryonics organizations.

We would expect with continuing economic growth that financial barriers would be reduced. However, “in 1996, young men between 25 and 34 years of age were already bringing home, in real terms, \$75 less per week than their fathers were 20 years earlier” (Pusey, 2007, p. 10). The stagnation of the G.W. Bush years, followed by the decline associated with the Great Recession, have further reduced incomes for the overwhelming majority.

The ignoring of financial barriers can explain the current stagnation of the industry: If atheist millionaires are being targeted by current marketing, then the industry has enrolled the persons available in this market segment. We know that the choice of cryonics is highly idiosyncratic. That is, individual variation plays a large role in the decision, perhaps a larger role than religion or economic standing. Therefore, it could easily be that all the atheist millionaires that could be recruited have become members and those remaining will not sign up for highly individualistic reasons that the industry cannot influence.

The fact that current membership includes many persons that are not atheists or not millionaires is not an argument against Stodolsky's (2008) conclusion: knowledge of the baseline effect is important in understanding this. For example, if only .4% of persons are atheists, then even a marketing strategy that targets them may not result in a majority of atheists as members. If we assume that the marketing strategy is nine times as likely to recruit atheists as compared to others, then the effect would be 27.6 ($99.6 \times .1/.4 \times .9$) times as many religious persons as atheists in the membership. That is, since atheists only comprise four-tenths of a percent of the population, then a 9 to 1 bias by the marketing strategy in their favor will result in atheists being outnumbered by about 28 to 1 in the membership. An unbiased marketing strategy would result in over 200 religious persons for each atheist in the membership.

The almost total neglect of science in marketing has resulted in an implicit focus on a very small market segment. A combination of ignorance and incompetence has led to a continuation of this strategy. The failed strategy has been maintained even in the face of a huge potential market.

5. Failure of the medical model

While the problems of the industry are not new, they have also not caused a rejection of the current approach. Originally, the father of the industry assumed that once people became aware of the possibility of medical time travel, there would be widespread acceptance of the option. He felt his book, *The Prospect of Immortality*, (Ettinger, 1964) would trigger a mass movement. After many years and much publicity, general acceptance had not been achieved. He eventually formed a company to provide suspension services himself. Now, more than 40 years after the first man was suspended and much technical progress, enrollment remains vanishingly small.

Failure of the medical model has been attributed to the inability to demonstrate revival from the suspended state. However, a reanalysis (Stodolsky, 2008) of the Badger (1998) survey data showed that attitudes were hardly affected at all by a range of motivational statements specifying conditions which might make people more favorably disposed toward cryonics. In fact, about 20%, of a

technologically sophisticated population—expected to be more favorable toward cryonics, responded, “I would feel more favorable toward the idea of cryonics under no circumstances.” Similarly, assuming the successful revival of a human from suspension had hardly any effect on intentions to act. While such results might seem inexplicable to supporters of the medical model, they are to be expected if we consider religiously based objections to medical treatment. These objections have been applied to, for example, blood transfusion and immunization against infectious diseases. Since even these widely validated and accepted medical procedures have been rejected on the basis of attitudes, it is not surprising that a more speculative and less accepted procedure does not attract proponents. Zhavoronkov (2015) found that a majority rejected any invasive procedure for life extension and expressed no desire to live past age 100, even if they could remain in a youthful state. Kaiser et al. (2014) found that 24% of a German sample saw their own cryopreservation as inconceivable and 54% rejected it completely. Only 16% regarded death as “a problem that needs to be solved (Kaiser et al., 2014).” Only 11% of a sample from the International Employee Benefits Association felt that aging was a disease (Zhavoronkov, 2015).

The mainstream view of cryonics is that it is an unusual interment practice. In fact, CI was, for a time, officially registered as a cemetery. Under the Uniform Anatomical Gift Act employed, persons must be declared dead prior to being processed for suspension. About half of all cases at CI are postmortems. Since no marketing is directed toward the funeral industry, we can conclude that marketing efforts are having no effect or that there is an unmet demand that is being made apparent. In fact, a cooperating funeral director recently requested that he be allowed to offer cryonics as a standard product. (A “cooperating funeral director” is an establishment that has agreed to assist in the shipment of a body to a cryonics facility. In this case, F. A. Albin & Sons, London, England, UK). Therefore, we can conclude that both mainstream opinion—government—and the market are signaling the need for a strategy employing the funeral industry as a sales channel.

Failure of the medical model has been attributed to the inability to demonstrate revival from the suspended state. However, survey data shows that attitudes would hardly be affected by such a demonstration. A majority of the public simply doesn’t view aging as a disease and doesn’t see death as a medical problem. Some funeral directors see cryonics as an option, suggesting the funeral industry as an appropriate sales channel.

6. Funeral industry

CI’s post-mortem cases are now getting an inferior suspension, because CI requires a two-week delay designed to reduce the risk of legal complications. If funeral directors were the contracting agents, they would be accepting any legal liability and, therefore, this delay could be reduced or eliminated. Another practical effect could be that cooperating funeral directors would be required to have cool down facilities and, most likely, a transport kit, ready at all times. Once they had invested in these facilities, it would make sense to assume initially that all cases would be sent for suspension. In fact, they would be highly motivated to get all cases cooled down at the earliest possible moment, since this would make it more likely they could sell a family on cryopreservation and thus make a better profit. Finally, CI could require, or the funeral directors themselves could request, certification as cryonics transport technicians. This would give them a competitive advantage over untrained funeral directors. This cooperation with funeral directors could be segregated into a subsidiary to minimize legal liability.

Current policy has led to an adversarial relationship between cryonics organizations and the funeral industry (This has not occurred in Russia, where KrioRus has exhibited at a funeral industry convention). It has been necessary to contribute to and to lobby supportive political figures to avoid troublesome legislation. This problem appears to be limited to Arizona at the moment. However, increased visibility of the cryonics industry could raise this issue to the national level. If it came down to who can afford to influence the most politicians, it is pretty clear the cryonics industry would be the loser. Therefore, improved cooperation between the two industries is very likely essential for the survival of cryonics. Cooperation in sales would have the advantage of isolating CI from any legal

liability and of generating a stream of funding for CI's research activities. CI has developed expertise in cryogenic storage and biopreservation. This expertise could be capitalized upon by opening this sales channel.

We can conclude that the current policy of ignoring the funeral industry as a sales channel is leading to inferior suspensions for at least half of current CI cases. It is also using up funds and creating a major political risk for the cryonics industry. Much needed funding for research is also being lost by not servicing what could be a highly lucrative sales channel. There is no physical difference necessary between facilities for cryonic suspension and cryogenic interment, which could be considered an esoteric burial practice similar to having one's ashes launched into space. The difference amounts to an intent to revive. The major barrier to implementation of this new sales channel is the self-perception of the leadership of the cryonics organizations. They would have to accept that they were participants in the funeral industry. The entire future of the cryonics industry, of those in storage, and of the many that will never be suspended because suspension is not marketed via the funeral industry is being jeopardized to maintain this self-perception by the leadership of the cryonics organizations. From the standpoint of social movement theory, the industry is maintaining its isolation from the mainstream at a time when it is technically mature enough to become a mass movement.

If local funeral directors acted as sales agents, a rapid response would be likely. This arrangement could lead to better suspensions and increased sales. The major barrier appears to be the self-perception of leaders in the cryonics organizations.

7. Repackaging cryonics

Funding is a major barrier to cryonic suspension for most people. Establishment of a non-profit organization supporting pay-as-you-go funding would permit economically neutral suspension coverage. The resulting rapid expansion of coverage would permit suspension expenses to be distributed across a very large population, thereby driving down costs dramatically. An appropriate business model would permit local groups to provide fully prepaid coverage for their members, once an adequate number of persons had joined. The benefits of local organization include superior social support for members, which could extend life, and significant political influence within a local jurisdiction, ensuring an appropriate response to cryonics emergencies.

Normally, large expenditures have to be financed in some manner, if widespread participation is desired. Examples are houses, cars, major appliances, and even mobile phones. The only currently widely available mechanism for financing a suspension is life insurance. This, however, has many potential disadvantages. First, it requires long-term economic stability, which is becoming less and less common as short-term jobs have become more prevalent. Second, such policies can be drawn down to provide for emergencies, such as expensive medical care not otherwise covered—and large numbers of persons in the USA have inadequate health insurance coverage. Third, the proceeds of life insurance have sometime been claimed by relatives of cryonicists. Even when such claims fail, the legal expenses are often significant. Contestation by families, often motivated by the possibility of large cash settlements, typically results in negative press coverage. Such contestation may also delay suspensions. Finally, there are classes of individuals excluded from obtaining life insurance, such as infants, the ill, and so on. So, financing by life insurance has significant limitations as a method of making suspension affordable.

An understanding of the market in which the cryonics industry ideally is competing suggests new strategies for effective marketing. The industry competes in the "immortality" market, since a new life of indefinite length is the hope of every cryonicist. However, the industry operates at a disadvantage in this market. The industry is competing with religious organizations that also offer followers eternal life: however, it doesn't offer the benefits available through and to these organizations. Effective competition requires a repackaging of cryonics. In itself, cryonics is an interment technology. It isn't competitive in this market, because it is, at least, 10 times as expensive as traditional

interment. Interment is only a minor element of the offerings from religious organizations. The industry is highly competitive in offering immortality, however, since the credibility of a new life through a scientific procedure is greater than that of one offered by a mystical procedure. Effective competition, however, requires offering a comprehensive package of services matching those available from religious organizations. Finally, while there have been efforts to present life in the future as utopian by cryonicists, this type of speculation is clearly not something that should be promoted by cryonics organizations. They need to be extremely conservative in making any kind of claims as to the benefits of their services. Therefore, some other type of organization is needed, that can approach the kind of claims made by religious organizations, if competition is to be effective.

A foundation could be used to facilitate a tax-advantaged prepayment strategy, that would overcome current economic barriers to enrollment. The services a foundation offers could include weekly dinner parties where people learn healthy cooking, lectures on health-related issues, first-aid courses, storage of stem cells from umbilical cord blood, of tissues, of pets, and so on. Since the organization would have to absorb the cost of suspending a member, it would be to everyone's advantage to keep members alive as long as possible.

Financing is a complicated topic, so I will present only a simplified example here. Let us say the income tax rate is 50% and someone donates 10% of their income to the foundation. Expense after taxes would be 5% of income. The foundation allocates 5% to current benefits and 5% to a suspension fund. Therefore, the average after-tax impact is null (expense after taxes = current benefits) and the suspension rapidly becomes prepaid. With a \$100,000 yearly income, one would have \$30,000 in the suspension fund after 6 years. Because it would be a collective agreement, new members would be covered immediately. Since new members would typically live for more than 6 years after enrollment, they would generate reserves for the suspension fund.

So, this financing strategy would allow prepayment through a collective agreement rather than through individual insurance policies. This results in substantial economies of scale, as well as securing tax benefits, if set up with an appropriate legal structure. A pay-as-you-go plan would be about 30% cheaper than insurance, so there is no reason to believe that a lack of funding by other means would bias the life expectancies of those enrolling. (A common objection to collective open-enrollment pay-as-you-go plans is that opportunists could join just prior to death, thereby benefiting at the expense of others who contributed over a longer period. The substantial savings of a collective agreement tend to counteract this risk.)

Even small regular donations by a significant number of people would, over many years and with new members continually enrolling, pay for biopreserving everyone. The existential crisis usually hits in middle age, say at age 45, and people in Europe currently need suspension at about age 75. That means 30 years of 5% of income being accumulated. With an income of only €10,000 per year, this would be €15,000 ($€500 \times 30$) or about \$21,400 at 2011 exchange rates. So, even relatively low income, late enrollments would cover a majority of their own suspension expense. If we include the contribution of interest payments or investment returns, the full expense would most likely be covered. This model assumes whole families would sign up, so most people's contributions would start around age 20, in the long run. This would add another 25 years of payments, almost doubling the contribution. If young people are raised in an environment accepting of cryonics, they will continue to support it. However, the target for marketing should be those in middle age, when existential concerns come to the fore.

If umbilical cord blood samples were routinely stored as part of the repackaging proposed, then every youth would have the knowledge that in case of serious disease, there would be a handy source of stem cells in suspension. This is just about the best form of recruitment and it would cost very little compared to a serious marketing effort.

If enrollment was on a group basis, self selection on life expectancy wouldn't be possible. A person would typically become a beneficiary at birth and achieve formal membership upon reaching adulthood. That membership would continue throughout life. Continued membership would be beneficial, since there would be near-term goods and services making membership economically neutral, as well as the social and psychological benefits of group membership.

Previously, CI was doubling in membership every 3 years (Stodolsky, 2005). In Figure 1, the 3-year (red line) and 5-year (blue line) doubling times are plotted. Fitting the data (Table 1) from 1985 to 1997 (blue squares) produced a 5-year doubling time. From 1998 to 2004 (red diamonds), growth appeared much faster, with a doubling time closer to three years—23% membership growth per year (Table 1). The yearly growth by period (1985–1997 vs. 1998–2004) interaction was highly significant ($p = .0018$) (Stodolsky, 2005). This suggested that the growth rate had changed after 1997. After this prediction had been made, the founder of CI, Robert C. W. Ettinger, noted that CI had established its website around 1997. Even with the 5-year doubling time, in 2014 CI would have had 2,314 members. However, the declining growth rate apparent at the end of 2010 resulted in only about 1,160 members enrolled at the end of 2014. (Alcor has a similar declining growth rate.)

This decline may be associated with the founder's retirement from active involvement in the management of CI, which formally occurred in 2004. In many ways, CI has been a family business. A majority of firms do not remain family managed in the second generation and few remain family managed in the third generation. However, a transition to professional management can be disruptive and can even lead to firm failure. Success requires a process of strategic planning, management improvements, and improvements in governance. These changes require family members to relinquish their power over the organization, since influence would then be determined by expertise rather than historical factors. Resistance to such changes minimizes the communication, information sharing, and knowledge sharing essential for organizational growth and survival. Unfortunately, the resistance to change at CI has resulted in a lack of organizational improvement and an increasingly restrictive communication environment. Opposition to professionalization has been a general feature of the industry, but only when it undermines the power of pioneers.

If this new marketing model generated the growth rate achieved at CI between 1998 and 2004, then there would be a multiplication of membership by more than a thousand over a 30-year period. Just a single year's contributions would then generate €500,000 ($1,000 \times €500$) for each initial member, thus providing suspension funding for at least 10 initial members, when only one was needed. Therefore, with adequate growth, the contributions to suspension reserves could be reduced to less than a percent of income. Financial risk would be highest in the startup phase, where a few early suspensions could exhaust reserves. This risk could be covered by insurance, which would be a worthwhile additional expense for a startup.

Figure 1. Cryonics Institute growth rate: Members.

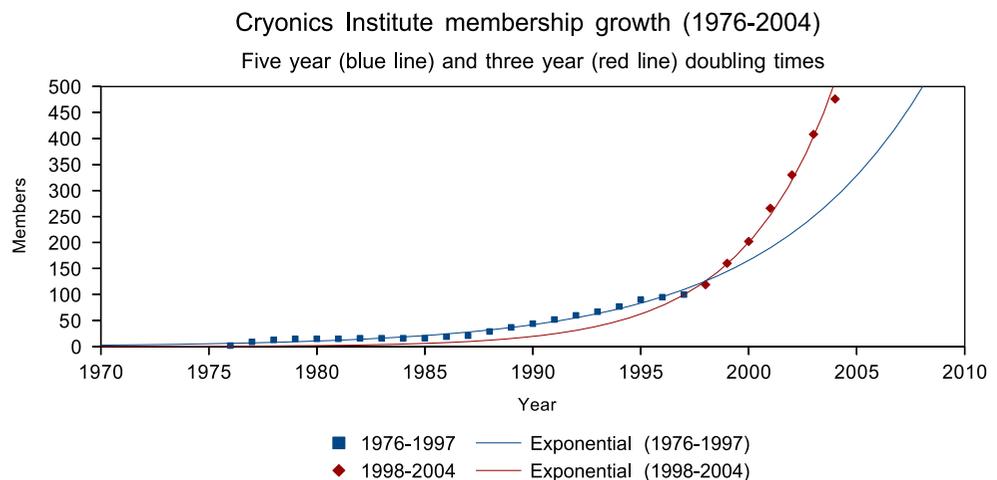


Table 1. Cryonics Institute members by year (1976–2004)

Year	Members
1976	2
1977	9
1978	13
1979	15
1980	15
1981	15
1982	16
1983	16
1984	16
1985	16
1986	19
1987	21
1988	29
1989	37
1990	44
1991	52
1992	60
1993	67
1994	77
1995	90
1996	95
1997	100
1998	119
1999	160
2000	202
2001	266
2002	330
2003	408
2004	476

Let’s consider another example in order to clarify the importance of the growth rate in reducing costs. If someone is paying \$30,000 for a suspension now, they could pay a \$1,000 a year for an average of 30 years of membership to fully fund their own suspension with a pay-as-you-go plan. However, since the membership would have grown by a 1,000 after 30 years, each new member would pay only \$1 yearly to fund old member’s suspensions. This is probably overly optimistic, but it demonstrates that the important variable is the growth rate.

The overwhelming predominance of men in cryonics raises an obvious question: Are women more hostile to cryonics than men? The difference can most likely be attributed to the greater religiosity of women—a cultural factor. For example, in the Badger (Badger, 1998) survey, men were almost four times as likely to be atheists (1.93 vs. .58%). Since this was a “high tech” sample, the bias in a general population is likely to be more extreme. We know from the reanalysis of that data, that religiosity is the best predictor of attitudes toward cryonics. This imbalance is another indication that the current approach to marketing cryonics is inadequate to reach a substantial sector of the population. The proposed repackaging, which includes a substantial social component, would likely eliminate this imbalance.

An important issue is the political risk that exists until cryonics achieves widespread acceptance. One answer is a marketing strategy that increases membership by hundreds at a time, not by ones or twos at a time. Such a strategy would also open up the overwhelming majority of the potential market that will never be reached by current efforts. Political acceptance can be achieved in a smaller jurisdiction by electing cryonicists to government posts and thereby ensuring that in that jurisdiction suspension would be an option that could be carried out as a routine hospital procedure. Thus, this new approach would benefit all cryonicists, both those active and those suspended.

According to some, the biggest expense of a cryonic suspension is standby—waiting at the bedside in order to start cryopreservation immediately after death. If standby were local and volunteer (or better yet, a side-task of someone with a job with some other primary tasks), then the cost would be lower. A decent hospital has staff ready to respond at any time and most already have the equipment on hand to do a body washout (replacement of blood with a type of organ preservation solution)—assuming the training has been given. Additional training for a clinical perfusionist would probably be pretty minor. The key to this cost saving and improvement in suspensions is getting enough political influence to ensure cooperation of a local hospital. This could be achieved by targeting small jurisdictions with a high percentage of atheists and low voter turnouts.

Beyond even the economic and political advantages of a strategy based upon recruitment of groups, as opposed to individuals, are those related to life satisfaction. Lim and Putnam (2010) find that social and participatory mechanisms in identity-based fellowships lead to the building of social networks. Subjective well-being is enhanced by participation in such networks. They suggest that enhanced life satisfaction may result from a feeling of belonging to a social group beyond the members' immediate social circle. Traditional religious organizations take advantage of such dynamics to retain and expand their membership. Competition with such organizations will be difficult, unless these same group dynamics are mobilized. Therefore, a group-based strategy would not only be a way to improve members' life satisfaction, but also a way to enhance growth. Life satisfaction and social support are associated with longevity. Therefore, a group marketing strategy would take advantage of a mechanism for life extension thus far ignored by cryonicists.

The repackaging strategy discussed here has been presented previously in public forums. While no obvious roadblocks have been identified, no funding has ever been made available to even investigate the feasibility of this approach. This can be explained by two factors. Probably the most important is the individualism that dominates the thinking in a substantial part of the industry. This typically leads to a summary dismissal of any strategy based upon groups. (An exception is lower rates for family members of those enrolled. However, this has had no effect on the general question of group enrollment.) Another factor is the associated focus only on improvements that would directly benefit the donors of research funding. These donors are already enrolled and therefore marketing and recruitment appears to them to be a solved problem, unless there is a perception that current business models are unsustainable in the long run. However, the optimism of those currently enrolled has been resistant to any interpretation of data as showing declining growth rates and therefore sustainability. While optimism is required to enroll for suspension, the rejection of the reality of industry stagnation could lead to disaster. We can conclude that the summary rejection of this repackaging strategy is again a function of the perceptions of industry leaders. The failure to apply well-known marketing and other social science knowledge results in a majority of leaders remaining captive of an unrealistic belief system detrimental to their own survival.

Establishment of local non-profit organizations supporting pay-as-you-go funding would permit economically neutral suspension coverage. The industry is competing with religious organizations that offer followers eternal life. Effective competition requires a repackaging of cryonics in order to offer similar benefits. A local group strategy would improve members' life satisfaction and enhance growth of the industry.

8. Religious doctrine

Transhumanism is already repackaging cryonics by including it in a sequence of technical developments, some of which are available already. The results for cryonics are positive. Partridge et al. noted, “The views of the theoretically sampled transhumanist and Christian focus groups reflected in sharp relief the pro and con arguments for life-extension.” (Partridge et al., 2009, p. 70) They comment further:

Participants for whom religious doctrines and “the church” were important sources of ethical guidance were more likely to express in-principle opposition to life-extension research than people who reported having no religious beliefs. Participants who identified themselves as religious often expressed the view that life-extension was contrary to some aspects of these religious beliefs (Partridge et al., 2009, p. 72)

A major risk with transhumanism is that people adopt it as a religious faith. That is, they feel that just believing will solve the problems of life-extension. This is not only a risk, since there are plenty of people who act on these types of views. The result can be doing nothing and just assuming the coming “singularity” will solve all problems or that anti-aging drugs, new organs, and so on will become available in time for them to avoid needing cryonic suspension.

The Temple of the Vampire (ToV) is a church that requires members to sign up for suspension in order to advance to the highest levels within the organization. However, there has been opposition by some cryonicists to any association between cryonics and ToV, because they fear negative press and so on.

So, cryonics is already being repackaged, but not in a manner most beneficial to the growth of the industry. None of the current repackaging models reduce the financial requirements of suspension. The rewards offered are only of a motivational character. The question is which of the methods of repackaging is going to be effective in mobilizing people to work for personal and social solutions in a realistic way.

Finally, we must ask whether cryonics itself is a religion (Monette, 2012), that is, a pursuit or interest to which someone ascribes supreme importance. While most cryonicists reject that it is a religion, it clearly is ascribed supreme importance. That is, cryonics is treated as a path to salvation, a way of transcending death. Lowenstein states, “I believe the cryonics movement, with its unified set of beliefs, its particular language and rituals, its faith in the power and impact of the as-yet unproven, is indeed a religion ...” (Lowenstein, 2012, p. 74)

On the other hand, cryonicists argue that cryonics is a scientific approach to immortality or, at least, to a vastly extended lifespan. Unfortunately, most insiders respond irrationally when cryogenic interment is suggested as a lifestyle choice. That is, if someone wishes to be placed in storage, but doesn’t believe reanimation is possible or doesn’t wish to be reanimated, no prearrangement is available. Even though all physical parameters would be the same, the fact that their beliefs contradict those of cryonicists, would make them ineligible for cryogenic interment. The belief in cryonics, then, is the crucial determinant of whether they are acceptable as a “patient” and will be placed in storage.

If cryonics is playing the role of a religion, it would explain the paradoxes previously discussed. It would explain why the funeral industry has not been used as a sales channel. Considering that cooperation with funeral directors is routine at CI, for example, this failure to open, what could be a very profitable new sales channel, is quite inexplicable in rational terms. It could also explain why a more explicitly religious framework has not been promulgated: a framework in which cryogenic interment is integral to the belief system. The answer could be that cryonics is already playing the role of a religion. This failure to promulgate a comprehensive belief system has had negative effects. It has led to the association of cryonics with tendencies that many find objectionable, such as The

Temple of the Vampire. It has allowed those with transhumanist beliefs, that are known to be supportive of cryonics, to consider enrollment as unnecessary. It has limited enrollment by not taking advantages of the many benefits society provides for explicitly religious organizations. It has made the individual and organizational benefits of membership in a group of like-thinking individuals unavailable. Finally, it may explain the profound failure to apply social science knowledge to the growth problems of the industry: the application of such knowledge would first and foremost require a rational assessment of the social status of cryonics. Such an assessment would conclude that cryonics is a cult, a cult that discriminates against non-believers. Such a conclusion would be in contradiction to the self image of insiders and therefore would be totally unacceptable. Instead, these pioneers of life-extension cling to beliefs that will likely lead to their destruction. Such a contradiction between belief and reality is typical of a religious cult.

One of the pioneers of the movement has come to a similar conclusion:

We have a profound responsibility to arrive at a world view, a morality, and code of conduct of [*sic*] for cryonics. That these should be reasonably inclusive and flexible there can be no doubt.

And there can be no doubt that we will neither survive as individuals nor endure as organizations, if we fail to take these most basic and necessary of steps (Darwin, 2012).

In summary, transhumanist organizations are already repackaging cryonics. However, this repackaging is only marginally beneficial to the growth of the industry. The failure of industry to repackage its products could be due to the fact that cryonics is playing the role of a religion.

9. Summary and conclusion

While uninterrupted operation of cryonics storage facilities is a precondition for a successful outcome of this experiment in medical time travel, the question of how to build an organization with the necessary parallel longevity and integrity has hardly been addressed. The typical business organization has been shown to not have such capabilities, and even state-like organizations are prone to failure and have their weaknesses. In its short history, cryonics has seen organizations rise on high expectations and then decline, sometime with the loss of those in storage. There have also been attacks on cryonics organizations by political actors, requiring immediate legal or political counter-measures. However, even these experiences have failed to alter the current organizational approach to these issues.

This neglect of social and political issues is also evident in the marketing of services. As a result, the industry continues to pursue a medical model overwhelmingly rejected by the public. And it fails to use the funeral industry as a sales channel, even after unsolicited expressions of interest (Michaels, 1993). As a result of its failure to deal with the financial and social barriers faced by many, enrollments remain miniscule. On the other hand, knowledge of and acceptance of cryonics, as an interment practice, has become widespread. The discrepancy between the acceptability of cryonics and its adoption suggests that a new approach based upon existing social models is needed. One such model is the church with its traditional community focus, educational services, and marking of life-stage transitions, in addition to interment of the deceased. The extreme individualism expressed by many of the industry's participants has proven to be a barrier to considering this alternative social arrangement. Another model is conventional funeral provision. It appears that a faith in cryonics as a path to salvation has inhibited cooperation with the funeral industry.

The key to survival of the cryonics industry appears to be a successful transition to the mainstream. However, continued isolationism appears to be essential to the maintenance of a preferred self-image by insiders. While insiders see themselves as "saving lives" by performing an advanced form of medicine, the isolationism of the industry is actually resulting in the "loss" of many lives that could be "saved."

Uninterrupted operation of a cryonics storage facility is a precondition for a successful outcome. However, neglect of social and financial issues has isolated the industry from the mainstream making failure likely. If unchanged, these cult-like beliefs and the associated isolationism may eventually lead to the destruction of the industry.

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